Cutler-Hammer

ATC-300
Automatic Transfer Switch Controller

Technical Data

New Information

Introduction

The Cutler-Hammer® ATC-300 Automatic Transfer Switch Controller from Eaton's Electrical business is a comprehensive, multi-function, microprocessor-based automatic transfer switch controller. It is a compact, self-contained, panel-mounted controller that 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-300 provides an unmatched degree of programming flexibility to address the needs of any system.

Primary Functions

As standard, the ATC-300 Automatic Transfer Controller will:

- 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 readouts.

Operational Simplicity

From installation to programming to usage, the ATC-300 Controller was designed with operational simplicity in mind. Only one style needs to be considered regardless of input/output requirements or system voltages and frequencies. The intuitive front panel interface simplifies routine operation, programming, and data presentation and set point adjustment. An LCD-based display is backlit for enhanced visibility. The front panel membrane pushbuttons with positive-feedback move the ATC-300 Controller display from function-to-function or step-to-step within a function. The ATC-300 Controller provides the functionality of multiple devices combined in one package and mounts in less than 5.75 inches (146.1 mm) x 7.75 inches (196.8 mm) of panel space.

Industrial Design Highlights

- True rms voltage sensing of normal and emergency sources.
- Frequency sensing of normal and emergency sources.
- Voltage unbalance and phase rotation sensing.
- Programmable set points stored in nonvolatile memory.
- PowerNet™ communications capable.
- System monitoring with historical data storage and display.
- Gold-plated engine start contact.
- Digital set points for accurate and consistent performance.
- Automatic plant exerciser.
- UV-resistant faceplate with Mimic Diagram and LED status indicators.
- LCD-based, backlit, two-line display.
- Suitable for application over a wide range of environmental conditions.
- Self-diagnostic and system diagnostic functions with LED indication.
- Help function for detailed description of displayed message.
- System Test pushbutton.
- Positive feedback membrane pushbuttons for application in harsh environments.
- Password protected access to programming mode.
- Pretransfer contacts.
- Bypass Time Delay pushbutton.
- Control input for remote testing or peak shaving applications.
- Five different control input functions for maximum operational flexibility.
- In-phase and Time Delay Neutral transfer modes for systems with inductive loads.

Standards

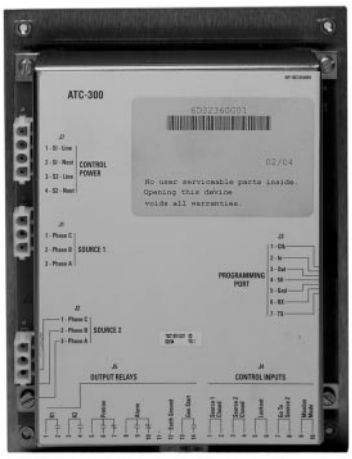
The Cutler-Hammer ATC-300 Automatic Transfer Switch Controller meets or exceeds all industry standards for endurance, reliability and performance. It is designed to meet the needs of markets worldwide.

The ATC-300 Automatic Transfer Switch Controller is designed and built as standard in accordance with the following standards where applicable.

Table 1. Standards

UL® 1008	UL Standard for Safety for Transfer Switch Equipment
UL 991	Tests for Safety-Related Controls Employing Solid-State Devices
CSA® 22.2 No.178	Canadian Standards Association
IEC 61000-4-2, 61000-4-3, 61000-4-4 61000-4-5 61000-4-6 61000-4-11	International Electrotechnical Commission EMC Standards
FCC Part 15, Class A	Federal Communication Commission RF Emissions
CISPR 11	International Electrotechnical Commission Standard for RF Emissions
UBC®, BOCA® Seismic Zone 4	California Building Code
CE	European Standards Conformance

