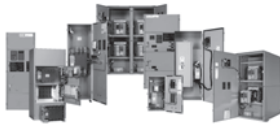


## Transfer Switches



### 5.1 Transfer Switch Equipment

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## Automatic Transfer Switches



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## Description

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Learn  
Online

## Product Selection Guide

## Transfer Switch Product

Catalog  
Numbering  
System**Automatic Contactor  
(600 Vac) (40–1200 A)  
(480 Vac) (40–1600 A)****Bypass Isolation Contactor  
(600 Vac) (40–1200 A)  
(480 Vac) (40–1600 A)****Service Entrance Rated Contactor  
(480 Vac) (40–1600 A)**

Type	AT = Automatic CT = Closed transition NT = Non-Automatic Refer to <b>Page V2-T5-8</b>			BI = Bypass isolation open transition CB = Bypass isolation closed transition Refer to <b>Page V2-T5-17</b>			AT = Automatic Refer to <b>Page V2-T5-27</b>		
Orientation	V = Vertical			V = Vertical			V = Vertical		
Logic	1 = ATC-100 (up to 400 A only) 3 = ATC-300+ 9 = ATC-900			3 = ATC-300+ 9 = ATC-900			3 = ATC-300+ 9 = ATC-900		
Frame	C = Contactor-based 2 = Two-position open in-phase transition 3 = Three-position delayed transition 5 = Open in-phase with default to delayed transition			C = Contactor-based 3 = Three-position delayed transition 5 = Open in-phase with default to delayed transition			C = Contactor-based 2 = Two-position open in-phase transition 3 = Three-position delayed transition 5 = Open in-phase with default to delayed transition		
Switch	X = Fixed mount			E = Drawout bypass X = Fixed mount bypass			X = Fixed mount		
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole			2 = Two-pole 3 = Three-pole 4 = Four-pole			2 = Two-pole 3 = Three-pole 4 = Four-pole		
Amperes	0040 = 40 A 0080 = 80 A 0100 = 100 A 0150 = 150 A 0200 = 200 A	0225 = 225 A 0260 = 260 A 0400 = 400 A 0600 = 600 A 0800 = 800 A	1000 = 1000 A 1200 = 1200 A 1600 = 1600 A ①	0100 = 100 A 0150 = 150 A 0200 = 200 A 0260 = 260 A 0400 = 400 A	0600 = 600 A 0800 = 800 A 1000 = 1000 A 1200 = 1200 A 1600 = 1600 A ②		0040 = 40 A 0080 = 80 A 0100 = 100 A 0150 = 150 A 0200 = 200 A	0225 = 225 A 0260 = 260 A 0400 = 400 A 0600 = 600 A 0800 = 800 A	1000 = 1000 A 1200 = 1200 A 1600 = 1600 A
Voltage	B = 208 V, 60 Hz E = 600 V, 60 Hz	G = 220 V, 50/60 Hz X = 480 V, 60 Hz H = 380/220, 50/60 Hz W = 240 V, 60 Hz		B = 208 V, 60 Hz E = 600 V, 60 Hz	G = 220 V, 50/60 Hz X = 480 V, 60 Hz H = 380/220, 50/60 Hz W = 240 V, 60 Hz		B = 208 V, 60 Hz W = 240 V, 60 Hz X = 480 V, 60 Hz		
Enclosure	K = Open S = NEMA 1 R = NEMA 3R	D = NEMA 4X J = NEMA 12		S = NEMA 1 R = NEMA 3R D = NEMA 4X			S = NEMA 1 R = NEMA 3R		
Listing	U = UL listed R = UL recognized X = No listing			U = UL listed R = UL recognized X = No listing			U = UL listed		

## Notes

① Up to 480 volts.

② 1600 A is dual drawout only.

## Key:

DO = Drawout  
FM = Fixed mounted  
MCB = Molded case breaker  
MCS = Molded case switch

## Transfer Switch Product Guide, continued



Catalog Numbering System	Manual Molded Case Switch (600 Vac) (30–1000 A)	Non-Automatic Molded Case Switch (600 Vac) (30–1000 A)	Automatic (Wallmount) Molded Case Switch (600 Vac) (30–1000 A)	Maintenance Bypass (480 Vac) (100–1000 A)
Type	MT = Manual Refer to <b>Page V2-T5-35</b>	NT = Non-automatic Refer to <b>Page V2-T5-39</b>	AT = Automatic Refer to <b>Page V2-T5-42</b>	MB = Maintenance bypass Refer to <b>Page V2-T5-48</b>
Orientation	H = Horizontal V = Vertical	H = Horizontal V = Vertical	H = Horizontal V = Vertical	H = Horizontal
Logic	X = No Logic	E = Electromechanical	1 = ATC-100 3 = ATC-300+ 9 = ATC-900	E = Electromechanical
Frame	Molded case device FD = 30–150 A KD = 150–300 A LD = 400–600 A  MD = 600–800 A NB = 800–1000 A	Molded case device FD = 30–150 A KD = 150–300 A LD = 400–600 A MD = 600–800 A NB = 800–1000 A	Molded case device FD = 30–200 A KD = 150–300 A LD = 400–600 A MD = 600–800 A NB = 800–1000 A (FD = 200 A available on ATH3 only)	Molded case device FD = 100–150 A KD = 150–300 A LD = 400–600 A MD = 600–800 A NB = 800–1000 A
Switch	Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB)  C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB) C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	Fixed mount A = FM, N (MCS), E (MCS) B = FM, N (MCB), E (MCB) C = FM, N (MCB), E (MCS) D = FM, N (MCS), E (MCB)	Fixed mount A = FM, N (MCS), E (MCS)
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole	2 = Two-pole 3 = Three-pole 4 = Four-pole	2 = Two-pole 3 = Three-pole 4 = Four-pole	2 = Two-pole 3 = Three-pole 4 = Four-pole
Amperes	0030 = 30 A 0070 = 70 A 0100 = 100 A 0150 = 150 A 0225 = 225 A	0300 = 300 A 0400 = 400 A 0600 = 600 A 0800 = 800 A 1000 = 1000 A	0030 = 30 A 0070 = 70 A 0100 = 100 A 0150 = 150 A 0200 = 200 A 0225 = 225 A 0300 = 300 A 0400 = 400 A 0600 = 600 A 0800 = 800 A 1000 = 1000 A	0100 = 100 A 0150 = 150 A 0225 = 225 A 0300 = 300 A 0400 = 400 A 0600 = 600 A 0800 = 800 A 1000 = 1000 A
Voltage	E = 600 V, 60 Hz	B = 208 V, 60 Hz E = 600 V, 60 Hz G = 220 V, 50/60 Hz H = 380 V, 50 Hz K = 600 V, 50 Hz O = 415 V, 50 Hz W = 240 V, 60 Hz X = 480 V, 60 Hz	B = 208 V, 60 Hz E = 600 V, 60 Hz G = 220 V, 50/60 Hz H = 380 V, 50 Hz K = 600 V, 50 Hz O = 415 V, 50 Hz W = 240 V, 60 Hz X = 480 V, 60 Hz	B = 208/120 V W = 240 V W = 240/120 V X = 480 V X = 480/277V
Enclosure	K = Open S = NEMA 1 J = NEMA 12	R = NEMA 3R D = NEMA 4X	K = Open S = NEMA 1 J = NEMA 12 R = NEMA 3R D = NEMA 4X	K = Open S = NEMA 1 J = NEMA 12 R = NEMA 3R D = NEMA 4X
Listing	U = UL listed R = UL recognized X = No listing	U = UL listed R = UL recognized X = No listing	U = UL listed R = UL recognized X = No listing	U = UL listed R = UL recognized X = No listing

**Key:** DO = Drawout  
FM = Fixed mounted  
MCB = Molded case breaker  
MCS = Molded case switch

## Transfer Switch Product Guide, continued

5

**Catalog  
Numbering  
System****Automatic (Free Standing)  
(600 Vac) (200–5000 A)**

Type	AT = Automatic CT = Closed transition Refer to <b>Page V2-T5-51</b>		BI = Open transition bypass isolation CB = Closed transition bypass isolation Refer to <b>Page V2-T5-60</b>
Orientation	V = Vertical		V = Vertical
Logic	9 = ATC-900		9 = ATC-900
Frame	Power case device (Magnum®) MG = 600–5000 A		Power case device (Magnum) MG = 600–5000 A
Switch	Fixed mount A = FM, N (MPS), E (MPS) B = FM, N (MPB), E (MPB) C = FM, N (MPB), E (MPS) D = FM, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB) G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)	Drawout mount E = DO, N (MPS), E (MPS) F = DO, N (MPB), E (MPB) G = DO, N (MPB), E (MPS) H = DO, N (MPS), E (MPB)
Poles	2 = Two-pole 3 = Three-pole 4 = Four-pole		2 = Two-pole 3 = Three-pole 4 = Four-pole
Amperes	0200 = 200 A 0300 = 300 A 0400 = 400 A 0600 = 600 A 0800 = 800 A 1000 = 1000 A 1200 = 1200 A 1600 = 1600 A 2000 = 2000 A 2500 = 2500 A 3000 = 3000 A 3200 = 3200 A 4000 = 4000 A ① 5000 = 5000 A ①		0200 = 200 A 0300 = 300 A 0400 = 400 A 0600 = 600 A 0800 = 800 A 1000 = 1000 A 1200 = 1200 A 1600 = 1600 A 2000 = 2000 A 2500 = 2500 A 3200 = 3200 A 4000 = 4000 A 5000 = 5000 A
Voltage	E = 600 V, 60 Hz E = 600/347, 50 Hz X = 480/277, 60 Hz X = 480/240, 60 Hz X = 480, 60 Hz O = 415/240, 50 Hz H = 380/220, 50 Hz W = 240/120, 60 Hz W = 240, 60 Hz G = 220/127, 50 Hz G = 220, 50 Hz B = 208/120, 60 Hz		E = 600 V, 60 Hz E = 600/347, 50 Hz X = 480/277, 60 Hz X = 480/240, 60 Hz X = 480, 60 Hz O = 415/240, 50 Hz H = 380/220, 50 Hz W = 240/120, 60 Hz W = 240, 60 Hz G = 220/127, 50 Hz G = 220, 50 Hz B = 208/120, 60 Hz
Enclosure	K = Open (up to 3200 A fixed mount only) S = NEMA 1 R = NEMA 3R T = NEMA 1 (through the door)		S = NEMA 1 R = NEMA 3R (non-walk-in) T = NEMA 1 (through the door)
Listing	U = UL listed R = UL recognized X = No listing		U = UL 1008 listed X = No listing

**Note**

① Supplied as drawout design only.

**Key:** DO = Drawout

FM = Fixed mounted

MPB = Magnum power breaker

MPS = Magnum power switch

**Bypass Isolation and Closed Transition Bypass Isolation (<100 ms)  
(600 Vac) (200–5000 A)**

## Product Description

Eaton's automatic transfer switches are reliable, rugged, versatile and compact assemblies for transferring essential loads and electrical distribution systems from one power source to another.

Transfer switches can be supplied in separate enclosures for stand-alone applications or can be supplied as an integral component in the following equipment (see table below).

### Product Type

Description	Section Reference
Magnum DS Switchgear	<b>Vol. 3, Tab 4</b>
DSII Switchgear	<b>Vol. 3, Tab 4</b>
Pow-R-Line® Switchboards	<b>Vol. 2, Tab 4</b>
Motor Control Centers	<b>Vol. 3, Tab 3</b>
Panelboards	<b>Vol. 2, Tab 3</b>

## Typical Applications

All Eaton transfer switches are designed to meet the requirements set forth by UL 1008; however, all transfer switches are not created equal. You can be assured of safe and reliable operation from all types of transfer switches that Eaton offers.

### Basic Components

The three basic components of a transfer switch are:

- Power switching device to shift the load circuits to and from the power source
- Transfer logic controller to monitor the condition of the power sources and provide the control signals to the power switching device
- Control power source to supply operational power to the controller and switching device

## Application Description

A transfer switch is a critical component of any emergency or standby power system. When the normal (preferred) source of power is lost, a transfer switch quickly and safely shifts the load circuit from the normal source of power to the emergency (alternate) source of power. This permits critical loads to continue running with minimal or no outage. After the normal source of power has been restored, the retransfer process returns the load circuit to the normal power source.

Transfer switches are available with different operational modes including:

- Manual
- Non-automatic
- Automatic
- Bypass isolation
- Maintenance bypass

### Switch Types

**Manual transfer**—This type of transfer is a non-automatic transfer switch manually initiated and manually operated. There is no motor operator or solenoid to initiate the transfer. The operator needs to open the enclosure door and operate the manual handle. Manual transfer is available only on a breaker-based design. Service entrance ratings are not available on manual transfer breaker-based designs.

**Non-automatic transfer**—This type of transfer is manually initiated, but electrically operated via the solenoid in a contactor-based design and the motor operator in a breaker-based design.

**Automatic transfer**—This type of transfer takes place automatically per the programmable settings in the ATS controller. The ATS controller senses source availability and when the programmed conditions are met, initiates a command to start the transfer including the generator start command (when transferring from a utility to a generator source). An automatic transfer switch can be configured to perform a utility-to-utility transfer or a generator-to-generator transfer (provided the ATS controller has this capability).

**Bypass isolation transfer switch**—This type of transfer switch includes an automatic transfer switch and also includes the bypass switch that allows the capability to transfer the load to the bypass switch without interrupting the power.

**Maintenance bypass transfer switch**—A maintenance bypass transfer switch is a non-automatic (manually initiated and electrically operated) initiated transfer switch used for specific applications for a UPS.

The power switching operation of transfer switches may be separated into the following transition modes:

### Transition Types

**Open transition**—This is a “break-before-make” transfer. There is a definite break in power as the load is taken off one source and connected to the other source.

**Open in-phase transition**—This is a “break-before-make” transfer. There is a definite break in power as the load is taken off one source and connected to the other source. The ATS controller allows the transfer only when the phase difference between the two sources is near zero. The two position transfer switch is closed on Source 1 or closed on Source 2.

**Open in-phase with default to time delay neutral**—break-before-make operation using an in-phase monitor for source synchronization. If the in-phase does not initiate a transfer within a programmable time delay, then the transfer will default to a time delay neutral type of transfer.

**Delayed transition**—This is a “break-before-make” or open transition that also has a “center off” or neutral position with a programmable time delay setting for the neutral position. The three position transfer switch is either closed on Source 1, closed on Source 2, or in a center off, neutral position (not closed on either source).

**Delayed transition with load voltage decay**—This is a delayed transition with the optional feature to delay in the neutral position to point where the load voltage decays to a programmable voltage level. When the load voltage level reaches the programmable set point, the transfer from the neutral position initiates.

**Closed transition**—This is a “make-before-break” transfer. Both sources are connected to the load for less than 100ms before the break occurs. The two power sources have to be in synchronism and be good sources for the transfer to take place. These programmable settings for relative phase angle difference, frequency and voltage difference are made in the ATS controller.

**Switch Position Types**

The power switching device in an automatic transfer switch may be designed as either a two-position or a three-position operation. A two-position switching device can only be closed on Source 1 or closed on Source 2. There is no center off or neutral position. A three-position switching device can be closed on Source 1, closed on Source 2, or be in the center off or neutral position.

**Transition Types**

Transition	Contactor-Based			
	Two Position	Three Position	Breaker-Based	Magnum-Based
Open	Yes	Yes	Yes	Yes
Open in-phase	Yes	No	No	Yes
Open in-phase default TDN	No	Yes	No	Yes
Delayed time delay neutral	No	Yes	Yes	Yes
Delayed load voltage decay	No	Yes	Yes	Yes
Closed	Yes	Yes	No	Yes

**Fully Rated Fourth Pole (Switched Neutral)**

Eaton provides a fully rated switched neutral or fourth pole, meaning that the fourth pole has withstand, interrupt and closing ratings identical to the power contacts. The neutral pole is operated on a common shaft with the power contacts, thereby ensuring simultaneous opening and closing of the switched neutral. Eaton's fully rated fourth pole eliminates typical problems with a three-pole overlapping neutral:

- Eliminates nuisance ground trips at the main due to circulating zero sequence harmonic current between sources
- Reduction in ground current due to isolated single ground point lowers arc-flash levels and reduces generator damage
- Eliminates potential for faults to propagate across overlapping neutral; fully rated fourth pole will handle as a normal operation
- Does not generate voltages that exceed normal phase voltage

**Note:** For more detail, reference Eaton White Paper IA08700002E.

**UL 1008 Endurance Testing**

The importance of specifying a UL 1008 transfer switch can be seen in the table below. When specifying any UL 1008 transfer switch, you can be assured the switch has met and passed the following endurance testing.

**UL 1008 Endurance Testing**

ATS Rating (Amperes)	Rate of Operation Per Minute	With Current	Without Current	Total
0–300	1	6000	—	6000
301–400	1	4000	—	4000
401–800	1	2000	1000	3000
801–1600	0.5	1500	1500	3000
1601–4000	0.25	1000	2000	3000

**UL 1008 Life Expectancy**

Transfer switch applications typically require a plant exerciser once a week or once a month. The table below demonstrates the life expectancy operating the UL 1008 switch once a week for the life of the switch.

**UL 1008 Life Expectancy**

ATS Rating (Amperes)	Minimum Operations Per Year	Life Expectancy in Years With Current Applied	Life Expectancy in Years Without Current Applied
0–300	52	115	115
301–400	52	76	76
401–800	52	38	57
801–1600	52	28	57
1601–4000	52	19	57

**Utility—Generator**

Transfer switches are traditionally applied between a utility and a generator set for emergency and standby power systems.

**Generator—Generator**

Transfer switches are sometimes applied between two generator sets for prime power use, often in remote installations. In such applications, source power is periodically alternated between the generator sets to equally share run time.

**Service Entrance Rated Transfer Switches**

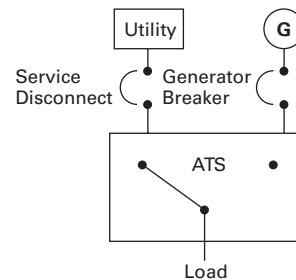
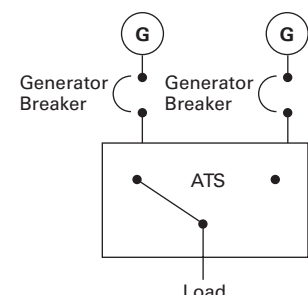
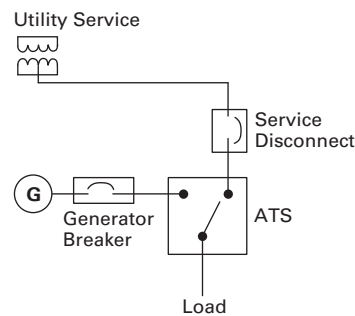
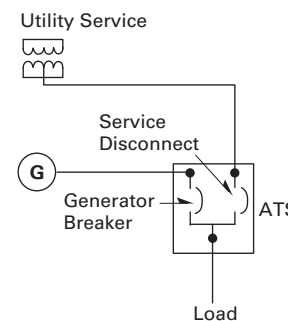
Modifying the molded case switch in the transfer switch by adding trip units and optional ground fault, along with adding the service entrance option eliminates the need for separate upstream disconnect devices and their respective power interconnections. This means the automatic transfer switch (ATS) is installed directly at the point of service entrance, saving valuable space and cost.

Eaton service entrance rated transfer switches have a 100% integrated rating. The ATS as well as the supplied breaker may be applied at 100% of the ATS rating, thus eliminating the need to consider any de-rating factors based upon the breaker rating.

The Eaton service entrance rated ATSs have been tested to and have successfully passed the stringent requirements of UL 1008 and carry the integrated UL 1008 rating. This rating ensures the end user that the ATS has passed the dielectric test, endurance test, overload test, withstand rating test and temperature rise requirements of UL 1008.

**Built-In Protection**

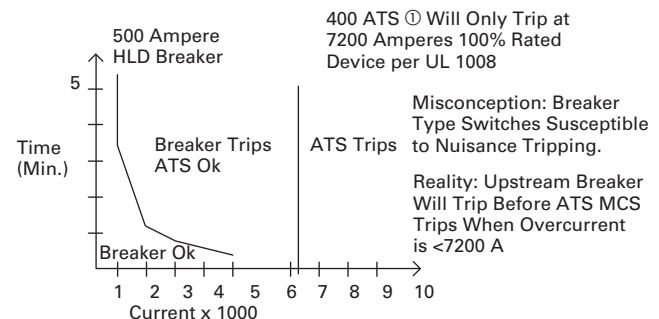
All Eaton molded case switches are “self protected,” such that under extreme fault conditions, the switch will open before destroying itself. This feature allows Eaton to offer “Maintenance-Free Contacts” on the molded case transfer switch. The molded case switches have instantaneous magnetic trip units installed in each switch. These trips are not accessible once installed by the factory to eliminate field tapering. The trips are set to a minimum of 12 to 15 times the rated current of the molded case device, well above any coordination set points. This means they will not interfere with the normal operation of the distribution system and will only trip if something is very wrong.

**Standard Application Utility—Generator****Standard Application Generator—Generator****Service Entrance Rated Transfer Switches****Typical Transfer Switch Installation****Transfer Switch Installation R: For Service Entrance****Built-In Protection**

Example: 400 Ampere ATS With 500 Ampere T/M Breaker

$400 \text{ FLA} \times 1.25 = 500 \text{ Ampere Breaker}$

Compare 400 Ampere ATS and 500 Ampere LD Breaker

**Note**

① Magnetic Trip 12 x frame rating.



Contactor-Based ATS with ATC-300+ Controller



### Automatic Open Transition, 40–1600 A

#### Product Description

The automatic open transition contactor-based transfer switch is the most basic design that will provide a fully functioning automatic transfer switch.

The power switching operation of Eaton's contactor-based transfer switches may be separated into the following key categories of:

- Open in-phase transition—break-before-make operation utilizing an in-phase monitor for source synchronization
- Open delayed transition—break-before-make operation utilizing a programmable time delay (true neutral position)
- Open in-phase with default to time delay neutral—break-before-make operation utilizing an in-phase monitor for source synchronization. If the in-phase does not initiate a transfer within a programmable time delay, then the transfer will default to a time delay neutral type of transfer

The open in-phase transition utilizes a two-position mechanism and the open delayed transition utilizes a three-position mechanism. The mechanism used to operate the Eaton electrical contactor is a momentarily energized solenoid consisting of a stationary core and a moving core that is magnetically driven by an electrical coil.

### Contents

#### Description

#### Page

Automatic Open Transition, 40–1600 A	
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Automatic Closed Transition, 40–1200 A . . . . .	<b>V2-T5-13</b>
Bypass Isolation Transfer Switches, 40–1600 A, Dual Drawout . . . . .	<b>V2-T5-17</b>
Bypass Isolation Transfer Switches, 40–1200 A, Fixed Bypass . . . . .	<b>V2-T5-22</b>
Service Entrance Rated Automatic Open Transition, 40–1600 A . . . . .	<b>V2-T5-27</b>

### Application Description

An automatic open transition transfer switch may be used for those applications where emergency backup power is required, but a momentary loss of power is acceptable on the retransfer from emergency to normal.

The mechanism can be electrically and mechanically operated. The design is such that the mechanism is inherently interlocked so the device cannot be closed on the Source 1 and Source 2 at the same time under any circumstances. When switching from Source 1 to Source 2, or Source 2 to Source 1, the mechanism will only allow a break-before-make operation.

These contactor-based designs can be applied with the ATC-100 controller up to 400 A. The ATC-100 controller is recommended for residential or light commercial applications. Eaton recommends for emergency or legally required application that an ATC-300+ or ATC-900 controller be used. Applications requiring the ATC-300+ controller can be applied for applications 40–1600 A. Applications needing communication capability require the ATC-300+ with communication or the ATC-900 controller.



## Features, Benefits and Functions

### Standard Features

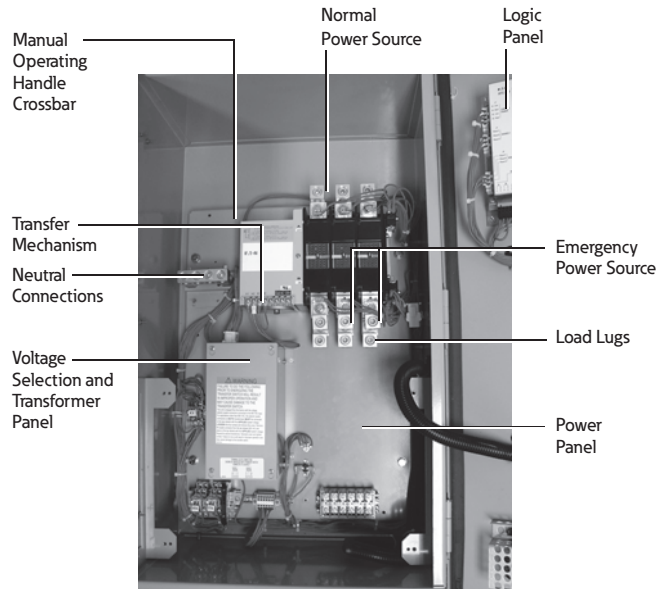
- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC (with three-position mechanism)
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostics and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe
- Modbus® RTU via RS-485

### Optional Features

- Available surge suppression device for power/controller, engine start circuit, phone and cable connections
- Space heater with thermostat
- Eaton IQ and Power Xpert® series metering
- Stainless steel cover for controller
- Open in-phase transition, time delay neutral or in-phase with a default to time delay neutral transfer
- ATC-100 and ATC-900 controllers available
- Source 2 inhibit
- Manual retransfer to normal
- Remote annunciator with control
- Ethernet communication (PXG 400 Gateway)

### Commercial Design Highlights

- UL 1008 front access
- High withstand and closing ratings
- Compact design



Typical Contactor-Based ATS 100–400 A



200 A ATS with ATC-300+ Controller



1600 ATS with ATC-300+ Controller



1200 A ATS with ATC-300+ Controller

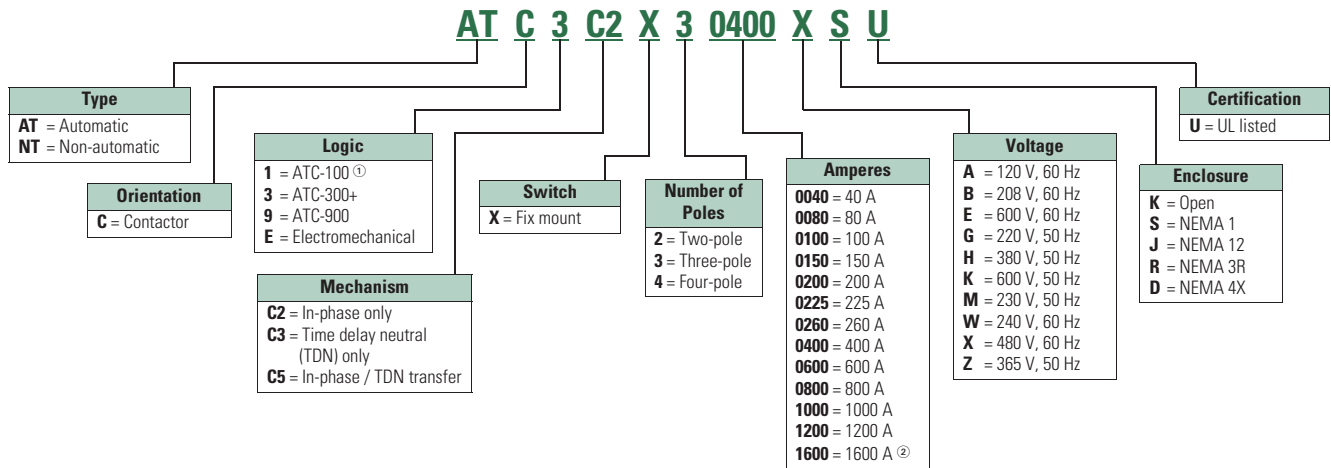
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## Transfer Switches

### Contactor-Based Designs

#### Catalog Number Selection

##### Automatic Transfer Switch



#### Technical Data and Specifications

##### UL 1008 Short-Circuit Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	Mechanism	480 V		600 V		Specific Fuse
		0.05 Seconds <sup>③</sup>	Specific Breaker	0.05 Seconds <sup>③</sup>	Specific Breaker	
40, 80, 100	C2	10,000	30,000	10,000	22,000	100,000 <sup>④</sup>
150, 200	C2	10,000	30,000	22,000	35,000	100,000
225, 260, 400	C2	30,000	50,000	—	—	200,000
40, 80, 100, 150, 200	C3, C5	30,000	50,000	22,000	35,000	200,000
225, 260, 400	C3, C5	30,000	50,000	50,000	65,000	200,000
600, 800, 1000, 1200	C3, C5	50,000	65,000	50,000	65,000	200,000
1600	C3, C5	50,000	65,000	—	—	—

##### Notes

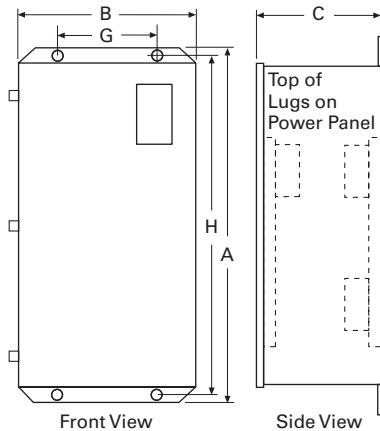
- <sup>①</sup> For application up to 400 A only.
- <sup>②</sup> Up to 480 V.
- <sup>③</sup> 0.025 seconds up through 200 A.
- <sup>④</sup> Specific fuse rating at 480 V only.

**Dimensions**

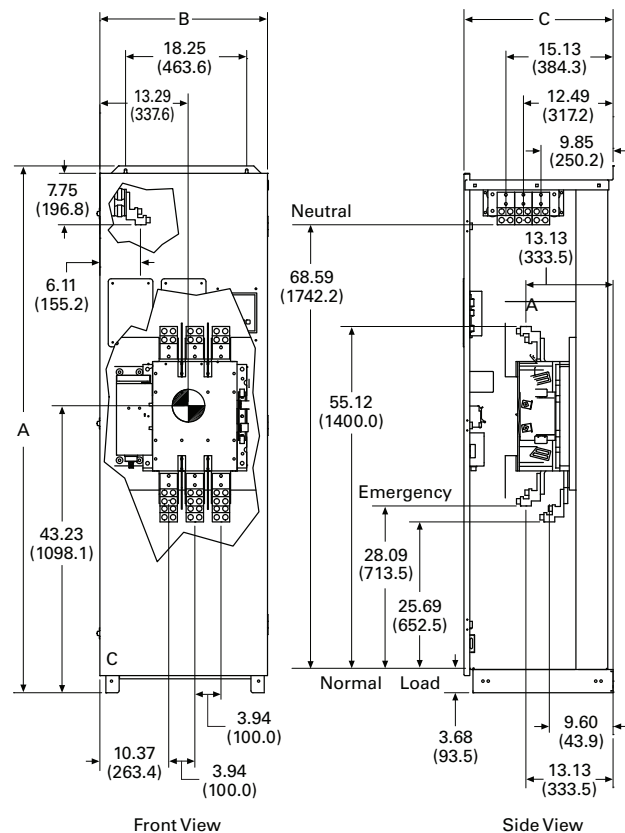
Approximate Dimensions in Inches (mm)

**Contactor-Based Transfer Switch 40–1200 A—Dimensions and Approximate Shipping Weight**

Ampere Rating	Enclosure	A (Height)	B (Width)	C (Depth)	Load Side, Normal and Standby Source	Neutral Connection	Weight in Lb (kg)
40–100 at 480 V ①	N1, N12, N3R	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	(1) #14–2/0	(3) #14–1/0	156 (71)
	N4X	37.50 (952.5)	17.50 (444.5)	14.34 (364.2)	(1) #14–2/0	(3) #14–1/0	156 (71)
40–100 at 600 V ①	N1, N12, N3R	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	(1) #14–2/0	(3) #14–1/0	164 (74)
	N4X	37.50 (952.5)	17.50 (444.5)	14.34 (364.2)	(1) #14–2/0	(3) #14–1/0	164 (74)
150–200 at 480 V ①	N1, N12, N3R	38.68 (982.5)	18.31 (465.1)	13.34 (338.8)	(1) #6–250 kcmil	(3) 1/0–250 kcmil	164 (74)
	N4X	37.50 (952.5)	17.50 (444.5)	14.34 (364.2)	(1) #6–250 kcmil	(3) 1/0–250 kcmil	164 (74)
150–200 at 600 V ①	N1, N12, N3R	52.00 (1321.0)	19.81 (503.2)	16.75 (425.5)	(1) #6–250 kcmil	(3) 1/0–250 kcmil	260 (118)
	N4X	52.00 (1321.0)	21.00 (533.4)	16.75 (425.5)	(1) #6–250 kcmil	(3) 1/0–250 kcmil	260 (118)
225–400 at 480 V ①	N1, N12, N3R	52.00 (1321.0)	19.81 (503.2)	16.75 (425.5)	(2) 3/0–250 kcmil (1) 3/0–600 kcmil	(6) 250–500 kcmil	260 (118)
	N4X	52.00 (1321.0)	21.00 (533.4)	16.75 (425.5)	(2) 3/0–250 kcmil (1) 3/0–600 kcmil	(6) 250–500 kcmil	260 (118)
225–1200 at 600 V ②	N1, N3R	79.41 (2017.0)	29.19 (741.4)	22.46 (570.5)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	600 (272) three-pole 650 (295) four-pole
	N12, N4X	84.75 (2152.7)	29.00 (737.0) three-pole 29.00 (737.0) four-pole	24.26 (616.2)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	700 (318) 750 (340)
600–1200 at 480 V ②	N1, N3R	79.41 (2017.0)	25.25 (641.4) three-pole 29.19 (741.4) four-pole	22.46 (570.5)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	600 (272) three-pole 650 (295) four-pole
	N12, N4X	84.75 (2152.7)	29.00 (737.0) three-pole 29.00 (737.0) four-pole	24.26 (616.2)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	700 (318) 750 (340)

**Automatic, Non-Automatic Up to 400 A—Wallmount, N1 or N3R****Notes**

- ① Wallmount.  
 ② Floorstanding and wall-secured—height dimension includes the bottom bracket.

**Automatic, Non-Automatic 600–1200 A Outline, N1 or N3R**

# 5.2 Transfer Switches

## Contactor-Based Designs

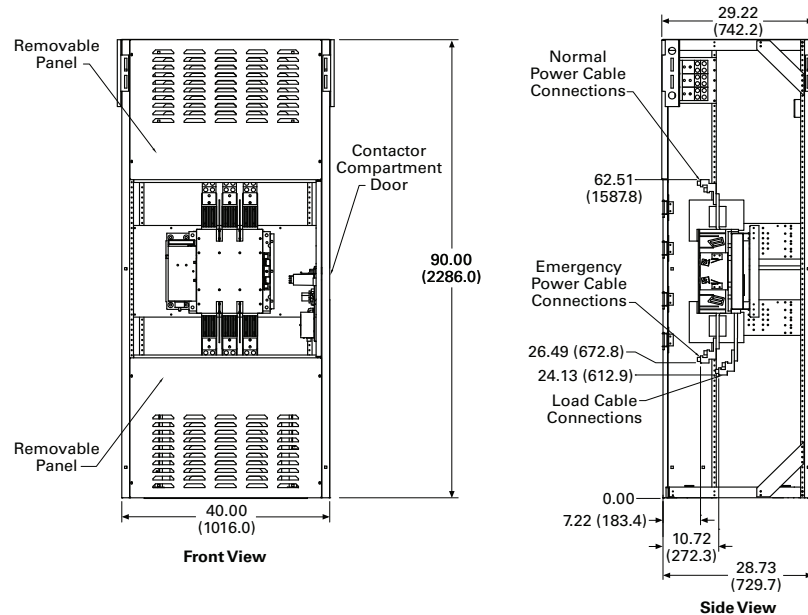
Approximate Dimensions in Inches (mm)

### 1600 A Transfer Switch

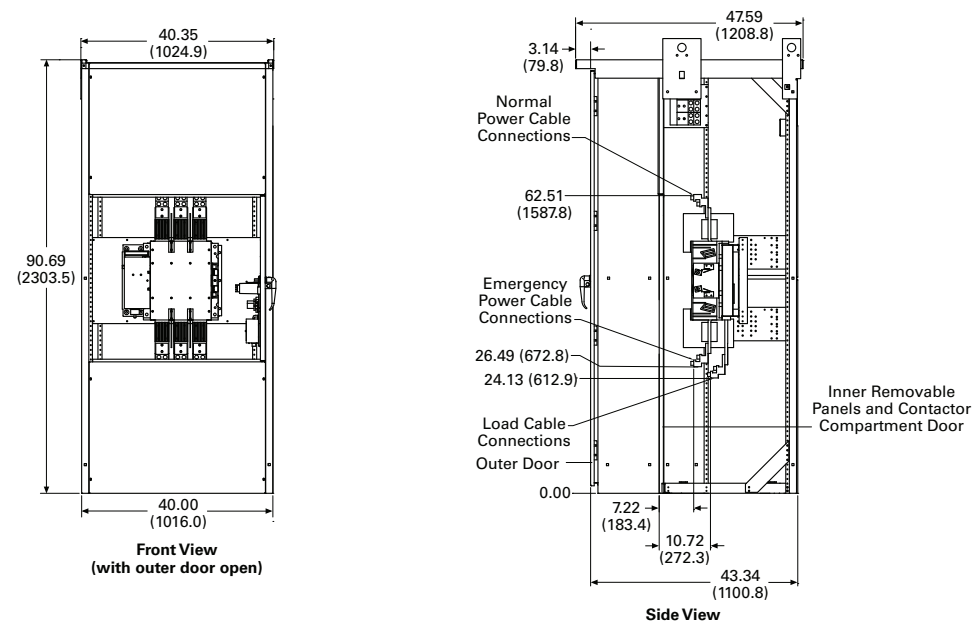
Ampere Rating	Enclosure	A (Height)	B (Width)	C (Depth)	Load Side, Normal and Standby Source	Neutral Connection	Weight in Lb (kg)
1600 A at 480 V <sup>①</sup>	N1	90.00 (2286.0)	40.00 (1016.0)	28.73 (729.7)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	730 (331) three-pole
	N3R	90.72 (2304.3)	40.35 (1024.9)	43.34 (1100.8)	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	780 (354) three-pole 830 (377) four-pole

5

### Automatic, Non-Automatic Open Transition NEMA 1 Enclosure 1600 A



### Automatic, Non-Automatic Open Transition NEMA 3R Enclosure 1600 A



#### Note

<sup>①</sup> Freestanding.

Contactor-Based ATS with ATC-900 Controller



## Contents

### Description

	<i>Page</i>
Automatic Open Transition, 40–1600 A . . . . .	<b>V2-T5-8</b>
Automatic Closed Transition, 40–1200 A	
Features, Benefits and Functions . . . . .	<b>V2-T5-14</b>
Catalog Number Selection . . . . .	<b>V2-T5-15</b>
Technical Data and Specifications . . . . .	<b>V2-T5-15</b>
Dimensions . . . . .	<b>V2-T5-16</b>
Bypass Isolation Transfer Switches, 40–1600 A, Dual Drawout . . . . .	<b>V2-T5-17</b>
Bypass Isolation Transfer Switches, 40–1200 A, Fixed Bypass . . . . .	<b>V2-T5-22</b>
Service Entrance Rated Automatic Open Transition, 40–1600 A . . . . .	<b>V2-T5-27</b>

## Automatic Closed Transition, 40–1200 A

### Product Description

Eaton's closed transition contactor-based automatic transfer switch is designed to avoid intentional interruption of power when both sources of power are available by momentarily paralleling both sources.

The controller is a comprehensive, multi-function, microprocessor-based controller, offering extensive monitoring, status reporting and transfer control operation.

The make-before-break contact sequence coupled with Eaton's ATC-900 provides a transfer switch that is useful in critical standby power applications available from 40–1200 A.

### Application Description

A transfer switch designed for closed transition has make-before-break contacts that require the normal and alternate sources to be synchronized. The source contacts on Eaton's controller will parallel for 100 ms or less. The controller provides all-phase undervoltage, underfrequency, and overvoltage and overfrequency protection as a standard. Consult with the local utility company for permission and to verify the protection requirements as each utility may have different rules regarding closed transition applications. Protective relays may be available as an option upon request.

### Closed transition controls

The switch accomplishes the closed transition transfer by monitoring the voltage and frequency set point conditions of both power sources. Once the set point conditions are met, the controller will start the closed transition synchronization timer (TSCT). The TSCT is adjustable from 1–60 minutes in duration. This duration is the time during which the controller will monitor the phase angles to anticipate when they will be within 8 electrical degrees. The closed transition scheme is anticipatory, allowing the close contacts signal to be initiated before the sources are exactly in phase. If the TSCT times out and the transfer switch has not reached synchronization, the transfer switch will remain connected to the current power source and a failure to transfer alarm will be displayed.

The transfer switch can also be equipped with an optional open transition transfer method for situations where synchronization is not possible, but a transfer is required. One of the following transition features can be selected:

- Closed transition only
- Closed transition with default to load voltage decay
- Closed transition with default to time delay neutral

**Features, Benefits and Functions****Standard Features**

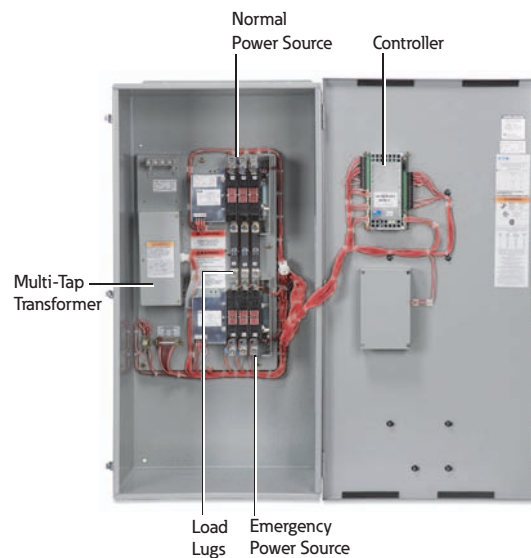
- Auxiliary relay contacts:
  - Source 1 present 1NO and 1NC
  - Source 2 present 1NO and 1NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostics and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-day interval selectable run time 0–600 minutes no load/load with fail-safe
- Multi-Tap transformer
- Closed transition parallel limit timer
- IBC/CBC seismic qualified

**Optional Features**

- Available surge suppression device for power/controller, engine start circuit, phone and cable connections
- Space heater with thermostat
- Ammeter—load side
- Power quality metering
- Steel cover for controller
- Closed transition with default to time delay neutral or default to load voltage decay
- Three-phase rotation protection
- Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC (with three-position mechanism)

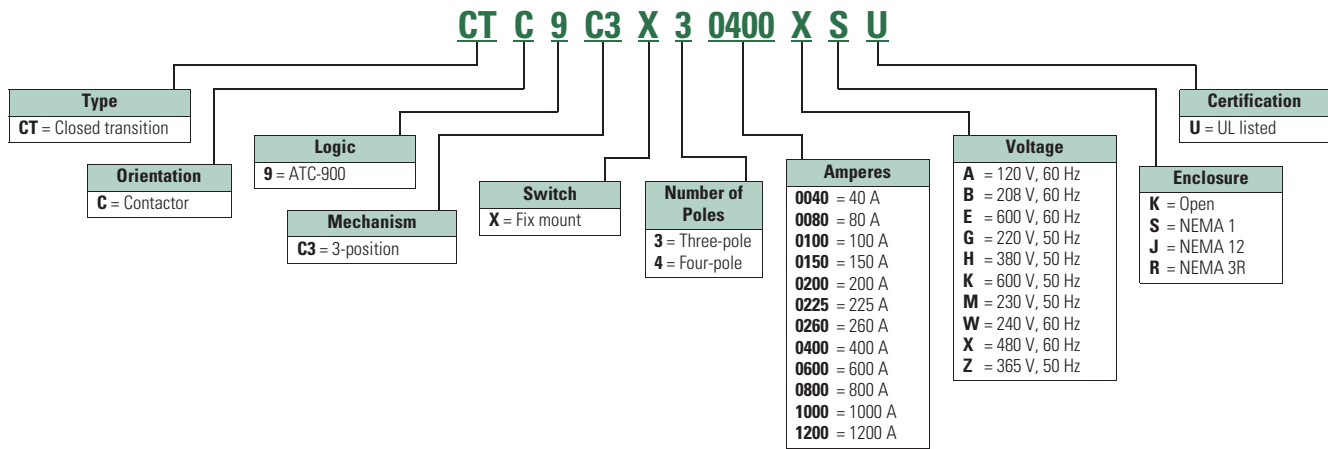
**Commercial Design Highlights**

- UL 1008 front access
- High withstand and closing ratings
- Compact design

**Typical Contactor-Based ATC-900 Controller**

## Catalog Number Selection

## Automatic Transfer Switch



## Technical Data and Specifications

## UL 1008 Short-Circuit Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480 V	480 V	600 V	600 V	Rating When Used with Upstream Fuse			Maximum Fuse Amperes
	0.05 Seconds <sup>①</sup>	Specific Breaker	0.05 Seconds <sup>①</sup>	Specific Breaker	Rating (kA)	Test Voltage	Fuse Type	
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L, R, J, T	1600
800	50	65	50	65	200	600	L, R, J, T	1600
1000	50	65	50	65	200	600	L, R, J, T	1600
1200	50	65	50	65	200	600	L, R, J, T	1600

**Note**

<sup>①</sup> 0.025 seconds up through 200 A.



# 5.2

## Transfer Switches

### Contactor-Based Designs

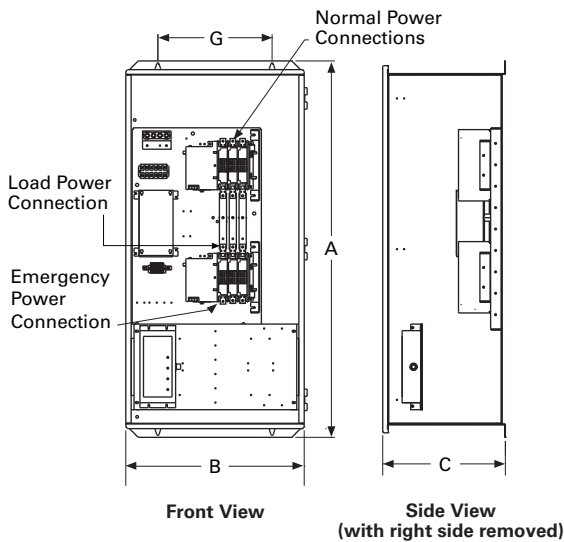
#### Dimensions

Approximate Dimensions in Inches (mm)

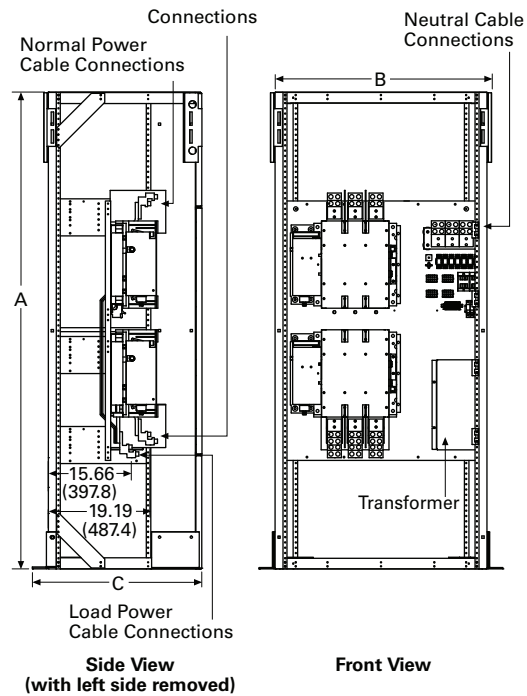
#### Contactor-Based Transfer Switch 40–1200 A Closed Transition

Ampere Rating	Enclosure		Bolt Pattern		Standard Terminals		Weight in Lb (kg)
	A (Height)	B (Width)	C (Depth)	G (Horizontal)	H (Vertical)	Load Side, Normal and Standby Source	
40–100 at 480 V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	16.00 (406.4)	37.38 (949.5)	(1) #14–2/0	190 (86)
40–100 at 600 V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	16.00 (406.4)	37.38 (949.5)	(1) #6–250 kcmil	210 (95)
150–200 at 480 V	52.74 (1339.6)	25.00 (635.0)	17.18 (436.4)	16.00 (406.4)	37.38 (949.5)	(1) #6–250 kcmil	210 (95)
150–200 at 600 V ①	71.02 (1803.9)	31.11 (790.2)	14.72 (373.9)	13.00 (330.2)	69.43 (1763.5)	(2) 3/0–250 kcmil	800 (363)
225–400 at 480 V	71.02 (1803.9)	31.11 (790.2)	14.72 (373.9)	13.00 (330.2)	69.43 (1763.5)	(2) 3/0–250 kcmil	420 (191)
225–1200 at 600 V ①	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	N/A	N/A	(4) 1/0–750 Cu/Al	800 (363)
600–1200 at 480 V ①	90.00 (2286.0)	46.00 (1168.4)	32.00 (812.8)	N/A	N/A	(4) 1/0–750 Cu/Al	800 (363)

#### Automatic Up to 400 A Wallmount NEMA 1 and NEMA 3R

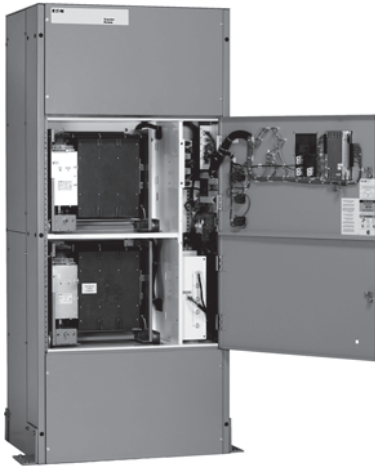


#### Automatic 600–1200 A—Wallmount NEMA 1 and NEMA 3R



#### Note

① For NEMA 3R, add 17.00 inches (431.8 mm) to depth.

**Bypass Isolation Transfer Switch****Contents****Description****Page**

Automatic Open Transition, 40–1600 A . . . . .	<b>V2-T5-8</b>
Automatic Closed Transition, 40–1200 A . . . . .	<b>V2-T5-13</b>
Bypass Isolation Transfer Switches, 40–1600 A, Dual Drawout . . . . .	<b>V2-T5-19</b>
Standards and Certifications . . . . .	<b>V2-T5-19</b>
Catalog Number Selection . . . . .	<b>V2-T5-19</b>
Technical Data and Specifications . . . . .	<b>V2-T5-19</b>
Diagram . . . . .	<b>V2-T5-20</b>
Dimensions . . . . .	<b>V2-T5-21</b>
Bypass Isolation Transfer Switches, 40–1200 A, Fixed Bypass . . . . .	<b>V2-T5-22</b>
Service Entrance Rated Automatic Open Transition, 40–1600 A . . . . .	<b>V2-T5-27</b>

## Bypass Isolation Transfer Switches, 40–1600 A, Dual Drawout

**Product Description**

A bypass isolation transfer switch may be used to provide emergency power to life safety and other critical loads where maintenance of the main transfer switch, without interruption of power to the load, is either desirable or required.

**Application Description**

Eaton's Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications. The switches can be equipped with the ATC-300+ or ATC-900 controllers to match your application needs.

A bypass isolation automatic transfer switch by application requirements and per UL 1008 requires the main automatic transfer switch contactor (ATS) to be a drawout design. Conventional designs allow the bypass contactor to be a fixed-mounted design. The Eaton premium design provides a drawout ATS and a drawout bypass contactor or a dual drawout design.

**Features, Benefits and Functions****Industrial Design Highlights**

- Front access is a standard feature on all ratings
- Entry:
  - Top, bottom or both
  - Isolated compartments
- Improved safety:
  - Isolated compartments with barriers
  - Single motion rack-out with doors closed
  - Ability to test power switching elements during drawout process
- Dual ATS capability—bypass contactor can be controlled by the ATS controller in the bypass mode of operation
- Installation flexibility:
  - Field entry/exit locations can be modified in the field
  - Interchangeable drawout contactors
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Dual drawout

**Standard Features**

- Drawout cassette design on both ATS and bypass
- No service interruption in bypass to the same source
- Source available contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection (ATC-300+ only)
  - Three-phase voltage unbalance/loss (ATC-300+ only)
- Pretransfer signal contacts 1NO and 1NC (open transition only)
- Go to Source 2 (EMERGENCY)
- Field-programmable time delays:
  - Time delay engine start: 0–1200 seconds
  - Time delay normal to emergency: 0–1800 seconds
  - Time delay emergency to normal: 0–1800 seconds
  - Time delay engine cooldown: 0–1800 seconds
  - Time delay emergency failure: 0–6 seconds
- LCD-based display for programming, system diagnostics and Help menu display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF; daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe

**Optional Features**

- Available UL 1448 Third Edition surge protection device (SPD)
- Eaton IQ and Power Xpert multi-function power quality metering
- Automatic transfer mode with selectable non-automatic/automatic retransfer mode
- Modbus RTU via RS-485
- Remote annunciation with control
- Open in-phase transition, time delay neutral or in-phase with a default to time delay neutral transfer
- ATC-900 controller
  - Includes Modbus RTU via RS-485
  - Includes four programmable inputs/outputs
  - Includes two plant exercisers
  - Includes LCD color display with easy navigation tools to settings and event logs
  - Expandable I/O (up to 20 I/O total)

- Optional integrated load metering
- Optional EtherNet TCP/IP communications

**Bypass Isolation Switch Components****Front Access**

Front access is a standard feature. Source 1 (NORMAL) Source and Load connections are set up as standard top entry and Source 2 (EMERGENCY) Source connections as bottom entry. These connections are located in their own separate compartments. These connections can be relocated in the field if necessary.

**Multi-Tap Transformer**

The industry-exclusive multi-tap system voltage selector allows the transfer switch to be applied on most system voltages by proper insertion of the selector plug.

**Drawout Contactors**

The ATS and the bypass drawout cassette power contactor designs are identical and interchangeable. This standard feature

allows the user the ability to withdraw, maintain or swap contactor assemblies, providing redundancy of ATS and bypass functions from one contactor assembly to the other.

**Improved Safety**

The unique Eaton design includes separation between control and power components. The ATS and bypass isolation contactors are mounted in separate compartments with protective barriers between them. This design prevents the possibility of contact with the rear-mounted power connections to the contactors. In addition, the top and bottom entry have separate compartment doors.

**Ease of Maintenance**

Transfer to the bypass power contactor is easily initiated and controlled via door-mounted controls. Once the transfer to the bypass contactor is complete, the ATS contactor is easily racked out with the compartment door closed.

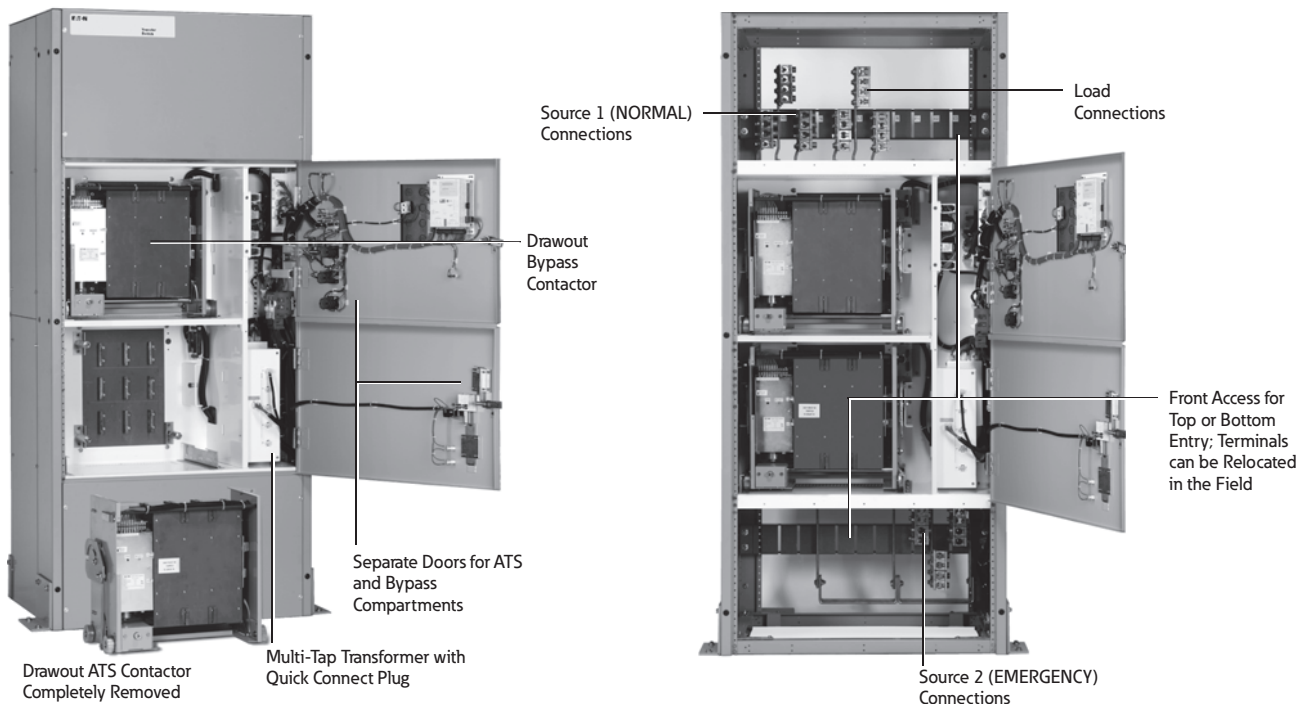
The ATS contactor may then be tested in the racked out position.

**Ease of Transfer**

The Eaton design allows the operator to make a quick and simple transfer from the ATS power contactor to the bypass contactor by initiating the electrically operated transfer via a two-position switch. Door-mounted indicating lights confirm that a successful transfer has taken place.

**Dual ATS Capability**

The controller on conventional bypass isolation switches only controls the ATS contactor. The Eaton design allows the switch controller to remain active in both the ATS and bypass modes, thus providing control to either contactor. This ability of the controller to remain active and control the bypass isolation contactor provides “N+1” redundancy of a second fully functioning ATS, a feature unique to Eaton.

**Bypass Isolation Switch Components**

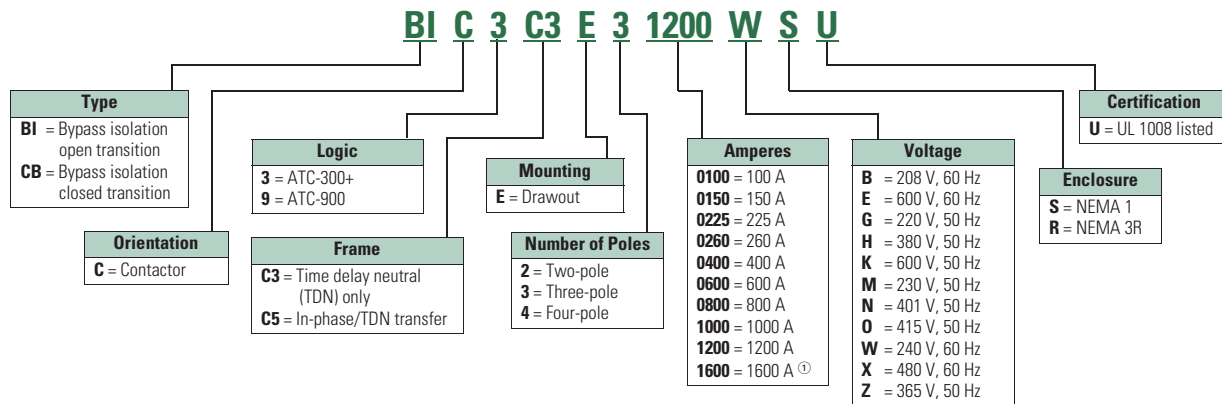
## Standards and Certifications

- UL 1008 listed
- CSA C22.2 No. 178 certified



## Catalog Number Selection

## Automatic Bypass Isolation Contactor-Based Transfer Switch



## Technical Data and Specifications

## UL 1008 Short-Circuit Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating	480 V		600 V		Rating When Used with Upstream Fuse			Maximum Fuse Amperes
	0.05 Seconds <sup>②</sup>	Specific Breaker	0.05 Seconds <sup>②</sup>	Specific Breaker	Rating (kA)	Test Voltage	Fuse Type	
40	10	30	10	22	100	480	RK5	200
80	10	30	10	22	100	480	RK5	200
100	10	30	10	22	100	480	RK5	200
150	10	30	22	35	100	600	RK5	400
200	10	30	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L	1200
800	50	65	50	65	200	600	L	1200
1000	50	65	50	65	200	600	L	1600
1200	50	65	50	65	200	600	L	1600
1600	50	65	—	—	200	480	L	1600

## Notes

① 1600 A is dual drawout only and up to 480 V.

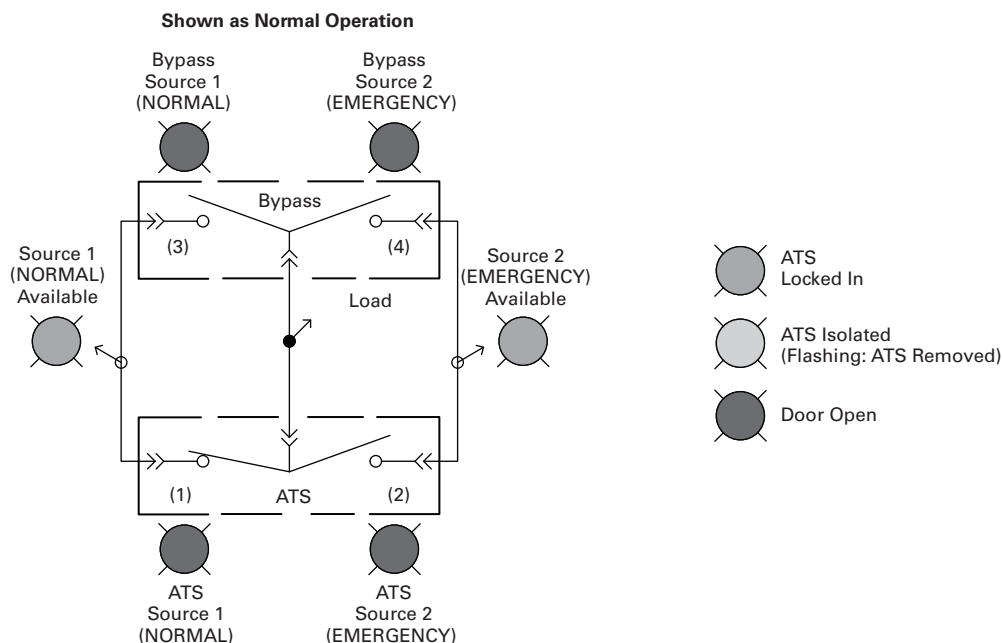
② 0.025 seconds up through 200 A.

# 5.2 Transfer Switches

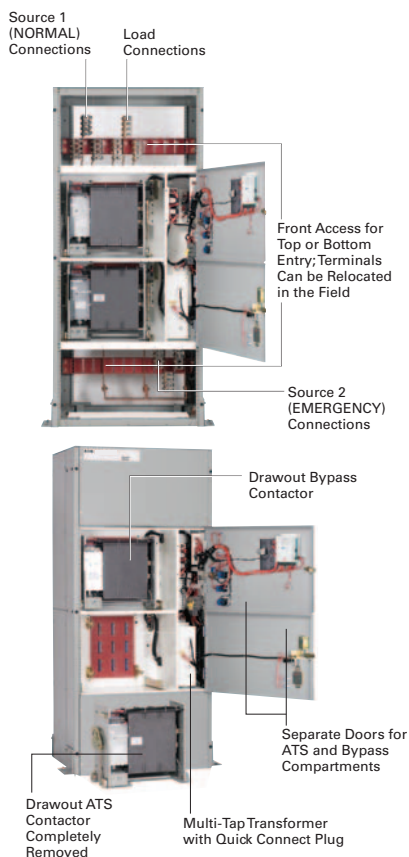
## Contactor-Based Designs

### Diagram

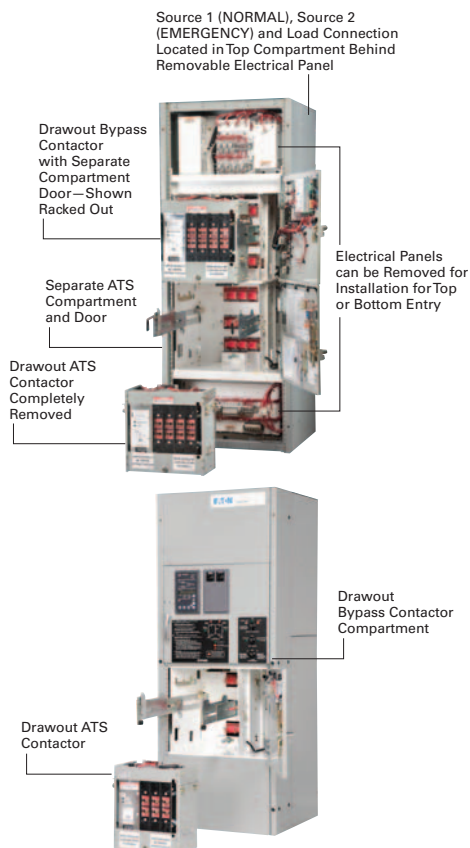
#### Bypass Isolation



#### 1200 A Drawout Bypass

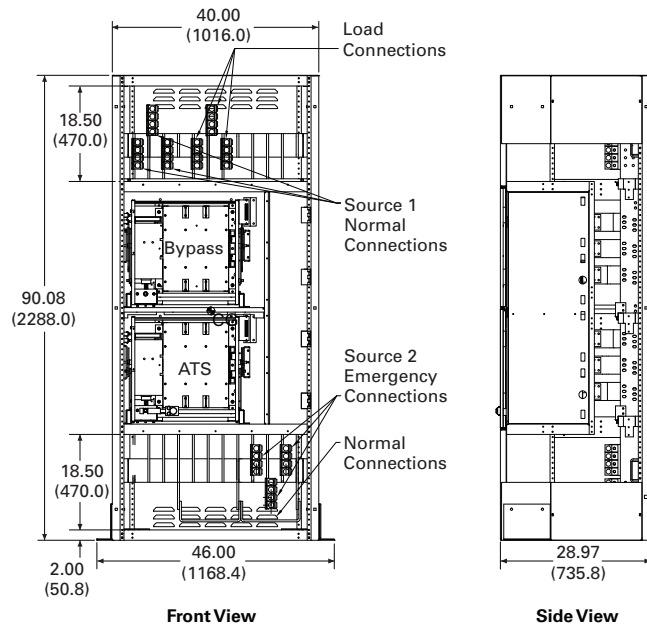
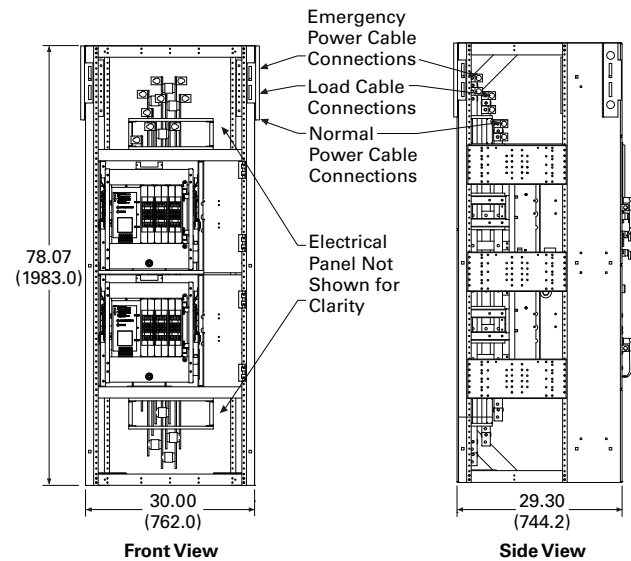


#### 400 A Drawout Bypass



**Dimensions**

Approximate Dimensions in Inches (mm)

**600–1200 A 480 V or 225–1200 A 600 V Dual Drawout Bypass NEMA 1****100–400 A 480 V or 100–200 A 600 V Dual Drawout Bypass NEMA 1**

5

**Note:** Source 1 Normal and Load connections are top and Source 2 is bottom. These connections can be relocated in the field.

**Contactor-Based Transfer Switch 100–1200 A—NEMA 1 Dimensions and Approximate Shipping Weight**

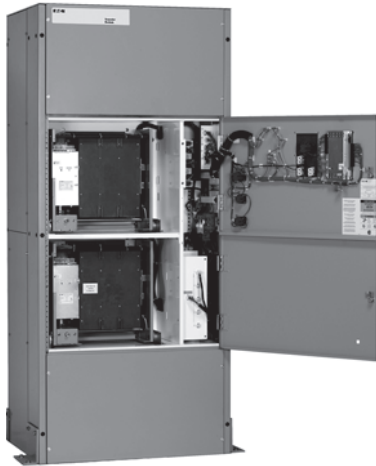
Ampere Rating <sup>(2)</sup>	Enclosure Seismic <sup>(1)</sup>			Standard Terminals		Metric Conversion (mm <sup>2</sup> ) <sup>(3)</sup>	Weight in Lb (kg)
	Height	Width	Depth	Normal, Emergency and Load	Neutral		
100–200 A at 480 V <sup>(4)</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) #6–350 Cu/Al	(3) #6–350 Cu/Al	13–177 mm <sup>2</sup> Cu/Al	625 (283.8)
100–200 A at 600 V <sup>(4)</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) #6–350 Cu/Al	(3) #6–350 Cu/Al	13–177 mm <sup>2</sup> Cu/Al	625 (283.8)
225–400 A at 480 V <sup>(4)</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) 3/0–600 Cu/Al	(3) 3/0–600 Cu/Al	85–304 mm <sup>2</sup> Cu/Al	625 (283.8)
225–400 A at 600 V <sup>(5)</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	85–304 mm <sup>2</sup> Cu/Al	1750 (794.5)
600 A at 480 V <sup>(5)</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	85–380 mm <sup>2</sup> Cu/Al	1750 (794.5)
600 A at 600 V <sup>(5)</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	85–380 mm <sup>2</sup> Cu/Al	1750 (794.5)
800–1200 A at 480 V <sup>(5)</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(4) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	85–380 mm <sup>2</sup> Cu/Al	1850 (839.9)
800–1200 A at 600 V <sup>(5)</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(4) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	85–380 mm <sup>2</sup> Cu/Al	1850 (839.9)

**Notes**

- <sup>(1)</sup> For seismic applications, it is necessary to use 5–13 UNC Grade or better hex head bolts and washers torqued to 50 ft-lbs.  
<sup>(2)</sup> NEMA 12 and 4X dimensions are 90.00 inches H x 46.00 inches W x 38.00 inches D (2286.0 mm H x 1168.4 mm W x 965.2 mm D). NEMA 4X enclosures are 304SS standard with an optional upgrade to 316SS.  
<sup>(3)</sup> Same number of terminals per phase will be supplied.  
<sup>(4)</sup> For NEMA 3R dimensions, add 18.29 inches (464.6 mm).  
<sup>(5)</sup> For NEMA 3R dimensions, add 18.59 inches (472.2 mm).



## Bypass Isolation Transfer Switch



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Bypass Isolation Transfer Switches, 40–1600 A, Dual Drawout . . . . .	<b>V2-T5-17</b>
Bypass Isolation Transfer Switches, 40–1200 A, Fixed Bypass . . . . .	<b>V2-T5-22</b>
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Technical Data and Specifications . . . . .	<b>V2-T5-24</b>
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## Bypass Isolation Transfer Switches, 40–1200 A, Fixed Bypass

## Product Description

A bypass isolation transfer switch may be used to provide emergency power to life safety and other critical loads where maintenance of the main transfer switch, without interruption of power to the load, is either desirable or required.

## Application Description

Eaton's Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications. The switches can be equipped with the ATC-300+ or ATC-900 controllers to match your application needs.

## Features

## Industrial Design Highlights

- Front access is a standard feature on all ratings
- Entry:
  - Top, bottom or both
  - Isolated compartments
- Improved safety:
  - Isolated compartments with barriers
  - Single motion rack-out with doors closed
  - Ability to test power switching elements during drawout process
  - Dual ATS capability—bypass contactor can be controlled by the ATS controller in the bypass mode of operation
- Installation flexibility:
  - Field entry/exit locations can be modified in the field
  - Interchangeable drawout contactors
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Fixed-mounted bypass, drawout ATS

## Standard Features

- Drawout cassette design on ATS with fixed-mounted bypass
- No service interruption in bypass to the same source
- Source available contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection (ATC-300+ only)
  - Three-phase voltage unbalance/loss (ATC-300+ only)
- Pretransfer signal contacts 1NO and 1NC (open transition only)
- Go to Source 2 (EMERGENCY)
- Field-programmable time delays:
  - Time delay engine start: 0–1200 seconds
  - Time delay normal to emergency: 0–1800 seconds
  - Time delay emergency to normal: 0–1800 seconds
  - Time delay engine cooldown: 0–1800 seconds
  - Time delay emergency failure: 0–6 seconds
- LCD-based display for programming, system diagnostics and Help menu display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe (ATC-300+ only)



**Optional Features**

- Available UL 1448 Third Edition surge protection device (SPD)
- Eaton IQ and Power Xpert multi-function power quality metering
- Automatic transfer mode with selectable non-automatic/automatic retransfer mode
- Modbus RTU via RS-485
- Remote annunciation with control
- Open in-phase transition, time delay neutral or in-phase with a default to time delay neutral transfer
- ATC-900 controller
  - Includes Modbus RTU via RS-485
  - Includes four programmable inputs/outputs
  - Includes two plant exercisers
  - Includes LCD color display with easy navigation tools to settings and event logs

- Expandable I/O (up to 20 I/O total)
- Optional integrated load metering
- Optional EtherNet TCP/IP communications

**Bypass Isolation Switch Components****Front Access**

Front access is a standard feature. Source 1 (NORMAL), Source 2 (EMERGENCY) and Load connections are set up as bottom entry. These connections are located in their own separate compartments.

**Multi-Tap Transformer**

The industry-exclusive Multi-Tap system voltage selector allows the transfer switch to be applied on most system voltages by proper insertion of the selector plug.

**Drawout ATS and Fixed-Mounted Bypass**

The ATS is designed as a drawout with the contactor mounted in a cassette with wheels. This allows the

user the ability to withdraw, maintain, inspect and re-insert the ATS.

The bypass unit is designed as a fixed-mounted design in its own separate compartment.

**Improved Safety**

The unique Eaton design includes separation between control and power components. The ATS and bypass isolation contactors are mounted in separate compartments with protective barriers between them. This design prevents the possibility of contact with the rear-mounted power connections to the contactors. In addition, the top and bottom entry have separate compartment doors.

**Ease of Maintenance**

Transfer to the bypass power contactor is easily initiated and controlled via door-mounted controls. Once the transfer to the bypass contactor is complete, the ATS contactor is easily racked out with the compartment

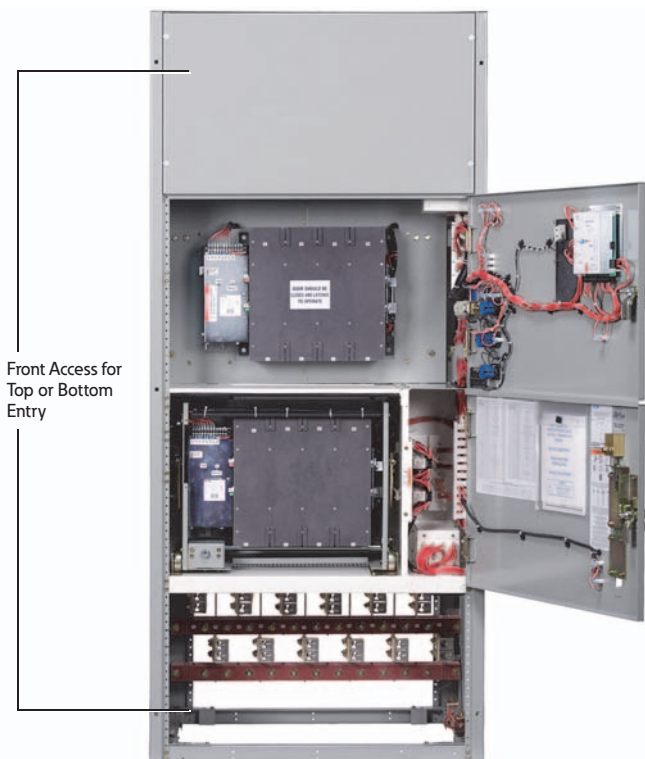
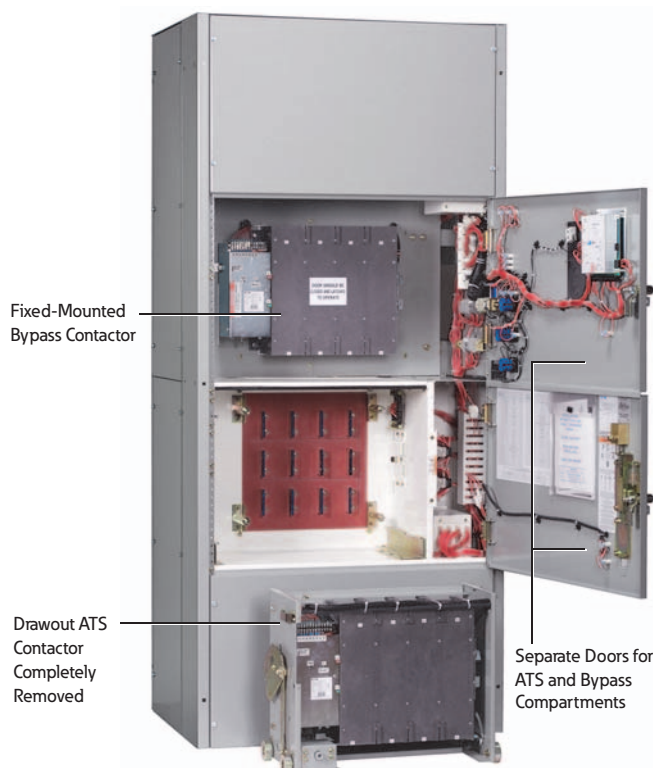
door closed. The ATS contactor may then be tested in the isolated position.

**Ease of Transfer**

The Eaton design allows the operator to make a quick and simple transfer from the ATS power contactor to the bypass contactor by initiating the electrically operated transfer via a two-position switch. Door-mounted indicating lights confirm that a successful transfer has taken place.

**Dual ATS Capability**

The controller on conventional bypass isolation switches only controls the ATS contactor. The Eaton design allows the switch controller to remain active in both the ATS and bypass modes, thus providing control to either contactor. This ability of the controller to remain active and control the bypass isolation contactor provides "N+1" redundancy of a second fully functioning ATS, a feature unique to Eaton.

**Bypass Isolation—Fixed Bypass Components**

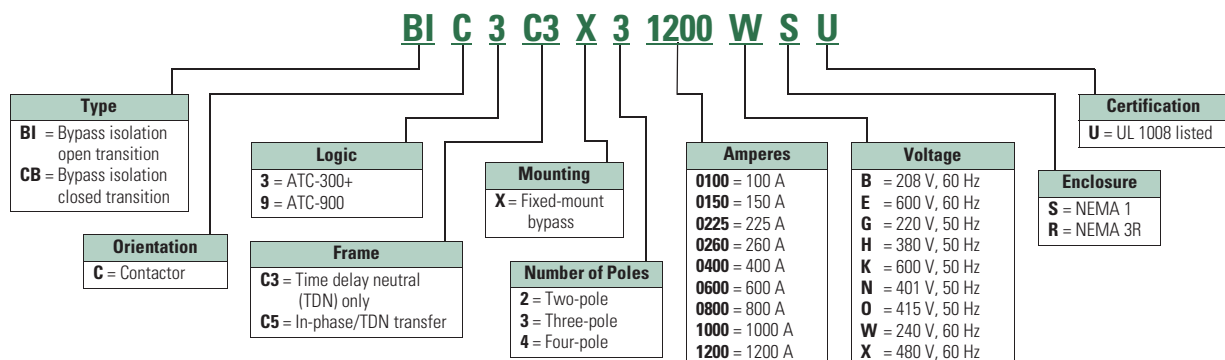
# 5.2

## Transfer Switches

### Contactor-Based Designs

#### Catalog Number Selection

##### Automatic Bypass Isolation Contactor-Based Transfer Switch



#### Technical Data and Specifications

##### UL 1008 Withstand and Close-On Ratings (kA)

UL 1008 Ampere Rating <sup>①</sup>	480 V	480 V	600 V	600 V	Rating When Used with Upstream Fuse			
	0.05 Seconds <sup>②</sup>	Specific Breaker	0.05 Seconds <sup>②</sup>	Specific Breaker	Rating (kA)	Test Voltage	Fuse Type	Maximum Fuse Amperes
100	30	50	22	35	100	480	RK5	200
150	30	50	22	35	100	600	RK5	400
200	30	50	22	35	100	600	RK5	400
225	30	50	50	65	200	600	RK5	600
260	30	50	50	65	200	600	RK5	600
400	30	50	50	65	200	600	RK5	600
600	50	65	50	65	200	600	L	1600
800	50	65	50	65	200	600	L	1600
1000	50	65	50	65	200	600	L	1600
1200	50	65	50	65	200	600	L	1600

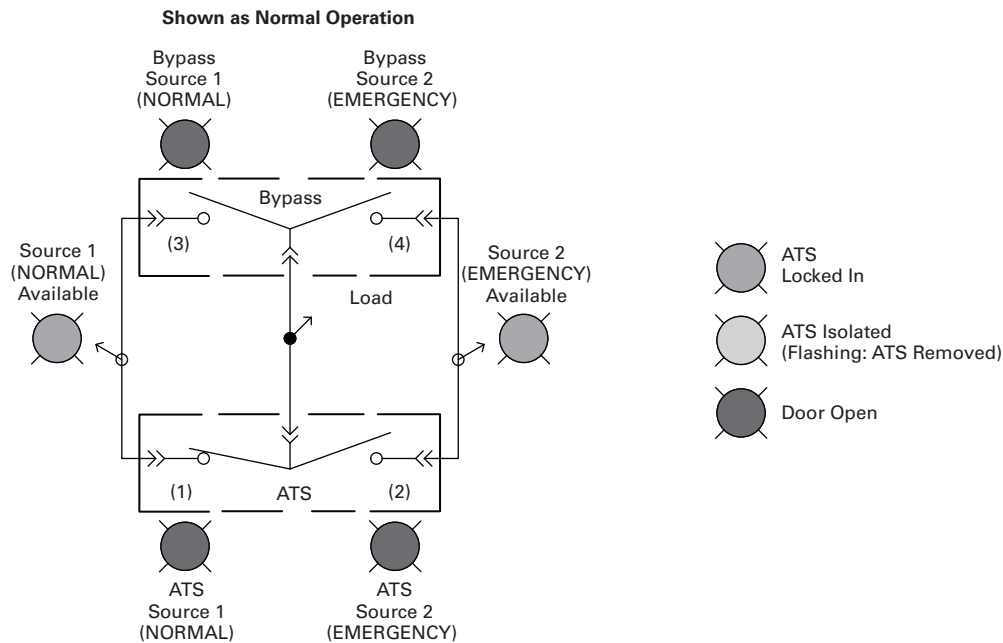
#### Notes

① 1600 A is available on dual drawout only.

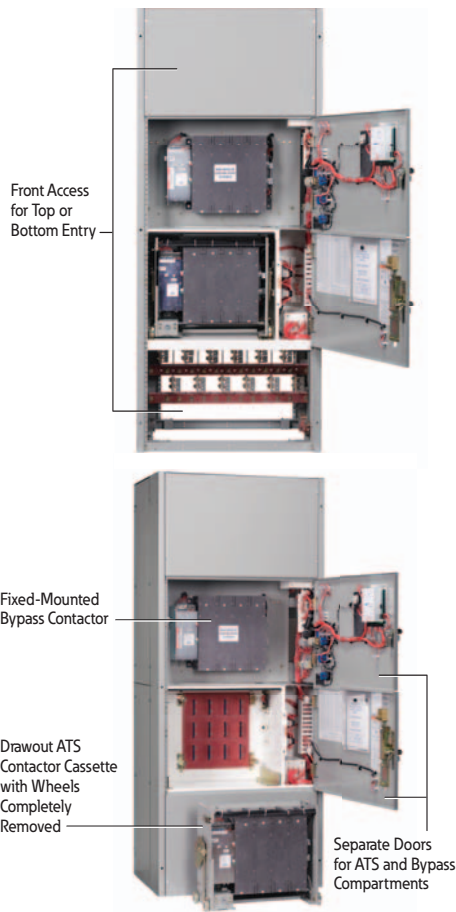
② 0.025 seconds up through 200 A.

### Diagram

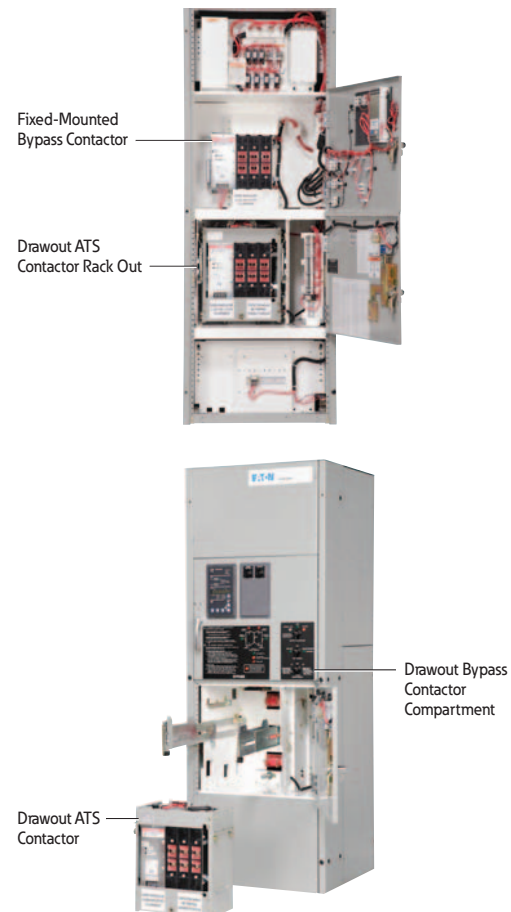
#### Bypass Isolation



#### 1200 A Fixed Bypass



#### 400 A Fixed Bypass



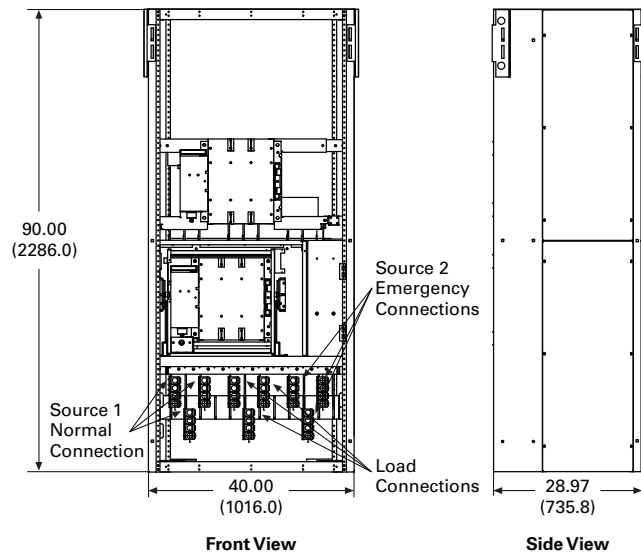
# 5.2 Transfer Switches

## Contactor-Based Designs

### Dimensions

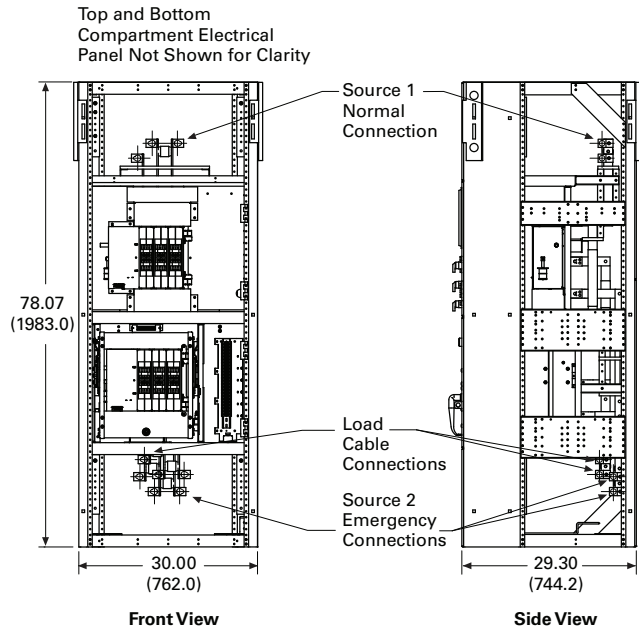
Approximate Dimensions in Inches (mm)

#### 600–1200 A 480 V or 225–1200 A 600 V Fixed Bypass NEMA 1



**Note:** Source 1 Normal, Source 2 Emergency and Load connections must be either ALL top or ALL bottom and are NOT field reconfigurable.

#### 100–400 A 480 V or 100–225 A 600 V Fixed Bypass NEMA 1



**Note:** Source 1 Normal, Source 2 Emergency and Load connections are NOT factory or field reconfigurable. Sufficient wireway and bending space is available to come in from either top or bottom.

### Contactor-Based Transfer Switch 100–1200 A—NEMA 1 Dimensions and Approximate Shipping Weight

Ampere Rating	Enclosure Seismic <sup>①</sup>			Standard Terminals			Weight in Lb (kg)
	Height	Width	Depth	Normal and Emergency	Load	Neutral	
100–200 A at 480 V <sup>②</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) #6–350 Cu/Al	(1) #6–350 Cu/Al	(3) #6–350 Cu/Al	625 (283.8)
100–200 A at 600 V <sup>②</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) #6–350 Cu/Al	(1) #6–350 Cu/Al	(3) #6–350 Cu/Al	625 (283.8)
225–400 A at 480 V <sup>②</sup>	78.07 (1983.0)	30.00 (762.0)	29.30 (744.2)	(1) 3/0–600 Cu/Al	(1) 3/0–600 Cu/Al	(3) 3/0–600 Cu/Al	625 (283.8)
225–400 A at 600 V <sup>③</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	1550 (703.7)
600 A at 480 V <sup>③</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	1550 (703.7)
600 A at 600 V <sup>③</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(2) 3/0–750 Cu/Al	(2) 3/0–750 Cu/Al	(6) 3/0–750 Cu/Al	1550 (703.7)
800–1200 A at 480 V <sup>③</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(4) 3/0–750 Cu/Al	(4) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	1750 (794.5)
800–1200 A at 600 V <sup>③</sup>	90.00 (2286.0)	40.00 (1016.0)	28.97 (735.8)	(4) 3/0–750 Cu/Al	(4) 3/0–750 Cu/Al	(12) 3/0–750 Cu/Al	1750 (794.5)

#### Notes

<sup>①</sup> For seismic applications, it is necessary to use 5–13 UNC Grade or better hex head bolts and washers torqued to 50 ft-lbs.

<sup>②</sup> For NEMA 3R dimensions, add 18.29 inches (464.6 mm).

<sup>③</sup> For NEMA 3R dimensions, add 18.59 inches (472.2 mm).

**Service Entrance Rated Contactor-Based ATS with ATC-900 Controller****Contents**

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**Service Entrance Rated Automatic Open Transition, 40–1600 A****Product Description**

The service entrance rated automatic open transition contactor-based design transfer switch will provide a fully functioning automatic transfer switch with an integrated upstream breaker to be applied and installed directly at the point of service entrance.

Eaton's service entrance rated contactor design has been tested and is listed as a 100% rated UL 1008 ATS (automatic transfer switch). In addition, the service entrance rated ATS will have a 100% load rating. The capability to provide a 100% load rating eliminates confusion in applying a 100% rated ATS with a breaker that is only rated for 80% load.

The combined package will provide the ATS in a separate compartment from the upstream breaker. The breaker compartment has a deadfront panel, allowing easy and safe access to the separate contactor compartment when the breaker is tripped to the off position and locked out. Line side connections are made in the breaker compartment and Source 2 and load connections are made in the contactor compartment. The main contactor compartment includes the main power switching device, auxiliary relays, control power and the controller.

The upstream breaker will use the Eaton 310+ trip unit, allowing the user to modify the continuous current rating, adjustable protection curve shaping with LSI or LSIG adjustability and optional selection of the Arcflash Reduction Maintenance System to address National Electrical Code® Section 240.87 for arc energy reduction.

**Application Description**

The service entrance rated contactor-based design can be used on applications requiring an integrated automatic transfer switch with an upstream breaker. The combined or integrated offering can be used and will come listed as a 100% rated to UL 1008 as suitable for use as service equipment. In addition, the transfer switch will be marked as "Continuous load current not to exceed 100 percent of switch rating."

**Features****Standard Features—  
with ATC-300+ Controller**

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC (with three-position mechanism)
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostics and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe
- Modbus® RTU via RS-485
- Source 1 Eaton Series G breaker with 310+ electronic trip unit with LSI
- Deadfront compartment for breaker
- Series G breaker with shunt trip
- Separate switch compartment

**Optional Features**

- Available surge suppression device for power/controller, engine start circuit, phone and cable connections
- Space heater with thermostat
- Eaton IQ and Power Xpert series metering
- Open in-phase transition, time delay neutral or in-phase with a default to time delay neutral transfer
- ATC-300+ and ATC-900 controllers available
- Source 2 inhibit
- Manual retransfer to normal
- Remote annunciator with control
- Ethernet communication (PXG 900 Gateway)
- Breaker with LSIG electronic trip units
- Breaker with Arcflash Reduction Maintenance System

**Commercial Design Highlights**

- Integrated service entrance rating listed to UL 1008 100% rated
- Meets overload, endurance, temperature rise and withstand rating per UL 1008
- Separate ATS and breaker compartment permits safe access to the ATS
- Combined breaker/ATS reduces overall equipment size and installation cost
- Lockable breaker permits safe downstream maintenance
- Breaker with electronic trip units provide adjustable ratings and adjustable curve shaping



### Design Features Integrated Service Entrance Rating

The service entrance rated contactor design has been tested and listed to UL 1008 as suitable for use as service equipment. In addition, per UL 1008, the switch is rated for 100% load ratings and eliminates application considerations when applying a 100% rated ATS with 100% load ratings.



**Separate Compartment for ATS  
and Breaker**

The standard design includes a separate deadfront compartment for the incoming breaker and separate compartment for the ATS. This innovative design provides simplified access to cable entrance areas and can reduce personal protection equipment (PPE) requirements when performing installation or routine maintenance.



**Electronic Trip Unit on SE Breaker**

The service entrance breaker is an Eaton Series G breaker with the 310+ trip unit that provides adjustable rating and breaker curve shaping. The trip unit comes with either LSI or LSI-G curve shaping capability. The long delay and short delay functions enable the breaker curves to be manipulated for upstream and downstream breaker coordination.



**Arcflash Reduction  
Maintenance System™**

The Eaton 310+ electronic trip units address the National Electrical Code® Section 240.87 for Arc Energy Reduction. These molded-case circuit breakers provide two approved methods to reduce arc energy: energy-reducing maintenance switching with local status indicator and zone selective interlocking.



**ATC-300+ Controller**

Eaton's ATC-300+ controller offers a full set of programmable time delays, source 2 inhibit and manual retransfer. The controller comes standard with Modbus communications.



**ATC-900 Controller**

Eaton's new ATC-900 controller brings ease of use, adaptability, supervisory and programming capabilities to mission-critical applications. The 4.3-inch color TFT display provides simple arrow keys for quick screen navigation. Event logging and recording of time-stamped events are viewed easily. Field configuration of I/O allows user adaptability to special requirements.



**Transformer Panel  
Allows for Easy  
Field Changes  
to Voltage  
Configurations**

**Multi-Tap Voltage Selector**

Allows the transfer switch to be readily applied on most system voltages by connecting to the proper terminals. Available system voltages include 120, 208, 220, 240, 277 or 480 Vac, 60 Hz. The non quick connect multi-tap transformer is standard on units up to 400 A and the quick re-connect version is standard on 600–1600 A.



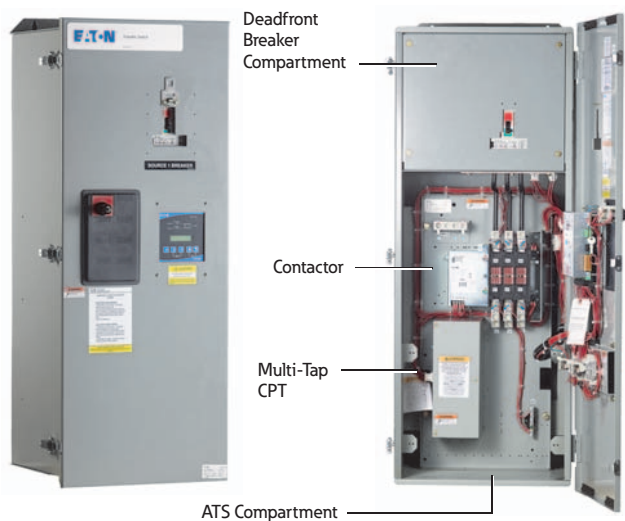
**Lockable Breaker**

The upstream service rated breaker includes a door-mounted keyed switch that will allow the breaker to be tripped to the OFF position and electrically locked out. The keyed switch has a Normal position and Disconnect position that indicates the breaker has been tripped. Once in the Disconnect position, the key may be removed. In addition there is a ship loose handle hasp that allows the breaker handle to be mechanically locked out.



## ATC-300+ and ATC-900 Controller Features

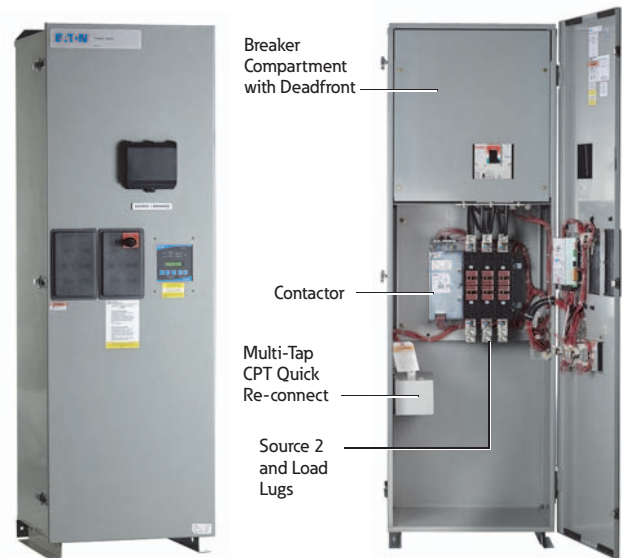
Description	Automatic Controllers	
	ATC-300+	ATC-900
Basic transfer control, plant exerciser, time delays, self diagnostics and system settings	Standard	Standard
Source mimic diagram with LED indication	Standard	Standard
Engine test and start contact	Standard	Standard
Dual source control power input	Standard	Standard
Liquid crystal display (LCD)	Standard	Standard
Programmable set points and plant exerciser	Standard	Standard
Password protection	Standard	Standard
Time stamped history and event log	Standard	Standard
Time delay bypass	Standard	Standard
Go to source 2 control input	Standard	Standard
Pre-transfer and general alarm control outputs	Standard	Standard
Lockout and monitor modes	Standard	Standard
Source status output relay contacts	Standard	Standard
Modbus RTU communication	Standard	Standard
Manual retransfer control input	Optional	Standard
Source 2 input / load shed input	Optional	Standard
USB port—profile and data management	—	Standard
Preferred source selection	—	Standard
Dual generator capability	—	Standard
User configurable inputs/outputs	—	Standard
Advanced diagnostics and troubleshooting with pre-/post-event data capture	—	Standard
Integrated load metering	—	Optional
Load management with selective load shed	—	Optional
DC voltage control power input	—	Optional
Three source ATS master/slave control	—	Optional
Modbus TCP/IP communication <sup>①</sup>	Optional	Optional



40–200 A Service Entrance Contactor NEMA 1

**Note**

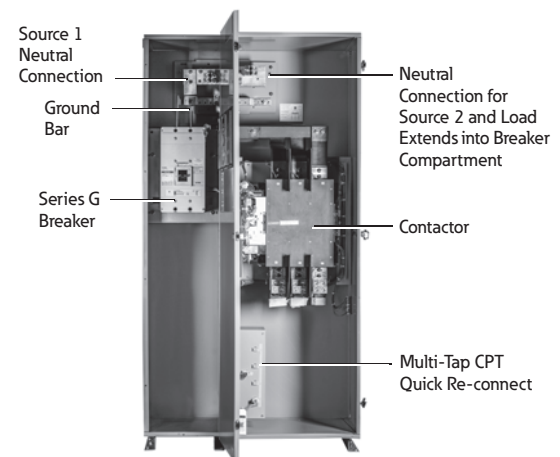
<sup>①</sup> Modbus TCP/IP ..... resources use of Modbus RTU port.