ATC-300 Automatic Transfer Switch Controller Product Overview



ATC-300 Automatic Transfer Switch Controller

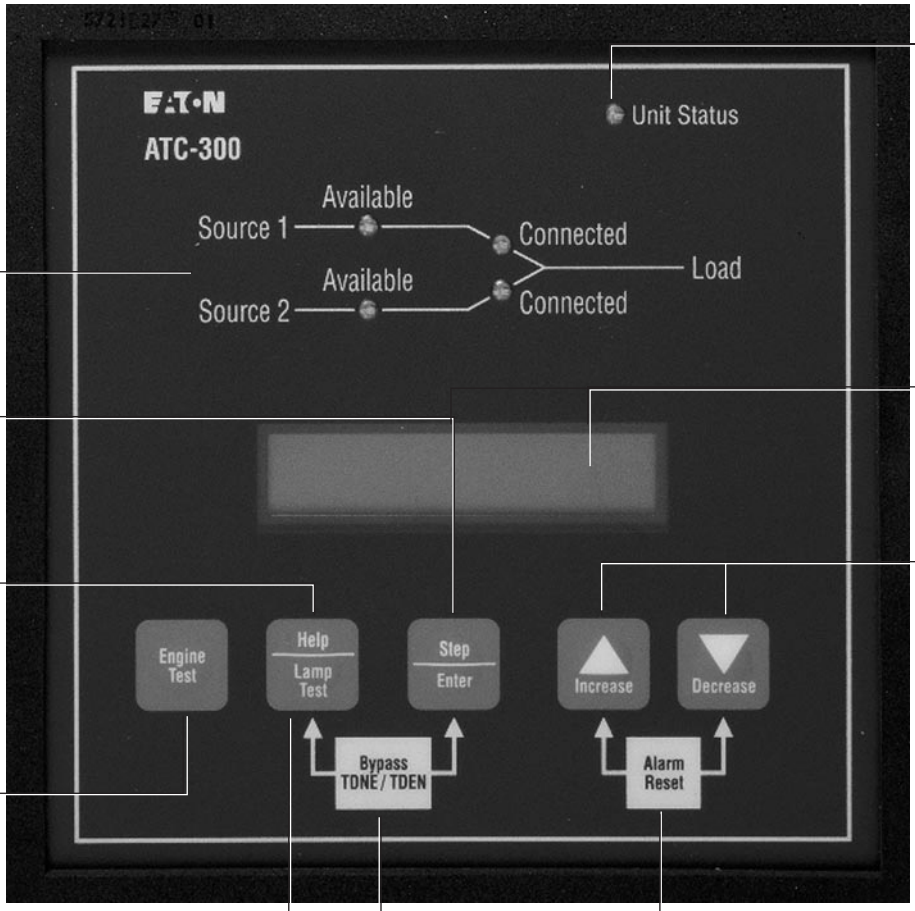
Table 2. Product Overview

Specifications	Value
Voltage	
Voltage Measurements of: Voltage Measurement Range Voltage Measurement Accuracy	Source 1 and 2: VAB, VBC and VCA 0 – 790 Vac rms ±1% of Full Scale
Frequency	
Frequency Measurements of: Frequency Measurement Range Frequency Measurement Accuracy	Source 1 and 2 40 – 70 Hz ±0.3 Hz
Control Power	
Input Range	65 Vac – 145 Vac rms, 50/60 Hz
System Inputs	
Source 1 Closed Source 2 Closed Lockout	Yes Yes Yes
Go to Source 2 Monitor Mode	Yes Yes
Output Contacts	
Form “A” for Generator Start Form “A” for Control	(1) 5 A, 250 Vac/30 Vdc (2) 10 A, 250 Vac/30 Vdc
Form “C” for Alarm Form “C” for Pre-Transfer	(1) 10 A, 250 Vac/30 Vdc (1) 10 A, 250 Vac/30 Vdc
Front Panel	
LED Indication	Unit Status. Source 1 and 2: Available and Connected (5 Total)
Main Display	LCD-Based Display
Parameters Displayed	Voltage, Frequency, Status, History, Time, Date, Set Points, Help Information
Stored Historical Data Includes:	Engine Run Time, Source 1 Available Time, Source 2 Available Time, Source 1 Connect Time, Source 2 Connect Time, Load Energized Time, Number of Transfers; Date, Time and Reason for Last 16 Transfers; Monitor Mode Event, Fail-Safe Event, Aborted Test

Table 2. Product Overview (Continued)