225–400 A Service Entrance Contactor NEMA 1

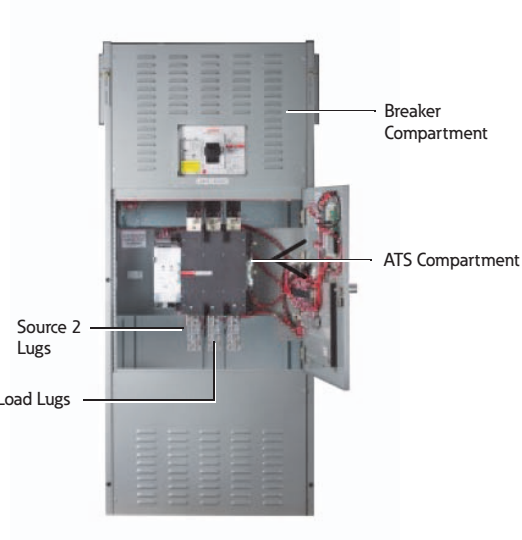


Typical Service Entrance ATS Construction for 600–1000 A NEMA 1

600–1000 A Service Entrance Contactor NEMA 1  
(ATS Door Open and Breaker Compartment Panel Removed)



**1200–1600 A Service Entrance  
Rated Contactor Design NEMA 1**



**1200–1600 A Service Entrance  
ATS Compartment Door Open**



**1200–1600 A Service Entrance  
Breaker Deadfront Not Shown**

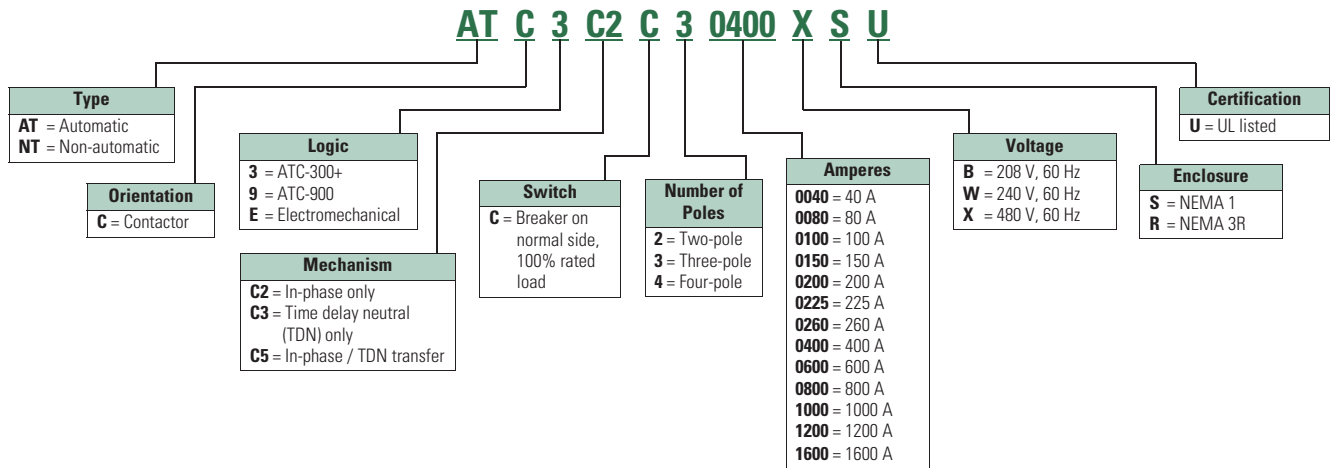
# 5.2

## Transfer Switches

### Contactor-Based Designs

#### Catalog Number Selection

##### Automatic Transfer Switch



#### Technical Data and Specifications

##### UL 1008 Short-Circuit Withstand and Close-On Ampere Ratings

UL 1008 Ampere Rating	Mechanism	Withstand Current Ratings rms Symmetrical 480 V
40, 80, 100	C2	30,000
150, 200	C2	30,000
225, 260, 400	C2	50,000
40, 80, 100, 150, 200	C3, C5	50,000
225, 260, 400	C3, C5	50,000
600, 800, 1000, 1200	C3, C5	65,000
1600	C3, C5	65,000

##### UL 1008 Ratings (100% Rated)

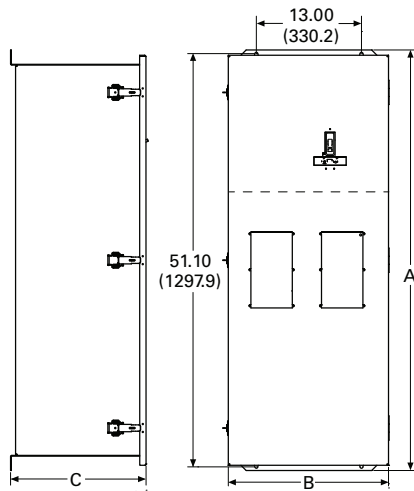
Mounting Type	Voltage	Current Amperes	No. of Poles ①	NEMA Enclosure
Fixed	480	40	2, 3, 4	NEMA 1 NEMA 3R
	480/277	80		
	480/240	100		
	415/240	150		
	240	200		
		225		
	240/120	260		
		400		
	220	600		
	208/120	800		
		1000		
		1200		
		1600		

**Dimensions**

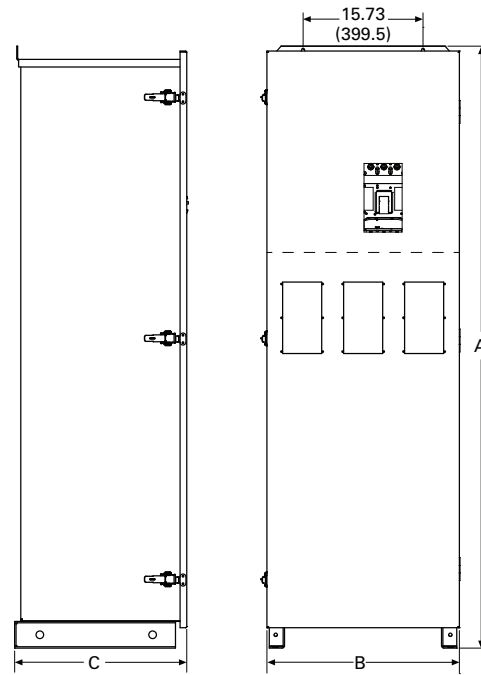
Approximate Dimensions in Inches (mm)

**Service Entrance Rated Contactor-Based Transfer Switch 40–1600 A, 100% Load Rating**

Ampere Rating	Enclosure	A (Height)	B (Width)	C (Depth)	Normal	Emergency	Load	Neutral	Weight in Lb (kg)
40–100 at 480 V	N1/N3R	52.00 (1320.8)	19.80 (502.9)	16.75 (425.5)	(1) #14–2/0	(1) #14–2/0	(1) #14–2/0	(3) #14–1/0	240 (109)
150–200 at 480 V	N1/N3R	52.00 (1320.8)	19.80 (502.9)	16.75 (425.5)	(1) #6–250 kcmil	(1) #6–250 kcmil	(1) #6–250 kcmil	(3) #6–250 kcmil	300 (136)
225–400 at 480 V	N1/N3R	79.00 (2006.6)	25.25 (641.4)	22.59 (573.8)	(2) 3/0–250 kcmil	(2) 3/0–250 kcmil	(2) 3/0–250 kcmil	(6) 250k–500 kcmil	500 (227)
600–1000 at 480 V	N1/N3R	79.00 (2006.6)	40.37 (1025.4)	22.59 (573.8)	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	900 (409)
1200 at 480 V	N1/N3R	79.00 (2006.6)	40.37 (1025.4)	22.59 (573.8)	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	900 (409)
1200 at 480 V	N1	90.00 (2286.0)	40.00 (1016.0)	48.22 (1224.8)	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	1400 (635)
	N3R			62.50 (1587.5)					1450 (658)
1600 at 480 V	N1	90.00 (2286.0)	40.00 (1016.0)	48.22 (1224.8)	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(4) 1/0–750 kcmil	(12) 1/0–750 kcmil	1600 (726)
	N3R			52.50 (1587.5)					1650 (748)

**Automatic, 40–200 A, NEMA 1 and NEMA 3R, Wall Mount****Note**

① Two-pole is available up to 800 A.

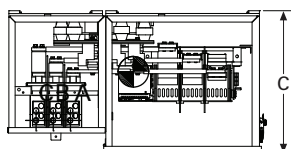
**Automatic, 225–400 A, NEMA 1 and NEMA 3R Floor Standing Wall Attached**

# 5.2 Transfer Switches

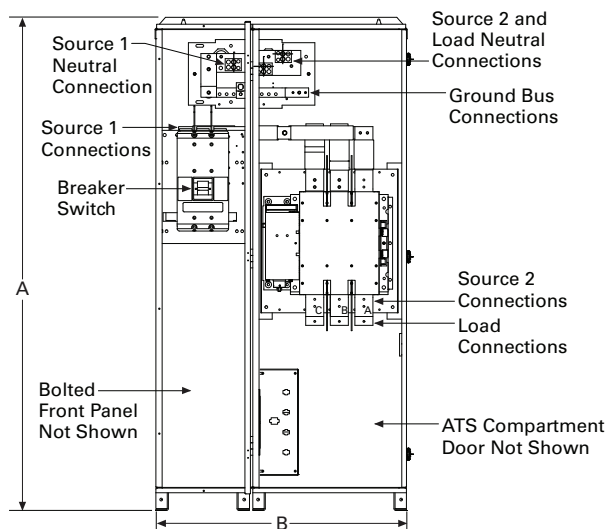
## Contactor-Based Designs

Approximate Dimensions in Inches (mm)

Automatic, 600–1000 A NEMA 1, 600–800 A NEMA 3R

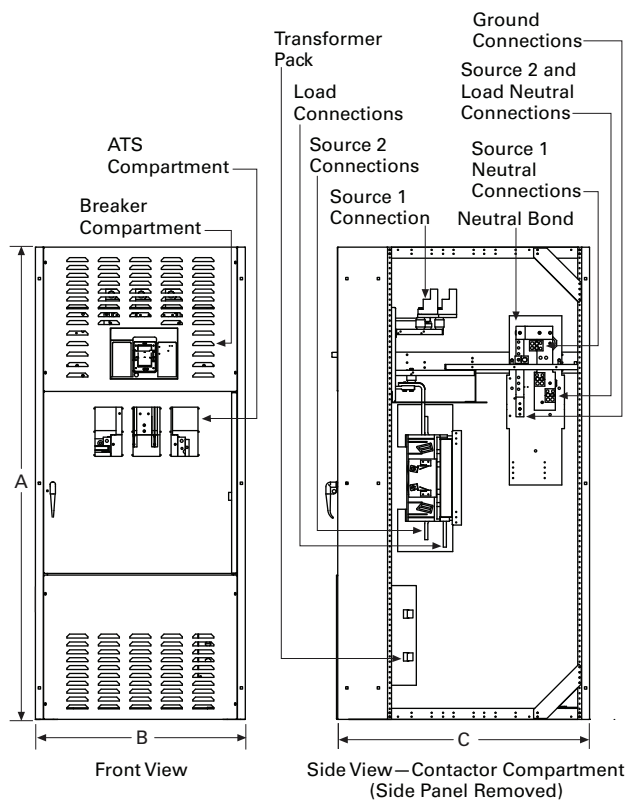


Top View—Roof Removed

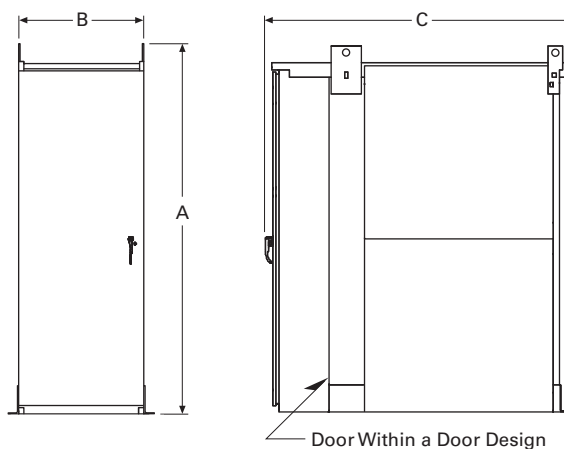


Front View—Doors Removed

Automatic, 1200 A and 1600 A, NEMA 1



Automatic 1000–1600 A, NEMA 3R



## Manual Wallmount Transfer Switch



## Molded Case Switches—Manual Wallmount, 30–1000 A

## Description

Eaton's wallmount manually operated transfer switches are designed for a variety of standby power applications for critical loads. In the event of a primary power source interruption, the user can manually transfer the load circuits to the standby power source. Once primary power has been restored, the user can manually transfer the load circuits back to the primary power source.

## Application Description

Manual transfer switches cover applications ranging from 30 to 1000 A through 600 Vac for standard manual configurations and open transition.

Manual transfer switches may be applied for those application where a manually initiated and manually operated transfer is suitable. The front door of the switch must be opened to operate the manual handle. The design comes standard with a deadfront design, allowing safe manual transfer under load. Should an application require a service entrance rating, then a non-automatic or automatic design needs to be selected.

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## Description

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Dimensions	V2-T5-38
Molded Case Switches—Non-Automatic Wallmount	V2-T5-39
Molded Case Switches—Automatic Wallmount, 30–1000 A	V2-T5-34
Maintenance Bypass Switches—Type MBHE 100–1000 A	V2-T5-48

## Features and Benefits

## Features

- Molded case switch power contact assemblies
- Positive mechanical interlocking
- Permanently affixed manual operating handle

## Benefits

- High withstand, totally enclosed for maximum arc suppression and isolation during power transfer
- Optional trip units offer system overcurrent protection
- Prevents the paralleling of two sources of power
- Permits safe and convenient manual transfer of power
- Requires no control power



**Manual Switch with Door Open—  
Manually Initiated and  
Manually Operated**

**Note:** If a service entrance rating is required, then a non-automatic type switch must be selected. Service entrance ratings are not available on a manual transfer switch.

# 5.3

## Transfer Switches

### Breaker-Based Design

5



Manual Switch with Door Closed—  
Must Open Door to Engage the  
Manual Handle



Manual Transfer Switch Shown  
Without Deadfront

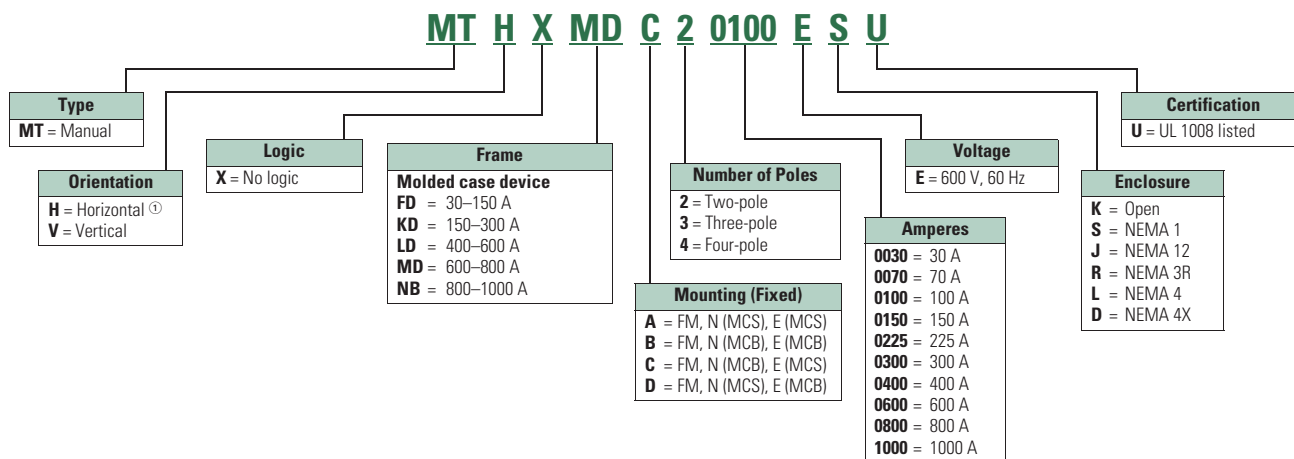
#### Standards and Certifications

- Complies with UL 1008 and UL 489 standards
- IBC seismic qualified



#### Catalog Number Selection

##### Manual Breaker-Based Transfer Switch



#### Notes

① Horizontal is available only on ratings 150 A or less.

Service entrance is not available on a manual design.



## Technical Data and Specifications

Wallmount Transfer Switch Standard Terminal Data for Power Cable Connections <sup>①</sup>

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

## UL 1008 Short Circuit Withstand and Close-On Ratings (kA)

## Standard UL 1008 3-Cycle—Horizontal and Vertical Industrial

ATS Ampere Rating	Short Circuit			Ratings When Used With Upstream Fuse (kA)		
	240 V	480 V	600 V	Maximum Fuse Rating	Fuse Type <sup>②</sup>	600 V
30	100	65	25	200	J,T	200
70	100	65	25	200	J,T	200
100	100	65	25	200	J,T	200
150	100	65	25	400	J,T	200
200	100	65	25	400	J,T	200
225	100	65	25	400	J,T	200
300	100	65	25	400	J,T	200
400	100	65	25	600	J,T	200
600	100	65 <sup>③</sup>	25	800/1200	J,T	100/200
800	65	50 <sup>③</sup>	25	1200/1600	L	100/200
1000	65	50 <sup>③</sup>	25	1600	L	200

**Notes**

<sup>①</sup> All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.

<sup>②</sup> Class RK5 fuse with 100 kA rating.

<sup>③</sup> Four-pole units rated 35 kA.

## Dimensions

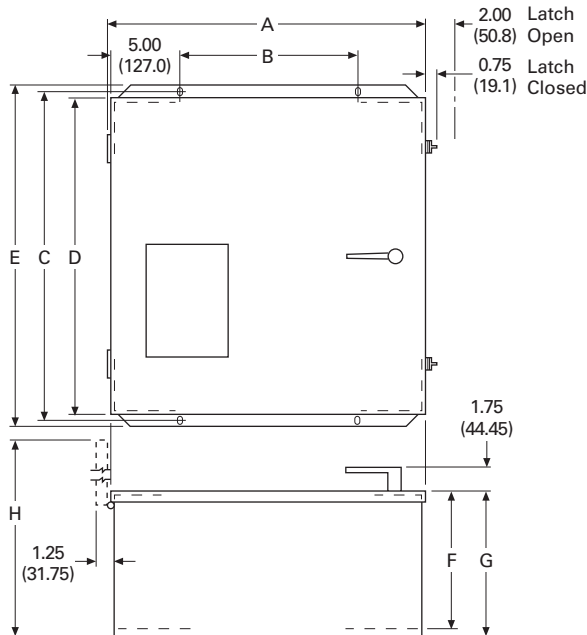
Approximate Dimensions in Inches (mm)

30–1000 A Type MTVX—NEMA 1, 3R, 12<sup>①</sup>

Switch Type	Enclosure			Gutter Space			Bolt Pattern		Standard Terminals <sup>②</sup>			Weight Lb (kg)
	A Height	B Width	C Depth	D Width	E Depth	F Bending	G Horizontal	H Vertical	Line	Load	Neutral	
HKD (150–225 A)	48.00 (1219.2)	20.81 (528.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.59 (269.0)	11.00 (279.4)	45.50 (1155.7)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HKD (300 A)	56.00 (1422.4)	20.81 (528.6)	16.65 (422.0)	8.00 (203.2)	4.00 (101.6)	13.59 (345.2)	11.00 (279.4)	53.50 (1358.9)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HLD (400 A)	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(1) 4/0–600	(2) #1–500	(6) 250–350	425 (193)
HLD (400 A) <sup>③</sup>	53.00 (1346.2)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	11.85 (301.0)	16.00 (406.4)	50.48 (1282.2)	(2) 3/0–350	(2) #1–500	(6) 250–350	425 (193)
HLD (600 A)	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 3/0–350	(2) #1–500	(12) 4/0–500	425 (193)
HLD (600 A) <sup>③</sup>	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 400–500	(2) #1–500	(12) 4/0–500	425 (193)
HMDL (600 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(2) #1–500	(2) #1–500	(12) 4/0–500	510 (232)
HMDL (800 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500	510 (232)
NB (800–1000 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.58 (446.5)	16.00 (406.4)	75.15 (1908.8)	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500	570 (259)

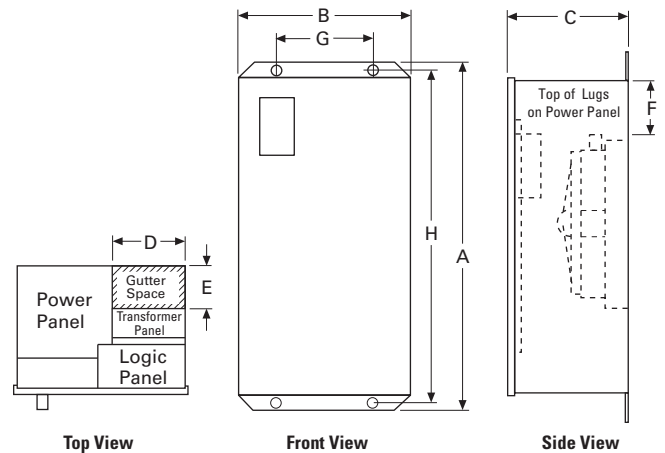
## 30–150 A Type MTHXFD Manual

Dimensions									Weight Lb (kg)
A	B	C	D	E	F	G	H		
22.88 (581.2)	13.13 (333.5)	22.74 (577.6)	22.62 (574.5)	24.50 (622.3)	9.78 (248.4)	10.28 (261.1)	32.31 (820.7)		143 (65)



## Power Panel and Transformer Panel

Power Panel Type	Height	Width	Depth
<b>Power Panel</b>			
HFD	11.00 (279.4)	17.00 (431.8)	6.81 (173.0)
HKD	24.50 (622.3)	11.88 (301.8)	17.50 (444.5)
HLD	26.00 (660.4)	16.88 (428.8)	17.50 (444.5)
HMDL	36.25 (920.8)	16.88 (428.8)	17.50 (444.5)
NB	36.25 (920.8)	16.88 (428.8)	19.00 (482.6)
<b>Transformer Panel</b>			
HFD	22.00 (558.8)	16.50 (419.1)	6.50 (165.1)
HKD, HLD, HMDL and NB	28.63 (727.2)	8.25 (209.6)	5.50 (139.7)



## Notes

- ① Consult factory for NEMA 4X.
- ② Suitable for Cu or Al wire. Consult the factory for other available terminal sizes.
- ③ Alternate line terminals.

Dimensions are approximate and should not be used for construction purposes.

## Non-Automatic Wallmount



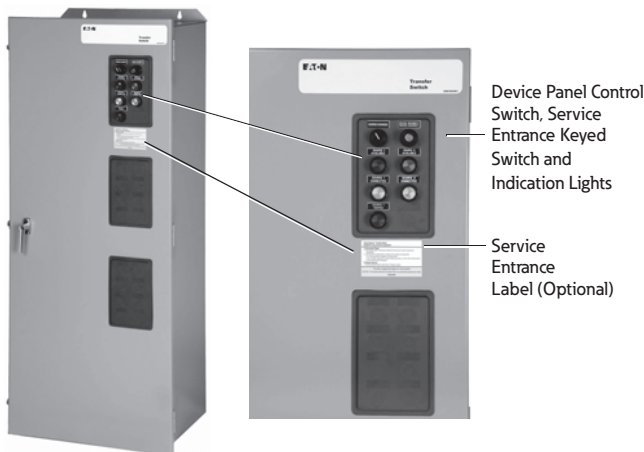
## Molded Case Switches—Non-Automatic Wallmount, 30–1000 A

## Product Description

Eaton's wallmount non-automatic transfer switches are designed for a variety of standby power applications for critical loads.

In the event of a primary power source interruption, the user can manually transfer the load circuits to the standby power source

through the use of an external pushbutton. Once primary power has been restored, the user can manually transfer the load circuits back to the primary power source through the use of an external pushbutton.



**Non-Automatic Switch with Doors Closed**

**Note:** Optional service entrance rating shown for this photo.

## Contents

## Description

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Maintenance Bypass Switches— Type MBHE 100–1000 A . . . . .	<b>V2-T5-48</b>

## Application Description

Non-automatic transfer switches cover applications ranging from 30–1000 A through 600 Vac for manual configurations, open transition, standard or service entrance.

Non-automatic transfer switches are manually initiated, but electrically operated designs. Front door-mounted controls allow the operator to initiate the transfer. Overcurrent trips may be added to the design for either or both the normal and emergency source. Service entrance ratings are available. Note that the Eaton service entrance rated non-automatic transfer switch is a 100% rated and listed to UL 1008 as suitable for use for service entrance.

## Features and Benefits

## Features

- Molded case switch power contact assemblies
- Positive mechanical and electrical interlocking
- Permanently affixed manual operating handle
- Pushbutton operation

## Benefits

- High withstand, totally enclosed for maximum arc suppression and isolation during power transfer
- Optional trip units offer system overcurrent protection
- Prevents the paralleling of two sources of power
- Permits safe and convenient manual transfer of power under load via external pushbutton initiated operation

## Non-Automatic Transfer Switch

Device panel shows controls to initiate the manual transfer and control indicating lights. In addition, an optional service entrance rating may be specified. Keyed switch is mounted on the device panel.

# 5.3

## Transfer Switches

### Breaker-Based Designs

#### Standards and Certifications

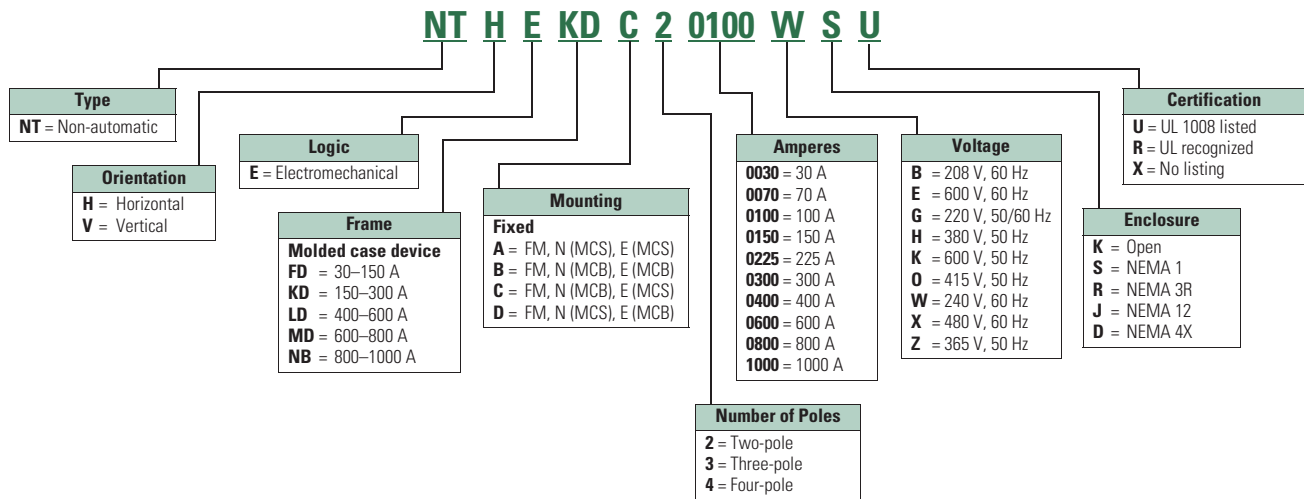
- Complies with UL 1008 and UL 489 standards
- IBC seismic qualified



## 5

### Catalog Number Selection

#### Non-Automatic Breaker-Based Transfer Switch



#### Technical Data and Specifications

##### Wallmount Transfer Switch Standard Terminal Data for Power Cable Connections <sup>①</sup>

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

##### UL 1008 Short Circuit Withstand and Close-On Ratings (kA)

###### Standard UL 1008 Three-Cycle—Horizontal and Vertical Industrial

ATS Ampere Rating	Short Circuit			Ratings When Used with Upstream Fuse (kA)		
	240 V	480 V	600 V	Maximum Fuse Rating	Fuse Type <sup>②</sup>	600 V
30	100	65	25	200	J, T	200
70	100	65	25	200	J, T	200
100	100	65	25	200	J, T	200
150	100	65	25	400	J, T	200
200	100	65	25	400	J, T	200
225	100	65	25	400	J, T	200
300	100	65	25	400	J, T	200
400	100	65	25	600	J, T	200
600	100	65 <sup>③</sup>	25	800/1200	J, T	100/200
800	65	50 <sup>③</sup>	25	1200/1600	L	100/200
1000	65	50 <sup>③</sup>	25	1600	L	200

#### Notes

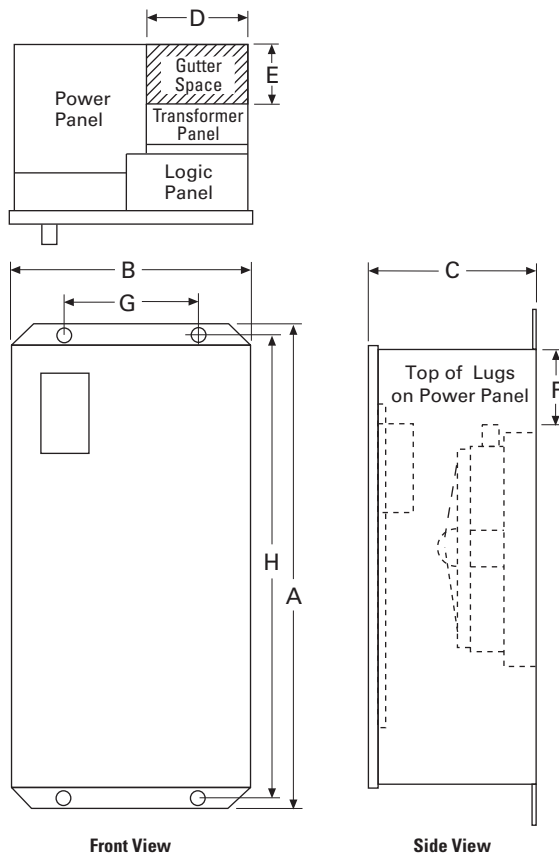
- All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.
- Class RK5 fuse with 100 kA rating.
- Four-pole units rated 35 kA.

**Dimensions**

Approximate Dimensions in Inches (mm)

**30–1000 A Types NTHE, NTVE—NEMA 1, 3R 12** <sup>①</sup>

Switch Type	Enclosure		Gutter Space			Bolt Pattern			Standard Terminals <sup>②</sup>			Weight Lb (kg)
	A Height	B Width	C Depth	D Width	E Depth	F Bending	G Horizontal	H Vertical	Line	Load	Neutral	
HFD (30–100 A) <sup>③</sup>	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	6.22 (157.9)	10.75 (273.0)	45.24 (1049.1)	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0	232 (105)
HFD (150 A) <sup>③</sup>	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	6.22 (157.9)	10.75 (273.0)	45.24 (1049.1)	(1) #6–300	(1) #6–300	(3) #4–300	232 (105)
HKD (150–225 A)	48.00 (1219.2)	20.81 (528.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.59 (269.0)	11.00 (279.4)	45.50 (1155.7)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HKD (300 A)	56.00 (1422.4)	20.81 (528.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	13.59 (345.2)	11.00 (279.4)	53.50 (1358.9)	(1) #3–350	(1) #6–350	(3) #4–350	305 (138)
HLD (400 A)	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(1) 4/0–600	(2) #1–500	(6) 250–350	425 (193)
HLD (400 A) <sup>④</sup>	53.00 (1346.2)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	11.85 (301.0)	16.00 (406.4)	50.48 (1282.2)	(2) 3/0–350	(2) #1–500	(6) 250–350	425 (193)
HLD (600 A)	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 3/0–350	(2) #1–500	(12) 4/0–500	425 (193)
HLD (600 A) <sup>④</sup>	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	10.54 (267.7)	16.00 (406.4)	61.48 (1561.6)	(2) 400–500	(2) #1–500	(12) 4/0–500	425 (193)
HMDL (600 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(2) #1–500	(2) #1–500	(12) 4/0–500	510 (232)
HMDL (800 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.73 (450.3)	16.00 (406.4)	75.15 (1908.8)	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500	510 (232)
NB (800–1000 A)	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	17.58 (446.5)	16.00 (406.4)	75.15 (1908.8)	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500	570 (259)

**Power Panel and Transformer Panel**

Power Panel Type	Height	Width	Depth
<b>Power Panel</b>			
HFD	11.00 (279.4)	17.00 (431.8)	6.81 (173.0)
HKD	24.50 (622.3)	11.88 (301.8)	17.50 (444.5)
HLD	26.00 (660.4)	16.88 (428.8)	17.50 (444.5)
HMDL	36.25 (920.8)	16.88 (428.8)	17.50 (444.5)
NB	36.25 (920.8)	16.88 (428.8)	19.00 (482.6)
<b>Transformer Panel</b>			
HFD	22.00 (558.8)	16.50 (419.1)	6.50 (165.1)
HKD, HLD, HMDL and NB	28.63 (727.2)	8.25 (209.6)	5.50 (139.7)

**Notes**

- ① Consult factory for NEMA 4X.
- ② Suitable for Cu or Al wire. Consult the factory for other available terminal sizes.
- ③ NTHE with multi-tap voltage selection panel.
- ④ Alternate line terminals.

Automatic Wallmount



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Catalog Number Selection . . . . .	<b>V2-T5-45</b>
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Dimensions . . . . .	<b>V2-T5-47</b>
Maintenance Bypass Switches— Type MBHE 100–1000 A . . . . .	<b>V2-T5-48</b>

## Molded Case Switches—Automatic Wallmount, 30–1000 A

### Product Description

Eaton's wallmount transfer switches are designed for a variety of standby power applications for critical loads. They provide flexibility, reliability and value in a compact package. In the event of a primary power source interruption, a transfer switch provides an effective means to transfer the load circuits to an alternate power source while reducing the possibility of injury or property damage.

Wallmount transfer switches meet or exceed all industry standards for endurance, reliability and performance.

These breaker-based designs can be applied with the ATC-100, ATC-300+ or ATC-900 controllers.

### Application Description

Suitable for emergency and standby systems (all loads).

### Features, Benefits and Functions

#### Industrial Design Highlights

- Double-throw, mechanically interlocked transfer mechanism
- High withstand and closing ratings
- Seismic qualified (BOCA®, CBC, IBC, UBC)

#### Standard Features

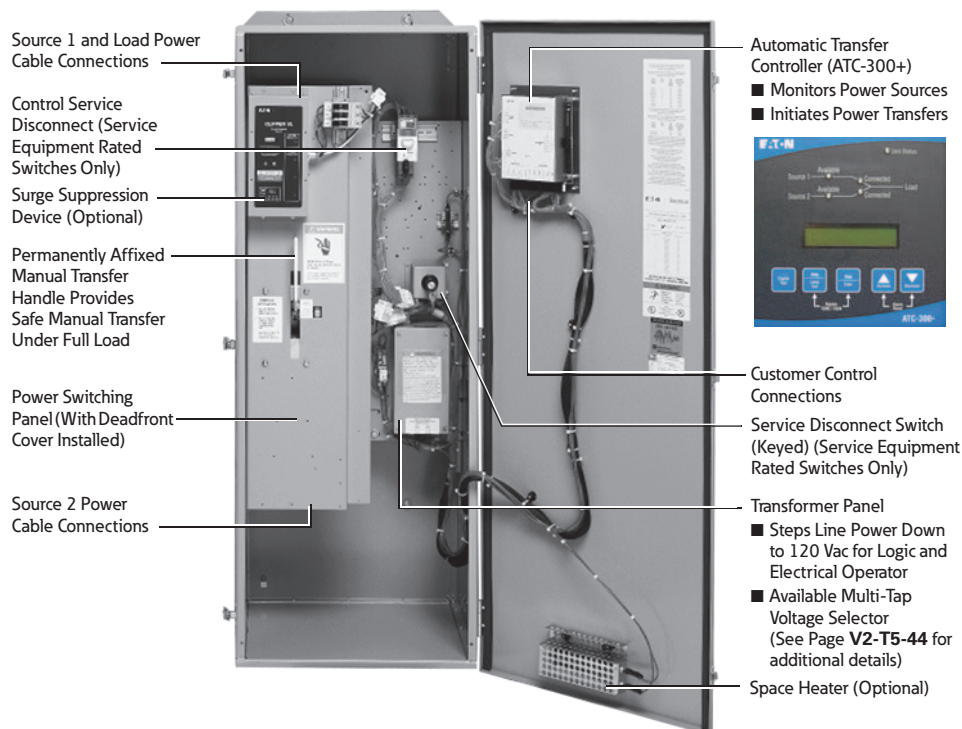
- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance/loss

- Pretransfer signal contacts 1NO/1NC
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostic and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe
- Safe manual operation under full load with permanently affixed operating handle

#### Optional Features

- Suitable for use as service equipment in the standard enclosure size, 100% rated and listed to UL 1008
- Available SPD for power/controller, engine start circuit, phone and cable connections
- Integrated distribution panels
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Integral overcurrent protection
- Not available on contactor transfer switch
- Space heater with thermostat
- Ammeter—load side
- Stainless steel cover for controller
- ATC-100 and ATC-900 controllers available
- Modbus RTU via RS-485
- Source 2 inhibit
- Manual retransfer to normal
- Remote annunciator with control
- Ethernet communication (PXG 400 Gateway)

### Basic Components of Automatic Transfer Switches



#### Eaton's Superior Design Transfer Switch Characteristics

##### Unmatched Performance and Versatility

Eaton's family of wallmount transfer switches offers unmatched performance, versatility and value for power switching applications. At the heart of these designs is Eaton's molded case switch, designed specifically to meet UL 1008.

##### Superior Main Contact Structure

All Eaton wallmount transfer switches meet or exceed the standards set forth in UL 1008 and UL 489. No other transfer switch manufacturer has met the rigid testing requirements of this combination of standards. Completely enclosed contacts add a measure of safety and reliability. It also ensures the integrity of the contact assemblies and minimizes the need for periodic maintenance of the contacts, reducing downtime.

#### Fast, Powerful and Safe Power Switching Mechanism

The power panel utilizes a unidirectional gear motor mechanism. The power panel can be operated manually under a FULL LOAD.

##### Molded Case Switch Features

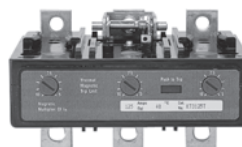
- True four-pole switched neutral availability
- Totally enclosed contact assembly



**Molded Case Switch**

#### Optional Integral Overcurrent Protection Capability

For service entrance and other applications, trip units can be integrated into the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space.



**Optional Thermal-Magnetic or Electronic Trip Units**

#### Optional Service Entrance Rated Automatic Transfer Switch

Eaton's service entrance rated molded case breaker design is a 100% rated ATS and UL 1008 Listed.



# 5.3

## Transfer Switches

### Breaker-Based Designs

5

#### Mechanical Interlock

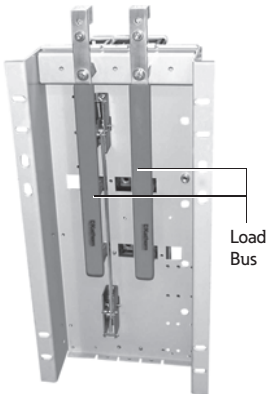
Wallmount transfer switches feature a rear-mounted, fail-safe mechanical interlock to prevent paralleling of sources. This is, in addition to software interlocking and the interlocking inherently provided by the transfer mechanism.



Triple Interlocks

#### Load Bus Assembly

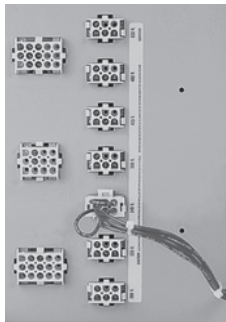
The load bus can be oriented for either top or bottom access. Top entry is standard.



Load Bus

#### Multi-Tap Voltage Selector

Eaton's industry-exclusive Multi-Tap system voltage selector allows our transfer switch to be applied on most system voltages just by proper insertion of the selector plug. Available in two configurations: Worldwide Multi-Tap with 600, 480, 415, 380, 240, 220 and 208 Vac, single- and three-phase, 50 and 60 Hz taps. North American Multi-Tap with 600, 480, 240, 208 and 120 Vac, single- and three-phase, 60 Hz taps.



Multi-Tap Voltage Selector

#### Ease of Maintenance

Keyed quick-disconnect plugs are provided for easy and complete isolation of the control circuitry.

Maintenance can be performed on the logic independent from the power sections and still allow the user to manually transfer power under full load conditions.

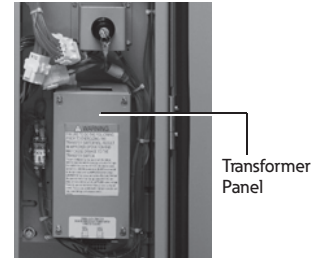


Logic Disconnect Plugs

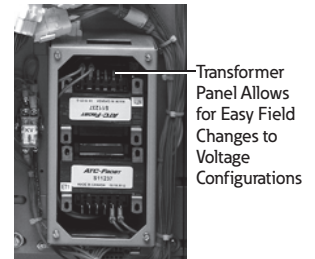
#### North American Voltage Selector

North American multi-tap transformer comes with 600, 480, 240, 208 and 120 Vac, single- and three-phase, and 60 Hz taps, which are all field selectable. Simply remove the steel cover and move the appropriate blue flag terminal to the desired voltage. All switches are shipped with the blue flag in the 600 V position.

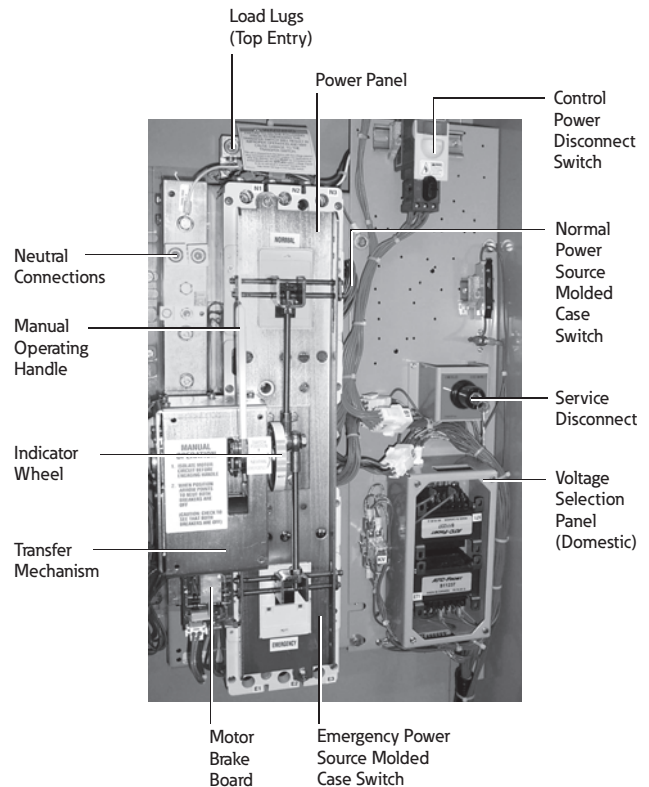
#### Transformer Panel Location



#### Transformer Panel Opened



#### Typical (225–1000 A) Vertical Design Transfer Switch Equipment



Shown Without the Deadfront

### Standards and Certifications

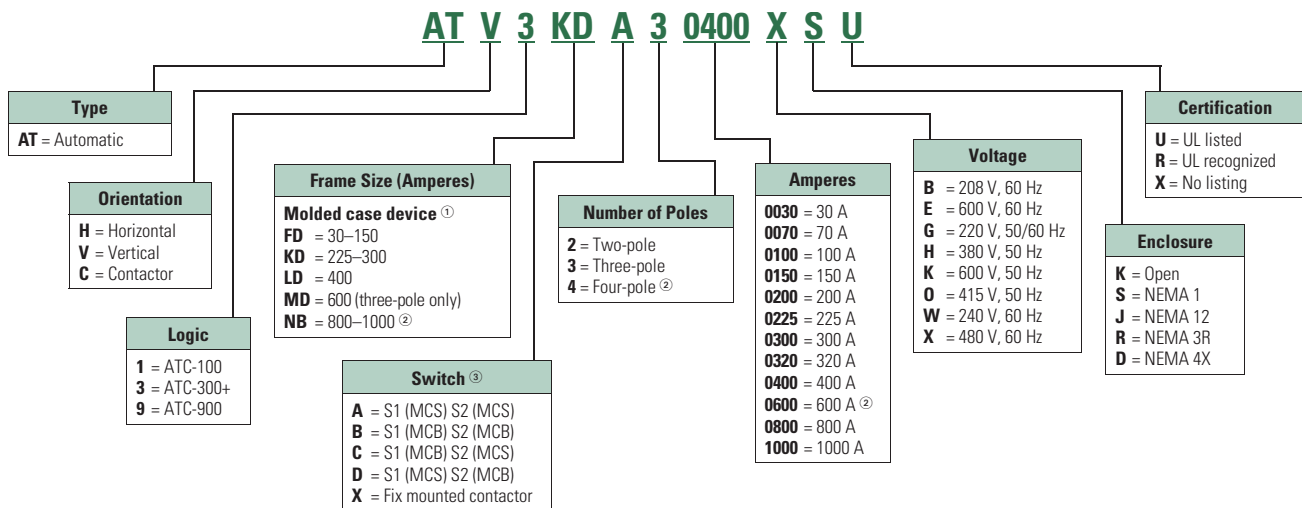
They are listed under Underwriters Laboratories UL 1008 Standard for transfer switch equipment and are optionally available as suitable for emergency and standby systems as defined in NFPA 99 for healthcare facilities.

- UL 1008 listed
- CSA C22.2 No. 178 certified



### Catalog Number Selection

#### Molded Case Transfer Switch



#### Notes

<sup>①</sup> HFD = 200 and 225 A, HLD = 600 A, HMD = 800 A for 240/120 Vac single-phase, three-wire and 208Y/120 Vac three-phase, four-wire systems only.

<sup>②</sup> Four-pole 600 A will use an NB breaker.

<sup>③</sup> MCB = Molded Case Breaker, MCS = Molded Case Switch.

**Technical Data and Specifications****Electrical Ratings**

- Molded case and circuit breaker 30–1000 A
- Two-, three- or four-pole
- Up to 600 Vac, 50/60 Hz
- NEMA 1, 3R, 4X, 12, open

**5****Molded Case Transfer Switch and Circuit Breaker****UL 1008 Short Circuit Withstand and Close-On Ratings (kA)**

Switch Ampere Rating	Short Circuit			Ratings When Used with Upstream Fuse		
	240 Vac	480 Vac	600 Vac	Maximum Fuse Rating	Fuse Type	600 Vac
30–100	100	65	25	200	J, T	200
150	100	65	25	400	J, T	200
225	100	65	25	400	J, T	200
300	100	65	25	400	J, T	200
400	100	65	25	600	J, T	200
600	100	65 <sup>①</sup>	25	800/1200	J, T	100/200
800	65	50 <sup>①</sup>	25	1200/1600	L	100/200
1000	65	50 <sup>①</sup>	25	1600	L	200

**Wallmount Transfer Switch Standard Terminal Data  
for Power Cable Connections <sup>②</sup>**

Switch Ampere Rating	Breaker Frame	Line Side (Normal and Standby Source)	Load Connection	Neutral Connection
30–100	HFD	(1) #14–1/0	(1) #14–1/0	(3) #14–1/0
150–225	HFD	(1) #6–300	(1) #6–300	(3) #4–300
150–225	HKD	(1) #3–350	(1) #6–350	(3) #4–350
225–300	HKD	(1) #3–350	(1) #6–350	(3) #4–350
400	HLD	(1) 4/0–600	(2) #1–500	(6) 250–350
600	HLD	(1) 3/0–350	(2) #1–500	(6) 250–350
600	HMDL	(2) #1–500	(2) #1–500	(12) 4/0–500
600 (four-pole)	NB	(3) 3/0–400	(3) 3/0–400	(3) 3/0–400
800	HMDL	(3) 3/0–400	(3) 3/0–400	(12) 4/0–500
800	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500
1000	HNB	(4) 4/0–500	(4) 4/0–500	(12) 4/0–500

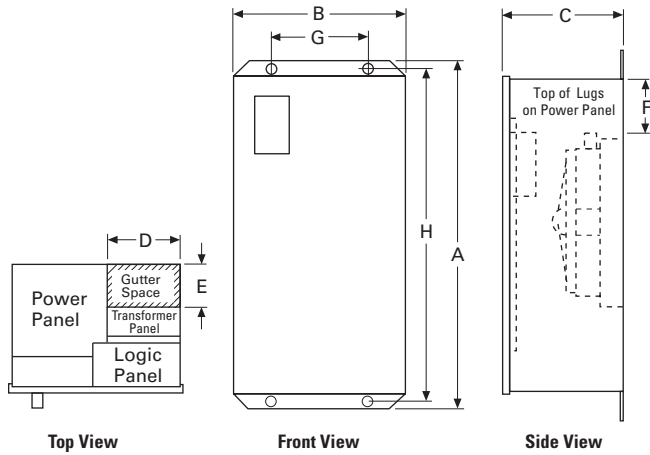
**Notes**

<sup>①</sup> For 600, 800 and 1000 A ratings, four-pole units are rated 35 kA at 480 volts.

<sup>②</sup> All terminals suitable for copper or aluminum conductors. For alternate terminal sizes, contact Eaton.

**Dimensions**

Approximate Dimensions in Inches (mm)

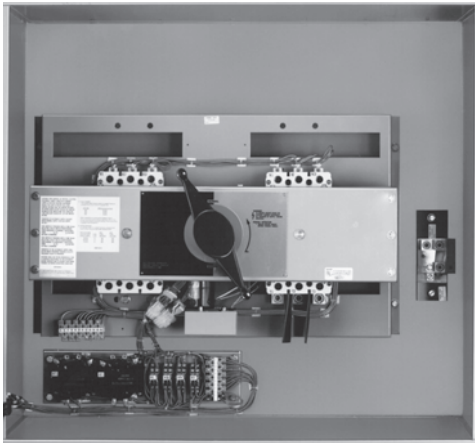
**Dimension Views****Breaker-Based and Molded Case Transfer Switches—NEMA 1, 3R, 12<sup>①</sup>**

Switch Rating Amperes	Switch Type	Enclosure			Gutter Space		Bolt Pattern		Standard Terminals ②			Weight Lb (kg)
		A Height	B Width	C Depth	D Width	E Depth	G Horizontal	H Vertical	Line Side (Normal Load and Standby Source) Connection	Neutral Connection		
Molded Case												
30–100	HFD ③	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
150–225	HFD ③	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
30–100	HFD ④	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
150	HFD ④	47.74 (1213.0)	20.81 (528.6)	15.22 (386.6)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	46.44 (1180.0)	—	—	—	232 (105)
150–225	HFD ③	35.61 (904.0)	20.06 (509.5)	11.34 (288.0)	8.00 (203.2)	4.00 (101.6)	10.75 (273.0)	34.31 (904.0)	—	—	—	150 (68)
150–225	HKD	56.00 (1422.4)	20.81 (528.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	11.00 (279.4)	45.50 (1155.7)	—	—	—	305 (134)
300	HKD	53.00 (1346.2)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	53.50 (1358.9)	—	—	—	295 (134)
400	HLD	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	61.48 (1561.6)	—	—	—	425 (193)
400	HLD ③	53.00 (1346.0)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	51.50 (1308.0)	—	—	—	425 (193)
600	HLD	64.00 (1625.6)	25.81 (655.6)	16.65 (422.9)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	62.50 (1588.0)	—	—	—	475 (214)
600	HMDL	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	480 (218)
800	HMDL ③	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	510 (232)
800–1000	HNB	76.74 (1949.2)	25.81 (655.6)	17.75 (450.8)	8.00 (203.2)	4.00 (101.6)	16.00 (406.4)	75.15 (1908.8)	—	—	—	570 (259)

**Notes**

- ① Consult factory for NEMA 4X.
- ② Suitable with copper only.
- ③ Alternate line terminals.
- ④ With multi-tap voltage selection panel.

Type MBHE Maintenance Bypass Switch



## Contents

Description	Page
Molded Case Switches—Manual Wallmount, 30–1000 A . . . . .	V2-T5-35
Molded Case Switches—Non-Automatic Wallmount . . . . .	V2-T5-39
Molded Case Switches—Automatic Wallmount, 30–1000 A . . . . .	V2-T5-42
Maintenance Bypass Switches— Type MBHE 100–1000 A Catalog Number Selection . . . . .	V2-T5-49
Technical Data and Specifications . . . . .	V2-T5-49
Dimensions . . . . .	V2-T5-50

## Maintenance Bypass Switches—Type MBHE 100–1000 A

### Product Description

Eaton's maintenance bypass switch is a UL 1008-listed device that provides a simple and effective means for bypassing un-interruptible power supplies while maintaining continuity of power to the critical computer loads. A maintenance bypass switch is a requirement on every UPS installation in order to accommodate the maintenance and testing of the UPS system.

### Features and Benefits

- Make-before-break electrical operation
- Lockout circuit to be wired into the UPS bypass authorization
- Pilot devices to show UPS position "Normal" and "Bypassed"
- Pilot device to show "Lockout" enabled
- Reliable manually initiated electrical operation
- High interrupting ratings are standard
- Molded case switch designs are available
- Solid neutral connections are standard
- Safe and reliable operation is ensured due to the simple and durable switching design
- Unauthorized bypass is prevented by the need of UPS system to send the bypass authorized signal
- 100% current ratings makes selection to the UPS kVA ratings easy to accomplish
- Use of interrupting rating switches makes the maintenance bypass switches adaptable to systems with high levels of available fault current

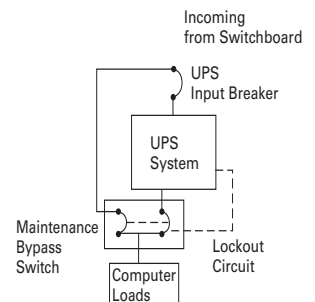
### Standards and Certifications

- UL 1008 listing—  
File E61639



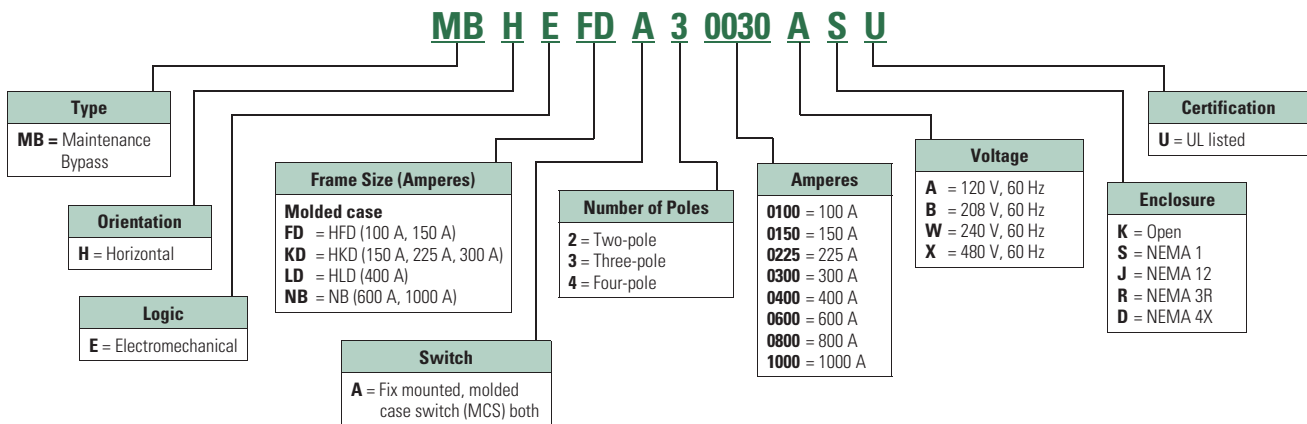
### Diagram

#### Single Line Diagram of Maintenance Bypass Switch



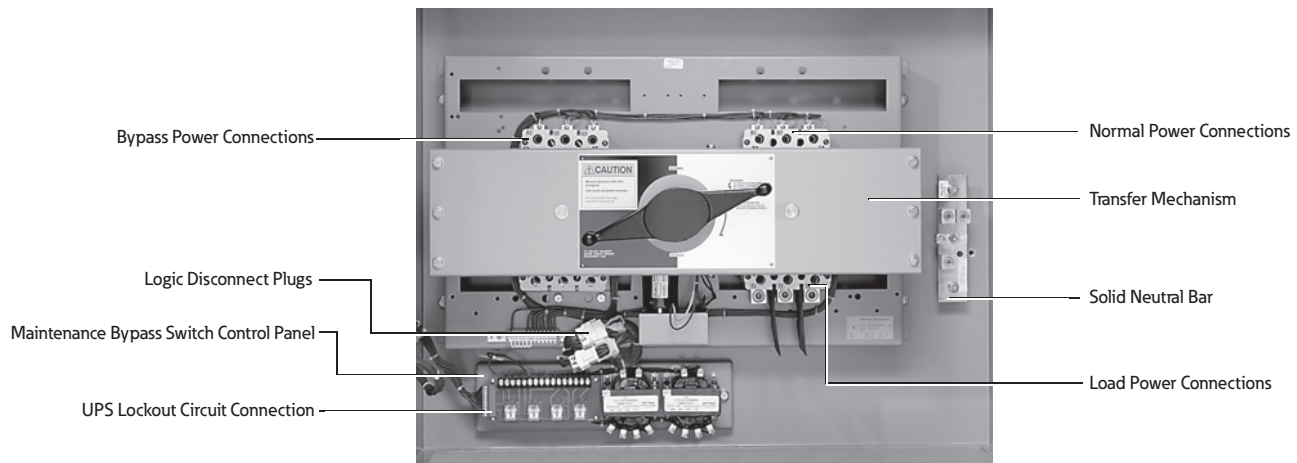
## Catalog Number Selection

## Transfer Switch Equipment



## Technical Data and Specifications

## Maintenance Bypass Switch

Standard Withstand, Closing and Interrupting Ratings <sup>①</sup>

Transfer Switch Ampere Rating	Rating When Used with Upstream Circuit Breaker		Rating When Used with Upstream Fuse			
	Suggested Breaker Rating <sup>②</sup>	240 V	480 V	Maximum Fuse Rating	Fuse Type	480 V
100	100	100	65	200	J, T	200
150	150	100	65	400	J, T	200
225	225	100	65	400	J, T	200
300	300	100	65	400	J, T <sup>③</sup>	200
400	400	65	35	600	J, T	200
600	600	65	50 <sup>④</sup>	800/1200	J, T	100/200
800	800	65	50 <sup>④</sup>	1200/1600	L	100/200
1000	1000	65	50 <sup>④</sup>	1600	L	200

## Notes

<sup>①</sup> Tested in accordance with UL 1008.

<sup>②</sup> For maximum breaker rating in circuits where the transfer switch is evaluated as a "motor branch circuit conductor" refer to the NEC Section 430.25 for sizing.

<sup>③</sup> Also can use Class RK5 fuse with 100 kA rating.

<sup>④</sup> Four-pole units rated 35 kA.

To attain the maximum rating shown in the chart, when protected by an upstream breaker, the upstream device must have an equivalent interrupting rating.



# 5.3

## Transfer Switches

### Breaker-Based Designs

#### Dimensions

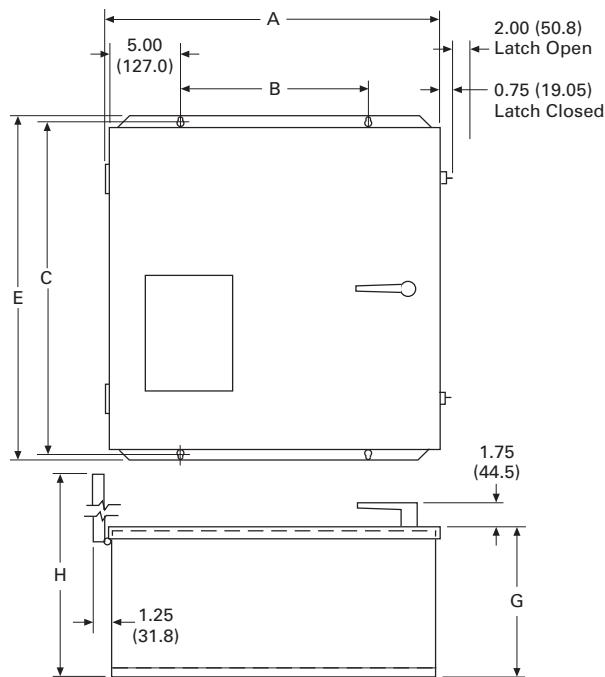
Approximate Dimensions in Inches (mm)

**Manual Transfer and Maintenance Bypass Switches—100–150 A Type MTHXFD Manual /100–1000 A Type MBHE Maintenance Bypass**

#### Manual and Maintenance Bypass Enclosures

Amperes	Dimensions					
	A	B	C	E	G	H
100–150	22.88 (581.2)	13.13 (333.5)	22.74 (577.6)	24.50 (622.3)	10.28 (261.1)	32.31 (820.7)
225–300	38.88 (987.6)	29.13 (739.9)	35.74 (907.8)	37.50 (952.5)	17.78 (438.9)	55.81 (1417.6)
400	38.88 (987.6)	29.13 (739.9)	35.74 (907.8)	37.50 (952.5)	17.78 (438.9)	55.81 (1417.6)
600	38.88 (987.6)	29.13 (739.9)	49.74 (1263.4)	51.50 (1308.1)	17.78 (438.9)	55.81 (1417.6)
800	38.88 (987.6)	29.13 (739.9)	49.74 (1263.4)	51.50 (1308.1)	17.78 (438.9)	55.81 (1417.6)
1000	38.88 (987.6)	29.13 (739.9)	59.74 (1517.4)	61.50 (1562.1)	17.78 (438.9)	55.81 (1417.6)

#### Manual and Maintenance Bypass Switches



**Floor-Standing Magnum Transfer Switch****Contents****Description****Page**

Power Case Switch—Floorstanding, 200–5000 A	
Features, Benefits and Functions . . . . .	<b>V2-T5-52</b>
Product Selection . . . . .	<b>V2-T5-55</b>
Catalog Number Selection . . . . .	<b>V2-T5-55</b>
Standards and Certifications . . . . .	<b>V2-T5-56</b>
Technical Data and Specifications . . . . .	<b>V2-T5-56</b>
Dimensions . . . . .	<b>V2-T5-57</b>
Bypass Isolation Transfer Switch, 200–5000 A . .	<b>V2-T5-60</b>

**Power Case Switch—Floorstanding, 200–5000 A****Product Description**

Eaton's Magnum transfer switches are designed for a variety of standby power applications for critical and noncritical loads. They monitor both Source 1 (Normal) and Source 2 (Emergency) power sources. In the event of a Source 1 power interruption, these switches will automatically transfer the load circuits to the Source 2 power source. Once Source 1 power source has been restored, the process is automatically reversed.

**Application Description**

The Magnum family of transfer switches covers applications ranging from 200 to 5000 A through 600 Vac. Some of the applications are: automatic or non-automatic configurations, open or closed transition and standard or rated suitable for use as service entrance. They are designed for applications where total system coordination must be accomplished while achieving a high level of Withstand, Interrupting, and Closing performance.

Drawout construction is available for applications, such as critical life-support systems, where preventive maintenance, inspection and testing must be accomplished while maintaining continuity of power to the load.

**Automatic Transfer****Open Transition**

Open transition type Magnum transfer switches use the Eaton programmable ATC-900 microprocessor-based logic controller.

**Automatic Transfer****Closed Transition**

Closed transition applications feature the ATC-900 closed transition logic controller.

## Features, Benefits and Functions

### Industrial Design Highlights

- Freestanding enclosure
- High withstand ratings
  - 100 kA standard 3-cycle rating
  - 85 kA standard 30-cycle rating
- Dual drawout on ATS and bypass
- Deadfront
- Safe manual transfer under load
- Electrically operated
- Magnum stored energy mechanism
- Quick make / quick break—switching times (<3 cycles)
- Multi-tap transformer
- True four-pole switched neutral
- Mechanically interlocked
- Integral overcurrent trip option
- Integrated service entrance rating option 100% rated per UL 1008
- OSHPD listed

### Standard Features

- ATC-900 controller
- Drawout cassette on ATS and bypass
- Source available contacts:
  - Source 1 available 1NO/1NC
  - Source 2 available 1NO/1NC
- Switch position contacts:
  - Source 1 position 1NO/1NC
  - Source 2 position 1NO/1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
- Field-programmable time delays
  - Time delay engine start
  - Time delay normal to emergency
  - Time emergency to normal
  - Time delay engine cooldown
  - Time delay emergency failure

- LCD color-based display for programming, system diagnostics and Help menu
- Mimic diagram with source available and connected LED indication
- Four programmable inputs and outputs
- Standard Modbus 485
- USB port for set point downloads and event recording uploads
- Password-protected access to control functions and set point programming
- Two automatic plant exercisers—load or no load, daily, 7-, 14-, 28-day or calendar date operation, 0–600 minute runtime

### Optional Features

- Available UL 1449 Third Edition surge protection device (SPD)
- Automatic transfer operation with selectable (via programming) nonautomatic or automatic retransfer with fail-safe
- Space heater with thermostat
- Digital multi-function power quality metering
- DC power input for uninterrupted monitoring of ATS status
- Integrated load metering
- Expandable I/O (up to 20 I/O total)
- EtherNet TCP/IP communications
- Integrated service entrance option with 100% rated per UL 1008
- Optional remote annunciator

### Unmatched Performance and Versatility

The Eaton family of Magnum transfer switches offers unmatched performance, versatility and value for standby power applications. At the heart of these designs is the Magnum switch with the following features:

### Superior Main Contact Structure

All Eaton Magnum Transfer Switches meet or exceed the standards set forth in UL 1008 and UL 489 with high withstand, totally enclosed Magnum switches. No other transfer switch manufacturer has met the rigid testing requirements of this combination of standards. Completely enclosed contacts add a measure of safety and reliability. They also ensure the integrity of the contact assemblies and minimize the need for periodic maintenance of the contacts, reducing downtime and maintenance time.

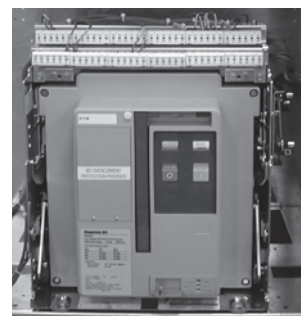
### Fast, Powerful and Safe Switching Mechanism

The mechanism uses a high speed less than or equal to a 3-cycle stored energy switching mechanism. This mechanism can be operated manually under a FULL LOAD.

### Ease of Coordination and Application—Short-Time Withstand

The use of electronic trips has allowed performance curve shaping to facilitate proper system coordination. The most significant is the “short time” rated trip unit.

These trip settings may be set for what are considered extremely high currents for much longer durations than the three-cycle withstand test required under UL 1008. To facilitate improved coordination, Eaton Magnum transfer switches have been tested and are provided with 30-cycle, extended withstand ratings.



Magnum Power Case Switch

### Optional Integral Overcurrent Protection Capability



Optional Digitrip™ Magnum Trip Unit

### UL 1008 100% Rated Service Entrance

For service entrance and other applications, Digitrip solid-state trip units can be integrated into the power switching section. This eliminates the need for separate upstream protective devices, saving cost and space. Available with various combinations of long, short time, instantaneous, ground fault protection and communication. Overcurrent trip selection can be made from the series of Eaton Digitrip RMS trip units including the standard Digitrip 520 or optional 520M, 520MC or 1150.

**Controller Logic**

The ATC-900 Automatic Transfer Switch Controller from Eaton is a comprehensive, multi-function, microprocessor-based automatic transfer switch controller and meter. It is designed to accurately monitor power sources and provide the necessary intelligence to reliably operate a transfer switch through a series of programmed sensing and timing functions. The ATC-900 provides an unmatched degree of programming flexibility to address the needs of any system.

**Controller Primary Functions**

The ATC-900 Automatic Transfer Switch Controller offers these standard features:

- Monitor normal and emergency source voltages and frequencies
- Provide transfer and re-transfer control signals
- Provide engine/generator starting and shutdown signals
- Permit customer programming of operational set points
- Display real-time and historical information
- Permit system testing
- Store customer and factory-established parameters in nonvolatile memory
- Provide faceplate source status indication
- Provides an LCD-based display for programming and status readout

**Controller Flexible Configurations**

The ATC-900 controller includes four programmable inputs and outputs as a standard offering. The inputs and outputs can be assigned functions from a preset list of options, either at the factory or in the field. Additional I/O can be added at any time by adding an external I/O module. Each I/O module contains four inputs and outputs, and up to four modules can be daisy chained to the ATC-900 controller.

**Controller Diagnostics and Troubleshooting**

Eaton's ATC-900 controller provides users with data required to quickly identify the root cause of a backup power system failure and minimize system downtime. With the DCT module, the ATC-900 stores 4 seconds of metered data every 20 msec for certain events. The data is captured 2 seconds before and 2 seconds after the event (except for a power failure, which is 4 seconds before). Oscillographic data for 10 events is stored in the controller and may be downloaded over USB or displayed graphically.

**Controller Communications**

Every ATC-900 controller includes a standard Modbus RTU communications interface with an option to upgrade to Modbus TCP/IP.

The ATC-900 is also compatible with Eaton's Power Xpert Gateway for web-based monitoring, Modbus TCP/IP, SNMP or BACnet®/IP. The Power Xpert Gateway can be used to consolidate data from up to 64 devices, including communications ready transfer switch controllers, trip units and meters, as well as other Eaton devices. Versions of the Power Xpert Gateway include email event notification and data-logging functionality.

**Magnum Fixed Mount Transfer Switch**

**2000 A, Four-Pole, NEMA 1 Enclosed, Through-the-Door Design**



**2000 A Three-Pole Fixed Design NEMA Behind-the-Door Enclosure**

Eaton's drawout Magnum switch should be considered for any systems requiring either greater redundancy, easier maintainability, or where true selective coordination is desired.

Eaton's drawout Magnum switch provides the capability to isolate either of the two power sources (Source 1 or Source 2) and its associated logic while maintaining power to the load.

Each switching section is independent and can be replaced either with a spare switch, or for less critical replacement needs, a replacement unit is available from the factory.

**Ease of Maintenance**

Keyed quick-disconnect plugs are provided for easy and complete isolation of the control circuitry.

Maintenance can be performed on the logic independent from the power sections and still allow the user to manually transfer power under full load conditions.



**Logic Disconnect Plugs**

**Deadfronts**

The Magnum transfer switch comes standard with two deadfront panels mounted over the Magnum power case switch or breaker. These deadfronts provide additional protection isolation from any power connections. The power connections for Source 1, Source 2 and Load connections are all in the back compartment of the transfer switch.

**Interlocking for Open Transition Applications**

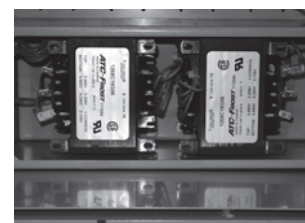
The open transition type Magnum transfer switches feature both mechanical (cable) and electrical interlocking to prevent paralleling of sources.



**Mechanical Cable Interlock**

**Multi-Tap Voltage Selector**

Allows the transfer switch to be readily applied on most system voltages worldwide by connecting to the proper terminals. Available system voltages include 120, 208, 220, 230, 240, 380, 401, 415, 480, or 600 Vac, 50 or 60 Hz.



**Voltage Selection Terminals**

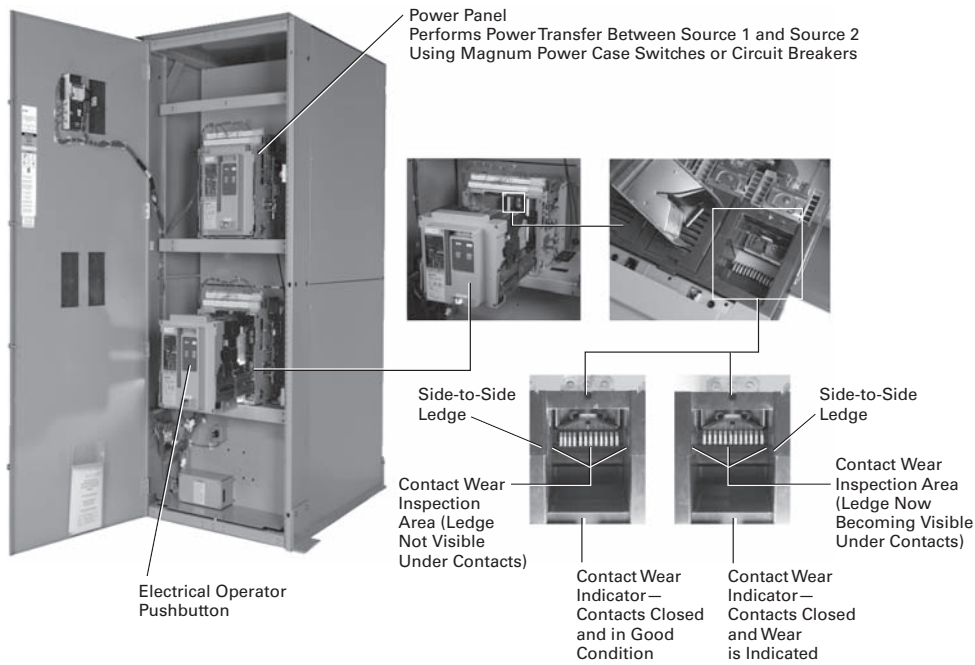
# 5.4

## Transfer Switches

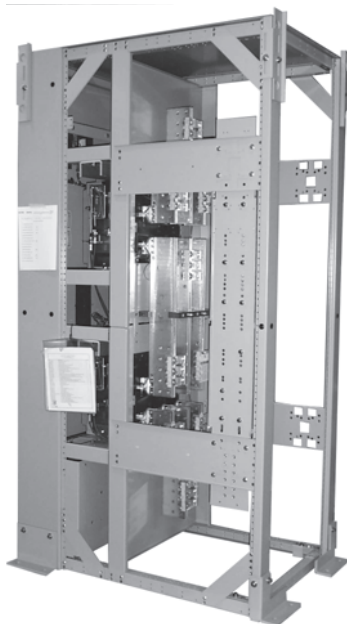
### Magnum-Based Design

5

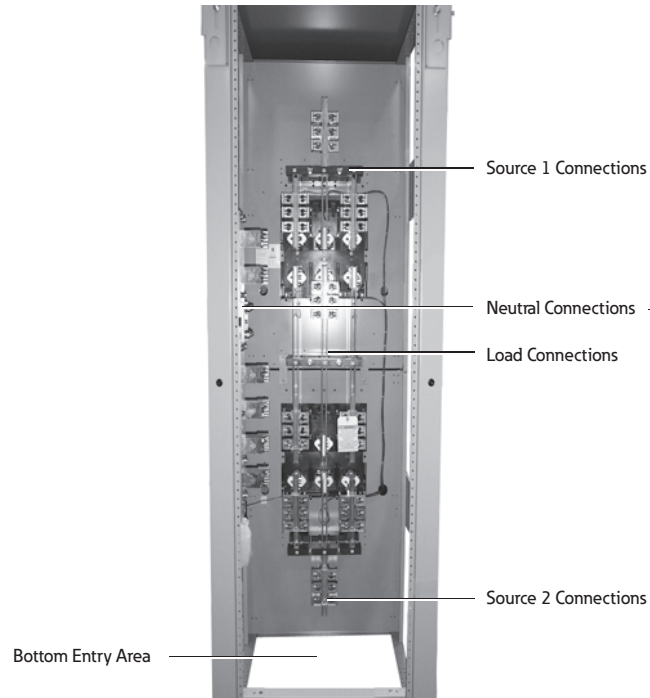
#### Typical Layout



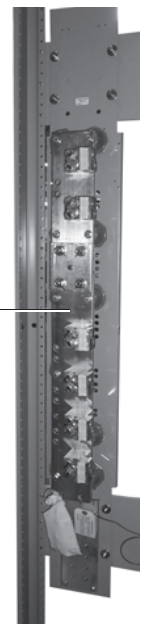
**Basic Switch Components of Magnum Automatic Transfer Switches**



**Side View of Magnum**  
Side or Rear Access Required  
(Half-High Side Panels and Back Panels are Not Shown)



**Magnum-Based Transfer Switches**



**Neutral Assembly**



### Product Selection

Eaton transfer switch equipment offers flexibility and versatility to the system designer and user. All switches include the basic features necessary for normal operation as standard. Eaton also offers an extensive array of optional features/accessories that allows the user to customize a new transfer switch to match the application. Select the appropriate catalog number for the application. Then choose any optional features/accessories needed to complete the project requirements.

#### Catalog Number: **ATV9MGB33200XRU with Optional Features 16B and 37B**

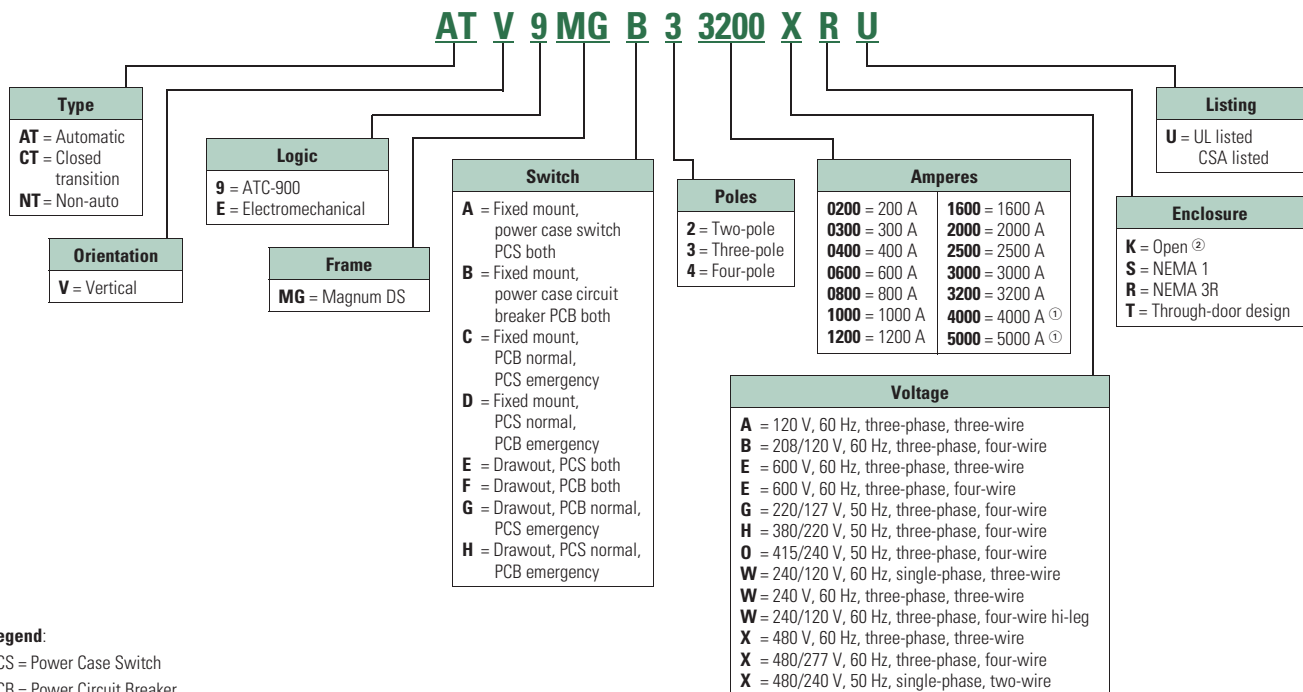
The example above would specify the following:

- Automatic transfer switch
- Vertical configuration
- ATC-900 logic
- Magnum DS frame
- Fixed mount
- Three-pole
- 3200 A
- 480 V
- NEMA 1 enclosure
- UL listed
- ATC-900 transfer logic
- Integral overcurrent protection both sources
- Service entrance rated with ground fault protection if service entrance rating was selected
- Seismic qualified

### Catalog Number Selection

Using the catalog numbering system provides an overview of the ten basic style/feature categories that generate the 15-digit catalog number.

#### Magnum Automatic and Non-Automatic Transfer Switches 200–5000 A



#### Legend:

PCS = Power Case Switch  
PCB = Power Circuit Breaker

#### Notes

- ① 4000 A and 5000 A available as drawout configuration only.  
 ② Available on fixed-mounted units up to 3200 A.

### Standards and Certifications

Eaton Magnum transfer switches meet or exceed all industry standards for endurance, reliability and performance. They are listed under Underwriters Laboratories UL 1008 Standard for transfer switch equipment. With certain options, they also comply with Source 2 and standby system requirements as defined in NFPA 99 for healthcare facilities.

- UL 1008—standard for safety for automatic transfer switches up to 4000 A; 5000 A available as UL 891 only
- UL 489—standard for circuit breakers and molded case switches
- CSA 22.2-178—Canadian transfer switch standard
- NEC Articles—code sections 517, 700, 701, 702—applicable switch equipment
- NFPA 110—Source 2 and Standby Power Systems
- NFPA 99—healthcare facilities
- EGSA 100S—standard for transfer switches
- NEMA ICS10—Standard for transfer switch equipment
- UBC—Uniform Building Code for Seismic Zone 4
- ISO® 9000—International Organization for Standardization
- CBC—California Building Code
- IBC—International Building Code
- BOCA—Building Officials Code Administrators



### Technical Data and Specifications

#### Floor-Standing Magnum Transfer Switch

- Ambient temperature range: -40 °C to 40 °C (-40 °F to 104 °F)
- Operating temperature range: -20 °C to 70 °C (-4 °F to 158 °F)
- Operating humidity: up to 90%
- Relative humidity (noncondensing)

#### Magnum Drawout Transfer Switch

- 200–5000 A
- Two-, three-, four-pole (except 4000 A: three- and four-pole only)
- 120–600 Vac
- 100,000 A withstand/closing/interrupting at 480 Vac
- Short-time withstand—85,000 for 30 cycles

#### Magnum Fixed-Mount Transfer Switch

- 200–3200 A
- Two-, three-, four-pole (except 3200 A: two- and three-pole only)
- 120–600 Vac
- 100,000 A withstand/closing/interrupting at 3 cycle
- Short-time withstand—85,000 for 30 cycles

#### Magnum Drawout Transfer Switches

##### Automatic and Non-Automatic Transfer Switches

Enclosures meet all current applicable NEMA and UL standards for conduit entry, cable bending, gutter space and shielding of live components.

##### NEMA 1 and NEMA 3R Enclosures

Magnum transfer switches are supplied with a front door only. The NEMA 3R are provided with a door within a door design.

The Magnum transfer switch requires rear access. If placed against a wall, then a minimum of 3 feet is needed as well as side access on at least one of the sides. Access to cable space can be via the side, bottom, top or rear.

##### Optional Service Entrance Rated Automatic Transfer Switch

Eaton's service entrance rated power case breaker design is a 100% rated ATS and UL 1008 Listed up to 4000 A.

#### Transfer Switch Withstand Ratings

#### Systems Coordination Information—Withstand, Closing and Interrupting Ratings

Transfer Switch Ampere Rating	0.050 Seconds Short-Circuit 600 V (kA)	0.5 Seconds <sup>①</sup> Short-Time 600 V (kA)
<b>UL 1008</b>		
800	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3000	100	85
3200	100	85
4000	100	—
<b>UL 891</b>		
4000	—	85 <sup>②</sup>
5000	—	85 <sup>②</sup>

#### Notes

<sup>①</sup> Ratings used for coordination with upstream breakers with short-time ratings.

<sup>②</sup> UL 1066 short-time withstand rating.



**Dimensions**

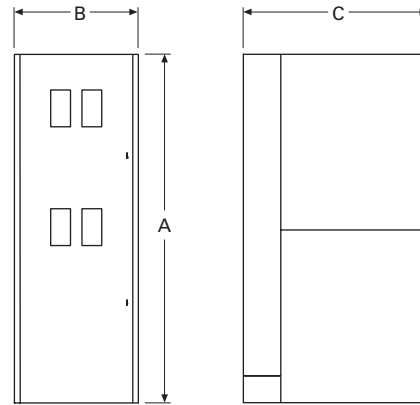
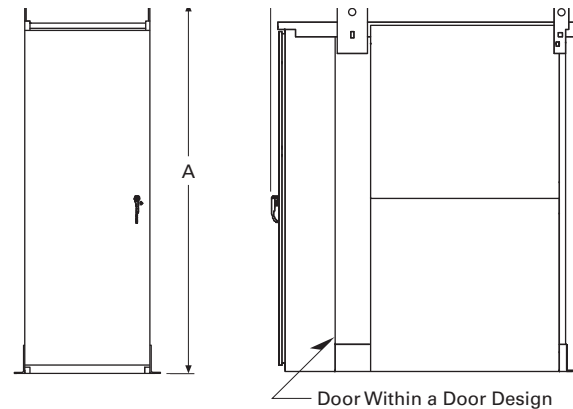
Approximate Dimensions in Inches (mm)

**Magnum Fixed-Mount Transfer Switches**

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lb (kg)
<b>NEMA 1 Enclosed Fixed-Mount Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1050 (477)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1050 (477)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	48.00 (1219.2)	1250 (568)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	1900 (863)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	1900 (863)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	48.00 (1219.2)	2000 (910)
4000 ①	—	①	①	①	①
5000 ①	—	①	①	①	①
<b>NEMA 3R Enclosed Fixed-Mount Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1600 (726)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1600 (726)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	63.00 (1600.2)	1800 (817)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2400 (1090)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	63.00 (1600.2)	2500 (1135)
4000	—	①	①	①	—
5000	—	①	①	①	—

**Note**

① At 4000 and 5000 A, the standard design is drawout. See drawout dimensions.

**200–3200 A Fixed-Mount NEMA 1****200–3200 A Fixed-Mount NEMA 3R**

# 5.4

## Transfer Switches

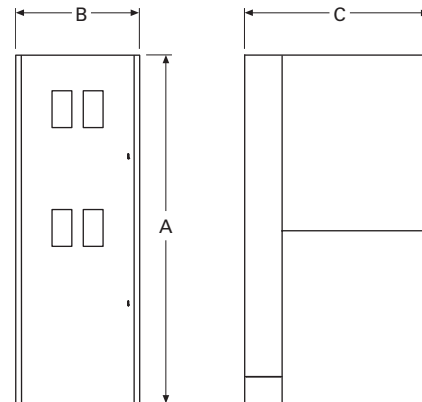
### Magnum-Based Designs

Approximate Dimensions in Inches (mm)

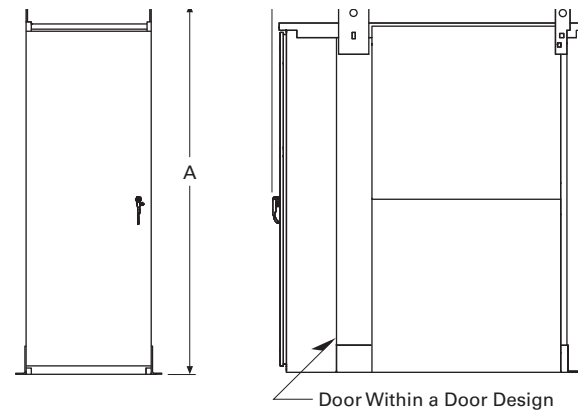
#### Magnum Drawout Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lb (kg)
<b>NEMA 1 Enclosed Drawout Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1600 (727)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1600 (727)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	60.00 (1524.0)	1900 (864)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2500 (1136)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2500 (1136)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	60.00 (1524.0)	2800 (1273)
<b>NEMA 3R Enclosed Drawout Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2100 (953)
200–2000	3	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2100 (953)
200–2000	4	90.00 (2286.0)	32.00 (812.8)	75.00 (1905.0)	2400 (1090)
2500–3200	2	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3000 (1362)
2500–3200	3	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3000 (1362)
2500–3200	4	90.00 (2286.0)	44.00 (1117.6)	75.00 (1905.0)	3300 (1498)

#### 200–3200 A Drawout NEMA 1

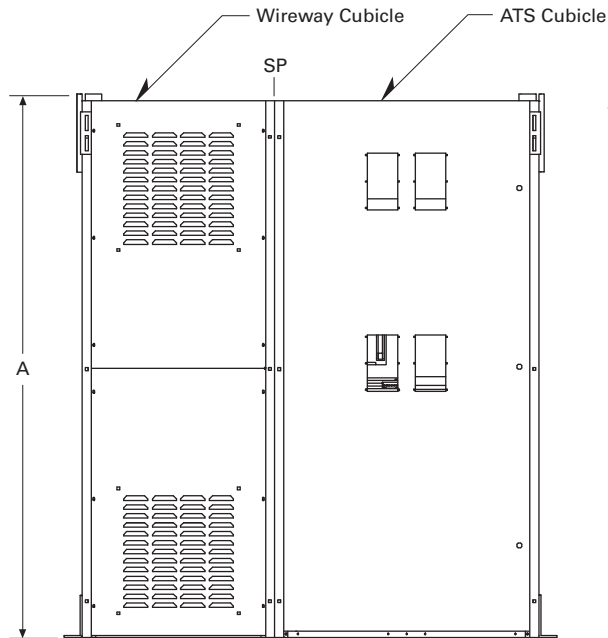


#### 200–3200 A Drawout NEMA 3R

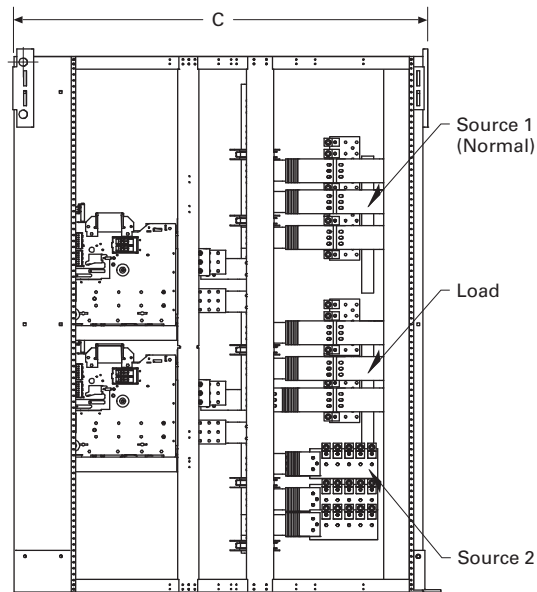


Approximate Dimensions in Inches (mm)

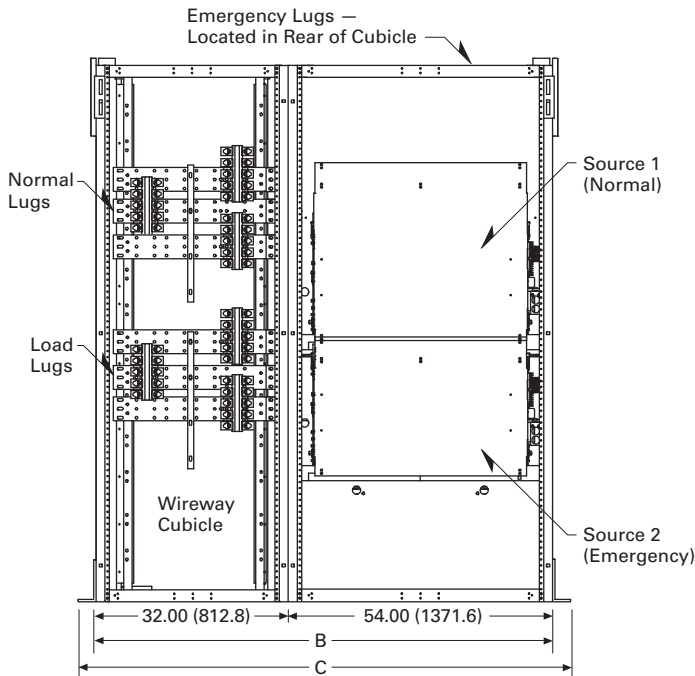
### Magnum 4000–5000 A Units



Front View With Covers



Right Side View



Front View Without Covers

SP = Shipping Split.  
Consult factory for dimensions.

**Note:** The typical Magnum ATS at 4000 and 5000 A ratings will include one cubicle with the Source 1 and Source 2 power case switches or breakers. A second cubicle called a wireway is required unless bus is used for the connections per Connection Type table above. Cable connections to the wireway cubicle can be made from the top or bottom. The wireway cubicle will have removable panels on the front, and cable connections may be made from the top or the bottom. Cable connections to the power case switch or breaker cubicle are made from the back. Consult factory for dimensions. The wireway width is 32.00 inches (812.8 mm).

### Connection Type (4000–5000 A Only)

Connection Type			
Line	Emergency	Load	Wireway
Cable	Cable	Cable	Yes
Bus	Cable	Cable	Yes
Cable	Bus	Cable	Yes
Cable	Cable	Bus	Yes
Bus	Bus	Cable	No
Bus	Cable	Bus	No
Cable	Bus	Bus	No
Bus	Bus	Bus	No

### Magnum Drawout Transfer Switches

Ampere Rating	No. of Poles	A Height	B Width	C <sup>①</sup> Width	D Depth	Shipping Weight Lb (kg)
4000	3 or 4	90.00 (2286.0)	86.00 (2184.4)	92.00 (2336.8)	68.00 (1727.2)	②
5000	3 or 4	90.00 (2286.0)	86.00 (2184.4)	92.00 (2336.8)	68.00 (1727.2)	②

#### Notes

- ① Seismic mounting adds 3.00 inches (76.2 mm) width to each side or additional 6.00 inches (152.4 mm) to width.
- ② Consult factory.

## Bypass Isolation Transfer Switch



## Contents

## Description

## Page

Power Case Switch—Floorstanding, 200–5000 A	<b>V2-T5-51</b>
Bypass Isolation Transfer Switch, 200–5000 A	
Standards and Certifications . . . . .	<b>V2-T5-61</b>
Catalog Number Selection . . . . .	<b>V2-T5-62</b>
Product Selection . . . . .	<b>V2-T5-62</b>
Technical Data and Specifications . . . . .	<b>V2-T5-63</b>

## Bypass Isolation Transfer Switch, 200–5000 A

## Product Description

A bypass isolation switch utilizes loadbreak isolation and bypass transfer power contacts. Thus, should voltage be lost on the line to which the ATS is connected, and should a manual bypass be required to the other line, this can be accomplished safely and quickly as described below. With contactor designs utilizing non-loadbreak isolation and bypass switches, manual bypass to the other line is hindered by mechanical or electrical safety interlocking.

## Application Description

The bypass isolation switch is designed for applications where maintenance, inspection and testing must be performed while maintaining continuous power to the load. This is typically required in critical life-support systems and standby power situations calling for safe system maintenance with no power disruptions. Such a design allows for the quick removal of the different switching devices for inspection, maintenance or replacement.

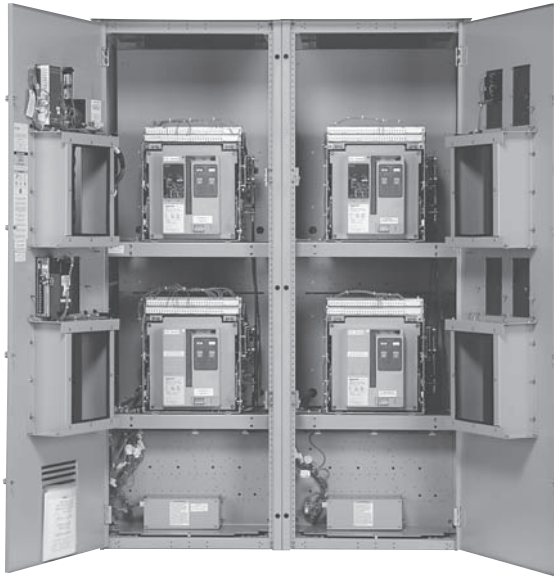
## Features, Benefits and Functions

Eaton's transfer switch is a rugged, compact design utilizing Magnum power switches or Magnum power circuit breakers to transfer essential loads from one power source to another. Open transition switching devices are interlocked to prevent both switching devices from being closed at the same time. The versatile design, in addition to standard transfer functions, offers an optional integral thermal and short-circuit protection in either or both switching devices.

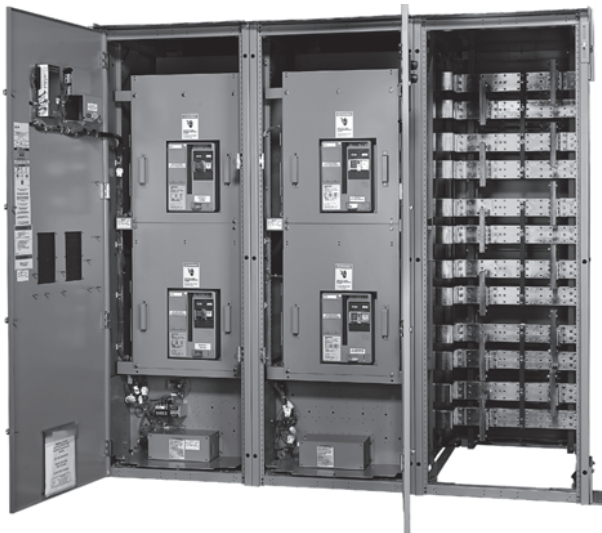
The switching devices are in a compact vertical arrangement. The logic can be easily disconnected from the switching device without disturbing critical connections. The enclosure is free standing, and by using the specially supplied cleats, the switch is seismic approved (Option 42). The terminals are mounted in the rear of the switch, permitting rear, top, bottom or side cable or bus bar entrance.

The switching devices have a high withstand rating. The high-speed, stored-energy switching mechanism guarantees a transfer time of less than three cycles.

- Reliable microprocessor logic
- Designed to safely withstand fault currents
- Eliminates need for complex interlocks
- Most versatile bypass isolation transfer switch available
- Eaton drawout cassette design
- Overcurrent protection available
- No loadbreak when bypassing to the same source
- Drawout capabilities on both ATS and bypass portions
- Compact design
- Ability to test power switching elements during drawout process
- Power switching devices completely interchangeable between ATS and bypass portions



**Magnum Bypass Isolation Front View without the Deadfront Panels—NEMA 1 Through the Door**



**Front Access Option 54 A is Available on All Magnum Designs**

### Standards and Certifications

Eaton transfer switch equipment is listed for application by UL and CSA. In addition, Eaton ATSS are listed in File E38116 by Underwriters Laboratories under Standard UL 1008. This standard covers requirements for ATSS intended for use in ordinary locations to provide for lighting and power as follows:

- A. In emergency systems, in accordance with Articles 517 and 700 in the National Electrical Code (NEC), American National Standards Institute/National Fire Protection Association (ANSI/NFPA) 70 and the NFPA No. 76A and/or
- B. In standby systems, in accordance with Article 702 of the NEC and/or
- C. In legally required standby systems in accordance with Article 701 of the NEC. Eaton ATSS are available to meet NFPA 110 for emergency and standby power systems, and NFPA 99 for health-care facilities when ordered with the appropriate options. Since Eaton ATSS utilize specially designed switches and/or switching devices as the main power switching contacts, these devices must also be listed under the additional UL Standard 1066. UL utilizes two basic types of listing programs:
  - a. Label Service, and
  - b. Re-examination. UL 1066 employs a label service listing program that requires an extensive follow-up testing program for listed devices. Standard UL 1008 for ATSS lists devices under the re-examination program that only requires a continual physical re-examination of the components used in the product to ensure consistency with the originally submitted device. Follow-up testing IS NOT required by UL 1008. Representative production samples of switches and switching devices used in Eaton ATSS are subjected to a complete test program identical to the originally submitted devices on an ongoing periodic basis per UL 1066. The frequency of such a re-submittal can be as often as every quarter for a low ampere device.