Specifications	Value
Front Panel	
Display Language Enclosure Compatibility	English, French NEMA® 1, 12 and 3R, UV-Resistant Faceplate
Operating Environmental Range	Operation -20°C – +70°C, Storage -30°C – +85°C, Humidity 0% – 95% Relative (Non-condensing)
Applicable Standards	UL 1008, UL 991, FCC Part 15, CISPR 11, IEC 1000-2,3,4,5, CSA, UBC and BOCA for Seismic Zone 4
Programming Access	Password
Front Panel Input Pushbuttons	Engine Test, Step, Help, Lamp Test, Increase, Decrease, Alarm Reset, Bypass Time Delays, Enter
Programming Selections	
Time Delay Normal to Emergency Time Delay Emergency to Normal Time Delay Engine Cooldown	0 – 1800 Seconds 0 – 1800 Seconds 0 – 1800 Seconds
Time Delay Engine Start Time Delay Neutral Time Delay Emergency Fail	0 – 120 Seconds 0 – 120 Seconds 0 – 6 Seconds
In-Phase In-Phase Frequency Difference Synchronization Time Allowance	Enabled or Disabled 0 – 3 Hz 1 – 60 Minutes
Pre-Transfer Signal Plant Exerciser	1 – 120 Seconds (Form “C” Contact) Selectable: Disabled, Daily or 7, 14, 28-Day Intervals, 0 – 600 Minutes, Load or No Load
System Sensing Voltage Unbalance Phase Reversal	3-Phase or Single-Phase 5% – 20% ABC – CBA
Test Pushbutton Mode	Disabled, Load, No Load
Undervoltage Dropout Range Undervoltage Pickup Range Overvoltage Dropout Range Overvoltage Pickup Range	50% – 97% of Nominal Dropout +2% – 99% of Nominal 105% – 120% of Nominal 103% of Nominal to Dropout -2%
Underfrequency Dropout Range Underfrequency Pickup Range	90% – 97% of Nominal Dropout +1 Hz – 99% of Nominal
Overfrequency Dropout Range Overfrequency Pickup Range	103% – 110% of Nominal 101% of Nominal to Dropout -1 Hz

ATC-300 Automatic Transfer Switch Controller Front Panel Display and Operator Functions



Unit Status
The Unit Status LED is a blinking indicator for self and system diagnostics.

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

LCD-Based Display
The LCD-based display is a backlit, 2-line, 16-character display. Displayed information includes:

- Source voltages and frequency
- Time/date stamp
- Historical data
- Programming and set point information
- Password entry

Step/Enter
Pressing the Step/Enter pushbutton advances the information through the programming or display cycle.

Help
Pressing the Help pushbutton in any function mode will bring up display messages, explanations and prompts to assist the operator.

Increase and Decrease
Pressing the Increase or Decrease pushbuttons effect the value of the function presently active on the LCD-based display.

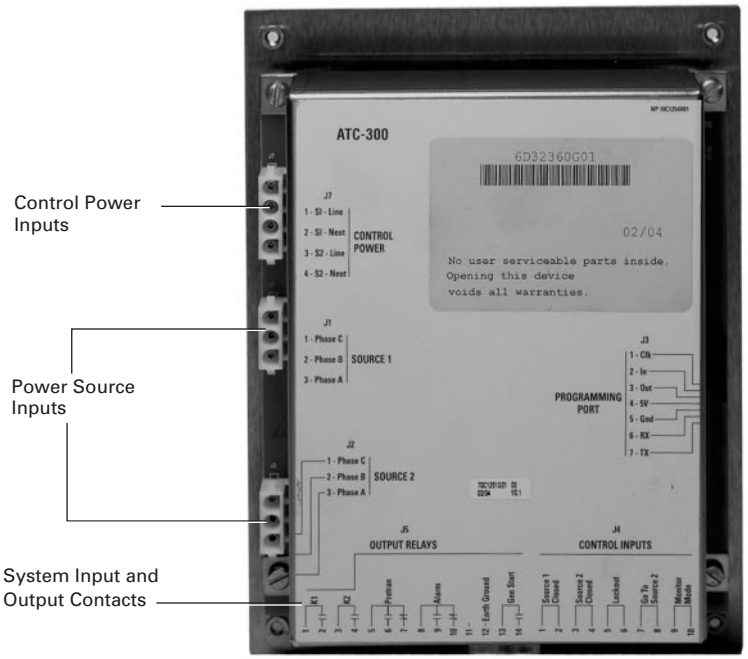
Engine Test
Pressing the Engine Test pushbutton twice initiates engine test cycle.

Alarm Reset
Pressing the Increase and Decrease pushbuttons simultaneously restores automatic operation in the event of an alarm condition).

Lamp Test
Pressing the Lamp Test pushbutton lights all LEDs and then displays ATC-300 controller information.