**Note:** IBC seismic qualified.



# 5.4

## Transfer Switches

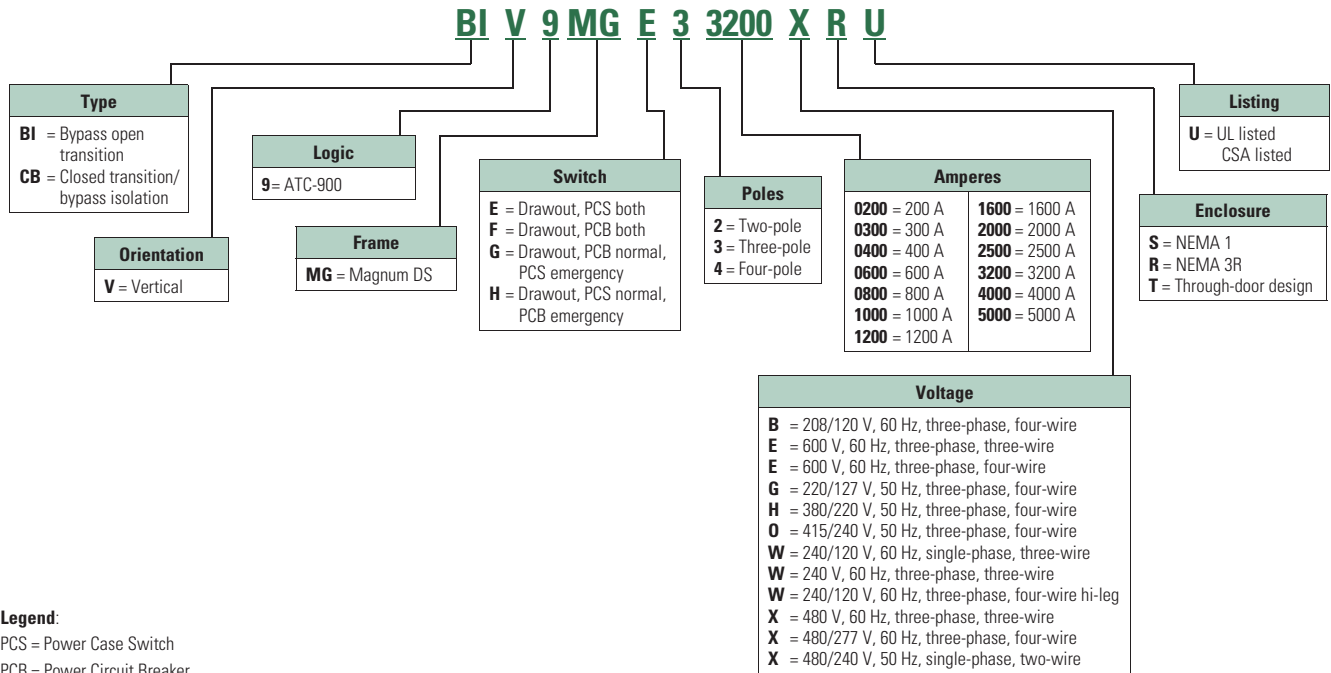
### Magnum-Based Designs

#### Catalog Number Selection

Using the catalog numbering system provides an overview of the ten basic style/feature categories that generate the 15-digit catalog number.

#### Magnum Bypass, Transfer Switches 200–5000 A

5



#### Product Selection

Eaton transfer switch equipment offers flexibility and versatility to the system designer and user. All switches include the basic features necessary for normal operation as standard. Eaton also offers an extensive array of optional features/accessories that allows the user to customize a new transfer switch to match the application. Select the appropriate catalog number for the application. Then choose any optional features/accessories needed to complete the project requirements.

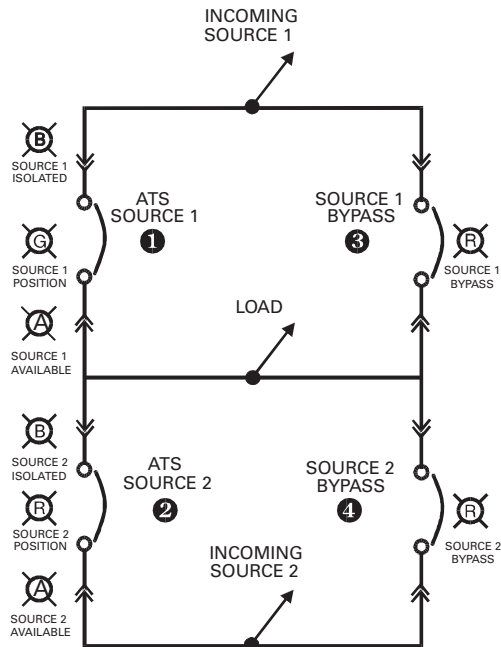
#### Catalog Number: **BIV9MGE33200XRU**

The example above would specify the following:

- Bypass isolation
- Vertical configuration
- ATC-900 controller
- Magnum DS frame
- Power case switch normal and emergency
- Drawout
- Three-pole
- 3200 A
- 480 V
- NEMA 3R enclosure
- UL listed

## Technical Data and Specifications

## Typical Bypass Isolation Switch Schematic



## Systems Coordination Information—Withstand, Closing and Interrupting Ratings

Transfer Switch Ampere Rating	0.050 Seconds Short-Circuit 600 V (kA)	0.50 Seconds <sup>①</sup> Short-Time 600 V (kA)
<b>UL 1008</b>		
800	100	85
1000	100	85
1200	100	85
1600	100	85
2000	100	85
2500	100	85
3000	100	85
3200	100	85
4000	100	—
<b>UL 891</b>		
4000	—	85 <sup>②</sup>
5000	—	85 <sup>②</sup>

**Notes**

<sup>①</sup> Ratings used for coordination with upstream breakers with short-time ratings.

<sup>②</sup> UL 1066 short-time withstand rating.



# 5.4

## Transfer Switches

### Magnum-Based Designs

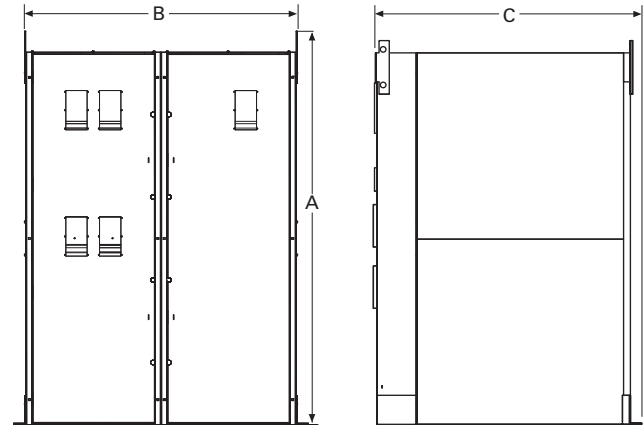
Approximate Dimensions in Inches (mm)

#### Magnum Bypass Isolation Drawout Transfer Switches

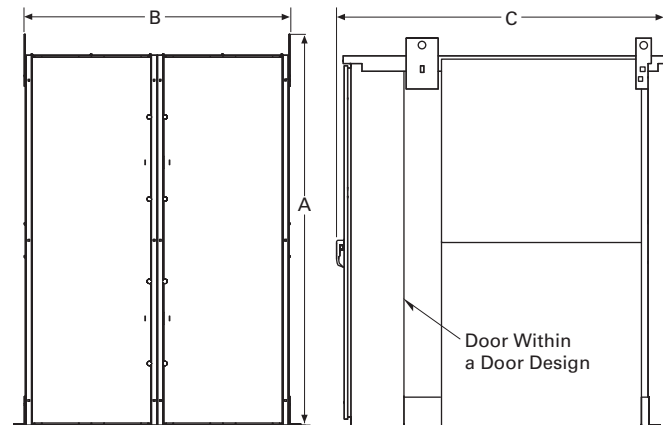
Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lb (kg)
<b>NEMA 1 Enclosed Drawout Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3100 (1409)
200–2000	3	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3100 (1409)
200–2000	4	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	3700 (1682)
2500–3200	2	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	4700 (2136)
2500–3200	3	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	4700 (2136)
2500–3200	4	90.00 (2286.0)	64.00 (1625.6)	60.00 (1524.0)	5500 (2500)
<b>NEMA 3R Enclosed Drawout Transfer Switch</b>					
200–2000	2	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	4100 (1861)
200–2000	3	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	4100 (1861)
200–2000	4	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	4700 (2134)
2500–3200	2	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	5700 (2588)
2500–3200	3	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	5700 (2588)
2500–3200	4	90.00 (2286.0)	64.00 (1625.6)	75.00 (1905.0)	6500 (2951)

**Note:** Add 3.00 inches (76.2 mm) to the height, 6.00 inches (152.4 mm) to the width and 3.00 inches (76.2 mm) to the depth to all enclosure dimensions to account for the seismic mounting brackets.

#### 200–3200 A Drawout NEMA 1

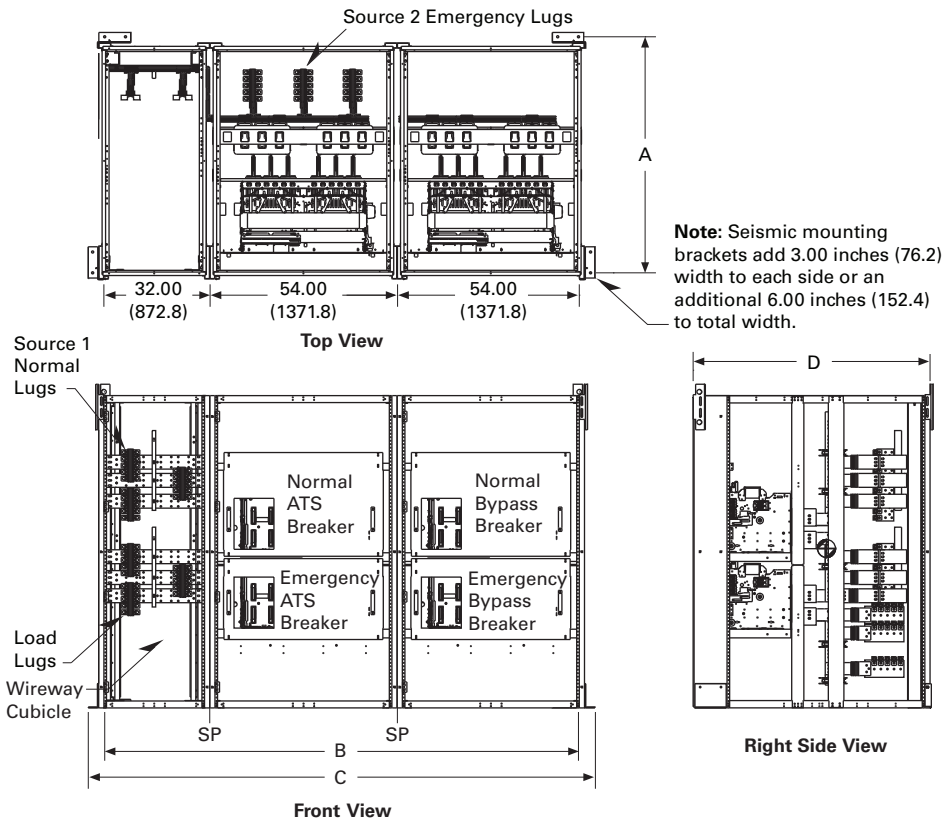


#### 200–3200 A Drawout NEMA 3R



Approximate Dimensions in Inches (mm)

### Magnum 4000–5000 A Units—NEMA 1



**Note:** The 4000 and 5000 A bypass isolation ATS will include two cubicles for the Source 1 and Source 2 Normal and the Bypass power case switch.

An additional cubicle called a wireway is provided for the Normal and Load connections. The wireway cubicle will have removable panels on the front, and cable connections may be made from the top or the bottom. Cable connections for Emergency are made in the rear. The wireway width is 32.00 inches (812.8 mm).

SP = Shipping Split.  
Consult factory for dimensions.

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### NEMA 1 Magnum Drawout Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C <sup>①</sup> Width	D Depth	Shipping Weight Lb (kg)
4000	3 or 4	90.00 (2286.0)	137.00 (3479.8)	146.00 (3708.4)	60.00 (1524.0)	②
5000	3 or 4	90.00 (2286.0)	137.00 (3479.8)	146.00 (3708.4)	60.00 (1524.0)	②

### Magnum Bypass Isolation Drawout Transfer Switches

Ampere Rating	Number of Poles	A Height	B Width	C Depth	Shipping Weight Lb (kg)
<b>NEMA 1 Enclosed Drawout Transfer Switch</b>					
4000	2 or 3	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	6900 (3133)
	4	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	7600 (3450)
5000	2 or 3	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	7900 (3587)
	4	90.00 (2286.0)	137.00 (3479.8)	60.00 (1524.0)	8600 (3904)
<b>NEMA 3R Enclosed Drawout Transfer Switch</b>					
4000	2 or 3	90.00 (2286.0)	137.00 (3479.8)	75.00 (1905.0)	7900 (3587)
	4	90.00 (2286.0)	137.00 (3479.8)	75.00 (1905.0)	8600 (3904)
5000	2 or 3	90.00 (2286.0)	137.00 (3479.8)	75.00 (1905.0)	8900 (4041)
	4	90.00 (2286.0)	137.00 (3479.8)	75.00 (1905.0)	9600 (4358)

#### Notes

① Seismic mounting adds 3.00 inches (76.2 mm) width to each side or additional 6.00 inches (152.4 mm) to width.

② Consult factory.

**Contents****Description****Page**

Product Selection Guide

Automatic Transfer Controllers Feature

Selection Chart . . . . .

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ATC-100 Controller . . . . .

**V2-T5-70**

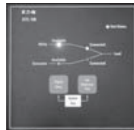
ATC-300+ Controller . . . . .

**V2-T5-72**

ATC-900 Controller . . . . .

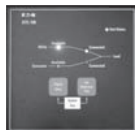
**V2-T5-76**

Controller Replacement Guide . . . . .

**V2-T5-87****Product Selection Guide****Automatic Transfer Controllers Feature Selection Chart**

Feature Description	ATC-100	ATC-300+	ATC-900
<b>Transition</b>			
Open transition	Standard	Standard	Standard
Closed transition	Not available	Not available	Standard
<b>Timers</b>			
Time delay normal to emergency (TDNE)	Standard	Standard	Standard
Time delay engine start (TDES)	Standard	Standard	Standard
Time delay emergency to normal (TDEN)	Standard	Standard	Standard
Time delay engine cooldown (TDEC)	Standard	Standard	Standard
Time delay emergency fail (TDEF)	Standard	Standard	Standard
<b>Engine/Generator Exerciser</b>			
Plant exerciser (PE) with fail-safe	Selectable—OFF, 7-, 14-, 28-day interval fixed run time 15 minutes no load/load with fail-safe	Selectable—OFF, 7-, 14-, 28-day interval, 0–600 minutes, no load/load with fail-safe	Two independent exerciser modes—OFF, daily, 7-, 14-, 28-day interval or by calendar date (up to 12 independent calendar dates). Test operations include independent transfer time delays
<b>Source 1 Sensing</b>			
All-phase undervoltage and underfrequency protection	Standard	Standard	Standard
All-phase overvoltage and overfrequency protection	Standard	Standard	Standard
Three-phase rotation sensing	Not available	Standard	Standard
Three-phase voltage unbalance	Not available	Standard	Standard
<b>Source 2 Sensing</b>			
All-phase undervoltage and underfrequency protection	Standard	Standard	Standard
All-phase overvoltage and overfrequency protection	Standard	Standard	Standard
Three-phase rotation sensing	Not available	Standard	Standard
Three-phase voltage unbalance	Not available	Standard	Standard

Automatic Transfer Controllers Feature Selection Chart, continued



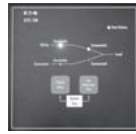
Feature Description	ATC-100	ATC-300+	ATC-900
<b>Manual Controls</b>			
Test operators	Standard	Standard	Standard
Four-position test selector switch (FPSS)	Not available	Not available	Optional
Time delay bypass pushbutton	Not available	Standard	Standard
Maintenance selector switch (MSS)	Not available	Optional	Optional
Automatic/manual operation selector switch	Not available	Optional	Optional
Automatic/manual retransfer selector switch	Not available	Not available	Optional
Manual retransfer pushbutton	Not available	Optional	Optional
<b>Indications / Status Display</b>			
Source 1 connected / Source 2 connected	Standard	Standard	Standard
Source 1 available / Source 2 available	Standard	Standard	Standard
Source 1 tripped / Source 2 tripped	Standard	Standard	Standard
<b>Customer Outputs</b>			
Source 1 / Source 2 present contacts	Not available	Standard—2NO and 2NC	Not available
Source 1 available / Source 2 available contacts	Not available	Not available	Standard—1 Form C
Load sequence	Not available	Not available	Configurable—1 Form C
Selective load shed	Not available	Not available	Configurable—1 Form C
Load bank control	Not available	Not available	Configurable—1 Form C
Pre-transfer	Not available	Standard—1 Form C	Configurable—1 Form C
Pre-/post-transfer	Not available	Not available	Configurable—1 Form C
Source 1 connected	Not available	Not available	Configurable—1 Form C
Source 2 connected	Not available	Not available	Configurable—1 Form C
ATS not in automatic	Not available	Not available	Configurable—1 Form C
General alarm	Not available	Standard	Configurable—1 Form C
ATS in test	Not available	Not available	Configurable—1 Form C
Engine test aborted	Not available	Not available	Configurable—1 Form C
Cooldown in process	Not available	Not available	Configurable—1 Form C
Engine start contact status	Not available	Not available	Configurable—1 Form C
Emergency inhibit on	Not available	Not available	Configurable—1 Form C
<b>Switch Position Indication Contact</b>			
Source 1 position indication contact	Not available	Standard—1 Form C	Standard—1 Form C
Source 2 position indication contact	Not available	Standard—1 Form C	Standard—1 Form C

## Automatic Transfer Controllers Feature Selection Chart, continued



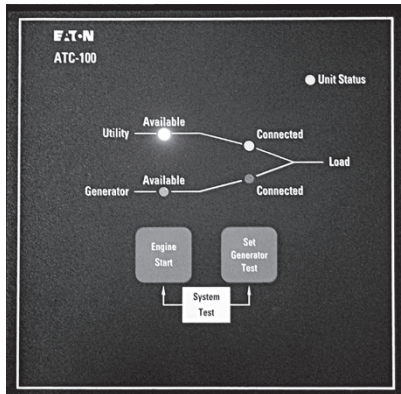
Feature Description	ATC-100	ATC-300+	ATC-900
<b>Customer Inputs</b>			
Go to emergency (Source 2)	Not available	Standard	Standard—configurable input
Load shed / emergency inhibit	Not available	Standard	Standard—configurable input
Monitor mode	Not available	Optional	Standard—configurable input
Bypass timers	Not available	Not available	Standard—configurable input
Lockout	Not available	Optional	Standard—configurable input
Manual retransfer on/off	Not available	Programmed	Standard—configurable input
Manual retransfer	Not available	Standard	Standard—configurable input
Slave in	Not available	Not available	Standard—configurable input
Remote engine test	Not available	Not available	Standard—configurable input
Preferred source selection	Not available	Not available	Standard—configurable input
Remote load test	Not available	Not available	Standard—configurable input
ATS on bypass	Not available	Not available	Standard—configurable input
<b>Integrated Metering</b>			
DCT metering—load side	Not available	Not available	Optional
<b>Communications</b>			
Modbus 485	Not available	Optional	Standard
Modbus TCP/IP	Not available	Optional	Optional
<b>Transfer Mode Open Transition</b>			
Delayed—time delay neutral	Standard—based on construction	Standard—based on construction	Standard—based on construction
In-phase monitoring	Standard—based on construction	Standard—based on construction	Standard—based on construction
Load voltage decay	Not available	Not available	Standard—based on construction
<b>Transfer Mode Closed Transition</b>			
Closed transition	Not available	Not available	Standard—based on construction
Closed transition/In-phase	Not available	Not available	Standard—based on construction
Closed transition/In-phase/ Time delay neutral	Not available	Not available	Standard—based on construction
Closed transition/In-phase/ Load voltage delay	Not available	Not available	Standard—based on construction
<b>Service Entrance Rating</b>			
Source 1, Source 2 or both, and with and without ground fault protection	Not available	Optional	Optional
<b>Stainless Steel Cover</b>			
SS lockable cover for controller		Optional	Optional

Automatic Transfer Controllers Feature Selection Chart, continued



Feature Description	ATC-100	ATC-300+	ATC-900
<b>Programming Selections</b>			
Time delay normal to emergency	3 seconds (fixed)	0–1800 seconds	0–9999 seconds
Time delay emergency to normal	5 minutes (fixed)	0–1800 seconds	0–9999 seconds
Time delay engine cooldown	5 minutes (fixed)	0–1800 seconds	0–9999 seconds
Time delay engine start	3 seconds (fixed)	0–120 seconds	0–120 seconds
Time delay neutral	Not available	0–120 seconds	0–120 seconds or based on load voltage decay of 2–30% of nominal
Time delay Source 2 fail	Not available	0–6 seconds	0–6 seconds
Time delay voltage unbalance	Not available	10–30 seconds	10–30 seconds
Voltage unbalance three-phase	Not available	0 or 1 (1 = enabled)	Enabled or disabled
Phase reversal three-phase	Not available	Dropout 5–20% Pickup (DO –2%) –3%	Dropout 5–20% Pickup (DO –2%) –3%
In-phase	Not available	0 or 1 (1 = enabled)	
Load sequencing	Not available	Not available	0–120 seconds (up to xx devices)
Pre-transfer signal	Not available	1–120 seconds	0–120 seconds
Plant exerciser	Selectable—OFF, 7-, 14-, 28-day interval, fixed run time 15 minutes, no load/load with fail-safe	Selectable—OFF, 7-, 14-, 28-day interval, 0–600 minutes, no load/load with fail-safe	Two independent exerciser modes—OFF, daily, 7-, 14-, 28-day interval or by calendar date (up to 12 independent calendar dates). Test operations include independent transfer time delays
Preferred source selection	Not available	Not available	Source 1, Source 2 or None
Commitment to transfer in TDNE	Not available	Not available	Enabled or disabled
Retransfer mode N/A automatic or manual	Not available	Optional	Enabled or disabled
Auto daylight saving time adjustment	Not available	Not available	Enabled or disabled
System selection	Utility/generator	Utility/generator or dual utility	Utility/generator, dual utility, dual generator or three source
<b>Voltage Specification</b>			
System application voltage	Up to 480 Vac	Up to 600 Vac	Up to 600 Vac
Voltage measurements	Source 1 and 2	Source 1 and 2—VAB, VBC and VCA	Source 1, 2 and load—VAB, VBC and VCA
Voltage measurement range	120–480 Vac	0–790 Vac rms	0–700 Vac rms
Operating power	95–145 Vac	65–145 Vac	65–160 Vac 24 Vdc (±10%)
<b>Frequency Specifications</b>			
Frequency measurements	Source 2	Source 1 and 2	Source 1 and 2
Frequency measurement range	50–60 Hz	40–70 Hz	40–70 Hz
<b>Environmental Specifications</b>			
Operating temperature range	–20 to +70 °C	–20 to +70 °C	–20 to +70 °C
Storage temperature range	–30 to +85 °C	–30 to +85 °C	–30 to +85 °C
Operating humidity	0 to 95% relative humidity (noncondensing)	0 to 95% relative humidity (noncondensing)	0 to 95% relative humidity (noncondensing)
Operating environment	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons
<b>Front Panel Indication</b>			
Mimic diagram with LED indication	Unit status, Source 1 and 2 available and connected (five total)	Unit status, Source 1 and 2 available and connected (five total)	Unit status, Source 1 and 2 available and connected (seven total)
Main display	N/A	LCD-based display, 2 lines, 16 characters	LCD display, 4.3 inch color TFT (480x272)
Display language	N/A	English, French and Spanish	English, French and Spanish
Communications capable	N/A	Modbus 485	Modbus 485 or Ethernet TCP/IP
Enclosure compatibility	NEMA 1 and 3R	NEMA 1, 12, 3R and 4X UV resistant faceplate	NEMA 1, 12, 3R and 4X UV resistant faceplate

## ATC-100 Controller



## Contents

## Description

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## ATC-100 Controller

## Product Description

The ATC-100 Controller is a comprehensive, multifunction, microprocessor-based ATS controller. It is a compact, self-contained, panel-mounted device designed to replace traditional relay and solid-state logic panels.

## Application Description

The ATC-100 Controller provides both fixed and jumper-selectable settings to allow for a range of applications. It operates from all system voltages between 120 and 480 Vac, single-phase and three-phase, at 50 or 60 Hz. In addition, a period of no control power operation is provided. The ATC-100 Controller monitors the condition of the three-phase line-to-line voltage and frequency of both the utility and generator power sources. It can also be set up for single-phase operation. The ATC-100 controller provides the necessary intelligence to ensure that the transfer switch operates properly through a series of sensing and timing functions.

The ATC-100 controller can be used with both the breaker-based design and the contactor-based design up to 400 A single- or three-phase. The ATC-100 controller is designed for residential or light commercial applications. If an application is defined as an Emergency or Legally required system, then Eaton recommends that an ATC-300+ or ATC-900 controller be used. See **Page V2-T5-71** for ranges and factory settings.

## Features, Benefits and Functions

## Standard Features

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/under frequency
  - Overvoltage/over frequency
- Controller settings via jumpers located at the rear of the unit
- Mimic diagram with source available and connected LED indication
- System TEST pushbutton
- Selectable—OFF, daily, 7-, 14-, 28-day interval fixed run time 15 minutes no load/load with fail-safe
- Monitor utility and generator power source voltages and generator power source frequency
- Provide undervoltage protection of the utility and generator power sources
- Provide underfrequency and overfrequency protection of the utility and generator power source
- Permit easy customer setup
- Permit system testing
- Provide faceplate source status indications



## Standards and Certifications

- UL listed component
- IEC 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-11
- CISPR 11, Class B
- FCC Part 15, Class B



## Technical Data and Specifications

### ATC-100 Controller Specifications

Description	Specification
Input control voltage	95 to 145 Vac 50/60 Hz
Voltage measurements of	Utility $V_{AB}$ Generator $V_{AB}$ Utility $V_{BC}$ Generator $V_{BC}$ Utility $V_{CA}$ Generator $V_{CA}$
Voltage measurement range	0 to 575 Vac rms (50/60 Hz)
Voltage measurement accuracy	±1% of full scale
Frequency measurements of	Generator
Frequency measurement range	40 Hz to 70 Hz
Frequency measurement accuracy	±0.3 Hz over the measurement range
Operating temperature range	−20 ° to +70 °C (−4 ° to +158 °F)
Storage temperature range	−0 ° to +85 °C (−22 ° to +185 °F)
Operating humidity	0 to 95% relative humidity (noncondensing)
Operating environment	Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons
Generator start relay	5 A, 1/6 hp @ 250 Vac 5 A at 30 Vdc with a 150W maximum load
K1, K2 relays	10 A, 1–3 hp @ 250 Vac 10 A @ 30 Vdc
Enclosure compatibility	NEMA 1, NEMA 3R and NEMA 12 UV-resistant ATC-100 faceplate

### Adjustable Features with Range and Factory Default

Set Point	Fixed/ Adjustable	Description	Range	Factory Default Breakers	Contactors
TDES	Fixed	Time delay engine start	3 seconds	3 seconds	3 seconds
TDNE	Jumper-selectable	Time delay normal to emergency	2 or 15 seconds	15 seconds	15 seconds
TDEN	Fixed	Time delay emergency to normal	5 minutes	5 minutes	5 minutes
TDEC	Fixed	Time delay engine cool-off	1 minute	1 minute	1 minute
NOM FREQ	Jumper-selectable	Nominal frequency	50 or 60 Hz	As ordered	As ordered
NOM VOLTS	Jumper-selectable	Nominal voltage	120, 208, 220, 230, 240, 380, and 480 V	As ordered	As ordered
S1 UV DROP	Fixed	Utility undervoltage dropout	80% of NOMV	80% of NOMV in volts	80% of NOMV in volts
S2 UV DROP	Fixed	Generator undervoltage dropout	80% of NOMV	80% of NOMV in volts	80% of NOMV in volts
S1 UV PICK	Fixed	Utility undervoltage pickup	90% of NOMV	90% of NOMV in volts	90% of NOMV in volts
S2 UV PICK	Fixed	Generator undervoltage pickup	90% of NOMV	90% of NOMV in volts	90% of NOMV in volts
S2 UF DROP	Fixed	Utility underfrequency dropout	90% of NOMF	90% of NOMF in hertz	90% of NOMF in hertz
S2 UF PICK	Fixed	Generator underfrequency pickup	95% of NOMF	95% of NOMF in hertz	95% of NOMF in hertz
S2 OF DROP	Jumper-selectable	Generator overfrequency dropout	Off or 115% of NOMF (contactor)	Off	115%
S2 OF PICK	Jumper-selectable	Generator overfrequency pickup	Off or 110% of NOMF	Off	110%
Generator test	Jumper-selectable	Generator test programming	7-, 14- or 28-day	7-day	7-day
Test mode	Jumper-selectable	Test mode	Off, No Load, Load	Off	Off
TER	Fixed	Engine run test time	15 minutes	15 minutes	15 minutes
PHASES	Jumper-selectable	Three-phase or single-phase	1 or 3	As ordered	As ordered
TDEF	Fixed	Time delay emergency fail timer	6 seconds	6 seconds	6 seconds
TDN	Jumper-selectable	Time delay neutral	Disabled (0 seconds) or enabled (2 seconds)	Enabled (2 seconds)	Enabled (2 seconds)

**ATC-300+ Controller****Contents**

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**ATC-300+ Controller****Product Description**

Transfer switches are equipped with the high-performance ATC-300+ digital transfer controller, receive rock-solid monitoring, status reporting and transfer control operation. Its superior design and robust construction make the ATC-300+ the industry benchmark for critical and distributed power systems.

**Application Description**

Eaton's ATC-300+ Controller-Based Automatic Transfer Switch is designed to provide unmatched performance, reliability and versatility for critical standby power applications.

**Features, Benefits and Functions****Standard Features**

- Auxiliary relay contacts:
  - Source 1 present 2NO and 2NC
  - Source 2 present 2NO and 2NC
- Switch position indication contacts:
  - Source 1 position 1NO and 1NC
  - Source 2 position 1NO and 1NC
- Source 1 and Source 2 sensing:
  - Undervoltage/underfrequency
  - Overvoltage/overfrequency
  - Three-phase rotation protection
  - Three-phase voltage unbalance
- Pretransfer signal contacts 1NO/1NC
- Go to emergency (Source 2)
- Seven field-programmable time delays
- LCD-based display for programming, system diagnostic and Help message display
- Mimic diagram with source available and connected LED indication
- Time-stamped history log
- System TEST pushbutton
- Programmable plant exerciser—OFF, daily, 7-, 14-, 28-day interval selectable run time 0–600 minutes no load/load with fail-safe

**Optional Features**

- Suitable for use as service equipment in the standard enclosure size when used with breaker-based design transfer switches
- Available UL 1449 3rd Edition compliant surge protection devices
- Integrated distribution panels
- Field-selectable multi-tap transformer panel permits operation on a wide range of system voltages
- Integral overcurrent protection available when used with breaker-based design transfer switches
- Space heater with thermostat
- Ammeter—load side
- Power quality metering
- Stainless steel cover for controller
- Manual retransfer from emergency to normal
- Communication via Modbus RTU—metering data, engine test, set point management system status
- Load shed/emergency inhibit
- Remote annunciator available

### Standards and Certifications

- UL listed component
- Meets intent of UL 991, 1008
- Meets IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, 1000-4-11
- Meets CISPR 11, Class A
- Complies with FCC Part 15, Class A



### Technical Data and Specifications

5

#### ATC-300+ Controller Specifications

Description		Specification
Input control voltage		65 to 145 Vac 50/60 Hz
Voltage measurements of		Source 1 $V_{AB}$ Source 2 $V_{AB}$ Source 1 $V_{BC}$ Source 2 $V_{BC}$ Source 1 $V_{CA}$ Source 2 $V_{CA}$
Voltage measurement range		0 to 790 Vac RMS (50/60 Hz)
Voltage measurement accuracy		±1% of full scale
Frequency measurements of		Source 1 and Source 2
Frequency measurement range		40 Hz to 70 Hz
Frequency measurement accuracy		±0.3 Hz over the measurement range
Undervoltage dropout range:	Breaker/switch style ATS	50 to 97% of the nominal system voltage
	Contactors style ATS	78 to 97% of the nominal system voltage
Undervoltage pickup range:	Breaker/switch style ATS	(Dropout +2%) to 99% of the nominal system voltage
	Contactors style ATS	(Dropout +2%) to 99% of the nominal system voltage
Overvoltage dropout range:	Breaker/switch style ATS	105 to 120% of the nominal system voltage
	Contactors style ATS	105 to 110% of the nominal system voltage
Overvoltage pickup range:	Breaker/switch style ATS	103% to (dropout –2%) of the nominal system voltage
	Contactors style ATS	103% to (dropout –2%) of the nominal system voltage
Underfrequency dropout range:	Breaker/switch style ATS	90 to 97% of the nominal system frequency
	Contactors style ATS	90 to 97% of the nominal system frequency
Underfrequency pickup range:	Breaker/switch style ATS	(Dropout +1Hz) to 99% of the nominal system frequency
	Contactors style ATS	(Dropout +1Hz) to 99% of the nominal system frequency
Overfrequency dropout range:	Breaker/switch style ATS	103 to 110% of the nominal system frequency
	Contactors style ATS	103 to 105% of the nominal system frequency
Overfrequency pickup range:	Breaker/switch style ATS	101% to (dropout –1 Hz) of the nominal system frequency
	Contactors style ATS	101% to (dropout –1 Hz) of the nominal system frequency
Operating temperature range		–20 °C to +70 °C (–4 °F to +158 °F)
Storage temperature range		–30 °C to +85 °C (–22 °F to +185 °F)
Operating humidity		0 to 95% relative humidity (noncondensing)
Operating environment		Resistant to ammonia, methane, nitrogen, hydrogen and hydrocarbons
Generator start relay		5 A, 1/6 Hp at 250 Vac
		5 A at 30 Vdc with a 150W maximum Load
K1, K2, pretransfer, alarm relays		10 A, 1–3 hp at 250 Vac
K3, K4		10 A at 30 Vdc
Applicable testing		UL recognized component
		Meets UL 1008
		Meets Intent of UL 991
		Meets IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, 1000-4-11
		Meets CISPR 11, Class A
		Complies with FCC Part 15, Class A
Enclosure compatibility		NEMA 1, NEMA 3R and NEMA 12
		UV resistant ATC-300+ faceplate

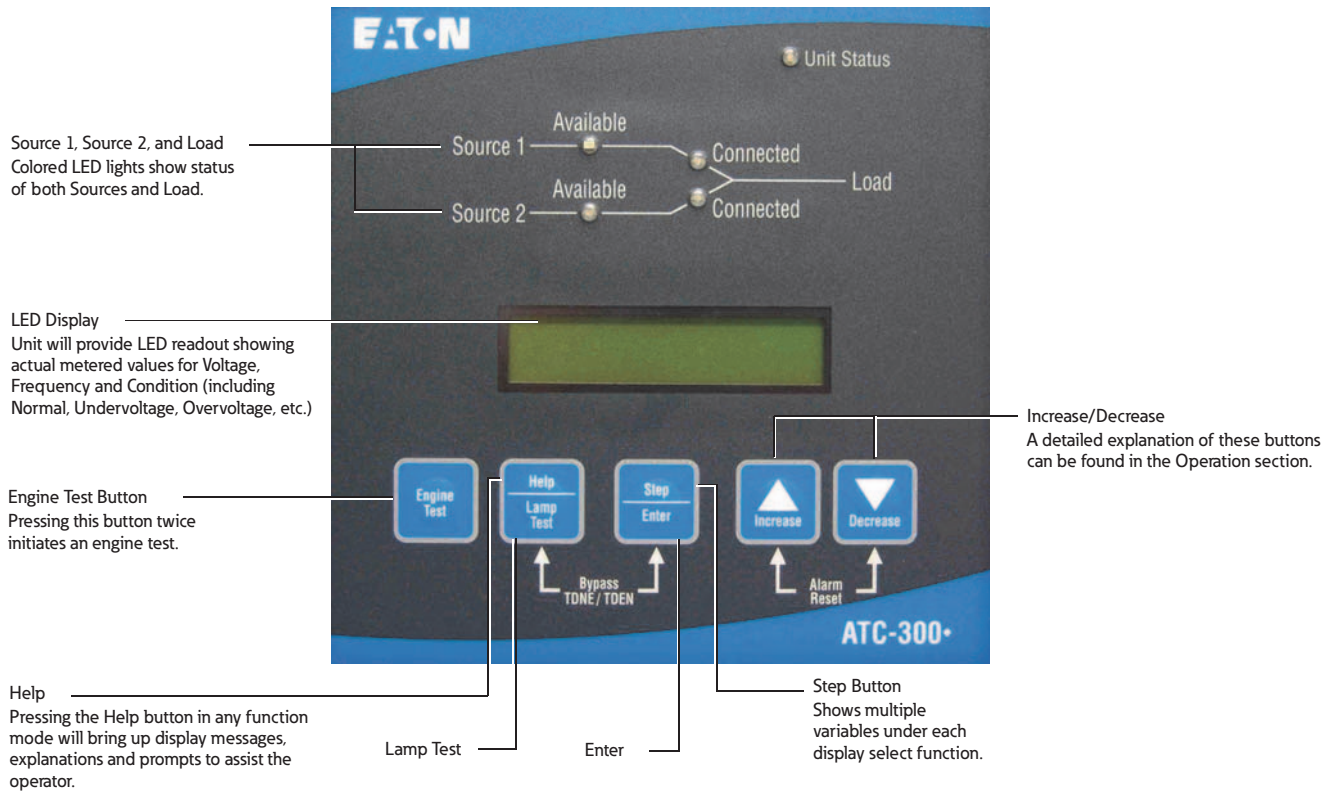
# 5.5

## Transfer Switches

### Automatic Transfer Controllers

#### Closed Transition ATC-300+ Front Panel Display and Button Functions

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The following set points are programmable if the corresponding feature is programmed.

### ATC-300+ Programming Features/Set Points <sup>①</sup>

Set Point	Set Point Units	Description	Range	Factory Default
TDES	Minutes: seconds	Time delay engine start	0–120 seconds	0:03
TDNE	Minutes: seconds	Time delay normal to emergency	0–1800 seconds	0:00
TDEN	Minutes: seconds	Time delay emergency to normal	0–1800 seconds	5:00
TDEC	Minutes: seconds	Time delay engine cool-off	0–1800 seconds	5:00
TDN	Minutes: seconds	Time delay neutral	0–120 seconds	0:00
PLANT EXER	Days	Plant exerciser programming	Off, daily, 7-day, 14-day or 28 day	Off
TEST MODE	—	Test Mode	0, 1 or 2 (0 = no load engine test, 1 = load engine test, 2 =disabled)	0
TER	Hours: minutes	Engine run test time	0–600 min	5:00
TPRE	Minutes: seconds	Pre-transfer delay timer	0–120 sec	0:00
PHASES	—	Three-phase or single-phase	1 or 3	As ordered
VOLT UNBAL	Volts	Voltage unbalanced	0 or 1 (1 = enabled)	1
UNBAL DROP %	Percent	Percent for unbalanced voltage dropout	5–20% of phase voltage unbalance	20%
UNBAL PICK %	Percent	Percent for unbalanced voltage pickup	Dropout minus (UNBAL DROP % –2) to 3%	10%
UNBAL DELAY	Seconds	Unbalanced delay timer	10–30	0:20
TDEF	Seconds	Time delay emergency fail timer	0–6 sec	6
PHASE REV	—	Phase reversal	OFF, ABC or CBA	OFF

#### Note

<sup>①</sup> Complete list of programming selections found in IB01602009E.

## ATC-900 Controller



## ATC-900 Controller

## Product Description

Eaton's ATC-900 brings intelligence, adaptability, and enhanced supervisory and programming capabilities to Eaton's complete transfer switch product offering including contactor-, breaker- and Magnum-based transfer switches. The one standard model concept offers a variety of monitoring and control features, selective load shedding, remote load testing, along with event logging/recording and Modbus communications. With configurable monitoring and control features and add-on accessory modules, the ATC-900 provides the flexibility to meet current and future system needs.

## Application Description

High reliability makes the ATC-900 ideal for mission-critical installations in the healthcare, water, industrial and data center industries. An intelligent control architecture allows the ATC-900 to address virtually any system requirements. Typical applications include utility-to-utility, utility-to-generator and generator-to-generator transfer pairs, and advanced programming features provide for control of three-source systems. Design flexibility allows for operations with open, in-phase, delayed or closed transition platforms.

## Features, Benefits and Functions

Ease of use is a major benefit of the ATC-900 controller. The simple yet powerful user interface includes many intuitive operating features. The color display and LED indications provide enhanced operator visibility of transfer switch status and system detail. Clear operational focus was achieved through design simplicity. Front arrow keys allow for quick screen navigation, removal of codes and abbreviations avoid potential confusion, and refined data screens provide for ease of viewing and edits.

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## Primary Functions

The ATC-900 Automatic Transfer Switch Controller offers these standard features:

- Monitor normal and emergency source voltages and frequencies
- Provide transfer and retransfer control signals
- Provide engine/generator start and shutdown signals
- Permit user programming of operational set points
- Display real-time and historical information
- Permit system testing
- Store customer and factory established parameters in nonvolatile memory
- Provide faceplate source status indication
- Provide an LCD for programming and status readouts

## Features and Benefits

- LCD screen for system status, programming, system diagnostics, help, and troubleshooting
- Event logging and recording, 450 time stamped events
- 0–600 V field programmable system voltage flexible configuration with assignable inputs and outputs
- Three-source ATS control—master and slave controller functionality
- Selective, automatic load shedding
- Industry standard communication protocols—Modbus RTU and/or Modbus TCP/IP communications interface
- USB drive for uploading and downloading of event data
- USB drive for uploading and downloading programmed set points

## ATC-900 User Interface

## LED Mimic Diagram

Source 1 and Source 2 color-coded LEDs provide Available and Connected status indication.

## Status Screen

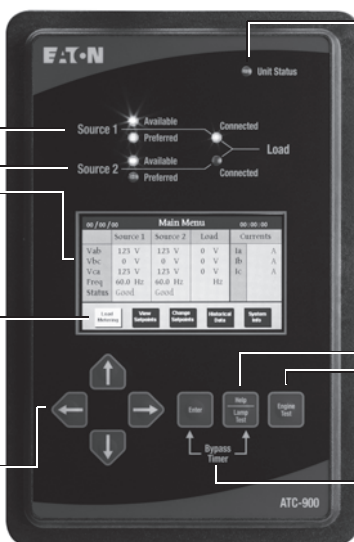
The ATC-900 Main Menu screen provides transfer switch status at a glance. Source 1, Source 2 and load-metering data are displayed as well as any active alarms.

## Display

The ATC-900 eliminates the use of codes and abbreviations for transfer switch functions. Data screens are grouped for ease of viewing and edits.

## Arrow Key Navigation

Right and Left Arrow Keys are used to navigate menu options and Up and Down Arrow Keys are used to select and change set point values.



## Unit Status Light

This LED blinks green indicating that the ATC-900 is operating and providing the transfer switch control function in keeping with programmed set points. If the LED is not lit or is on continuously, a problem may be indicated.

## Help

Displays controller firmware version and user tips.

## Lamp Test

Pressing the Lamp Test pushbutton lights all LEDs and then displays ATC-900 controller information.

## Engine Test

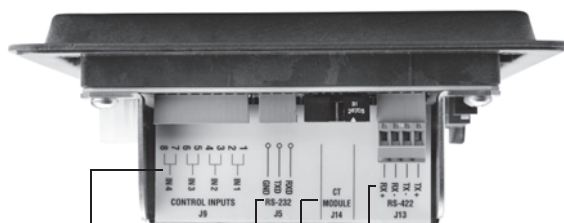
Performs an engine test using the programmed engine run and cooldown times. This is a password-protected feature.

## Bypass Time Delays

Pressing the Enter and Help pushbuttons simultaneously reduces the active programmed time delay to zero to simplify test procedures.

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## ATC-900 Connections



## Configurable Inputs

System inputs are "wetted" contacts. System inputs can be configured to perform a preset list of functions. (Note: A factory configured input cannot be reconfigured in the field if the factory provides associated hardware.)

## Factory Use Only

The sensing inputs are the connection points for monitoring Source 1, Source 2, and the Load. Three-phase systems are connected to Phase A, B and C. Single-phase systems are connected to points Phase A and Phase B.

## Factory Use Only

■ Source 1 and Source 2 auxiliary: These inputs are connected to the power switching devices position indication contacts

■ K1, K2, K3 and K4: These Form-A output contacts are utilized to control the power switching mechanism. They operate in conjunction with the Source 1 and 2 auxiliary inputs

## Control Power Inputs (Source 1 and Source 2)

The control power input range is 65–145 Vac, 50/60 Hz, 9–36 Vdc.

## RS-422

DCT Module

RS-232 (ATC-900 ECAM)

Modbus 485

Accessory I/O Port

USB Port

Generator start

Form-C contact. This is a latching relay utilized to initiate startup and shutdown cycles of the engine/generator set. The GENERATOR START contact is rated 5 amperes at 250 Vac/30 Vdc.

Earth Ground

Provides a connection point for the common system ground.

Configurable Outputs

Four Form C dry relay contacts that can be configured to perform a preset list of functions. Contacts are rated 10 amperes at 250 Vac/30 Vdc. **Note:** A factory-configured output cannot be reconfigured in the field if the factory provides associated hardware)

Source 1 and Source 2 Available

Form C dry relay contacts that indicate Source 1 and Source 2 availability based on the programmed voltage and frequency set points. Contacts are rated 10 amperes at 250 Vac/30 Vdc.



## ATC-900 Features

Features	ATC-900
<b>Hardware</b>	
4.3-inch color TFT LCD display	■
UV-resistant faceplate	■
Mimic diagram and LED status indicators	■
Suitable for application over a wide range of environmental conditions	■
Positive feedback membrane pushbuttons for application in harsh environments	■
Help function for detailed description of displayed message	■
Password protected system test pushbutton	■
Bypass time delay pushbutton	■
Form C engine start contact for Source 1 and Source 2	■
S1 and S2 available Form C contacts	■
Self-diagnostic and system diagnostic functions with LED indication	■
DC power input	Optional
<b>Metering</b>	
True rms voltage sensing of Source 1, Source 2 and Load	■
Frequency sensing of Source 1, Source 2 and Load	■
Voltage unbalance and phase rotation sensing	■
Load current sensing	Optional
Sampling at 64 samples per cycle	Optional
Source 1 voltages (three-phase)	■
Source 2 voltages (three-phase)	■
Load voltages (three-phase)	■
Source 1 frequency	■
Source 2 frequency	■
Load frequency	■
Load currents (three-phase)	Optional
Load kW	Optional
Load kvar	Optional
Load kVA	Optional
PF	Optional
<b>Programming</b>	
Programmable set points stored in nonvolatile memory	■
System monitoring with historical data storage and display	■
Digital set points for accurate and consistent performance	■
Password-protected access to control functions and set point programming	■
Four programmable control inputs	■
Four programmable control outputs	■
Expandable I/O modules (up to 20 I/O total)	Optional
Automatic plant exerciser—two plant exerciser schedules, Off, daily, 7-day, 14-day, 28-day, calendar, separate TDNE, TDEN, TDEC timers from normal operation, control input provided for remotely initiating an engine test	■
<b>Communications</b>	
Modbus RTU	■
Modbus TCP/IP	Optional
USB port for set point configuration and event-recording downloads	■
<b>Event History</b>	
320 time-stamped events	■
2 seconds of metered data stored before and after a transfer event	Optional

### ATC-900 Programmable Set Points

The table below lists only controller features; switch features are not listed, as they are defined by switch construction. Transition settings are specific to the transfer switch construction.

### Features and Set Points

Option Number	Description	Range	Factory Default
<b>General Settings</b>			
—	Set new password	0000–9999	0900
—	Selected language	English, French or Spanish	English
—	Nominal frequency	50 or 60 Hz	As ordered
—	Nominal voltage	110–600 V	As ordered
—	Number of phases	1 or 3	As ordered
—	Number of generators	0, 1 or 2	1
—	Preferred source	Source 1 or Source 2	Source 1
—	PT ratio	2:1–500:1	As ordered
—	CT ratio	200–5000	—
—	Daylight saving time	On or Off	1
—	Operating mode	Stand-alone/master or slave	Master
—	Phase sequence check	ABC, CBA or Off	Off
—	Commitment to transfer in TDNE	Yes or no	No
—	Manual retransfer	Auto, manual or external	As ordered
—	Modbus address	1–247	1
—	Modbus baud rate	0 = 9600, 1, even 1 = 9600, 1, odd 2 = 9600, 2, none 3 = 9600, 1, none 4 = 19,200, 1, even 5 = 19,200, 1, odd 6 = 19,200, 2, none 7 = 19,200, 1, none	9600 — — — — — — —
<b>Transition Settings</b>			
47	Closed transition		
	Closed transition On or Off	On or Off	As ordered
	Closed voltage difference	1–5%	2%
	Closed frequency difference	0.0–0.3 Hz	0.3
32f/32d	Open—in-phase transition		
	In-phase—On or Off	Disable, in-phase default to alarm, in-phase default to open transition	As ordered
	In-phase frequency difference	0.0–3.0 Hz	1.0
—	Synchronization timer	1–60 minutes	5
32a/32d	Open—delayed transition		
	Time delay neutral	0–120 seconds	0
	Load voltage decay	2–30% of nominal voltage	6%
<b>Time Delays</b>			
1a	Time delay normal to emergency	0–9999 seconds	0:00
3a	Time delay emergency to normal	0–9999 seconds	5:00
35A	Time delay pre-transfer	0–120 seconds	0:01
35C	Time delay post-transfer	0–120 seconds	0:10
2A	Time delay engine 1 start	0–120 seconds	0:03
—	Time delay engine 2 start	0–120 seconds	0:03
4A	Time delay engine cool-off	0–9999 seconds	5:00
7A	Time delay engine fail timer	0–6 seconds	0:06
—	Voltage unbalance time delay	10–30 seconds	0:30

## Features and Set Points, continued

Option Number	Description	Range	Factory Default
<b>Source Settings</b>			
26P	Source 1 undervoltage dropout	70–97% of nominal	80%
	Source 1 undervoltage pickup	(dropout + 2%) to 99% of nominal	90%
5P	Source 2 undervoltage dropout	70–97% of nominal	80%
	Source 2 undervoltage pickup	(dropout + 2%) to 99% of nominal	90%
26K	Source 1 overvoltage dropout	105–120% of nominal (0 = disabled)	115%
	Source 1 overvoltage pickup	103% of nominal to (dropout – 2%) (0 = disabled)	105%
5K	Source 2 overvoltage dropout	105–120% of nominal (0 = disabled)	115%
	Source 2 overvoltage pickup	103% of nominal to (dropout – 2%) (0 = disabled)	105%
26J	Source 1 underfrequency dropout	90–97% of nominal (0 = disabled)	94%
	Source 1 underfrequency pickup	(dropout + 1 Hz) to 99% of nominal (0 = disabled)	96%
5J	Source 2 underfrequency dropout	90–97% of nominal (0 = disabled)	94%
	Source 2 underfrequency pickup	(dropout + 1 Hz) to 99% of nominal (0 = disabled)	96%
26N	Source 1 overfrequency dropout	103–110% (0 = disabled)	106%
	Source 1 overfrequency pickup	101% to (dropout – 1 Hz) (0 = disabled)	104%
5N	Source 2 overfrequency dropout	103–110% (0 = disabled)	106%
	Source 2 overfrequency pickup	101% to (dropout – 1 Hz) (0 = disabled)	104%
26L	Source 1 percent for unbalanced voltage dropout	5–20% of phase-to-phase voltage unbalance (0 = disabled)	12%
	Source 1 percent for unbalanced voltage pickup	3% to (dropout – 2%) (0 = disabled)	10%
5L	Source 2 percent for unbalanced voltage dropout	5–20% of phase-to-phase voltage unbalance (0 = disabled)	12%
	Source 2 percent for unbalanced voltage pickup	3% to (dropout – 2%) (0 = disabled)	10%
<b>Engine Test/Plant Exerciser (PE1 and PE2 are independently programmable)</b>			
6B	Engine test pushbutton on panel		
	Test mode	No load, load transfer, disabled	Load transfer
	Engine run test time	0–600 minutes	Load transfer
23M	PE time delay normal to emergency	0–9999 seconds	1 minute
	PE time delay emergency to normal	0–9999 seconds	1 minute
	PE time delay engine cooldown	0–9999 seconds	5 minutes
	PE1/PE2 test mode	No load, load transfer, disabled	Disabled
	PE1/PE2 run time	0–600 minutes	30 minutes
	PE1/PE2 schedule	Off, daily, 7-day, 14-day, 28-day or calendar date (up to 12 user-specified dates)	30 minutes
	PE1/PE2 calendar date	Month: 1–12; Day: 1–31	30 minutes
	PE1/PE2 day of week	1 Sunday, 2 Monday, 3 Tuesday, 4 Wednesday, 5 Thursday, 6 Friday or 7 Saturday	30 minutes
	PE1/PE2 plant start time	HH:MM AM/PM	30 minutes
<b>Accessory I/O</b>			
—	Accessory I/O modules	0–4	—

**Flexible Configuration**

Designed for scalability, the ATC-900 can be configured for a wide variety of applications. A mix-and-match approach to features allows the user to build a transfer switch controller that meets the precise application needs.

The ATC-900 controller includes four user configurable inputs and outputs. The inputs and outputs can be assigned functions from a predefined list of options either at the factory or in the field.

- Inputs
  - Monitor mode
  - Bypass timers
  - Lockout
  - Manual retransfer On or Off
  - Manual retransfer
  - Slave in
  - Remote engine test
  - Preferred source selection
  - Go to emergency
  - Emergency inhibit
  - ATS on bypass
  - Go to neutral
- Outputs (control)
  - Load sequence
  - Selective load shed
  - Load bank control
  - Pre-/post-transfer
  - Pre-transfer
  - Post-transfer
  - User remote control
- Outputs (status/alarms)
  - Source 1 available (standard)
  - Source 2 available (standard)
  - Source 1 connected
  - Source 2 connected
  - ATS not in automatic
  - General alarm
  - ATS in test
  - Engine test aborted
  - Cooldown in process
  - Engine start contact status
  - Generator 1 start status
  - Generator 2 start status
  - Emergency inhibit on
  - ATS on bypass

Additional I/O can be added at any time by adding an external I/O module. Each I/O module contains four inputs and outputs and up to four modules can be daisy chained to the ATC-900 controller.



***I/O Module—The ATC-900 optional I/O module provides users with four additional assignable inputs and outputs. Up to four I/O modules can be added to an ATC-900 controller providing a total of 20 inputs and outputs.***

## ATC-900 Metering

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**ATC-900 Main Screen Shows Current Values**

The DCT module incorporates a current transformer interface to the ATC-900, allowing current to be metered along with voltage and frequency. Combined with the ATC-900, the DCT module serves as a multi-function power meter and provides measurement of the listed electrical parameters. Readings are displayed on the ATC-900 controller display or can be monitored through Modbus 485.



**DCT Module Attached**

### Current Voltage Frequency Metering Data

Metering	Units	Accuracy	Notes
<b>Current</b>			
IA, IB, IC	Amps	±1% of reading	Accuracy range 5–100%
<b>Voltage</b>			
VAB, VBC, VCA	Volts	±1% of reading	Applicable to volt range of 34–721 Vac
<b>Frequency</b>			
Frequency	Hz	±0.2 Hz of reading	Range is 20–255 Hz

### Power and Energy Metering Data

Power Metering	Units	Accuracy	Notes
Power	kW	±2% of reading	Approx. 1-second update
kVA	kVA	±2% of reading	Approx. 1-second update
kvar	kvar	±2% of reading	Approx. 1-second update
PF (power factor)	—	0 to ±1.00	—

## Features

## Feature Overview

## Instrumentation

Current, per phase	■
Current Demand	—
Voltage, per phase (L-L)	■
Min. Max. Readings	—
Frequency	■

## Power

Real, reactive and apparent power total (W,VAR,VA)	■
Power factor, total	■
Energy	—
Real, reactive and apparent energy, total (Wh,VAR,VAh)	—

## Communications

RS-485, Modbus RTU, Modbus ASCII	■
----------------------------------	---

## Voltage Inputs (measurement category)

Range: universal, auto-ranging up to 416 Vac L–N, 721 Vac L–L  
Supported hookups: 3-element wye or delta  
Input impedance: 2 m ohm/phase  
Burden: 0.0022 VA/phase at 120 V  
Fault withstand: meets IEEE C37.90.1

## Current Inputs

5 A nominal, 10 A maximum  
Burden: 0.005 VA per phase maximum at 11 A  
Pickup current: 0.1% of nominal  
Connections: screw terminals  
Maximum input wire gauge: AWG #12/2.5 mm<sup>2</sup>  
Fault withstand: 100 A/10 seconds, 300 A/3 seconds, 500 A/1 second

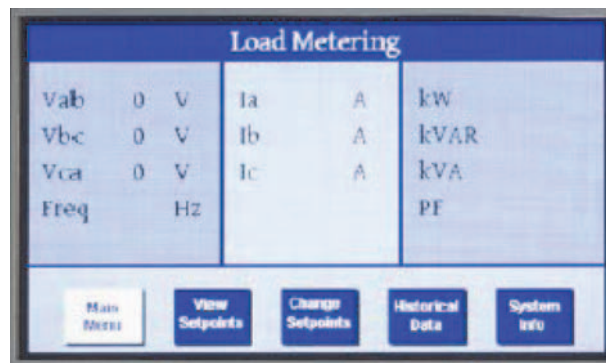
## Isolation

All inputs are isolated to 2600 Vac

## Measurement Methods

Voltage, current: true rms  
Power: sampling at 64 samples per cycle on all channels measured readings simultaneously  
A/D conversion: 16 simultaneous 12-bit analog to digital converters

## Load Metering



Integrated  
ATC-900  
Meter

**Diagnostics and Troubleshooting**

In a mission-critical application, a failure to transfer to the backup power system requires quick and decisive action. Eaton's ATC-900 controller provides users with the data required to quickly identify the root cause of a backup power system failure and minimize system downtime. This data allows the user to identify a specific event and obtain the detailed event information including a step by step breakdown of the transfer sequence.

**Historical Data**

Historical Data				Reset Date	
Source 1 Available	4795	hours	10 min.	01/10/11	Reset
Source 1 Connected	4720	hours	5 min.	01/10/11	Reset
Source 1 Engine Run	0	hours	0 min.	01/10/11	Reset
Source 2 Available	515	hours	38 min.	01/10/11	Reset
Source 2 Connected	280	hours	20 min.	01/10/11	Reset
Source 2 Engine Run	515	hours	22 min.	01/10/11	Reset
Tier 4 Timer	4750	hours	38 min.	01/10/11	Reset
Load Energized	4800	hours	25 min.	01/10/11	Reset
Number of Transfers	28	hours	35 min.	01/10/11	Reset

**Historical Data Display**

The historical data display indicates historical and cumulative counter values as follows:

- Source 1 available
- Source 1 connected
- Source 1 engine run
- Source 2 available
- Source 2 connected
- Source 2 engine run
- Tier IV timer
- Load energized
- Number of transfers

Historical counter resets are date and time-stamped events that are captured in the event log.

**Event Summary**

Event Summary			
05/28/11	4:28:15 PM	S2 → S1	Closed Transition
05/28/11	4:04:36 PM	S1 → S2	Open Transition
05/02/11	9:54:33 PM	S2 → S1	Closed Transition
05/02/11	9:29:10 PM	S1 → S2	Closed Transition
04/28/11	8:15:20 AM	S2 → S1	Closed Transition
04/28/11	8:05:44 PM	S1 → S2	Open Transition
03/31/11	8:35:33 AM	S2 → S1	Closed Transition
03/31/11	8:00:00 AM	S1 → S2	Closed Transition
03/03/11	8:35:53 AM	S2 → S1	Closed Transition
03/03/11	8:00:00 AM	S1 → S2	Closed Transition

**Event Summary Display**

The ATC-900 controller stores 100 transfer summaries, 350 transfer details, 100 alarms and 20 time adjustments.

Events include:

- Actions of the transfer sequence
- Alarms
- Changes to the set points
- Changes to the time/date
- Resetting a historical counter
- Engine run test
- Time-stamping resolution of 1 second.

**Event Details**

Event Details				10:20:32 AM
06/23/11	05/02/11	04:04:36 PM	S1-->S2	Open Transition
05/02/11	04:04:17:10 PM	Source 1 Undervoltage		
05/02/11	04:04:20:23 PM	Gen Start Contacts Closed		
05/02/11	04:04:28:18 PM	Source 2 Available		
05/02/11	04:04:33:20 PM	Transfer to Neutral Initiated		
05/02/11	04:04:33:55 PM	Transfer to Neutral Complete		
05/02/11	04:04:36:05 PM	Transfer to Source 2 Initiated		
05/02/11	04:04:36:54 PM	Transfer to Source 2 Complete		

**Event Details Display**

Each transfer event can be exploded to view a step by step, time stamped, sequence of operation for a transfer event. All metered values are also logged for each event and can be viewed on the event data screen. Time stamping resolution of 0.1 seconds.



**Hi-Speed Capture**

Hi-Speed Capture		
05/28/11	4:28:15 PM	Closed Transition to Source 1
05/28/11	4:04:36 PM	Transfer to Source 2
05/02/11	9:54:33 PM	Closed Transition to Source 1
05/02/11	9:54:10 PM	Transfer to Source 2
05/02/11	8:15:20 AM	Source 1 Undervoltage
03/31/11	11:05:44 AM	Closed Transition to Source 1
03/31/11	8:35:33 AM	Transfer to Source 2
03/03/11	10:02:05 AM	Closed Transition to Source 1
03/03/11	8:35:53 AM	Transfer to Source 2
03/03/11	8:35:40 AM	Source 1 Undervoltage

**High Speed Capture Display, Pre and Post Event**

The ATC-900 stores metered data updated on a continuous 20 millisecond basis for specific events. The data is captured 2 seconds before and 2 seconds after the event (except for a power failure, which is 4 seconds before). Oscillographic data for 10 events is stored in the controller and may be downloaded over USB or displayed graphically.

- Events include:
- Source unavailability actions that initiate a transfer sequence (undervoltage, overvoltage, etc.)
- Successful transfers (at the point of breaker/contact closure)
- Unsuccessful transfers (at the point of breaker/contact failure to close or open)

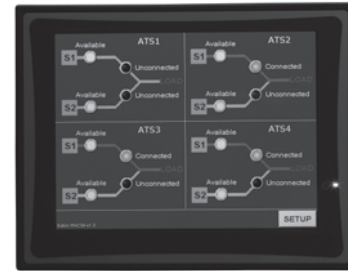
**Industry Standard Communication Protocol**

Every ATC-900 controller includes a standard Modbus RTU communications interface with an option to upgrade to Modbus TCP/IP.

The ATC-900 is also compatible with Eaton's Power Xpert Gateway for web-based monitoring, Modbus TCP/IP, SNMP, or BACnet/IP. The Power Xpert Gateway can be used to consolidate data from up to 64 devices, including communications ready transfer switch controllers, trip units and meters, as well as other Eaton devices. Versions of the Power Xpert Gateway include email event notification and data-logging functionality.

**HMI Remote Annunciator and Controller**

The HMI Remote Annunciator and Controller monitors and controls up to eight transfer switches on a 7-inch LCD touch screen. It is compatible with either Modbus RTU or Modbus TCP/IP protocols. A basic mimic bus for each transfer switch displays source availability, source connected and preferred source. Users can drill down to metered source values and event history for each transfer switch. All control features are password-protected and include engine test, transfer to emergency (peak shaving), manual retransfer and bypass time delays.

**HMI Remote Annunciator and Controller****USB Programming Port**

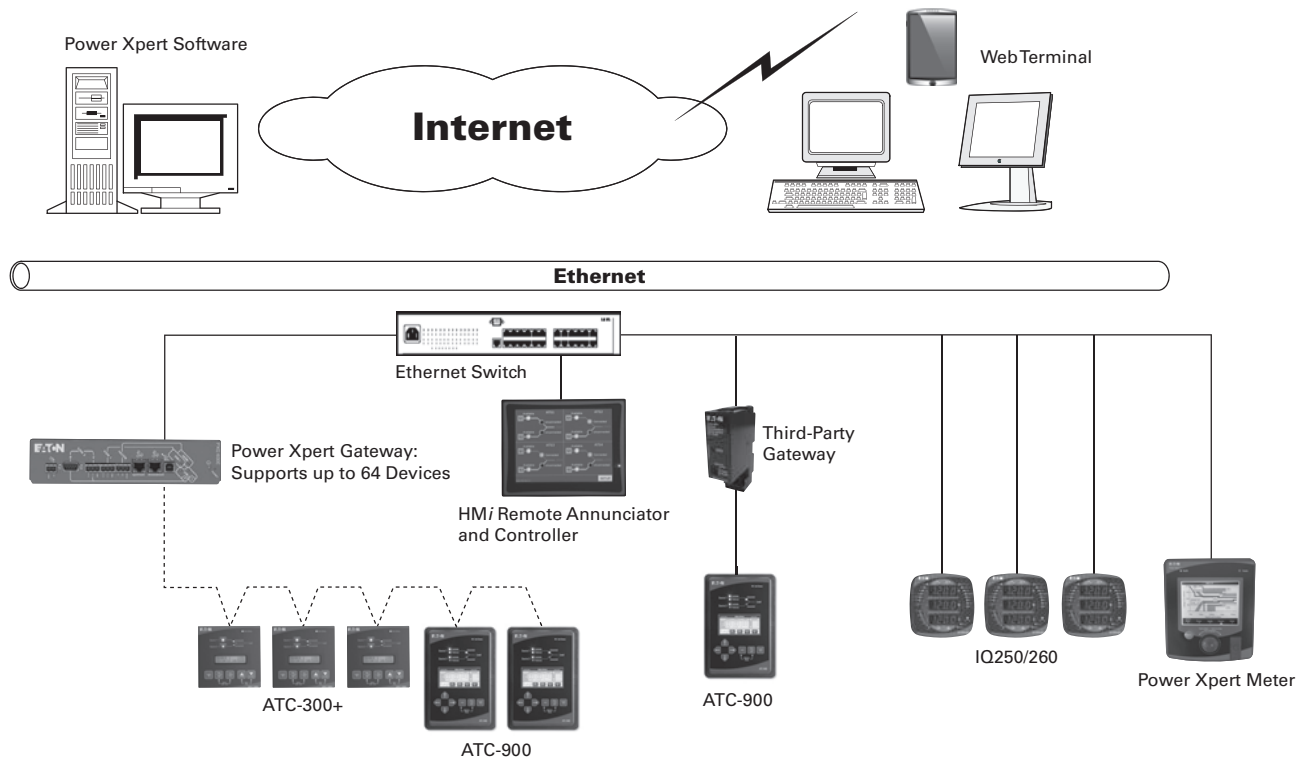
Every ATC-900 transfer switch includes a front panel, NEMA 4X rated USB port for use in configuring set points or downloading event data to a USB flash drive. To reduce the time spent on site for commissioning, set points can be configured at a PC using the ATC-900 configuration software and saved to a USB flash drive to be uploaded to one or multiple controllers. Set points are also easily copied from one controller to another.

Downloading event capture data provides the user the ability to more thoroughly analyze high-speed capture data using a PC, or data can be emailed to Eaton's Technical Support Team when off site troubleshooting support is required.

**USB Programming Port**



## Power Xpert Architecture with ATC-900



## Special Applications

**Three-Source ATS Control**

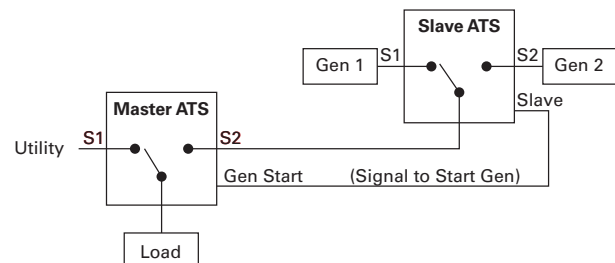
The ATC-900 Master/Slave controller functionality provides the user with the ability to use two independent transfer switches in three-source systems consisting of a utility and two generator sources. In a three-source system, the Master ATS controls the engine starting and stopping of the Slave ATS.

In the event of a Source 1 power failure, the Master ATS engine start relay closes signaling the Slave ATS to start both generators. (Note: The Slave ATS requires continuous power using either the DCT Module for a DC power input or a UPS input.) The Master ATS handles all transfer time delays between the utility to generator transfer. If the preferred generator does not start within the programmed time delay, the Slave ATC-900 will initiate a transfer to the non-preferred generator. If "None Preferred" is selected, then both generators will start and the Slave ATS will transfer to the first generator source available. The ATC-900 will sense the load is connected to a good source and shut down the second generator.

**Load Management**

The ATC-900 includes several features to enhance the user's ability to manage load while on the alternate source.

- Integrated load metering: provides metering data that allows the user to monitor energy utilization and manage system loading
- Selective load shedding: selectively drop non-essential loads when a user-defined kW level is reached. The transfer switch remains on generator
- Load shed to neutral (where ATS construction allows): provides the ability to load shed to a neutral position from a generator source
- Pre-/post-transfer signals: provides the ability to stop select loads during the transfer process
- Load bank disable output: disengages a load bank if utility power is lost during an engine test

**Three-Source Transfer Switch Arrangement**

## Technical Data and Specifications

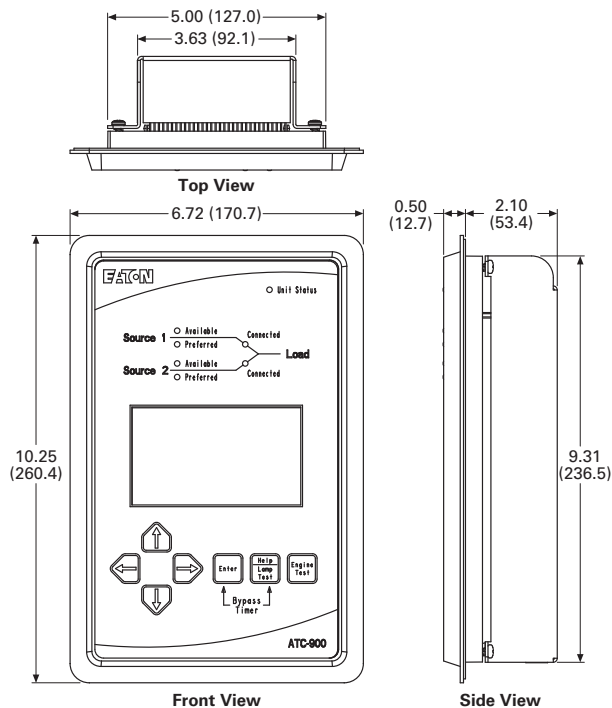
### Technical Specifications

Parameter	Specification
Control power	120 Vac (50/60 Hz) (operating range 65–160 Vac) or 24 Vdc ( $\pm 10\%$ ) with DCT module
Power consumption	18 VA
Environmental conditions	
Operating temperature	–4 to +158 °F (–20 to +70 °C)
Operating humidity	Up to 90% relative humidity (noncondensing)
Enclosure compatibility	NEMA 12 (standard mounting) NEMA 4/4X (mounted with gasket between panel and device faceplate) NEMA 3R (outdoor) UV resistant ATC-900 faceplate
System voltage application	120–600 Vac (50/60 Hz) (single- or three-phase)
Voltage measurements	Source 1, Source 2 and Load (VAB, VBC, VCA for three-phase system)
Voltage measurement range	0–700 Vac
Voltage measurement accuracy	$\pm 1\%$ of reading
Frequency measurements	Source 1 and Source 2
Frequency measurement range	40–80 Hz
Frequency measurement accuracy	$\pm 0.1$ Hz
Applicable testing	UL recognized component 2009 IBC, 2010 CBC and OSHPD certified in ATS assemblies Complies with UL 991 environmental tests Complies with IEC 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5 and 61000-4-6 Complies with CISPR 11, Class A Complies with FCC Part 15, Subpart B, Class A
CSA conformance	C22.2 No. 178-1978 (reaffirmed 1992)
CE mark	European standards conformance

## Dimensions

Approximate Dimensions in Inches (mm)

### ATC-900



## Additional Information

Instruction bulletin: IB01602088E

Web-based demo: [www.eaton.com/ats](http://www.eaton.com/ats)

## Controller Replacement Guide



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## Description

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## Controller Replacement Guide

## Product Description

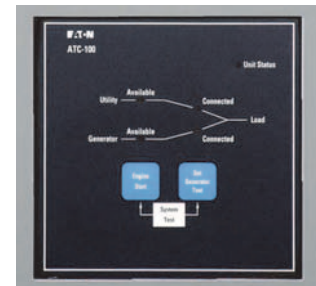
**Automatic Transfer Switch Controller Replacement**

Eaton automatic transfer switches use several different controller types. These automatic transfer controllers (ATCs) may be ordered as replacement for current manufacturer's existing automatic transfer switches. If vintage analog controller or controller parts are needed, then a separate renewal part data list needs to be referenced. The intent of this section is to address current controllers as listed in the table below.

It is important to note that the same controller type can be used on different switch types and the factory programmed firmware/options will vary depending on the switch type. Thus it is very important to know the original switch type in order to select the correct controller replacement kit. If there is a question on which kit to select, then providing the factory with the original general order number and/or the 15-character catalog number will eliminate any doubts regarding the correct kit selection.

**ATC-100 Controller Replacement Kits**

The ATC-100 controller is primarily used on residential and light commercial applications up to 400 A. This controller may be used with either contactor-based or molded-case switch designs. The ATC-100 is only used on open transition type transfers. Replacement kits are ordered by style number (see table below).



ATC-100

**ATC-100 Replacement Kits**

Switch Type	Controller Type	Replacement Style Number
<b>Magnum-Based Design</b>		
ATC-100 controller is not available	—	—
<b>Breaker-Based Design</b>		
Breaker open transition	ATC-100	<b>8160A00G23</b>
<b>Contactor-Based Design</b>		
2-position open transition	ATC-100	<b>8160A00G24</b>
2-position closed transition	—	—
3-position open transition	—	—
3-position closed transition	—	—

**Note**

① Feature list required upon order entry.

**Automatic Transfer Controllers**

Controller Type	Order via Style Number Only	Order via Replacement Kit Style Number and Feature List ①
ATC-100	See ATC-100 Replacement Kits table on the right	
ATC-300		Superseded by ATC-300+
ATC-300+		See ATC-300 Replacement Kits, <b>Page V2-T5-88</b>
ATC-600		See ATC-600/800 Replacement Kits, <b>Page V2-T5-89</b>
ATC-800		See ATC-600/800 Replacement Kits, <b>Page V2-T5-89</b>
ATC-900		ATC-900 Controller Replacement Guide, <b>Page V2-T5-91</b>

**ATC-300 Controller Replacement Kits**

The ATC-300 controller has been in use for many years and was applied on molded-case switch units up to 1000 A and contactor-based automatic transfer switches up to 1200 A. In 2012, the ATC-300 was replaced by the ATC-300+ controller. An ATC-300+ replacement kit is used for replacement of older ATC-300s. When ordering the replacement kit, it is very important to identify that the existing application is either a molded-case switch design, a breaker-based design (has the lockout feature), or a contactor 2-position or 3-position design.

The ATC-300+ has two features—Emergency Inhibit and Manual Retransfer—that

were not available on the ATC-300. If these features were not previously supplied with the ATC-300, then the end user does not have to use these additional features. In addition, the ATC-300+ has communication capability for providing Modbus 485.

The ATC-300 and ATC-300+ have identical size and mounting dimensions. The J8 pin is now an 8-pin connector versus a 4-pin connector on the older ATC-300. J8 pins 5–6 and 6–8 are the connections for Emergency Inhibit and Manual Retransfer. The replacement kit includes the 8-pin connector.

**ATC-300 Replacement Kits**

Switch Type	Controller Type	Replacement Style Number <sup>①</sup>
<b>Magnum-Based Design</b>		
ATC-300+ controller is not available	—	—
<b>Breaker-Based Design</b>		
Breaker open transition	ATC-300+	<b>8160A00G100 <sup>②</sup></b>
<b>Contactor-Based Design</b>		
2-position open transition	ATC-300+	<b>8160A00G104</b>
2-position closed transition	—	—
3-position open transition	ATC-300+	<b>8160A00G108</b>
3-position closed transition	—	—

**Examples: Replacement Kit Style Number Selection****Example 1—Breaker-Based Design**

Review 5th and 6th character in the ATS 15-character catalog number.

- If the 5th and 6th character is FD, KD, LD, MD, NB, then select 816000G100
- Example:  
ATV3**KDA**30300XSU  
implies 8160A00G100

**Example 2—Contactor-Based Design**

Review 5th and 6th character to determine if the ATS is a two-position or a three-position, and then select replacement kit accordingly.

**Note:** C2 is two-position and C3 or C5 is a three-position.

- Example:  
ATC3**C2**X30200XSU  
implies 8160A00G104
- Example:  
ATC3**C3**X30400XSU  
implies 8160A00G108
- Example:  
ATC3**C5**X30600XSU  
implies 8160A00G108

**ATC-300+ Controller Replacement Kits**

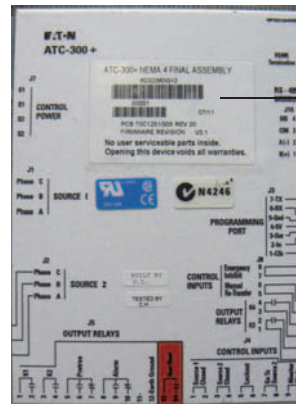
The ATC-300+ controller was first used in 2012 for molded-case switch, breaker-based (with lockout feature) and open transition contactor-based (2-position and 3-position) designs. It is also used as the replacement kit for older ATC-300 controllers. It is critical to identify the application that needs a replacement kit. The ATC-300+ is NOT used on closed transition designs.

The ATC-300+ controller will have the lock out feature enabled. If not required, then the feature is jumpered out.

Ordering the breaker-based kit does not assure that the lockout feature (option 16) will be supplied. A note needs to be supplied with the order entry.

The controllers have a style number (typically 6D32360Gxx) on the back of the board. This style number is the board level style used in the controller. IT WILL NOT identify what controller replacement kit will be needed.

If there is trouble identifying the correct controller type, pressing the Help button will provide a scrolling Rev number, Firmware ID number and a series of catalog numbers that an Eaton factory representative can use for identification. The catalog number will be a series of 1s and 0s.

**ATC-300+ Rear View****ATC-300+ PCB Style Number****6D32360Gxx**

**Note:** This style number will not identify the replacement kit. The ATS catalog number is required to identify the replacement kit. The 15-character catalog number is on the ATS nameplate located on interior door of the ATS.

**Notes**

- <sup>①</sup> The replacement style number 8160A00Gxx will include the printed circuit board style number (6D32360Gxx) shown on back of the controller.
- <sup>②</sup> Identify if lockout feature 16 is required.

**ATC-600 and ATC-800 Controller Replacement Kits**

The ATC-600 is used on molded-case switch and breaker-based designs up to 1000 A. It is also used on open transition Magnum power case switch and breaker designs up to 5000 A.

The ATC-800 has been used on closed transition Magnum power case switch and breaker-based designs up to 5000 A. The ATC-800 is currently being used on open and closed transition contactor-based designs up to 1200 A.

Older automatic transfer switches may have used what is referred to as IQ Controllers. Controller replacements for those units can be ordered as ATC-600 for open transition and ATC-800 for closed transition.

In some cases, both the ATC-600 and ATC-800 controllers have been used on medium voltage transfer switches.

When ordering the replacement kit, always provide the original GO# of the ATS to correctly identify the features supplied with the controller. This feature set will then be used to program the replacement controller.

See the table below for the replacement kit style numbers for automatic transfer switches with ATC-600 or ATC-800 controllers. Because each controller was specifically supplied with the standard features and any order-specific optional features, there is no practical way to create a replacement kit style number for each variation of the features supplied. Thus, when ordering the replacement kit 8160A00GXX, the job-specific controller features must be specified. Order-specific features need to be included with the order entry.

See Feature List Steps table on **Page V2-T5-90** for identifying the features to be supplied on the order entry.

On the back of the ATC-800/600 controllers is a style number similar to a 2D7858GXX. This style number only identifies the basic control board that is included in the replacement kit per the table on this page. The replacement kit style number listed on this page must be used to order the replacement kit.



Board Level Style Number 2D7858GXX

**ATC-600/800 Replacement Kits**

Switch Type	Controller Type	Replacement Style Number
<b>Magnum-Based Design</b>		
Magnum open transition	ATC-600	8160A00G03 <sup>①</sup>
Magnum open transition	ATC-600	8160A00G41 <sup>②</sup>
Magnum closed transition	ATC-800	8160A00G05 <sup>①</sup>
Magnum closed transition	ATC-800	8160A00G42 <sup>②</sup>
<b>Breaker-Based Design</b>		
Breaker open transition	ATC-600	8160A00G03 <sup>①</sup>
Breaker open transition	ATC-600	8160A00G41 <sup>②</sup>
<b>Contactor-Based Design</b>		
2-position open transition	ATC-800	8160A00G43 <sup>②</sup>
2-position closed transition	ATC-800	8160A00G43 <sup>②</sup>
3-position open transition	ATC-800	8160A00G43 <sup>②</sup>
3-position closed transition	ATC-800	8160A00G43 <sup>②</sup>

Type	Replacement Style Number
<b>ATC-600/800 Connectors</b>	
J4 19-pin	67A2590H25
J5 22-pin	67A2590H26
Source 1 4-pin	1268C07H31
Source 2 4-pin	1268C07H31
Load 4-pin	1268C07H31
J7 4-pin	1268C07H31

**Notes**

- <sup>①</sup> Kit includes one J4 (19-pin), one J5 (22-pin), four 4-pin connectors (S1, S2, Load, J7 Power) and pins.
- <sup>②</sup> Kit does not include any connectors/pins.

**Feature List**

The replacement controller needs to match the features originally supplied. The easiest way to supply this list is to provide the **original order number** from the original shipment. The ATS product line maintains a database with the original feature list. The general order (GO) number is on the ATS nameplate located on the inside of the door. In addition, it is very helpful to also supply the **15-digit ATS catalog number** that can be found on the ATS nameplate.

The existing controller also has a catalog number feature code that defines what features are included. Pressing the Help Lamp Test button will show this code on a scrolling display.

If this information is not supplied on order entry, then the order will be placed on manufacturing hold until the information is supplied.



Feature code example (3f-e3-31-032)

Press Help Lamp Test button to initiate the Display Screen Readout

**Feature List Steps**

Step	Action
A.1	Identify replacement style number from table on <b>Page V2-T5-89</b> .
A.2	Identify original general order (GO) number. ①②
A.3	Order style number with GO information in the order notes. ③ If the original GO number is hard to identify or is unavailable, then one of the following steps below can be taken.
B.1	Provide the 9-digit feature code from the ATC-800 or ATC-600 controller. Feature code is viewable from ATC-600 or ATC-800 readout screen by pressing the Help button. Controller must be able to be powered up to view this feature code. On older controllers, the feature code may be 7 or 8 characters. Feature code example (3f-e3-31-032).
C.1	If the above information is not available, then provide a detailed listing of features to be supplied with the controller. The following questions must be answered.
<b>Switch Type</b>	
Molded-case switch	
Power case switch, open transition	
Power case switch, closed transition	
Contactor open transition, 2-position	
Contactor open transition, 3-position	
Contactor closed transition, 2-position	
Contactor closed transition, 2-position	
Medium voltage WLI or breaker	
Medium voltage open transition	
Medium voltage closed transition	
<b>Features</b>	
5C source 2 O–F monitoring	
5E/G source 2 O–V monitoring	
Bypass TDEN/TDNE	
10 preferred source	
16 overcurrent trip	
23 plant exerciser	
Source 1 O–V monitoring	
26D go to emergency	
Source 1 U–F monitoring	
Source 1 O–F monitoring	
29J manual retransfer	
32A/B delayed transition	
32A TDN time delay neutral	
32B time delay load voltage	
32C in-phase/TDNLV	
32D in-phase/TDN	
35 pretransfer signal	
36 emergency inhibit	
37 service entrance	
45 remote sequencing	
46 PT ratio	
47C closed/in-phase transition	
47D closed transition only	
47E closed/in-phase/TDN	
47F closed/TDNLV	

**Notes**

- ① Not replacement order number.
- ② If ATS is mounted in Eaton motor control center or Eaton switchboard, the ATS order number must be supplied, not the overall gear General Order number. This ATS order number is located on the ATS label.
- ③ If the original GO number is not supplied on order entry, then the order will be placed on manufacturing hold until the feature list is supplied.



**ATC-900 Controller Replacement Guide**

The ATC-900 controller is used on any of Eaton's automatic transfer switches. It can be used on contactor-based, molded case switch-based, and Magnum power case switch-based designs. In addition, the ATC-900 is used on either open or closed transition type switches. The ATC-900 controller is provided as a replacement controller for existing designs. The selection guide below provides the different style number replacement kits.

**ATC-900 Replacement Kit Selector Table**

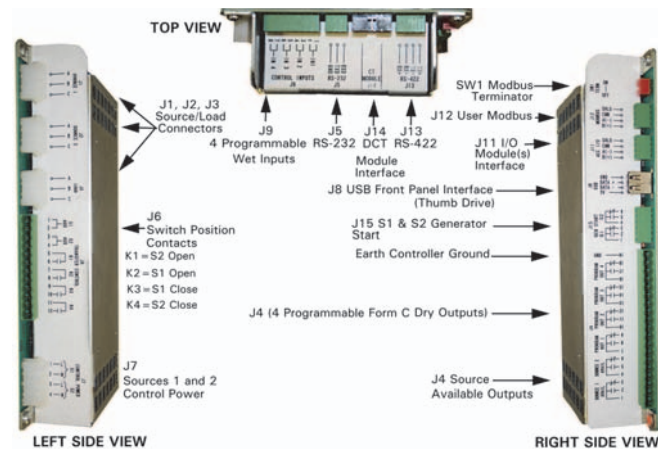
Switch Type	Number of Positions	Transition	Style Number Kit
Contactor-based	3	Open	<b>8160A90G01</b>
Contactor-based	2	Open	<b>8160A90G07</b>
Contactor-based	3	Closed	<b>8160A90G13</b>
Bypass contactor-based	3	Open	<b>8160A90G19</b>
Bypass contactor-based	3	Closed	<b>8160A90G25</b>
Molded case switch-based	3	Open	<b>8160A90G31</b>
Magnum-based	3	Open	<b>8160A90G37</b>
Magnum-based	3	Closed	<b>8160A90G43</b>

In addition, the ATC-900 controller can be used to retrofit and upgrade existing automatic transfer switches using either an ATC-600 or an ATC-800 controller.

Refer to the controller field upgrade selection below. The upgrade kit includes the ATC-900 controller and the wire harness adapter kit.

**Retrofit/Upgrade Selector Kit for ATC-600 or ATC-800**

Switch Type	Style Number Kit
Contactor-based	<b>8160A91G01</b>
Molded case switch-based	<b>8160A91G01</b>
Magnum-based	<b>8160A91G01</b>
Bypass contactor	<b>8160A91G04</b>

**ATC-900 (Top Left and Right Side Views)****ATC-900 Mating Connectors (Plugs)**

Connector Designation	Number of Pins	Connector Part Number
J1	3	<b>1268C07H41</b>
J2	3	<b>1268C07H41</b>
J3	3	<b>1268C07H41</b>
J4	19	<b>67A2590H25</b>
J5	3	<b>66A8190H01</b>
J6	12	<b>67A2590H32</b>
J7	4	<b>1268C07H31</b>
J8	USB	<b>M22-USB-SA</b>
J9	8	<b>66A8190H04</b>
J11	4	<b>66A8190H02</b>
J12	4	<b>66A8190H02</b>
J13	4	<b>66A8190H02</b>
J14	n/a	From DCT Module
J15	6	<b>66A8190H03</b>
<b>DCT Module</b>		
J18	2	<b>66A8190H05</b>
<b>I/O Module</b>		
J1 120 Vac Power	4	<b>1268C07H31</b>
J2 Inputs and GND	10	<b>67A2590H28</b>
J3 Communications	4	<b>66A8190H02</b>
J4 Outputs Form C	12	<b>67A2590H32</b>

**Note**

The connectors to the ATC-900 can be ordered separately; however, connector kit style number 8160A92G01 can be ordered that includes connectors for J4, J6, J9, J11 and J15 plus the USB port.



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Magnum-Based—Automatic Transfer Switch Features	<b>V2-T5-103</b>
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Glossary	<b>V2-T5-116</b>

**Contactor-Based—Automatic Transfer Switch Features**

Feature Number	Description	Open Transition									NTCE	
		RLC1	ATC1	ATC3	C3	C5	ATC9		C5			
		C2	C2	C2			C2	C3				
Timers												
1	Time delay normal to emergency (TDNE) fixed 2 or 15 seconds	S	S	—	—	—	—	—	—	—	—	
1A	Adjustable 0–1800 seconds	—	—	S	S	S	—	—	—	—	—	
1B	Adjustable 0–9999 minutes	—	—	—	—	—	S	S	S	—	—	
2	Time delay engine start (TDES) fixed 3 seconds	S	S	—	—	—	—	—	—	—	—	
2A	Adjustable 0–120 seconds	—	—	S	S	S	S	S	S	—	—	
3	Time delay emergency to normal (TDEN) fixed 5 minutes	S	S	—	—	—	—	—	—	—	—	
3A	Adjustable 0–1800 seconds	—	—	S	S	S	—	—	—	—	—	
3B	Adjustable 0–9999 minutes	—	—	—	—	—	S	S	S	—	—	
4	Time delay engine cooldown (TDEC) fixed 5 minutes	S	S	—	—	—	—	—	—	—	—	
4A	Adjustable 0–1800 seconds	—	—	S	S	S	—	—	—	—	—	
4B	Adjustable 0–9999 minutes	—	—	—	—	—	S	S	S	—	—	
Emergency (S2) Source Sensing												
5H	Phase reversal protection	—	—	S	S	S	S	S	S	—	—	
5J	All phase undervoltage/underfrequency	S	S	S	S	S	S	S	S	—	—	
5K	All phase overvoltage/overfrequency	—	—	S	S	S	S	S	S	—	—	
5L	All phase voltage unbalance	—	—	S	S	S	S	S	S	—	—	
5M	All phase voltage phase loss	—	—	—	—	—	S	S	S	—	—	
5N	All phase overfrequency	—	—	—	—	—	S	S	S	—	—	
System or Engine Test												
6B	Engine test pushbutton	S	S	S	S	S	S	S	S	—	—	
6C	Remote engine test input	—	—	—	—	—	C	C	C	—	—	
6D	Maintained 2-position test switch	—	—	—	—	—	O	O	O	—	—	
6H	Maintained 4-position test switch	—	—	—	—	—	O	O	O	—	—	
7	Time delay emergency fail (TDEF) fixed 6 seconds	S	S	—	—	—	—	—	—	—	—	
7A	Adjustable 0–6 seconds	—	—	S	S	S	S	S	S	—	—	
Pushbutton Bypass												
8C	Bypass TDEN	—	—	S	S	S	S	S	S	—	—	
8D	Bypass TDNE	—	—	S	S	S	S	S	S	—	—	
8E	Bypass TDNE/TDEN (input)	—	—	—	—	—	C	C	C	—	—	
Maintenance Selector Switch												
9B	Electrical operator isolator switch	—	—	O	O	O	O	O	O	—	—	

S = Standard, O = Optional, C = Configurable

### Contactor-Based—Automatic Transfer Switch Features, continued

		Open Transition									
Feature Number	Description	RLC1	ATC1	ATC3			ATC9			NTCE	
		C2	C2	C2	C3	C5	C2	C3	C5	C2	C3
Preferred Source Selector											
	Preferred source selector (programmed)	—	—	—	—	—	S	S	S	—	—
10A	Preferred source selector input	—	—	—	—	—	C	C	C	—	—
10C	Preferred source selector with selector switch	—	—	—	—	—	O	O	O	—	—
10B	Utility to utility or utility to generator	—	—	—	—	—	S	S	S	—	—
10D	Generator to generator	—	—	—	—	—	S	S	S	—	—
Indicating Lights/LEDs											
12C	Normal (S1) source connected	S	S	S	S	S	S	S	S	S	S
12D	Emergency (S2) source connected	S	S	S	S	S	S	S	S	S	S
12G	Normal (S1) source available	S	S	S	S	S	S	S	S	S	S
12H	Emergency (S2) source available	S	S	S	S	S	S	S	S	S	S
12L	Normal (S1) source tripped (requires feature 16)	—	—	—	—	—	—	O	O	—	—
12M	Emergency (S2) source tripped (requires feature 16)	—	—	—	—	—	—	O	O	—	—
Source Available Contacts											
14C	Normal (S1) source available 4 Form C	—	—	O	O	O	O	O	O	O	O
14D	Emergency (S2) source available 4 Form C	—	—	O	O	O	O	O	O	O	O
14E	Normal (S1) source available 1 Form C	—	—	—	—	—	S	S	S	—	—
14F	Emergency (S2) source available 1 Form C	—	—	—	—	—	S	S	S	—	—
14G	Normal (S1) source available 2 Form C	—	S	S	S	S	O	O	O	S	S
14H	Emergency (S2) source available 2 Form C	—	S	S	S	S	O	O	O	S	S
Position Contacts											
15E	Normal (S1) source position 1 Form C	—	S	S	S	S	S	S	S	S	S
15F	Emergency (S2) source position 1 Form C	—	S	S	S	S	S	S	S	S	S
15G	Normal (S1) source position 3 Form C	—	O	O	O	O	O	O	O	O	O
15H	Emergency (S2) source position 3 Form C	—	O	O	O	O	O	O	O	O	O
15R	Normal (S1) source position 1 Form C (relay OUTPUT)	—	—	—	—	—	C	C	C	—	—
15S	Emergency (S2) source position 1 Form C (relay OUTPUT)	—	—	—	—	—	C	C	C	—	—
Integral Overcurrent Protection											
16N	Normal (S1) switch only	—	—	—	—	—	—	—	—	—	—
16E	Emergency (S2) switch only	—	—	—	—	—	—	—	—	—	—
16B	Normal (S1) and emergency (S2) switches	—	—	—	—	—	—	—	—	—	—
16S	Service equipment/overcurrent protection normal (S1) and emergency (S2)	O	—	—	—	—	—	—	—	—	—
Breaker with O/C Trip											
17N	Normal (S1) Breaker Only with 100% load rating	—	—	—	O	O	O	O	O	O	O
Metering (Specify normal (S1), emergency (S2) or load side for 18A thru E)											
18	Integrated load metering (DCT module)	—	—	—	—	—	O	O	O	—	—
18A	IQ 250/260	—	O	O	O	O	O	O	O	O	O
18B	PX4000/6000/8000	—	—	—	—	—	—	—	—	—	—
18D	IQ 130/140/150	—	O	O	O	O	O	O	O	O	O
18E	PXM2250/2260/2270	—	O	O	O	O	O	O	O	O	O
18J	Integrated metering (DCT module—load side only)	—	—	—	—	—	O	O	O	—	—
21A	Non-standard terminals	—	—	—	—	—	—	—	—	—	—
22	Ground bus	—	—	S	S	S	S	S	S	S	S
22C	Special ground bar—contact factory	—	—	—	—	—	—	—	—	—	—
22D	16 conductor ground bus 500 or 750 kcmil	—	—	—	—	—	—	—	O	—	—
Plant Exerciser											
23A	Selectable—disabled/7-, 14-, 28-day interval, fixed 15 minutes load/no load, with fail-safe	S	S	—	—	—	—	—	—	—	—
23K	Selectable—disabled 7-, 14-, 28-day interval, 0–600 minutes load/no load, with fail-safe	—	—	S	S	S	—	—	—	—	—
23L	24-hour, 7-day, 365-day programmable plant exerciser	—	—	O	O	O	—	—	—	—	—
23M	Selectable—disabled 7-, 14-, 28-, 365-day interval, 0–600 minutes load/no load, with fail-safe	—	—	—	—	—	S	S	S	—	—

S = Standard, O = Optional, C = Configurable

## Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition					ATC9			NTCE	
		RLC1	ATC1	ATC3							
		C2	C2	C2	C3	C5	C2	C3	C5	C2	C3
Normal (S1) Source Sensing											
26D	Go to emergency (S2) input	—	—	S	S	S	C	C	C	—	—
26E	Go to emergency (S2) input with selector switch ①	—	—	—	—	—	—	O	O	—	—
26H	Phase reversal protection	—	—	S	S	S	O	S	S	—	—
26J	All phase undervoltage/underfrequency	—	—	S	S	S	S	S	S	—	—
26K	All phase overvoltage/overfrequency	—	—	S	S	S	S	S	S	—	—
26L	All phase voltage unbalance	—	—	S	S	S	O	S	S	—	—
26M	All phase voltage phase loss	—	—	—	—	—	S	S	S	—	—
26P	All phase undervoltage	S	S	—	—	—	—	—	—	—	—
Alternative Transfer Modes of Operation											
29G	Selector switch for auto or non-auto operation ①	—	—	O	O	O	O	O	O	—	—
29J	Manual (pushbutton) transfer E to N; automatic N to E ①	—	—	O	O	O	O	O	O	—	—
29L	Manual retransfer on/off input	—	—	—	—	—	C	C	C	—	—
29M	Manual retransfer on/off input with selector switch ①	—	—	—	—	—	O	O	O	—	—
29K	Manual retransfer input	—	—	—	—	—	C	C	C	—	—
Open Transfer Operation Modes											
32A	Time delay neutral adjustable 0–120 seconds (delayed transition)	—	—	—	S	—	—	C	C	—	—
32B	Load voltage decay adjustable 2–30% nominal voltage	—	—	—	—	—	—	C	C	—	—
32C	In-phase transition defaults to load voltage decay	—	—	—	—	—	—	C	C	—	—
32D	In-phase transition defaults to time delay neutral	—	—	—	—	S	—	—	—	—	—
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	—	—	—	—	—	—	—
32F	In-phase transition	S	S	S	—	—	S	—	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (delayed transition)	—	—	—	—	—	—	—	—	—	—
Logic Extender Cable (Open Enclosures Only)											
34A	48 inches (1219 mm)	—	—	—	—	—	—	—	—	—	—
34C	96 inches (2438 mm)	—	O	O	O	O	—	—	—	O	O
34E	144 inches (3658 mm)	—	—	—	—	—	—	—	—	—	—
34F	100 inches (2540 mm) (fixed mount only)	—	—	—	—	—	—	—	—	—	—
35A	Pre-transfer signal contacts 1 Form C	—	—	S	S	S	C	C	C	—	—
35B	Pre-/post-transfer signal	—	—	—	—	—	C	C	C	—	—
36	Load shed from emergency (S2 inhibit)	—	—	—	S	S	C	C	C	—	—
36A	Load shed—S2 inhibit with keyed switch (INPUT)	—	—	—	—	—	O	O	O	—	—
37	Go to “isolated” position (not SE rated)	—	—	—	—	—	C	C	C	—	—
Suitable for Use as Service Equipment Requires 16B, N or S											
37A	Without ground fault protection	—	—	O	O	O	O	O	O	O	O
37B	With ground fault protection required at 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 V to ground but not exceeding 600 V phase to phase	—	—	O	O	O	O	O	O	O	O
Stainless Steel Device Covers											
38A	SS cover for device plate or SE disconnect	—	—	O	O	O	O	O	O	O	O
38B	SS cover for controller	—	O	O	O	O	O	O	O	—	—
Space Heater with Thermostat											
41A	100 watts	—	O	O	O	O	O	O	O	O	O
41E	375 watts	—	—	—	—	—	—	—	—	—	—
42	IBC/CBC seismic qualified	S	S	S	S	S	S	S	S	S	S
Load Management Contacts											
45A–K	Load sequencing contacts (1)	—	—	—	—	—	C	C	—	—	—
45L	Selective load shed (assignable to multiple out put contacts)	—	—	—	—	—	C	C	C	—	—

S = Standard, O = Optional, C = Configurable

**Note**

① When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

### Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition									
		RLC1	ATC1	ATC3				ATC9		NTCE	
		C2	C2	C2	C3	C5	C2	C3	C5	C2	C3
Communications											
48D	PXG400 gateway (includes Modbus)	—	—	0	0	0	0	0	0	—	—
48F	Modbus—MPONI module (PONI not required with ATC-300+)	—	—	0	0	0	—	—	—	—	—
48F	Modbus communication—no PONI required	—	—	S	S	S	S	S	S	—	—
48G	Modbus TCP/IP gateway	—	—	—	—	—	0	0	0	—	—
48P	Power supply for remote annunciator	—	—	0	0	0	0	0	0	—	—
48RAC	Remote annunciator with control (includes Modbus)	—	—	0	0	0	0	0	0	—	—
48MRAC	Remote annunciator with control multi-switch (includes Modbus)	—	—	0	0	0	—	—	—	—	—
48U	USB port	—	—	—	—	—	S	S	S	—	—
49A	Sensing isolation transformer Magnum	—	—	—	—	—	0	0	0	—	—
49B	Sensing isolation transformer	—	—	0	0	0	0	0	0	—	—
49C	Multi-tap voltage transformer (non AG only)	—	S	S	S	S	S	S	S	S	S
49C	Multi-tap voltage transformer (option only on fixed)	—	—	—	—	—	—	—	—	—	—
TVSS up to 480 V (Connected to Normal)											
51D1	50 kA—CVX	—	—	0	0	0	0	0	0	0	0
51F1	100 kA—CVX	—	—	0	0	0	0	0	0	0	0
Surge Protection Device with 12 ft Cable (on Normal)											
51S1	50 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S2	80 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S3	100 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S4	120 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S5	160 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S6	200 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S7	250 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S8	300 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
51S9	400 kA—SPD ①	—	—	—	—	—	—	—	—	—	—
52B	24 V generator battery power	—	—	—	—	—	—	—	—	—	—
52C	24 V onboard power supply (charger and batteries)	—	—	—	—	—	—	—	—	—	—
54B	Upgrade to 316 stainless steel	—	—	0	0	0	0	0	0	0	0
60	Control power transformer (240/120 V single-phase and 208 V only)	—	0	0	—	—	—	—	—	—	—
61A	UPS device	—	—	—	—	—	—	—	—	—	—
61B	UPS 120 Vac terminal block input	—	—	—	—	—	—	—	—	—	—
80A	Emergency (S2) inhibit contact	—	—	—	0	0	C	C	C	—	—
Monitoring Outputs											
81A	General alarm indication contact	—	—	—	—	—	C	C	C	—	—
81B	ATS not in automatic	—	—	—	—	—	C	C	C	—	—
81C	ATS in test	—	—	—	—	—	C	C	C	—	—
81D	Engine test aborted	—	—	—	—	—	C	C	C	—	—
81E	Cooldown in process	—	—	—	—	—	C	C	C	—	—
81F	Engine start contact status	—	—	—	—	—	C	C	C	—	—
81G	Emergency inhibit on	—	—	—	—	—	C	C	C	—	—
81GL	Emergency inhibit on with white indicating light ②	—	—	—	—	—	0	0	0	—	—
81H	ATS on bypass	—	—	—	—	—	C	C	C	—	—
Inputs											
81J	Lockout	—	—	—	—	—	C	C	C	—	—
81K	Monitor mode	—	—	—	—	—	C	C	C	—	—
81L	Remote load test	—	—	—	—	—	C	C	C	—	—
Three Source ATS Control (Master/Slave)											
90A	Master control output	—	—	—	—	—	C	C	C	—	—
90B	Slave input	—	—	—	—	—	C	C	C	—	—

S = Standard, 0 = Optional, C = Configurable

#### Notes

- ① Add feature package B or C (e.g., 51S4B).  
B: LED indication and audible alarm, Form C contact, EMI/RFI filtering (standard)  
C: B and surge counter with Reset button (standard with surge)
- ② When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

## Contactor-Based—Automatic Transfer Switch Features, continued

		Open Transition				Closed Transition		
Feature Number	Description	BIC3 C	BIC3 D	BIC9 C	BIC9 D	CBC9 C	CBC9 D	CTC9 C3
Timers								
1A	Adjustable 0–1800 seconds	S	S	—	—	—	—	—
1B	Adjustable 0–9999 minutes	—	—	S	S	S	S	S
2A	Adjustable 0–120 seconds	S	S	S	S	S	S	S
3A	Adjustable 0–1800 seconds	S	S	—	—	—	—	—
3B	Adjustable 0–9999 minutes	—	—	S	S	S	S	S
4A	Adjustable 0–1800 seconds	S	S	—	—	—	—	—
4B	Adjustable 0–9999 minutes	—	—	S	S	S	S	S
Emergency (S2) Source Sensing								
5H	Phase reversal protection	S	S	S	S	S	S	S
5J	All phase undervoltage/underfrequency	S	S	S	S	S	S	S
5K	All phase overvoltage/overfrequency	S	S	S	S	S	S	S
5L	All phase voltage unbalance	—	—	O	O	O	O	O
5M	All phase voltage phase loss	—	—	S	S	S	S	S
5N	All phase overfrequency	—	—	S	S	S	S	S
System or Engine Test								
6B	Engine test pushbutton	S	S	S	S	S	S	S
6C	Remote engine test input	—	—	C	C	C	C	C
6D	Maintained 2-position test switch	—	—	O	O	O	O	O
6H	Maintained 4-position test switch	—	—	O	O	O	O	O
7A	Adjustable 0–6 seconds	S	S	S	S	S	S	S
Pushbutton Bypass								
8C	Bypass TDEN	S	S	S	S	S	S	S
8D	Bypass TDNE	S	S	S	S	S	S	S
8E	Bypass TDNE/TDEN (input)	—	—	C	C	C	C	C
Maintenance Selector Switch								
9B	Electrical operator isolator switch	O	O	O	O	O	O	O
Preferred Source Selector								
10A	Preferred source selector (programmed)	—	—	S	S	S	S	S
	Preferred source selector input	—	—	C	C	C	C	C
10C	Preferred source selector with selector switch	—	—	O	O	O	O	O
10B	Utility to utility or utility to generator	—	—	S	S	S	S	S
10D	Generator to generator	—	—	S	S	S	S	S
Indicating Lights/LEDs								
12C	Normal (S1) source connected	S	S	S	S	S	S	S
12D	Emergency (S2) source connected	S	S	S	S	S	S	S
12G	Normal (S1) source available	S	S	S	S	S	S	S
12H	Emergency (S2) source available	S	S	S	S	S	S	S
12L	Normal (S1) source tripped (requires feature 16)	—	—	O	O	O	O	O
12M	Emergency (S2) source tripped (requires feature 16)	—	—	O	O	O	O	O
Source Available Contacts								
14C	Normal (S1) source available 4 Form C	O	O	O	O	O	O	O
14D	Emergency (S2) source available 4 Form C	O	O	O	O	O	O	O
14E	Normal (S1) source available 1 Form C	—	—	S	S	S	S	S
14F	Emergency (S2) source available 1 Form C	—	—	S	S	S	S	S
14G	Normal (S1) source available 2 Form C	S	S	O	O	O	O	O
14H	Emergency (S2) source available 2 Form C	S	S	O	O	O	O	O

S = Standard, O = Optional, C = Configurable

### Contactor-Based—Automatic Transfer Switch Features, continued

		Open Transition				Closed Transition		
Feature Number	Description	BIC3 C	BIC3 D	BIC9 C	BIC9 D	CBC9 C	CBC9 D	CTC9 C3
Position Contacts								
15E	Normal (S1) source position 1 Form C	S	S	S	S	S	S	S
15F	Emergency (S2) source position 1 Form C	S	S	S	S	S	S	S
15G	Normal (S1) source position 3 Form C	O	O	O	O	O	O	O
15H	Emergency (S2) source position 3 Form C	O	O	O	O	O	O	O
15R	Normal (S1) source position 1 Form C (relay OUTPUT)	—	—	C	C	C	C	C
15S	Emergency (S2) source position 1 Form C (relay OUTPUT)	—	—	C	C	C	C	C
Integral Overcurrent Protection								
16N	Normal (S1) switch only	—	—	—	—	—	—	—
16E	Emergency (S2) switch only	—	—	—	—	—	—	—
16B	Normal (S1) and emergency (S2) switches	—	—	—	—	—	—	—
16S	Service equipment/overcurrent protection normal (S1) and emergency (S2)	—	—	—	—	—	—	—
Metering (Specify normal (S1), emergency (S2) or load side for 18A thru E)								
18	Integrated load metering (DCT module)	—	—	O	O	O	O	O
18A	IQ 250/260	O	O	O	O	O	O	O
18B	PX4000/6000/8000	—	O	—	—	—	—	—
18D	IQ 130/140/150	O	O	O	O	O	O	O
18E	PXM2250/2260/2270	O	O	O	O	O	O	O
18J	Integrated metering (DCT module—load side only)	—	—	O	O	O	O	O
20A	Rear bus connections	—	—	—	—	—	—	—
21A	Non-standard terminals (optional in IES for centers)	—	—	—	—	—	—	—
22	Ground bus	S	S	—	—	—	—	—
22C	Special ground bar—contact factory	—	—	—	—	—	—	—
22D	16 conductor ground bus 500 or 750 kcmil	O	O	O	O	O	—	—
Plant Exerciser								
23A	Selectable—disabled 7-, 14-, 28-day interval, fixed 15 minutes load/no load, with fail-safe	—	—	—	—	—	—	—
23K	Selectable—disabled 7-, 14-, 28-day interval, 0–600 minutes load/no load, with fail-safe	S	S	—	—	—	—	—
23L	24-hour, 7-day, 365-day programmable plant exerciser	O	O	—	—	—	—	—
23M	Selectable—disabled 7-, 14-, 28-, 365-day interval, 0–600 minutes load/no load, with fail-safe	—	—	S	S	S	S	S
Normal (S1) Source Sensing								
26D	Go to emergency (S2) input	S	S	C	C	C	C	C
26E	Go to emergency (S2) input with selector switch ①	—	—	O	O	O	O	O
26H	Phase reversal protection	S	S	S	S	S	S	S
26J	All phase undervoltage/underfrequency	S	S	S	S	S	S	S
26K	All phase overvoltage/overfrequency	S	S	S	S	S	S	S
26L	All phase voltage unbalance and phase loss	—	—	O	O	O	O	O
26L	All phase voltage unbalance	S	S	S	S	S	S	S
Alternative Transfer Modes of Operation								
29D	Dual ATS bypass	S	S	S	S	S	S	—
29G	Selector switch for auto or non-auto operation ①	O	O	O	O	O	O	O
29J	Manual (pushbutton) transfer E to N; automatic N to E ①	O	O	O	O	O	O	O
29L	Manual retransfer on/off input	—	—	C	C	C	C	C
29M	Manual retransfer on/off input with selector switch ①	—	—	O	O	O	O	O
29K	Manual retransfer input	—	—	C	C	C	C	C

S = Standard, O = Optional, C = Configurable

#### Note

① When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

## Contactor-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition				Closed Transition		
		BIC3 C	BIC3 D	BIC9 C	BIC9 D	CBC9 C	CBC9 D	CTC9 C3
Open Transfer Operation Modes								
32A	Time delay neutral adjustable 0–120 seconds (delayed transition)	S	S	C	C	—	—	—
32B	Load voltage decay adjustable 2–30% nominal voltage	—	—	C	C	—	—	—
32C	In-phase transition defaults to load voltage decay	—	—	—	—	—	—	—
32D	In-phase transition defaults to time delay neutral	—	—	—	—	—	—	—
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	—	—	—	—
32F	In-phase transition	—	—	—	—	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (delayed transition)	—	—	—	—	—	—	—
Load Control								
35A	Pre-transfer signal contacts 1 Form C	S	S	C	C	C	C	C
35B	Pre-/post-transfer signal	—	—	C	C	C	C	C
36	Load shed from emergency (S2 inhibit)	S	S	C	C	C	C	C
36A	Load shed—S2 inhibit with keyed switch (INPUT)	—	—	O	O	O	O	O
37	Go to “isolated” position (not SE rated)	—	—	C	C	C	C	C
Suitable for Use as Service Equipment Requires 16B, N or S								
37A	Without ground fault protection	—	—	—	—	—	—	—
37B	With ground fault protection required at 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 V to ground but not exceeding 600 V phase to phase	—	—	—	—	—	—	—
Stainless Steel Device Covers								
38A	SS cover for device plate or SE disconnect	O	O	O	O	O	O	O
38B	SS cover for controller	O	O	O	O	O	O	O
Space Heater with Thermostat								
41A	100 watts	O	O	O	O	O	O	O
41E	375 watts	—	—	—	O	—	O	—
42	IBC/CBC seismic qualified	S	S	S	S	S	S	S
Load Management Contacts								
45A–K	Load sequencing contacts (1)	—	—	C	C	C	C	C
45L	Selective load shed (assignable to multiple out put contacts)	—	—	C	C	C	C	C
Closed Transition Operational Modes (User Must Specify)								
47C	Closed/in-phase transition default to load voltage decay	—	—	—	—	—	—	—
47D	Closed transition	—	—	—	—	C	C	C
47E	Closed/in-phase transition default to time delay neutral	—	—	—	—	—	—	—
47F	Closed transition load voltage decay	—	—	—	—	C	C	C
47G	Closed transition time delay neutral	—	—	—	—	C	C	C
47H	Parallel limit timer	—	—	—	—	—	—	—
Communications								
48A	INCOM—IPONI module	—	—	—	—	—	—	—
48D	PXG400 gateway (includes Modbus)	O	O	O	O	O	O	O
48F	Modbus—MPONI module (PONI not required with ATC-300+)	O	O	—	—	—	—	—
48F	Modbus communication—no PONI required	S	S	S	S	S	S	S
48G	Modbus TCP/IP gateway	O	O	O	O	O	O	O
48P	Power supply for remote annunciator	O	O	O	O	O	O	O
48RAC	Remote annunciator with control (includes Modbus)	O	O	O	O	O	O	O
48MRAC	Remote annunciator with control multi-switch (includes Modbus)	—	—	—	—	—	—	—
48R	Remote annunciator	—	—	S	S	S	S	S
48U	USB port	—	—	—	—	—	—	—
49A	Sensing isolation transformer Magnum	—	—	O	O	O	O	O
49B	Sensing isolation transformer	—	—	O	O	O	O	O
49C	Multi-tap voltage transformer (non AG only)	—	—	—	—	—	—	S
49C	Multi-tap voltage transformer (option only on fixed)	S	S	S	S	S	S	—

S = Standard, O = Optional, C = Configurable



### Contactor-Based—Automatic Transfer Switch Features, continued

		Open Transition				Closed Transition		
Feature Number	Description	BIC3 C	BIC3 D	BIC9 C	BIC9 D	CBC9 C	CBC9 D	CTC9 C3
TVSS up to 480 V (Connected to Normal)								
51D1	50 kA—CVX	0	—	0	—	0	—	0
51F1	100 kA—CVX	0	—	0	—	0	—	0
Surge Protection Device with 12 ft Cable (on Normal)								
51S1	50 kA—SPD ①	—	0	—	0	—	0	—
51S2	80 kA—SPD ①	—	0	—	0	—	0	—
51S3	100 kA—SPD ①	—	0	—	0	—	0	—
51S4	120 kA—SPD ①	—	0	—	0	—	0	—
51S5	160 kA—SPD ①	—	0	—	0	—	0	—
51S6	200 kA—SPD ①	—	0	—	0	—	0	—
51S7	250 kA—SPD ①	—	—	—	—	—	—	—
51S8	300 kA—SPD ①	—	—	—	—	—	—	—
51S9	400 kA—SPD ①	—	—	—	—	—	—	—
52B	24 V generator battery power	—	—	—	—	—	—	—
52C	24 V onboard power supply (charger and batteries)	—	—	—	—	—	—	—
54A	Front access cabinet	—	—	—	—	—	—	—
54B	Upgrade to 316 stainless steel	0	0	0	0	0	0	—
59A	Silver-plated bus	S	S	—	S	—	S	—
59B	Tin-plated bus	0	0	—	—	—	—	—
61A	UPS device	0	0	—	—	—	—	—
61B	UPS 120 Vac terminal block input	S	S	—	—	—	—	—
80A	Emergency (S2) inhibit contact	S	S	C	C	C	C	C
Monitoring Outputs								
81A	General alarm indication contact	—	—	C	C	C	C	C
81B	ATS not in automatic	—	—	C	C	C	C	C
81C	ATS in test	—	—	C	C	C	C	C
81D	Engine test aborted	—	—	C	C	C	C	C
81E	Cooldown in process	—	—	C	C	C	C	C
81F	Engine start contact status	—	—	C	C	C	C	C
81G	Emergency inhibit on	—	—	C	C	C	C	C
81GL	Emergency inhibit on with white indicating light ②	—	—	0	0	0	0	0
81H	ATS on bypass	—	—	C	C	C	C	C
Inputs								
81J	Lockout	—	—	C	C	C	C	C
81K	Monitor mode	—	—	C	C	C	C	C
81L	Remote load test	—	—	C	C	C	C	C
Three Source ATS Control (Master/Slave)								
90A	Master control output	—	—	C	C	C	C	C
90B	Slave input	—	—	C	C	C	C	C

S = Standard, 0 = Optional, C = Configurable

#### Notes

① Add feature package B or C (e.g., 51S4B).

B: LED indication and audible alarm, Form C contact, EMI/RFI filtering (standard)

C: B and surge counter with Reset button (standard with surge)

② When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

## Breaker-Based—Automatic Transfer Switch Features

		Open Transition					Closed Transition
Feature Number	Description	ATH1	ATH3	ATH9	NTHE	MTHX	MBHE
		ATV1	ATV3	ATV9	NTVE	MTVX	
Timers							
1	Time delay normal to emergency (TDNE) fixed 2 or 15 seconds	S	—	—	—	—	—
1A	Adjustable 0–1800 seconds	—	S	—	—	—	—
1B	Adjustable 0–9999 minutes	—	—	S	—	—	—
2	Time delay engine start (TDES) fixed 3 seconds	S	—	—	—	—	—
2A	Adjustable 0–120 seconds	—	S	S	—	—	—
3	Time delay emergency to normal (TDEN) fixed 5 minutes	S	S	—	—	—	—
3A	Adjustable 0–1800 seconds	—	—	—	—	—	—
3B	Adjustable 0–9999 minutes	—	—	S	—	—	—
4	Time delay engine cooldown (TDEC) fixed 5 minutes	S	—	—	—	—	—
4A	Adjustable 0–1800 seconds	—	S	—	—	—	—
4B	Adjustable 0–9999 minutes	—	—	S	—	—	—
Emergency (S2) Source Sensing							
5H	Phase reversal protection	—	S	S	—	—	—
5J	All phase undervoltage/underfrequency	S	S	S	—	—	—
5K	All phase overvoltage/overfrequency	—	S	S	—	—	—
5L	All phase voltage unbalance	—	—	O	—	—	—
5L	All phase voltage phase loss	—	—	S	—	—	—
5N	All phase overfrequency	S	—	S	—	—	—
System or Engine Test							
6B	Engine test pushbutton	S	S	S	—	—	—
6C	Remote engine test input	—	—	C	—	—	—
6D	Maintained 2-position test switch	—	—	O	—	—	—
6H	Maintained 4-position test switch	—	—	O	—	—	—
7	Time delay emergency fail (TDEF) fixed 6 seconds	S	—	—	—	—	—
7A	Adjustable 0–6 seconds	—	S	S	—	—	—
Pushbutton Bypass							
8C	Bypass TDEN	—	S	S	—	—	—
8D	Bypass TDNE	—	S	S	—	—	—
8E	Bypass TDNE/TDEN (input)	—	—	C	—	—	—
Maintenance Selector Switch							
9B	Electrical operator isolator switch	—	O	O	—	—	—
Preferred Source Selector							
	Preferred source selector (programmed)	—	—	S	—	—	—
10A	Preferred source selector input	—	—	C	—	—	—
10C	Preferred source selector with selector switch	—	—	O	—	—	—
10B	Utility to utility or utility to generator	—	—	S	—	—	—
10D	Generator to generator	—	—	S	—	—	—
Indicating Lights/LEDs							
12C	Normal (S1) source connected	S	S	S	S	—	S
12D	Emergency (S2) source connected	S	S	S	S	—	S
12G	Normal (S1) source available	S	S	S	S	—	—
12H	Emergency (S2) source available	S	S	S	S	—	—
12L	Normal (S1) source tripped (requires feature 16)	—	O	O	O	—	—
12M	Emergency (S2) source tripped (requires feature 16)	—	O	O	O	—	—
Source Available Contacts							
14C	Normal (S1) source available 4 Form C	—	O	O	O	—	—
14D	Emergency (S2) source available 4 Form C	—	O	O	O	—	—
14E	Normal (S1) source available 1 Form C	—	—	S	—	—	—
14F	Emergency (S2) source available 1 Form C	—	—	S	—	—	—
14G	Normal (S1) source available 2 Form C	S	S	O	O	—	—
14H	Emergency (S2) source available 2 Form C	S	S	O	O	—	—

S = Standard, O = Optional, C = Configurable

### Breaker-Based—Automatic Transfer Switch Features, continued

		Open Transition					Closed Transition
Feature Number	Description	ATH1 ATV1	ATH3 ATV3	ATH9 ATV9	NTHE NTVE	MTHX MTVX	MBHE
Position Contacts							
15E	Normal (S1) source position 1 Form C	S	S	S	—	—	—
15F	Emergency (S2) source position 1 Form C	S	S	S	—	—	—
15G	Normal (S1) source position 3 Form C	0	0	0	—	—	—
15H	Emergency (S2) source position 3 Form C	0	0	0	—	—	—
15R	Normal (S1) source position 1 Form C (relay OUTPUT)	—	—	C	—	—	—
15S	Emergency (S2) source position 1 Form C (relay OUTPUT)	—	—	C	—	—	—
Integral Overcurrent Protection							
16N	Normal (S1) switch only	—	0	0	0	0	—
16E	Emergency (S2) switch only	—	0	0	0	0	—
16B	Normal (S1) and emergency (S2) switches	—	0	0	0	0	—
Metering (Specify normal (S1), emergency (S2) or load side for 18A thru E)							
18	Integrated load metering (DCT module)	—	—	—	—	—	—
18A	IQ 250/260	0	0	0	0	—	—
18B	PX4000/6000/8000	—	—	—	—	—	—
18D	IQ 130/140/150	0	0	0	0	—	—
18E	PXM2250/2260/2270	0	0	0	0	—	—
18J	Integrated metering (DCT module—load side only)	—	—	0	0	—	—
20A	Rear bus connections	—	0	0	0	0	—
21A	Non-standard terminals (optional in IES for centers)	0	0	0	0	0	0
22	Ground bus with provisions to attach to neutral	—	—	0	—	—	—
Plant Exerciser							
23A	Selectable—disabled 7-, 14-, 28-day interval, fixed 15 minutes load/no load, with fail-safe	S	—	—	—	—	—
23K	Selectable—disabled 7-, 14-, 28-day interval, 0–600 minutes load/no load, with fail-safe	—	S	—	—	—	—
23L	24-hour, 7-day, 365-day programmable plant exerciser	—	0	—	—	—	—
23M	Selectable—disabled 7-, 14-, 28-, 365-day interval, 0–600 minutes load/no load, with fail-safe	—	—	S	—	—	—
Normal (S1) Source Sensing							
26D	Go to emergency (S2) input	—	S	C	—	—	—
26E	Go to emergency (S2) input with selector switch ①	—	—	0	—	—	—
26H	Phase reversal protection	—	S	S	—	—	—
26J	All phase undervoltage/underfrequency	—	S	S	—	—	—
26K	All phase overvoltage/overfrequency	—	S	S	—	—	—
26L	All phase voltage unbalance and phase loss	—	—	0	—	—	—
26L	All phase voltage unbalance	—	S	S	—	—	—
26M	Allows operation with generator with utility sensing	0	—	—	—	—	—
26P	(available only through a field installed kit) (not in IES)	S	—	—	—	—	—
Alternative Transfer Modes of Operation							
29G	Selector switch for auto or non-auto operation ①	—	0	0	—	—	—
29J	Manual (pushbutton) transfer E to N; automatic N to E ①	—	0	0	—	—	—
29L	Manual retransfer on/off input	—	—	C	—	—	—
29M	Manual retransfer on/off input with selector switch ①	—	—	0	—	—	—
29K	Manual retransfer input	—	—	C	—	—	—

S = Standard, 0 = Optional, C = Configurable

#### Note

<sup>①</sup> When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

## Breaker-Based—Automatic Transfer Switch Features, continued

		Open Transition					Closed Transition
Feature Number	Description	ATH1 ATV1	ATH3 ATV3	ATH9 ATV9	NTHE NTVE	MTHX MTVX	MBHE
Open Transfer Operation Modes							
32A	Time delay neutral adjustable 0–120 seconds (delayed transition)	—	S	C	—	—	—
32B	Load voltage decay adjustable 2–30% nominal voltage	—	—	C	—	—	—
32C	In-phase transition defaults to load voltage decay	—	—	—	—	—	—
32D	In-phase transition defaults to time delay neutral	—	—	—	—	—	—
32E	Delay transition timer adjustable 3–60 seconds	—	—	—	S	—	—
32F	In-phase transition	—	—	—	—	—	—
32G	Time delay neutral fixed 0 or 2 seconds (delayed transition)	S	—	—	—	—	—
Logic Extender Cable (Open Enclosures Only)							
34A	48 inches (1219 mm)	—	—	O	O	—	—
34C	96 inches (2438 mm)	—	—	O	O	—	—
34E	144 inches (3658 mm)	—	—	O	O	—	—
34F	100 inches (2540 mm) (fixed mount only)	—	—	—	—	—	—
35A	Pre-transfer signal contacts 1 Form C	—	S	C	—	—	—
35B	Pre-/post-transfer signal	—	—	C	—	—	—
36	Load shed from emergency (S2 inhibit)	—	O	C	—	—	—
36A	Load shed—S2 inhibit with keyed switch (INPUT)	—	—	O	—	—	—
37	Go to “isolated” position (not SE rated)	—	—	C	—	—	—
Suitable for Use as Service Equipment Requires 16B, N or S							
37A	Without ground fault protection	—	O	O	O	—	—
37B	With ground fault protection required at 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 V to ground but not exceeding 600 V phase to phase	—	O	O	O	—	—
Stainless Steel Device Covers							
38A	SS cover for device plate or SE disconnect	—	O	O	O	—	—
38B	SS cover for controller	O	O	O	—	—	—
Distribution Panel (For 240/120 V Only)							
39A	225 A with (2) 200 A feeders	—	O	—	—	—	—
39B	300 A with (3) 200 A feeders	—	O	—	—	—	—
39C	400 A with (4) 200 A feeders	—	O	—	—	—	—
Space Heater with Thermostat							
41A	100 watts	O	O	O	O	O	O
42	IBC/CBC seismic qualified	S	S	S	S	S	S
Load Management Contacts							
45A–K	Load sequencing contacts (1)	—	—	C	—	—	—
45L	Selective load shed (assignable to multiple out put contacts)	—	—	C	—	—	—
Communications							
48D	PXG400 gateway (includes Modbus)	—	O	O	—	—	—
48F	Modbus communication—no PONI required	—	—	S	—	—	—
48G	Modbus TCP/IP gateway	—	—	O	—	—	—
48P	Power supply for remote annunciator	—	O	O	—	—	—
48RAC	Remote annunciator with control (includes Modbus)	—	O	O	—	—	—
48MRAC	Remote annunciator with control multi-switch (includes Modbus)	—	O	—	—	—	—
48U	USB port	—	—	S	—	—	—
49B	Sensing isolation transformer	—	O	O	—	—	—
49C	Multi-tap voltage transformer ①	S	S	S	S	S	—
49C	Multi-tap voltage transformer (option only on fixed)	—	—	—	—	—	—

S = Standard, O = Optional, C = Configurable

**Note**<sup>①</sup> On dedicated voltage 240 V or 208 V, multi-tap transformer is not included as standard.

### Breaker-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition					Closed Transition
		ATH1 ATV1	ATH3 ATV3	ATH9 ATV9	NTHE NTVE	MTHX MTVX	MBHE
TVSS up to 480 V (Connected to Normal)							
51D1	50 kA—CVX	—	0	0	0	0	—
51F1	100 kA—CVX	—	0	0	0	0	—
Surge Protection Device with 12 ft Cable (on Normal)							
51S1	50 kA—SPD ①	—	—	—	—	—	—
51S2	80 kA—SPD ①	—	—	—	—	—	—
51S3	100 kA—SPD ①	—	—	—	—	—	—
51S4	120 kA—SPD ①	—	—	—	—	—	—
51S5	160 kA—SPD ①	—	—	—	—	—	—
51S6	200 kA—SPD ①	—	—	—	—	—	—
51S7	250 kA—SPD ①	—	—	—	—	—	—
51S8	300 kA—SPD ①	—	—	—	—	—	—
51S9	400 kA—SPD ①	—	—	—	—	—	—
52B	24 V generator battery power	—	—	—	—	—	—
52C	24 V onboard power supply (charger and batteries)	—	—	—	—	—	—
54A	Front access cabinet	—	—	—	—	—	—
54B	Upgrade to 316 stainless steel	—	0	0	0	0	—
55B	Source swap (normal—bottom / emergency—top)	—	—	—	—	—	—
60	Control power transformer (240/120 V single-phase and 208 V only)	0	0	—	—	—	—
61A	UPS device	—	—	—	—	—	—
61B	UPS 120 Vac terminal block input	—	—	—	—	—	—
80A	Emergency (S2) inhibit contact	—	0	C	—	—	—
Monitoring Outputs							
81A	General alarm indication contact	—	—	C	—	—	—
81B	ATS not in automatic	—	—	C	—	—	—
81C	ATS in test	—	—	C	—	—	—
81D	Engine test aborted	—	—	C	—	—	—
81E	Cooldown in process	—	—	C	—	—	—
81F	Engine start contact status	—	—	C	—	—	—
81G	Emergency inhibit on	—	—	C	—	—	—
81GL	Emergency inhibit on with white indicating light ②	—	—	0	—	—	—
81H	ATS on bypass	—	—	C	—	—	—
Inputs							
81J	Lockout	—	—	C	—	—	—
81K	Monitor mode	—	—	C	—	—	—
81L	Remote load test	—	—	C	—	—	—
Three Source ATS Control (Master/Slave)							
90A	Master control output	—	—	C	—	—	—
90B	Slave input	—	—	C	—	—	—

S = Standard, 0 = Optional, C = Configurable

#### Notes

- ① Add feature package B or C (e.g., 51S4B).  
B: LED indication and audible alarm, Form C contact, EMI/RFI filtering (standard)  
C: B and surge counter with Reset button (standard with surge)
- ② When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

# 5.6

## Transfer Switches

### Standard and Optional Features

#### Magnum-Based—Automatic Transfer Switch Features

		Open Transition			Closed Transition	
Feature Number	Description	ATV9	NTVE	BIV9	CTV9	CBV9
		MG	MG	MG	MG	MG
Timers						
1B	Adjustable 0–9999 minutes	S	—	S	S	S
2A	Adjustable 0–120 seconds	S	—	S	S	S
3A	Adjustable 0–1800 seconds	—	—	—	—	—
3B	Adjustable 0–9999 minutes	S	—	S	S	S
4A	Adjustable 0–1800 seconds	—	—	—	—	—
4B	Adjustable 0–9999 minutes	S	—	S	S	S
Emergency (S2) Source Sensing						
5H	Phase reversal protection	S	—	S	S	S
5J	All phase undervoltage/underfrequency	S	—	S	S	S
5K	All phase overvoltage/overfrequency	S	—	S	S	S
5L	All phase voltage unbalance	O	—	O	O	O
5L	All phase voltage phase loss	S	—	S	S	S
5N	All phase overfrequency	S	—	S	S	S
System or Engine Test						
6B	Engine test pushbutton	S	—	S	S	S
6C	Remote engine test input	C	—	C	C	C
6D	Maintained 2-position test switch	O	—	O	O	O
6H	Maintained 4-position test switch	O	—	O	O	O
7A	Adjustable 0–6 seconds	S	—	S	S	S
Pushbutton Bypass						
8C	Bypass TDEN	S	—	S	S	S
8D	Bypass TDNE	S	—	S	S	S
8E	Bypass TDNE/TDEN (input)	C	—	C	C	C
Maintenance Selector Switch						
9B	Electrical operator isolator switch	O	—	O	O	O
Preferred Source Selector						
	Preferred source selector (programmed)	S	—	S	S	S
10A	Preferred source selector input	C	—	C	C	C
10C	Preferred source selector with selector switch	O	—	O	O	O
10B	Utility to utility or utility to generator	S	S	S	S	S
10D	Generator to generator	S	S	S	S	S
Indicating Lights/LEDs						
12C	Normal (S1) source connected	S	S	S	S	S
12D	Emergency (S2) source connected	S	S	S	S	S
12G	Normal (S1) source available	S	S	S	S	S
12H	Emergency (S2) source available	S	S	S	S	S
12L	Normal (S1) source tripped (requires feature 16)	O	O	O	O	O
12M	Emergency (S2) source tripped (requires feature 16)	O	O	O	O	O
Source Available Contacts						
14C	Normal (S1) source available 4 Form C	O	O	O	O	O
14D	Emergency (S2) source available 4 Form C	O	O	O	O	O
14E	Normal (S1) source available 1 Form C	S	—	S	S	S
14F	Emergency (S2) source available 1 Form C	S	—	S	S	S
14G	Normal (S1) source available 2 Form C	O	—	O	O	O
14H	Emergency (S2) source available 2 Form C	O	—	O	O	O

S = Standard, O = Optional, C = Configurable

### Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition	
Feature Number	Description	ATV9 MG	NTVE MG	BIV9 MG	CTV9 MG	CBV9 MG
Position Contacts						
15E	Normal (S1) source position 1 Form C	S	—	S	S	S
15F	Emergency (S2) source position 1 Form C	S	—	S	S	S
15G	Normal (S1) source position 3 Form C	O	—	O	O	O
15H	Emergency (S2) source position 3 Form C	O	—	O	O	O
15R	Normal (S1) source position 1 Form C (relay OUTPUT)	C	—	C	C	C
15S	Emergency (S2) source position 1 Form C (relay OUTPUT)	C	—	C	C	C
Integral Overcurrent Protection						
16N	Normal (S1) switch only	O	O	O	O	O
16E	Emergency (S2) switch only	O	O	O	O	O
16B	Normal (S1) and emergency (S2) switches	O	O	O	O	O
Metering (Specify normal (S1), emergency (S2) or load side for 18A thru E)						
18	Integrated load metering (DCT module)	O	—	O	O	O
18A	IQ 250/260	O	O	O	O	O
18B	PX4000/6000/8000	—	O	—	—	—
18D	IQ 130/140/150	O	O	O	—	—
18E	PXM2250/2260/2270	O	O	O	—	—
18J	Integrated metering (DCT module—load side only)	O	O	O	O	O
20A	Rear bus connections	O	O	O	O	O
21A	Non-standard terminals (optional in IES for centers)	O	O	O	O	O
22	Ground bus with provisions to attach to neutral	O	S	O	O	O
22A	18 conductor ground bus 500 or 750 kcmil	S	O	S	S	S
22B	30 conductor ground bus 500 or 750 kcmil	O	O	O	O	O
22C	Special ground bar—contact factory	O	O	O	O	O
22D	16 conductor ground bus 500 or 750 kcmil	—	—	—	—	—
Plant Exerciser						
23M	Selectable—disabled 7-, 14-, 28-, 365-day interval, 0–600 minutes load/no load, with fail-safe	S	—	S	S	S
Normal (S1) Source Sensing						
26D	Go to emergency (S2) input	C	—	C	C	C
26E	Go to emergency (S2) input with selector switch ①	O	—	O	O	O
26H	Phase reversal protection	S	—	S	S	S
26J	All phase undervoltage/underfrequency	S	—	S	S	S
26K	All phase overvoltage/overfrequency	S	—	S	S	S
26L	All phase voltage unbalance and phase loss	O	—	O	O	O
26L	All phase voltage unbalance	S	—	S	S	S
Alternative Transfer Modes of Operation						
29D	Dual ATS bypass	—	—	—	—	—
29G	Selector switch for auto or non-auto operation ①	O	—	O	O	O
29J	Manual (pushbutton) transfer E to N; automatic N to E ①	O	—	O	O	O
29L	Manual retransfer on/off input	C	—	C	C	C
29M	Manual retransfer on/off input with selector switch ①	O	—	O	O	O
29K	Manual retransfer input	C	—	C	C	C

S = Standard, O = Optional, C = Configurable

#### Note

① When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.



# 5.6

## Transfer Switches

### Standard and Optional Features

#### Magnum-Based—Automatic Transfer Switch Features, continued

Feature Number	Description	Open Transition			Closed Transition	
		ATV9 MG	NTVE MG	BIV9 MG	CTV9 MG	CBV9 MG
Open Transfer Operation Modes						
32A	Time delay neutral adjustable 0–120 seconds (delayed transition)	C	—	C	C	C
32B	Load voltage decay adjustable 2–30% nominal voltage	C	—	C	C	C
32C	In-phase transition defaults to load voltage decay	C	—	C	C	C
32D	In-phase transition defaults to time delay neutral	C	—	C	C	C
Logic Extender Cable (Open Enclosures Only)						
34F	100 inches (2540 mm) (fixed mount only)	O	O	—	—	—
35A	Pre-transfer signal contacts 1 Form C	C	—	C	C	C
35B	Pre-/post-transfer signal	C	—	C	C	C
36	Load shed from emergency (S2 inhibit)	C	—	C	C	C
36A	Load shed—S2 inhibit with keyed switch (INPUT)	O	—	O	O	O
37	Go to “isolated” position (not SE rated)	C	—	C	C	C
Suitable for Use as Service Equipment Requires 16B, N or S						
37A	Without ground fault protection	O	O	O	O	O
37B	With ground fault protection required at 1000 A or more if the electrical service is a solidly grounded wye system of more than 150 V to ground but not exceeding 600 V phase to phase	O	O	O	O	O
Stainless Steel Device Covers						
38A	SS cover for device plate or SE disconnect	O	O	O	O	O
38B	SS cover for controller	O	O	O	O	O
Space Heater with Thermostat						
41A	100 watts	—	—	—	—	—
41E	375 watts	O	O	O	O	O
42	IBC/CBC seismic qualified	S	S	S	S	S
Load Management Contacts						
45A–K	Load sequencing contacts (1)	C	—	C	C	C
45L	Selective load shed (assignable to multiple out put contacts)	C	—	C	C	C
Closed Transition Operational Modes (User Must Specify)						
47C	Closed/in-phase transition default to load voltage decay	—	—	—	C	C
47D	Closed transition	—	—	—	C	C
47E	Closed/in-phase transition default to time delay neutral	—	—	—	C	C
47F	Closed transition load voltage decay	—	—	—	—	—
47G	Closed transition time delay neutral	—	—	—	—	—
47H	Parallel limit timer	—	—	—	S	S
Communications						
48D	PXG400 gateway (includes Modbus)	O	—	O	O	O
48G	Modbus TCP/IP gateway	O	—	O	O	O
48P	Power supply for remote annunciator	O	—	O	O	O
48RAC	Remote annunciator with control (includes Modbus)	O	—	O	O	O
48MRAC	Remote annunciator with control multi-switch (includes Modbus)	O	—	O	O	O
48U	USB port	S	—	S	S	S
49A	Sensing isolation transformer Magnum	O	—	O	O	O
49B	Sensing isolation transformer	O	—	O	O	O
49C	Multi-tap voltage transformer (non AG only)	S	S	S	S	S

S = Standard, O = Optional, C = Configurable

### Magnum-Based—Automatic Transfer Switch Features, continued

		Open Transition			Closed Transition	
Feature Number	Description	ATV9 MG	NTVE MG	BIV9 MG	CTV9 MG	CBV9 MG
Surge Protection Device with 12 ft Cable (on Normal)						
51S1	50 kA—SPD ①	0	0	0	0	0
51S2	80 kA—SPD ①	0	0	0	0	0
51S3	100 kA—SPD ①	0	0	0	0	0
51S4	120 kA—SPD ①	0	0	0	0	0
51S5	160 kA—SPD ①	0	0	0	0	0
51S6	200 kA—SPD ①	0	0	0	0	0
51S7	250 kA—SPD ①	0	0	0	0	0
51S8	300 kA—SPD ①	0	0	0	0	0
51S9	400 kA—SPD ①	0	0	0	0	0
52B	24 V generator battery power	—	—	—	—	—
52C	24 V onboard power supply (charger and batteries)	—	—	—	—	—
54A	Front access cabinet	0	0	0	0	0
54B	Upgrade to 316 stainless steel	—	—	—	—	—
55B	Source swap (normal—bottom / emergency—top)	0	0	0	0	0
57A	Magnum breaker lift device (1) NEMA 1 only	0	0	—	—	—
57B	Magnum breaker lift device bypass (2) NEMA 1 only	—	—	0	0	0
58A	Shutterless cassette (drawout only)	S	S	S	S	S
58B	Shuttered cassette (drawout only)	0	0	0	0	0
59A	Silver-plated bus	S	S	S	S	S
59B	Tin-plated bus	0	0	0	0	0
61A	UPS device	—	0	—	—	—
61B	UPS 120 Vac terminal block input	—	0	—	—	—
80A	Emergency (S2) inhibit contact	C	—	C	C	C
Monitoring Outputs						
81A	General alarm indication contact	C	—	C	C	C
81B	ATS not in automatic	C	—	C	C	C
81C	ATS in test	C	—	C	C	C
81D	Engine test aborted	C	—	C	C	C
81E	Cooldown in process	C	—	C	C	C
81F	Engine start contact status	C	—	C	C	C
81G	Emergency inhibit on	C	—	C	C	C
81GL	Emergency inhibit on with white indicating light ②	0	—	0	0	0
81H	ATS on bypass	C	—	C	C	C
Inputs						
81J	Lockout	C	—	C	C	C
81K	Monitor mode	C	—	C	C	C
81L	Remote load test	C	—	C	C	C
Three Source ATS Control (Master/Slave)						
90A	Master control output	C	—	C	C	C
90B	Slave input	C	—	C	C	C

S = Standard, 0 = Optional, C = Configurable

#### Notes

- <sup>①</sup> Add feature package B or C (i.e., 51S4B).  
B: LED indication + audible alarm, Form C contact, EMI/RFI filtering (standard)  
C: B + surge counter with Reset button (standard with surge)
- <sup>②</sup> When these options are selected with the ATC-900 controller, the associated input or output will be factory fixed and cannot be reconfigured by the user.

## Feature Description

### Timers

#### 1. Time Delay Normal to Emergency (TDNE)

Provides a time delay to allow for the generator to warm up before transferring the load to the emergency source. Timing begins only after the Emergency Source becomes available and is deemed good based on the programmable voltage and frequency set points in the controller.

#### 2. Time Delay Engine Start (TDES)

Provides a time delay before initiating the generator start cycle. This is to account for momentary power outages or voltage fluctuations of the normal source. Provides a Form C contact to the generator starter circuit.

#### 3. Time Delay Emergency to Normal (TDEN)

Provides a time delay of the retransfer operation to permit stabilization of the normal source. Timing begins only after the normal source becomes available and is deemed good based on the programmable voltage and frequency set points in the controller. This function is fail-safe protected.

#### 4. Time Delay Engine Cooldown (TDEC)

Provides a time delay before initiating the generator stop cycle after the retransfer operation. This allows the generator to cool down by running unloaded. Timing begins on completion of the retransfer cycle.

### Source 2 Sensing

#### 5. Source 2—Monitoring and Protection

Provides monitoring and protection based on the Source 2 voltage and/or frequency set points. All **Feature 5** monitoring and protection functions are fail-safe operations.

#### 5H. Three-Phase Rotation Protection

Provides three-phase reversal sensing in order to protect against transferring to an out-of-phase source. The controller will treat the opposite source as unavailable if the sources are out of phase, based on programmable set points in the controller.

#### 5J. All-Phase Undervoltage/Underfrequency Protection

Provides undervoltage/underfrequency monitoring and protection based on programmable set points in the controller.

#### 5K. All-Phase Overvoltage/Overfrequency Protection

Provides overvoltage/overfrequency monitoring and protection based on programmable set points in the controller.

#### 5L. Three-Phase Voltage Unbalance/Phase Loss

Provides phase loss detection from blown fuses on the Source 2 supply circuit.

#### 5M. All Phase Voltage Phase Loss

Provides phase loss detection on the Source 2 supply circuit.

#### 6B. Test Operators

Automatic transfer switches are provided with a controller faceplate test pushbutton that simulates a loss of the Source 1 as standard. All programmed time delays (TDNE, TDEN, etc.) will be performed as part of the test. Engine run time of the test is equal to the plant exerciser programmed set point. All tests are fail-safe protected.

#### 6C. Remote Engine Test (INPUT)

Provides an input to initiate a test to simulate a loss of the Source 1 as standard. All programmed time delays (TDNE, TDEN, etc.) will be performed as part of the test. Engine run time of the test is equal to the plant exerciser programmed set point. All tests are fail-safe protected. The test is initiated via remote momentary contact closure.

#### 6D. Maintained 2 Position Test Switch

Provides a door-mounted 2-position test switch marked "Auto" and "Test." Available with ATC-900 controller only.

#### 6H. 4-Position Test Selector Switch (FPSS)

Provides a door-mounted 4-position, maintained contact selector switch marked "Auto," "Test," "Engine Start," and "Off." The FPSS is fail-safe protected, except for the "Off Position."

Transfer switch operation is determined by the switch position. Transfer switch operations are as follows:

"Auto"—Automatic operation mode.

"Test"—A load test is performed until the switch is moved to another position.

"Engine Start"—A no-load test is performed until the switch is moved to another position.

"Off"—The automatic transfer controller and engine start contact are disabled. A white pilot light is provided to indicate that the FPSS is in the "Off" position.

#### 7. Time Delay Emergency Fail (TDEF)

Provides a time delay that prevents a connected emergency source from being declared "unavailable" based on the customer's set points. This is to account for momentary generator fluctuations. If the Source 2 remains in a failed state, then 0.5 seconds after the TDEF timer expires the transfer switch will proceed with the programmed sequence for retransfer if Source 1 is available. This time delay is only implemented when Source 2 is a generator.

**Note:** This feature is also enabled when large loads cause generator output to drop below customer set points.

#### 8. Time Delay Bypass Push-button

Provides a momentary contact pushbutton to bypass the TDNE (**Feature 1**) and/or TDEN (**Feature 3**) time delays. The Time Delay Bypass Pushbutton contact, when closed, will reduce any or all of the programmed time delay to zero. Must be executed when TDNE or TDEN timer is displayed on the controller.

#### 8C. Bypass Time Delay Emergency to Normal (TDEN)

#### 8D. Bypass Time Delay Normal to Emergency (TDNE)

#### 8E. Bypass TDNE/TDEN (INPUT)

Provides input to bypass the TDNE (**Feature 1**) and/or TDEN (**Feature 2**) time delays. The Time Delay Bypass Pushbutton contact, when closed, will reduce any or all of the programmed time delay to zero. Must be executed when TDNE or TDEN timer is displayed on the controller. The bypass time delay feature is initiated via remote momentary contact closure.

**8F. Bypass Timers—  
External Pushbutton Input**

Provides an input from a customer supplied external pushbutton to bypass or reduce the programmed time delays to zero for TDEN and TDNE.

**9B. Maintenance Selector  
Switch (MSS)**

Provides a 2-position, maintained contact selector switch marked "Operate" and "Disable." When the MSS is placed in the "Disable" position, the controller logic will be disconnected from the transfer motor circuit. The MSS is placed in the "Operate" position for normal automatic operation.

**9C. Monitor Mode Selector  
Switch**

Provides a 2-position selector switch to enable/disable Monitor Mode on the controller. When enabled, the controller will monitor the availability, connected state and voltage conditions and will initiate a transfer.

**10. Preferred Source  
Selector**

Provides a means to designate either Source 1 or Source 2 as the "Preferred" source. The "Preferred" source is the source that the transfer switch will connect the load to if it is available.

**Note:** This is a programmable software feature not an actual switch.

**10A. Preferred Source  
Selector (INPUT)**

Provides a means to designate either Source 1 or Source 2 as the "Preferred" source using a remote contact or device panel mounted contact closure. The "Preferred" source is the source that the transfer switch will connect the load to if it is available.

**10B. Preferred Source  
Selector**

Provides a programmable source selector for use on systems comprised of dual utility or utility and engine/generator power sources.

**10C. Preferred Source  
Selector with Selector  
Switch**

Provides a means to designate either Source 1 or Source 2 as the "Preferred" source via device panel mounted selector switch control. The "Preferred" source is the source that the transfer switch will connect the load to if it is available.

**10D. Preferred Source  
Selector**

Provides a programmable source selector for use on systems comprised of dual engine/generator power sources. (Dual engine starting circuits are provided.)

**12C. Source 1—Load  
Connected**

Provides a green indication that indicates the load is connected to Source 1 when lit.

**12D. Source 2—Load  
Connected**

Provides a red indication that indicates the load is connected to Source 2 when lit.

**12G. Source 1—Present**

Provides a white or amber indication "Depending on the Controller" that Source 1 has power; however, this does not indicate whether Source 1 is acceptable.

**12H. Source 2—Present**

Provides an amber indication that Source 2 has power; however, this does not indicate whether Source 2 is acceptable.

**Overcurrent Trip Indication**

Available only with integral overcurrent protection (**Feature 16**) (shown on automatic transfer controller display).

**12L. Source 1 Trip  
Indication**

The automatic transfer controller display will read "Lockout" if the Source 1 circuit breaker is in the "tripped" position.

**12M. Source 2 Trip  
Indication**

The automatic transfer controller display will read "Lockout" if the Source 2 circuit breaker is in the "tripped" position.

**14. Relay Auxiliary Contacts****14C. Source 1 Present**

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

**14D. Source 2 Present**

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 2 is present.

**14E. Source 1 Available**

Provides 1 Form C relay auxiliary contact. The relay is energized when Source 1 is available and within the controller's programmable set points.

**14F. Source 2 Available**

Provides 1 Form C relay auxiliary contact. The relay is energized when Source 2 is available and within the controller's programmable set points.

**14G. Source 1 Present**

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

**14H. Source 2 Present**

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 2 is present.

**14J. Source 1 Present**

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

**14K. Source 2 Present**

Provides 4 Form C relay auxiliary contacts. The relay is energized when Source 2 is present.

**14L. Source 1 Present**

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

**14M. Source 2 Present**

Provides 2 Form C relay auxiliary contacts. The relay is energized when Source 1 is present.

**15. Switch Position  
Indication Contact**

Provides a contact that indicates if the power switching device is in the "open" or "closed" position.

**15E. Source 1 Position  
Indication Contact**

Provides 1 Form C contact that indicates the position of the Source 1 power switching device.

**15F. Source 2 Position  
Indication Contact**

Provides 1 Form C contact that indicates the position of the Source 2 power switching device.

**15G. Source 1 Position  
Indication Contact**

Provides 3 Form C contact that indicates the position of Source 1 power switching device.

**15H. Source 2 Position  
Indication Contact**

Provides 3 Form C contact that indicates the position of Source 1 power switching device.

**15K. Normal (S1) Breaker  
Position Indication 1 Form C  
(Output)**

Provides 1 Form C contact of the breaker indicating the breaker position.

**15L. Normal (S1) Breaker  
Position Indication 2 Form C  
(Output)**

Provides 2 Form C contact of the breaker indicating the breaker position.

**15M. Source 2 Load Shed Contacts**

Provides 4 Form C contacts to initiate a load circuit disconnect while on Source 2. This gives the user the capability of selectively choosing not to run certain loads while on Source 2.

**15R. Normal (S1) Source Position 1 Form C (Relay OUTPUT)**

Provides 1 Form C relay contact that indicates the position of the Source 1 power switching device.

**15S. Emergency (S2) Source Position 1 Form C (Relay OUTPUT)**

Provides 1 Form C relay contact that indicates the position of the Source 2 power switching device.

**16B. Integral Overcurrent Protection on Both Power Source Switching Devices**

Provides integral overcurrent protection on both Source 1 and Source 2 power switching devices.

**16E. Integral Overcurrent Protection on the Source 2 Power Switching Device**

Provides integral overcurrent protection on the Source 2 power switching device.

**16N. Integral Overcurrent Protection on the Source 1 Power Switching Device**

Provides integral overcurrent protection on the Source 1 power switching device.

**16S. External Overcurrent Protection on the Source 1 Power Switching Device**

Provides overcurrent protection on the Source 1 power switching device.

**17. Breaker with an Overcurrent Trip Unit****17H. Padlockable Handle Lock Hasp**

Provides a means to padlock the breaker supplied only on a service entrance rated contactor based design. The padlock kit is provided as a ship loose item and able to be customer mounted as a mechanical means to lock out the breaker.

**17N. Normal (S1) Breaker with Eaton 310+ Trip Unit**

The UL 1008 integrated service entrance rated contactor design has a 100% load rating.

**18. Metering**

The ATS controller provides voltage and frequency readings. If additional metering functions are required, Eaton offers a series of digital meters that may be added to the ATS. The meter type can provide simple current and voltage readings or more capable meters providing Power, Demand and energy readings.

Available with an optional communications interface. (See **Feature 48**—Communications for available communication modules.)

**Feature 18** metering options include all required external devices (CTs, etc.) for a fully functioning metering system.

**18J. Integrated Metering (LOAD Side)**

This metering option incorporates basic load metering into the ATC-900 using the add-on DCT module. In addition to the standard voltage and frequency metering, the DCT module adds current, real power, reactive power, apparent power, and power factor. This option also enables the selective load shed feature (option 45L).

**IQ 130/140/150 (Option 18d)****IQ 130**

This digital meter provides basic current and voltage per phase (L-L, L-N) and min./max. readings (I, V). Optional communication RS-485, Modbus RTU.

**IQ 140**

In addition to basic current and voltage, will provide frequency, power measurements real, reactive and apparent power, total (W, VAR, VA). Optional communication RS-485, Modbus RTU.

**IQ 150**

In addition to basic current/voltage/frequency and power readings, will provide Energy Real reactive and apparent (Wh, VAR, VAh). Optional communication RS-485, Modbus RTU.

**IQ 250/260 (Option 18a)****IQ 250**

This digital meter provides current per phase and current demand, voltage (L-L, L-N) and frequency. Power, energy and demand readings. Real, reactive and apparent power and energy, power factor. RS-485 communications, Modbus RTU or ASCII. Optional I/O slots available.

**IQ 260**

In addition to all of the features of the IQ 250, power quality analysis is available with THD voltage and current per phase.

**Power Xpert 2000 (Option 18e)**

Provides either a Power Xpert PXM 2250, PXM 2260 or PXM 2270 meter.

**Power Xpert 4000, 6000, 8000 (Option 18b)**

Provides one of the Power Xpert Meters with or without graphic displays.

**20A. Rear Bus Provisions**

Provides Source 1, Source 2 and Load Circuit rear accessible bus stabs with provision for bus bar connection. Eaton transfer switches are provided with either front or rear (dependent on switch type) connected solderless screw-type terminals for power cable connection as standard.

**21A. Optional Power Cable Connection Terminals**

Eaton transfer switches are provided as standard with Source 1, Source 2 and load circuit solderless screw-type terminals for power cable connection. Alternate terminal wire sizes, and compression lug provisions may be available dependent on transfer switch type and ampere rating.

**Plant Exerciser****23A. Plant Exerciser With Fail-Safe**

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during plant exerciser operations.

Programmable set points for test intervals are start time, either disabled, daily, 7, 14 or 28 days.

15-minute fixed engine test time.

Test may be performed with or without load transfer. Test may be manually cancelled during the operation. This function is fail-safe protected.

**23K. Plant Exerciser With Fail-Safe**

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during plant exerciser operations.

Programmable set points for test intervals are start time, either disabled, daily, 7, 14 or 28 days, engine test time.

Test may be performed with or without load transfer. Test may be manually cancelled during the operation. This function is fail-safe protected.



**23M. Selectable—Disabled, 7, 14, 28 or Day Interval, or Calendar Date, 0–600 Minutes, Load/No Load, with Fail-safe**

Provides a means for automatic testing of the engine generator set or standby power system. All programmed time delays in the controller will be performed during plant exerciser operations. Programmable set points for test intervals are start time, engine test time and either disabled, daily, 7, 14 or 28 days or up to 12 specific calendar dates. Test may be performed with or without load transfer. Test may be manually cancelled during the operation. This function is fail-safe protected. This feature includes independent time delays for time delay normal to emergency, time delay emergency to normal and time delay for engine cooldown.

**Source 1 Sensing****26. Source 1 — Monitoring and Protection**

Provides Source 1 monitoring and protection functions. If Source 1 fails, then the automatic transfer controller will begin the sequence of operations necessary to transfer the load to Source 2. All **Feature 26** monitoring and protection functions are fail-safe operations.

**26D. Go to Emergency (Source 2)**

Provides the capability for an external contact closure to initiate a transfer to the Source 2 power source. This includes starting the generator, performing the programmed time delays and the transfer operation. Retransfer will occur when the external contact is opened. This is a fail-safe function.

**26E. Go to Emergency (S2) Input with Selector Switch**

Provides a device panel mounted selector switch labeled, "Auto/Go to Source 2", to initiate a transfer to the Source 2 power source. This includes starting the generator, performing the programmed time delays and the transfer operation. Retransfer will occur when the external contact is opened. This is a fail-safe function.

**26H. Three-Phase Rotation Protection**

Provides three-phase reversal sensing in order to protect against transferring to an out-of-phase source. The controller will treat the opposite source as unavailable if the sources are out of phase, based on programmable set points in the controller.

**26J. All-Phase Undervoltage/Underfrequency Protection**

Provides all-phase undervoltage/underfrequency monitoring and protection based on programmable set points in the controller.

**26K. All-Phase Overvoltage/Overfrequency Protection**

Provides all-phase overvoltage/overfrequency monitoring and protection based on programmable set points in the controller.

**26L. Three-Phase Voltage Unbalance/ Phase Loss**

Provides phase loss detection from blown fuses on the Source 1.

**26M. All-Phase Voltage Phase Loss**

Provides phase loss detection on the Source 1 supply circuit.

**26N. All-Phase Undervoltage Protection**

Provides undervoltage protection for Source 1 (ATC-100 Controller only).

**29. Transfer Operation Modes**

Provides standard or optional transfer modes, mode selection devices and operational methods for transfer switches.

**29D. Dual ATS Bypass**

Provides an active controller while the bypass isolation switch is in the bypass mode.

**29G. Automatic/Manual Operation With Selector Switch**

Provides 2-position selector switch (labeled Auto/manual) that permits selection of the automatic or manual transfer. When in the "Auto" position, the transfer switch operates with fully automatic transfer, retransfer and generator startup and shutdown operations. When in the "Manual" position, manual operation is required to initiate the generator startup or retransfer with generator shutdown operations.

**Note:** Transfer switches with **Feature 29** must be labeled as non-automatic transfer switch equipment.

**29J. Automatic Transfer or Automatic Transfer With Non-Automatic Retransfer Operation**

Provides a field-selectable programmable set point that permits the transfer switch to operate in one of the following two transfer modes (A or B):

- A. Fully automatic operation.
- B. Automatic engine/generator startup and automatic transfer operation from Source 1 to Source 2. Manual pushbutton operation is required to initiate the retransfer operation and engine/generator shutdown. The pushbutton for manual retransfer operation is included. This is fail-safe protected.

**29K. Manual Retransfer (INPUT)**

Provides an input to remotely initiate a manual retransfer from Source 2 to Source 1.

**29L. Manual Retransfer On/Off (INPUT)**

Provides an input to remotely enable or disable the manual retransfer feature.

**29M. Manual Retransfer On/Off Input with Selector Switch**

Provides a device panel mounted selector switch to enable or disable the manual retransfer feature. Selection of this option automatically adds option 29J.

**32. Delayed Transition Transfer Modes for Open Transition Transfer Switches**

Provides delayed transition transfer modes for an open transition transfer switch. Often used in systems with inductive loads, a delayed transition transfer switch may prevent or reduce inrush currents due to out-of-phase switching of inductive loads.

**32A. Time Delay Neutral**

Provides a time delay in the neutral position during the transfer and retransfer operations during which both Source 1 and Source 2 are disconnected from the load circuit. This allows inductive loads time to reach a safe voltage and eliminate back EMF. The time delay is programmable and is the same for both transfer and retransfer operations. This is a passive feature that requires the consulting engineer/installer to determine the settings based on how the user will operate the facility. Adjustable 0–120 seconds.

**32B. Load Voltage Decay**

Provides load voltage measurement to sense back EMF that is generated when the transfer switch is the neutral position. It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a programmed set point. This is an active feature that adapts to how the facility is operating in order to minimize neutral position wait time, but ensure safety. Adjustable 2–30% of nominal voltage.

**32C. In-Phase Transition With Default to Load Voltage Decay**

Provides in-phase transition, which is a feature that will permit a transfer or retransfer between two available sources that have a phase angle difference near zero. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, then the controller defaults to the load voltage decay operation as described in **Feature 32B**. Adjustable frequency difference 0.0–3.0 Hz. Adjustable synchronization time allowance 1–60 minutes.

**32D. In-Phase Transition With Default to Time Delay Neutral**

Provides in-phase transition, which is a feature that will permit a transfer or retransfer only between two available sources that have a phase angle difference near zero. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, then the controller defaults to the time delay neutral operation as described in **Feature 32A**. Adjustable frequency difference 0.0–3.0 Hz. Adjustable synchronization time allowance 1–60 minutes.

**32E. Delayed Transition**

The transfer and retransfer operations during which both Source 1 and Source 2 are disconnected from the load circuit. The time delay is programmable and the same for both transfer and retransfer operation. Adjustable 3–60 seconds.

**32F. In-Phase Transition**

Provides in-phase transition, this feature will permit a transfer or retransfer between two available sources that have a phase angle difference of 8 degrees or less. The in-phase transition feature includes permissible frequency difference and synchronization time set points. In the event Source 1 and Source 2 fail to synchronize within the permitted frequency difference and time, the Alarm relay will energize and “Failed to Sync” will be displayed on Line 1 of the controller. After resetting the alarm, another in-phase transition may be attempted or a non-synchronized transfer may be initiated by failing the connected source. The adjustable frequency difference is 0.0 to 3.0 Hz.

If the synchronization does not occur within a specified amount of time, the Alarm relay will energize and the failure will be logged into the transfer history as either “Sync Fail - Freq” or “Sync Fail - Phase” depending on whether the frequency difference or the phase difference was excessive.

**32G. Time Delay Neutral**

This feature provides a time delay in the neutral position during the transfer and retransfer operations during which both the utility source and the generator source are disconnected from the load circuit. TDN cannot be implemented on a transfer switch using a 2-position contactor.

Jumper selectable at disable (0 seconds) or enable (2 seconds).

**Logic Extender Cable****34A. 48 Inches (1219 mm)**

Provides logic extension cable with connectors.

**34C. 96 Inches (2438 mm)**

Provides logic extension cable with connectors.

**34E. 144 Inches (3658 mm)**

Provides logic extension cable with connectors.

**34F. 100 Inches (2540 mm)**

Provides logic extension only for open Magnum ATS.

**35A. Pre-Transfer Signal with 1 Form C Contact**

Provides a signal prior to the transferring of the load. Will not transfer until the programmable delay set point in the controller is reached. The pre-transfer time delay option, if both sources are not available, will ignore the time delay set in the controller.

**35C. Pre-/Post-Transfer Signal (OUTPUT)**

Provides a Form C contact signal prior to and after a transfer from S1 to S2 or S2 back to S1. Will not transfer until the programmable delay set point in the controller is reached. If both sources are not available, this option will ignore the time delay set in the controller. The time delay is programmable for 0–120 seconds pre transfer and 0–120 seconds post transfer.

**35D. Post-Transfer Signal with 1 Form C Contact**

Provides a Form C output from the ATC-900 to signal that the switch did transfer. The time delay is programmable for 0–120 seconds but does not start to count down until connected to the new source.

**36. Load Shed From Emergency**

Provides the capability for an external NC contact to initiate a load circuit disconnection from the Source 2 power source. If the load circuit is connected to Source 2 and the contact is opened, then a retransfer to Source 1 is completed if Source 1 is available. If Source 1 is not available, then the transfer switch will transfer to neutral. If the load circuit is connected to Source 1 and the contact is open, then a transfer Source 2 is prohibited.

**36A. Load Shed—S2 Inhibit with Keyed Switch (INPUT)**

Provides a device panel mounted selector switch to initiate a load circuit disconnection from the Source 2 power source. If the load circuit is connected to Source 2 and the selector switch is switched to the “S2 Inhibit/Enabled” position, then a retransfer to Source 1 is completed if Source 1 is available. If Source 1 is not available, then the transfer switch will transfer to neutral. If the load circuit is connected to Source 1 and the switch is in the “S2 Inhibit” position, then a transfer Source 2 is prohibited.



**37. Go to Neutral (not SE Rated) (INPUT)**

Provides an input to transfer a three-position transfer switch from either of the connected sources to the off or neutral position. This feature applies only to those transfer switches with three-position power device using a remote contact closure. When the signal is removed, the transfer switch will transfer back to the available, preferred source.

**Service Equipment Rated Transfer Switch**

Provides the label “suitable for use as service equipment” and the features necessary to meet the requirements for the label. Includes service disconnect with visible indication and neutral assembly with removable link. **Feature 16B** or **16N** must be selected separately for a molded case or power case switch design and 17N for a service rated contactor design.

**37A. Service Equipment Rated Transfer Switch Without Ground Fault Protection**

Provides service equipment rating for an application that does not require ground fault protection.

**37B. Service Equipment Rated Transfer Switch With Ground Fault Protection**

Provides service equipment rating for an application that requires ground fault protection.

**38. Steel Cover**

Provides protection for a device panel as option 38a and protection for the controller as option 38b.

**39. Distribution Panel**

The distribution panel feature uses a panelboard design with bolt-on circuit breakers type EHD. Bolt-on breakers are designed to hold up to the changes in temperature and humidity that an industrial application calls for. (240/120 Vac single-phase systems only.)

**39A. 225 A With (2) 200 A Feeders****39B. 300 A With (3) 200 A Feeders****39C. 400 A With (4) 200 A Feeders****41. Space Heater With Thermostat**

Provides a space heater and adjustable thermostat. External control power is not required. Availability is dependent on transfer switch type.

**41A. Space Heater With Thermostat—100 Watt**

Provides 100-watt space heater with an adjustable thermostat.

**41E. Space Heater With Thermostat—375 Watt**

Provides 375-watt space heater with an adjustable thermostat.

**42. Seismic Qualification****45. Load Sequencing Capability**

Provides the capability for sequential closure of up to 10 addressable relays after a transfer. Each addressable relay provides (1) Form C contact. A single adjustable time delay between each of the relay closures is provided. Operates via a sub-network. Adjustable 1–120 seconds.

**45A–J. Load Sequencing Contacts (1–10) (OUTPUT)**

Provides the capability for sequential contact closure of up to 10 contacts after a transfer. A single adjustable time delay between each of the relay closures is provided. Operates using the configurable output contacts (Form C). Adjustable 0–120 seconds. Each individual configurable contact has its own adjustable time delay. When more than one contact is supplied, they start the timing sequence at the same time.

**45L. Selective Load Shed**

Provides an output contact that opens to shed a customer load if the measured kW value exceeds the load shed kW set point value. The load will be picked up if the load restore set point is attained.

**47. Transfer Modes for Closed Transition Transfer Switches**

Provides available transition transfer modes for a closed transition transfer switch. Closed transition is a “make before break” transfer and retransfer scheme that will parallel (a maximum of 100 ms) Source 1 and Source 2 providing a seamless transfer when both sources are available. The closed transition feature includes permissible voltage difference frequency difference and synchronization time allowance set points. The phase angle difference between the two sources must be near zero for a permitted transfer. These are all programmable set points in the controller.

**47C. Closed Transition With Default to In-Phase Transition With Default to Load Voltage Decay**

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the in-phase transition with default to load voltage decay operations as described in **Feature 32C** and **32B**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% volts. Adjustable synchronization time allowance 1–60 minutes.

**47D. Closed Transition**

Provides a closed transition transfer as the primary transfer mode. Only under a fail-safe condition (i.e., loss of the connected source) will the controller transfer to the alternate source using the load voltage decay operation as described in **Feature 32B**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5% V.

**47E. Closed Transition With Default to In-Phase Transition With Default to Time Delay Neutral**

Provides a closed transition transfer as the primary transfer mode. In the event Source 1 and Source 2 fail to synchronize within the permitted voltage difference, frequency difference, phase angle difference and time, then the controller defaults to the in-phase transition with default to time delay neutral operation as described in **Features 32D** and **32A**. Adjustable frequency difference 0.0–0.3 Hz. Adjustable voltage difference 1–5 percent volts. Adjustable synchronization time allowance 1–60 minutes.

**47F. Closed/Load Voltage Decay**

Controllers equipped with Feature Set 47F will perform a closed transition when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Load Voltage Decay transfer. Time Delay Load Voltage Decay uses the load voltage measurements to sense back EMF that is generated when the transfer switch is in the Neutral position.

It provides a delay in transfer in either direction if an unacceptable level is sensed as established by a customer programmed level. The transfer will not take place until the back EMF decays below the acceptable programmed level. This feature has a separate setting of enabling or disabling the operation. If disabled, the transfer switch will not delay in the Neutral position and will transfer between the sources as fast as possible. This feature is not available with the Time Delay Neutral Optional **Feature 32A**.

**47G. Closed/Time Delay Neutral**

Controllers equipped with Feature Set 47F will perform a closed transition transfer when both sources are synchronized in frequency, phase and voltage. Failure to synchronize will result in an open transition Time Delay Neutral transfer. Time Delay Neutral provides a time delay in the transfer switch neutral position when both sources are open. This delay takes place when the load is transferred in either direction to prevent excessive in-rush currents due to out-of-phase switching of large motor loads.

**47H. Parallel Limit Timer**

Provides an independent timing relay with NO contact (watchdog timer) activated only during a closed transition transfer. The timing is set to 100 ms per code requirements and will initiate a contact closure that can be used by the end user to annunciate an alarm or to trip an upstream breaker.

**48. Communication Modules**

Provides communications modules for the transfer switch controllers.

**48D. Ethernet Communication (PXG900 Gateway)**

Translates Modbus RTU, QCPort or INCOM to Modbus TCP. The PXG900 Gateway includes embedded Web server monitoring of up to 64 connected devices.

**48F. Modbus Communication (MPONI)**

Provides Modbus RTU protocol via communications module.

**48G. Modbus TCP/IP**

Provides a third-party device for Modbus 485 to Modbus TCP/IP pass through.

**48M1–48M4. I/O Module**

Each I/O module provides four additional user configurable inputs and outputs. Up to four additional I/O modules can be added, either by the factory or in the field.

**48MRAC. Multi-view Remote Annunciator with Control**

Provides remote monitoring of source availability, source position and test status for up to eight transfer switches with the ATC-300+ or ATC-900 controller. Operates using Modbus protocol.

**48P. Remote Annunciator Power Supply**

Provides a remote mounted power supply providing DC power to the remote annunciator.

**48RAC. Remote Annunciator with Control**

Provides remote monitoring and control via a color touch screen display for the controllers. Operates using Modbus protocol (MPONI required for the ATC-600/800).

**48U. USB Port for Memory Stick**

Provides a device panel mounted USB port for uploading or downloading controller set points and for downloading event history.

**49. Sensing Isolation Transformer**

Provides a set of control power transformers that converts the delta system sensing to a wye sensing input to the controller. The sensing isolation transformer is recommended for high resistance grounded systems and for grounded delta systems.

**49A. Sensing Isolation Transformer**

Option 49A is available for Magnum ATSSs.

**49B. Sensing Isolation Transformer**

Option 49B is available for MCCB and contactor transfer switches.

**49C. Multi-Tap Control Power Transformer**

The multi-tap control power transformer is used to step-down voltage to 120 Vac for the transfer switch control circuit. Incoming voltage can be adjusted by moving the tap on the primary side from 208 V, 240 V or 480 V for 60 Hz applications or 220 V, 380 V, 415 V, 600 V for 50 Hz applications.

**Option 51. Surge Protection Device**

Two types of surge protection devices are used in Eaton automatic transfer switches. Both types meet the requirements for UL 1449 3rd Edition for surge suppression devices and are CE marked. The type CVX is used on Eaton wallmount ATS designs and the Eaton type SPD are used on floor-standing designs.

**CVX**

The CVX device features a Thermally Protected Metal Oxide Varistor technology and comes with high intensity LED phase status indicators.

**SPD**

The SPD features a Thermally Protected Metal Oxide Varistor technology. It comes with dual-colored protection status indicators for each phase and for neutral-ground protection mode. It comes with an audible alarm with silence button and a Form C contact.

An optional SPD with surge counter feature package is available. This provides six-digit surge counter with reset button.

**51S1B.** 50 kA—SPD standard source 1

**51S2B.** 80 kA—SPD standard source 1

**51S3B.** 100 kA—SPD standard source 1

**51S4B.** 120 kA—SPD standard source 1

**51S5B.** 160 kA—SPD standard source 1

**51S6B.** 200 kA—SPD standard source 1

**51S7B.** 250 kA—SPD standard source 1

**51S8B.** 300 kA—SPD standard source 1

**51S9B.** 400 kA—SPD standard source 1

**51S1C.** 50 kA—SPD standard with surge counter source 1

**51S2C.** 80 kA—SPD standard with surge counter source 1

**51S3C.** 100 kA—SPD standard with surge counter source 1

**51S4C.** 120 kA—SPD standard with surge counter source 1

**51S5C.** 160 kA—SPD standard with surge counter source 1

**51S6C.** 200 kA—SPD standard with surge counter source 1

**51S7C.** 250 kA—SPD standard with surge counter source 1

**51S8C.** 300 kA—SPD standard with surge counter source 1

**51S9C.** 400 kA—SPD standard with surge counter source 1

**51SC8.** Remote display panel (8 feet standard)

**51SC12.** Remote display panel (12 feet)

**51SC4.** Remote display panel (4 feet)

#### 54. Front Access

**54A.** Front access cabinet available for all Magnum products. This option will add an additional pull section mounted on the side of the switch.

#### 54B. Upgrade to 316 Stainless Steel

Provides a stainless enclosure with 316 grade. Contact plant for availability.

#### 55B. Source Swap (Normal Bottom/Emergency Top)

Provides ability to designate the Normal Source to be physically located at the bottom of the structure and the Emergency Source to be at the top of the structure. Contact plant for availability.

#### 59a. Silver-Plated Bus

Silver-plated bus is a standard feature for all Magnum-based designs.

#### 59b. Tin-Plated Bus

Tin-plated bus is available as an option for Magnum-based designs.

#### 60. Dedicated Voltage Control Power Transformer

The dedicated voltage control power transformer can be selected for 208/240 V systems where an added buffer is preferred between the incoming power and the micro-processor controller's control power input.

#### 61A. UPS Device with Terminal Block Input

Provides a factory mounted and wired UPS sized to provide power to the ATC controller and the bypass isolation logic controller. Inputs to the UPS are wired out to a terminal block.

#### 61B. UPS 120 Vac Ready, Terminal Block Input

Provides a terminal block input only for customer supplied external mounted UPS that provides power to the logic controller supplied in bypass isolation switches.

#### 61C. Power Loss Buffer for ELC

Provides ride-through power for the ELC contained in automatic transfer switches with bypass isolation. This feature does not provide continuous power for microprocessor controller.

#### 61D. UPS 120 Vac Ready, Terminal Block Ready

Provides a terminal block input only for customer supplied external mounted UPS that provides power to the ATC controller.

#### 61E. 24 Vdc Ready, Terminal Block Ready

Provides a terminal block input only for customer supplied external 24 Vdc power to the ATC900 controller (requires the DCT Module).

#### 61F. Power Loss Buffer ATC Comm (Requires DCT Module)

Provides ride-through power for the ATC-900 controller to maintain communications during a power loss. The power loss buffer provides 24 Vdc to the controller (requires the DCT module).

#### 81A. General Alarm Contact (OUTPUT)

Provides a remote indication that an alarm condition exists on the ATC-900. Remains on until all alarms are resolved and reset at the controller.

#### 81B. ATS Not in Automatic (OUTPUT)

Provides remote indication that the ATS is not in automatic mode.

#### 81C. ATS in Test (OUTPUT)

Provides remote indication that the ATS is currently running a test. The test could be initiated by the device panel engine test pushbutton or automatically using the programmed engine exerciser.

#### 81D. Engine Test Aborted (OUTPUT)

Provides remote indication that an engine test has been aborted. The ATC-900 event log contains detailed event information that can help assess the reason the test was aborted.

#### 81E. Cooldown in Process (OUTPUT)

Provides remote indication that an engine cooldown is in progress.

#### 81F. Engine Start Contact Status (OUTPUT)

Provides remote indication that the engine start contact is calling for the generator to start.

#### 81G. LOAD SHED—S2 Inhibit On (OUTPUT)

Provides remote indication that the emergency inhibit is on.

#### 81GL. LOAD SHED—S2 Inhibit On with White Indicating Light

Provides a 30 mm pilot light on the transfer switch device panel to indicate that S2 Inhibit is on.

#### 81H. ATS on Bypass (OUTPUT)

Provides remote indication that the bypass switch is carrying the load.

#### 81J. Lockout

Provides an input to temporarily disable automatic control. This feature is used to indicate a tripped breaker in a breaker-based transfer switch. It is treated as an alarm and the alarm must be reset to continue automatic operation.

#### 81K. Monitor Mode

Provides an input to disable automatic control in the ATC-900 controller. This function is used for when manual operation is required. The controller continues to accurately monitor source status and set points can be changed; however, no action will be initiated by the controller.

#### 81L. Remote Load Test

Provides an input to initiate a system test using a remote contact closure. The test will run based on the programmed engine test settings in the controller. The settings include with or without load, engine run time, and independent test time delays.

**81M. Load Bank Control (OUTPUT)**

Provides a remote output to disconnect a load bank if Source 1 fails while the load bank is running. The load bank control output is turned on when an unloaded engine test is in process and the load is connected to the source that is not under test. It is off at all other times. If, while an engine test is in process, the non-test source fails (i.e., Source 1), the test is aborted, which will cause load bank control relay to turn off in anticipation of transferring load to the generator.

**81N. Health (OUTPUT)**

Provides a remote indication that an alarm condition or loss of control power exists on the ATC-900. Remains on until an alarm condition occurs or control power is lost.

**90A. Master Control (OUTPUT)**

Provides the user with the ability to use two independent transfer switches in three source systems consisting of a utility and two generator sources. In a three-source system, the Master ATS controls the engine starting and stopping of the Slave ATS. The slave input receives the engine start signal from the Master controller.

**90B. Slave Input (INPUT)**

The ATC-900 Master/Slave controller functionality provides the user with the ability to use two independent transfer switches in three source systems consisting of a utility and two generator sources. In a three-source system, the Master ATS controls the engine starting and stopping of the Slave ATS. The slave input receives the engine start signal from the Master controller.

**Glossary**

With respect to their use in this document and as they relate to switch operation, the following terminology is defined:

**Available**—A source is defined as “available” when it is within its undervoltage/overvoltage/underfrequency/overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting.

**Fail-safe**—A feature that prevents disconnection from the only available source and will also force a transfer or retransfer operation to the only available source.

**Retransfer**—Retransfer is defined as a change of the load connection from the secondary to primary source.

**Source 1**—is the primary source or normal source or normal power source or normal. (Except when Source 2 has been designated the “Preferred Source.”)

**Source 2**—is the secondary source or emergency source or emergency power source or emergency or standby or backup source. (Except when Source 2 has been designated the “Preferred Source.”)

**Source 1**—Failed or fails—Source 1 is defined as “failed” when it is outside of its undervoltage or overvoltage or underfrequency or overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting.

**Source 2**—Failed or fails—Source 2 is defined as “failed” when it is outside of its undervoltage or overvoltage or underfrequency or overfrequency (if applicable) set point ranges for the nominal voltage and frequency setting for a time exceeding 0.5 seconds after the time delay emergency fail (TDEF) time delay expires.

**Transfer**—“Transfer” is defined as a change of the load connection from the primary to secondary source except when specifically used as “Transfer to Neutral.”

**Transfer to Neutral**—“Transfer to Neutral” is defined as when the load circuits are disconnected from both Source 1 and Source 2.



**Transient Voltage Surge Suppression**

Eaton's Clipper Power System —Visor™ series transient voltage surge suppression (TVSS) components can be integrated into any closed transition soft load switch. Surge current ratings 100 kA, 160 kA and 200 kA per phase provide a range of cost-effective facility-wide protection solutions. Status indication on each phase is standard with any TVSS option. Metering and communication capabilities are also available. See Appendix C for details.

**Communications**

Optional communication capability via Communication Gateway is available, allowing remote data access, control, programming, system interface and dispatch.

**System Interface**

A system control panel provides a user-friendly interface to the closed transition soft load controller, allowing operators to easily monitor the switching devices position and manually test the generator and the system operations.

**Switching Devices Status Lights**

- Source 1 open (green)
- Source 1 closed (red)
- Source 1 trip (amber)
- Source 2 open (green)
- Source 2 closed (red)
- Source 2 trip (amber)

**Front Panel Control Switches and Lights**

The combination of the following pilot devices can be implemented on the unit:

- AUTO/TEST switch
- SYSTEM TEST switch
- TEST MODE switch
- ALARM SILENCE switch
- READY FOR OPERATION lamp (white)—verifies the ATC-5000 status

**Optional Integral Overcurrent Protection Capability**

For service entrance applications, Digitrip microprocessor-based trip units can be integrated into the power switching devices. This eliminates the need for the separate upstream protective device, saving installation cost and space. Available with various combinations of long, short, instantaneous and ground fault protection, Digitrips can communicate with Eaton's IMPACC and PowerNet Power Management Systems.

**Optional On-Board 24 Vdc Power Supply**

On-board 24 Vdc power supply circuit, consisting of two 12 Vdc gel-cell UPS type batteries and battery charger, is available on the unit to provide DC control power to soft load transfer switch components. Engine battery can be connected in the "best battery" circuit as well, further improving the system's reliability.

**Optional Components****Description****Service Entrance Rating**

16N	Overcurrent protection—normal
16E	Overcurrent protection—emergency
16B	Overcurrent protection—both
37A	Service entrance
37B	Service entrance with ground fault

**Metering**

18O	IQ Analyzer—normal
18P	IQ Analyzer—emergency
18Q	IQ Analyzer—N/E selectable
18U	IQ Analyzer—load

**Plant Exerciser**

23J	Automatic 24 hours/7 days selectable load/no load
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**Expanded Controller I/O**

25A	Additional discrete and analog I/O for Genset control and monitoring
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**Space Heater and Thermostat**

41C	400 W heater with thermostat
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**Surge Protection**

51M4B	Engine control (24 Vdc) surge device
51NA1	100 kA surge device with AdVisor Source 1
51NS1	100 kA surge device with SuperVisor Source 1
51NN1	100 kA surge device with NetVisor Source 1
51QA1	160 kA surge device with AdVisor Source 1
51QS1	160 kA surge device with SuperVisor Source 1
51QN1	160 kA surge device with NetVisor Source 1
51SA1	200 kA surge device with AdVisor Source 1
51SS1	200 kA surge device with SuperVisor Source 1
51SN1	200 kA surge device with NetVisor Source 1

**On-Board 24 Vdc Power Supply**

24C	Battery charger and gel-cell batteries
-----	--

**Protective Devices**

53A	Beckwith M-3410A
53B	Schweitzer SEL-547
53C	Basler BE1-951
53D	Beckwith M-3520
53E	Schweitzer SEL-351
53F	Basler BE1-IPS100

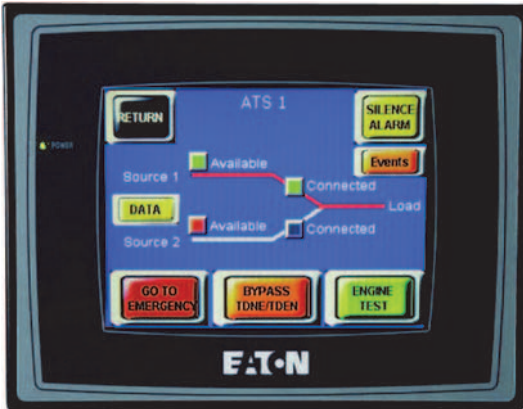
**Communication**

54B	External Communication Gateway
54C	Serial Modbus Over Ethernet

**Field Startup**

56A	2-day startup (includes 1 day for travel)
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## Remote Annunciator Controller



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## Remote Annunciator Controller

## Product Description

Eaton's HMi remote annunciator controller series provides users with the ability to remotely monitor and control multiple transfer switches from one intuitive, touchscreen user interface.

**Remote Monitoring, Enhanced Safety**

Tightening arc-flash regulations and requirements for personal protective equipment are driving more and more end users toward the use of remote monitoring and control devices. Eaton's HMi remote annunciator controller offers a simple and cost-effective means of providing transfer switch monitoring and control.

Designed to meet today's most common specifications, including the City of Chicago Electrical Code, the HMi remote annunciator controller connects to Eaton's ATC-300+, 600 or 800 controller via Modbus® 485 and serves as an extension of the transfer switch controller.

**One Product, Multiple Advantages**

The HMi remote annunciator controller has a multi-view option that allows end users to monitor and control one to four transfer switches. Additional product advantages include the ability to:

- Initiate a transfer to the generator for peak shaving
- Perform a remote test based on programmed engine exerciser set points
- View and silence system alarms
- Perform basic troubleshooting using the source data and alarm history screens

## Features

- Monitors and controls one to four transfer switches
- Mimics bus display for source availability, source position and preferred source monitoring
- Audible alarm with alarm silence option when on source 2
- Remote control features include transfer to source 2, engine test, time delay bypass and alarm silence
- Date- and time-stamped alarm history
- 6-inch color touch-screen display
- User-assignable transfer switch designations
- Compatible with Eaton's ATC-300+, ATC-600 and ATC-800 ① microprocessor controllers
- Password protection for all control functions
- Modbus 485 communication
- Flush mounted

## Design Highlights

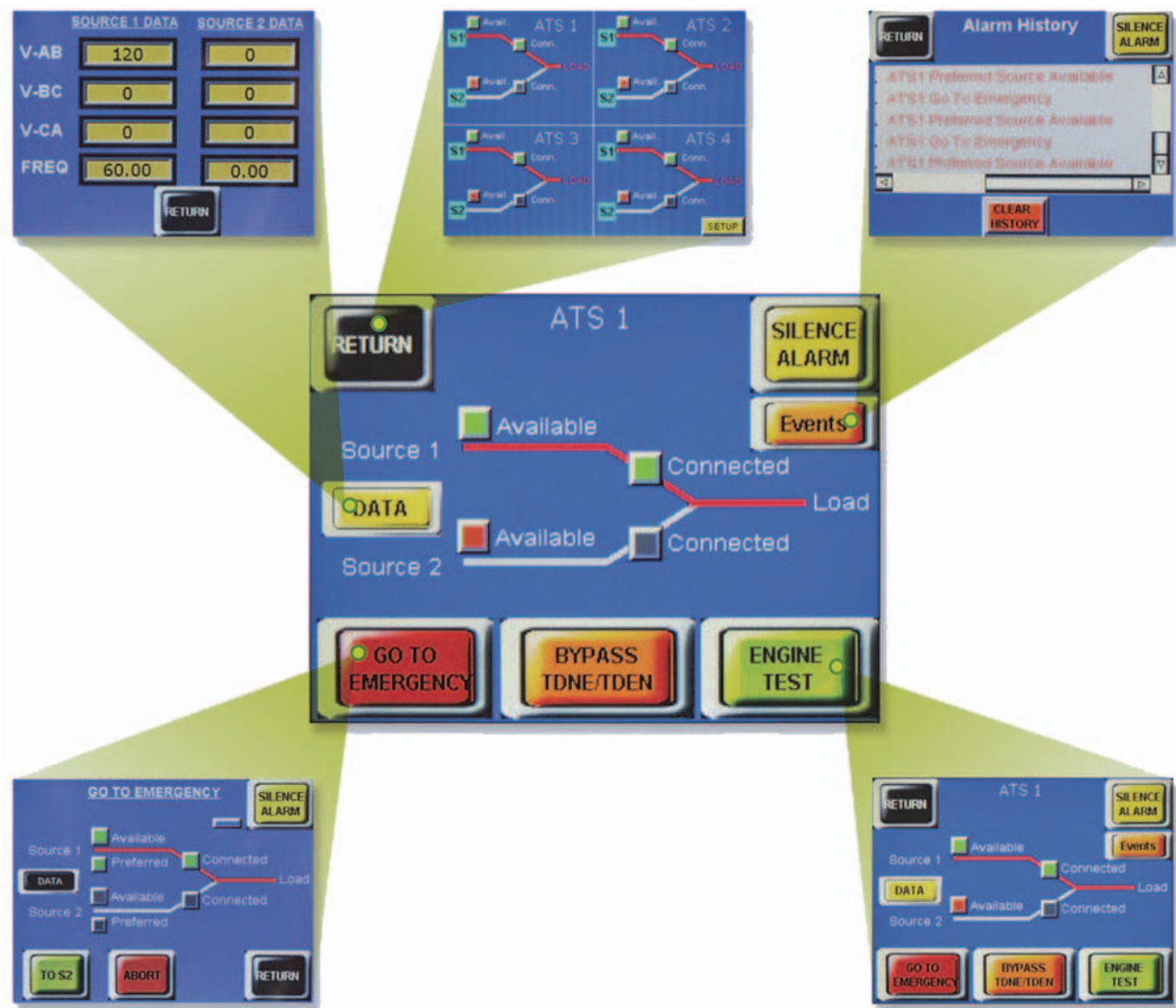
- Uses Eaton's HMi (human-machine interface) series
- Display type: 6-inch TFT, LED backlight
- NEMA® 4X / IP65
- 24 Vdc operating voltage (power supply optional)
- 85 dB multi-tone-frequency alarm buzzer
- Operating temperature 32° to 122 °F (0° to 50 °C)
- Storage temperature -4° to 140 °F (-20° to 60 °C)
- 3 V lithium battery backup (CR2032 x 1)

**ATS Individual Unit Screen**

- Monitors source availability, source position indication, alarm status, ATS in test, communication status and ATS in non-automatic mode for a single transfer switch
- Initiates peak shaving and engine tests, bypass time delays ① and silence audible alarms

**Note**

① Requires MPONI communication module for use with the ATC-600 or ATC-800 controller.



#### ATS Multi-Unit Screen (ATC-300+ Only)

- Monitors source availability, source position and alarm status for up to four transfer switches
- Password-protected setup screen for transfer switch designations
- Access to the ATS individual unit home screen

#### Source Data Screen

- Monitors values for source 1 and source 2 voltage and frequency

#### Alarm Screen

- Monitors all alarm messages with the touch of a button right from the HMI display. Alarm messages include:
  - Source 2 closed (audible alarm)
  - Overvoltage
  - Undervoltage
  - Overfrequency
  - Plant exerciser
  - Engine test
  - Remote engine test
  - Voltage unbalance ①
  - Phase reversal ①
  - Go to emergency
  - Lockout
  - Failed to sync (phase angle)

- Failed to sync (frequency difference)
- Engine test or plant exerciser
- Source 1 error
- Source 2 error

#### Engine Test Screen

- Provides password protected control to start and abort an engine test. The engine test will run according to the controller-programmed set points for duration and with or without load
- Provides control to bypass the source 1 to source 2 and source 2 to source 1 time delays

#### Go To Emergency Screen (Peak Shaving)

- Provides password protected control to force transfer to source 2 regardless of the condition of source 1. This feature is failsafe, meaning the ATS will automatically return to source 1 in the event of a source 2 failure
- Provides control to bypass the source 1 to source 2 and source 2 to source 1 time delays

#### Note

① ATC-300+ controller only.



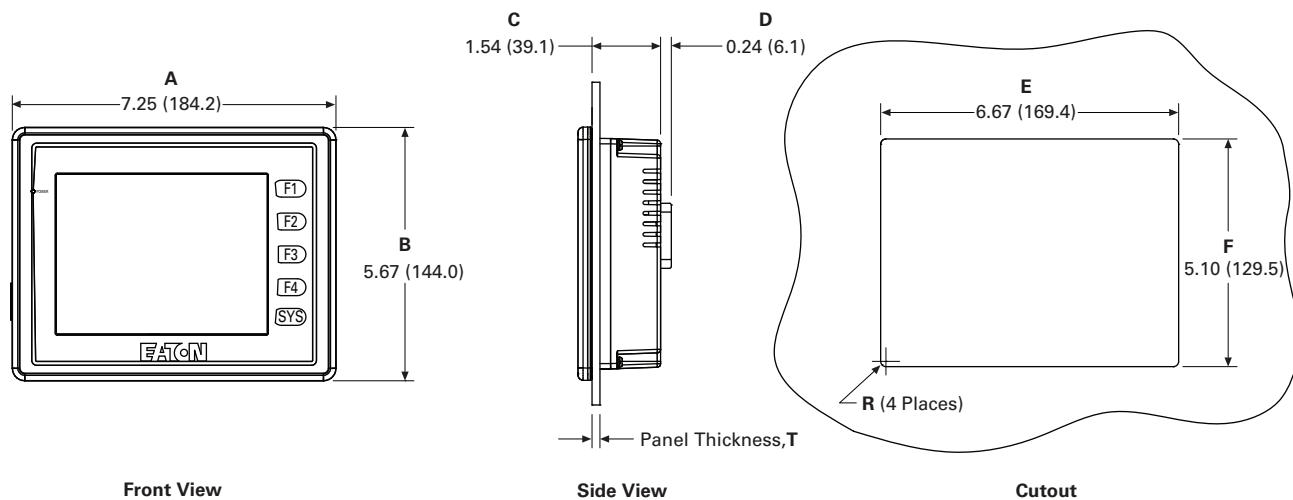
## Transfer Switches

## Remote Annunciator Controller

## Dimensions

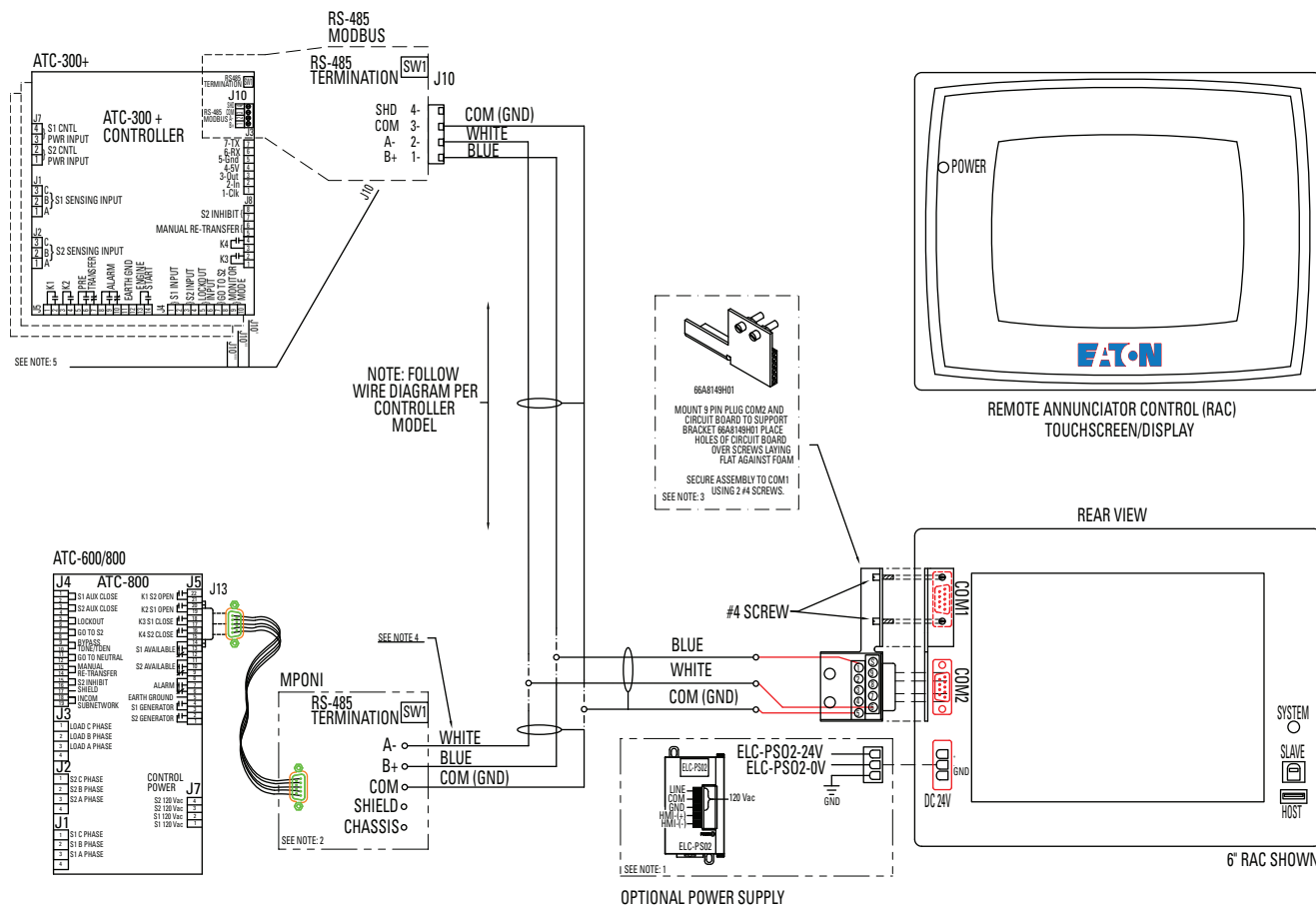
Approximate Dimensions in Inches (mm)

# 5



Catalog Number	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E +0.04 (1.0) –0	Dimension F +0.04 (1.0) –0	Radius R	Panel Thickness T
HM106CU	7.25 (184.2)	5.67 (144.0)	1.54 (39.1)	0.24 (6.1)	6.67 (169.4)	5.10 (129.5)	0.12 (3.0)	0.06–0.12 (1.5–3.0)

## Wiring Diagram



## kW Conversion Chart

## kW to Ampere Conversion Chart

Three-Phase Ampere Table at Common Line-to-Line Voltage

kW <sup>①</sup>	200 V	208 V	220 V	230 V	240 V	380 V	400 V	415 V	460 V	480 V	600 V
5.0	18	17	16	16	15	9	9	9	8	8	6
7.5	27	26	25	24	23	14	13	13	12	11	9
10.0	36	34	33	31	30	19	18	17	16	15	12
15.0	54	52	49	47	45	28	27	26	24	23	18
20.0	72	69	66	63	60	38	36	35	31	30	24
25.0	90	87	82	78	75	47	45	43	39	38	30
30.0	108	104	98	94	90	57	54	52	47	45	36
40.0	144	139	131	126	120	76	72	70	63	60	48
50.0	180	173	164	157	150	95	90	87	78	75	60
60.0	217	208	197	188	180	114	108	104	94	90	72
75.0	271	260	246	235	226	142	135	130	118	113	90
80.0	289	278	262	251	241	152	144	139	126	120	96
100.0	361	347	328	314	301	190	180	174	157	150	120
125.0	451	434	410	392	376	237	226	217	196	188	150
150.0	541	520	492	471	451	285	271	261	235	226	180
175.0	631	607	574	549	526	332	316	304	275	263	210
200.0	722	694	656	628	601	380	361	348	314	301	241
250.0	902	867	820	784	752	475	451	435	392	376	301
300.0	1083	1041	984	941	902	570	541	522	471	451	361
350.0	1263	1214	1148	1098	1052	665	631	609	549	526	421
400.0	1443	1388	1312	1255	1203	760	722	696	628	601	481
500.0	1804	1735	1640	1569	1504	950	902	870	784	752	601
600.0	2165	2082	1968	1883	1804	1140	1083	1043	941	902	722
700.0	2526	2429	2296	2197	2105	1329	1263	1217	1098	1052	842
800.0	2887	2776	2624	2510	2406	1519	1443	1391	1255	1203	962
900.0	3248	3123	2952	2824	2706	1709	1624	1565	1412	1353	1083
1000.0	3609	3470	3280	3138	3007	1899	1804	1739	1569	1503	1203

**Note**<sup>①</sup> At 0.8 power factor.