Bypass TDNE/TDEN
Pressing Step and Help/Lamp Test pushbuttons simultaneously reduces programmed time delays to zero to simplify test procedures.

ATC-300 Automatic Transfer Switch Controller



Rear View of ATC-300 Automatic Transfer Switch Controller

Output Contacts: The output contacts are dry relay contacts. The GEN START contact is rated 5 amperes at 250 Vac/ 30 Vdc. All other contacts are rated 10 amperes at 250 Vac/30 Vdc.

- K1, K2: These Form "A" output contacts are utilized to control single power switching mechanisms. They operate in conjunction with the SOURCE 1 and 2 CLOSED inputs.
- ALARM: Form "C" contact. This relay is energized during any of the following alarm conditions: failure of the power switching device to open or close, motor operator failure, unsuccessful in-phase transition, lockout condition, failed engine test, failed plant exerciser operation.
- PRE-TRAN: This relay operates on a timed basis (adjustable 0 – 120 seconds) prior to any transfer operation. Timing begins after TDNE or TDEN times out.
- GEN START: This is a latching relay utilized to initiate startup and shutdown cycles of the engine/ generator set.

Control Power Inputs (Source 1 and Source 2): The Control Power Input range is 65 Vac – 145 Vac, 50/60 Hz.

System Inputs: System Inputs are "wetted" contacts. Some system inputs are optional and must be enabled via factory control.

- SOURCE 1 CLOSED: This input is connected to the Source 1 power switching device position indication contact.
- SOURCE 2 CLOSED: This input is connected to the Source 2 power switching device position indication contact.
- LOCKOUT: This input is connected to an alarm contact. During an alarm condition, automatic operation is inhibited.
- GO TO SOURCE 2: This input provides the means to remotely initiate a startup and transfer cycle or retransfer and shutdown cycle.
- MONITOR MODE: This input allows the controller to be placed in a "non-automatic mode" while continuing to monitor source voltages and frequencies.
- EARTH GROUND: Provides a connection point for the common system ground.

Power Source Inputs (SOURCE 1 and SOURCE 2): The Power Source Inputs are the connection points for the power sources that are to be monitored. Three-phase systems are connected to Phase A, B and C. Single-phase systems are connected to points Phase A and Phase B.

Standard and Optional Features

All ATC-300 standard and optional features are listed in **Table 3**. All standard features are included and provided on all ATC-300 units.

Optional features must be specified with order entry and factory programmed. Only features that are originally ordered and factory programmed will appear on the LCD-based display. The ATC-300 Upgrade Module may be ordered to add optional features in the field.

Table 3. ATC-300 Automatic Transfer Controller — Standard and Optional Features

ATC-300 Features	Cutler-Hammer Feature Number	Field Programmable Set Point Range
Standard		
Time Delay Source 1 to Source 2 (TDNE) Time Delay Engine Start (TDES) Time Delay Source 2 to Source 1(TDEN) Time Delay Engine Cooldown (TDEC)	1 2 3 4	0 – 1800 Seconds 0 – 120 Seconds 0 – 1800 Seconds 0 – 1800 Seconds
Source 2 Single-Phase Undervoltage and Underfrequency Sensing	5B	UV Dropout: 50% – 97% of Nominal UV Pickup: (Dropout +2%) – 99% of Nominal UF Dropout: 90% – 97% of Nominal UF Pickup: (Dropout +1 Hz) – 99% of Nominal
Source 2 (Emergency) 3-Phase Undervoltage and Underfrequency Sensing	5J	UV Dropout: 50% – 97% of Nominal UV Pickup: (Dropout +2%) – 99% of Nominal UF Dropout: 90% – 97% of Nominal UF Pickup: (Dropout +1 Hz) – 99% of Nominal
Test Pushbutton Time Delay Emergency Fail (TDEF) Bypass TDEN Time Delay Bypass TDNE Time Delay	6B 7 8C 8D	No Load, Load or Disabled 0 – 6 Seconds Pushbutton Pushbutton
Source 1 Connected LED Indication Source 2 Connected LED Indication	12C 12D	N/A N/A
Source 1 Available LED Indication Source 2 Available LED Indication	12G 12H	N/A N/A
Plant Exerciser (Fail-Safe) with Selectable: (Daily, 7, 14 or 28-Day Cycle), (Load or No Load), (Day, Hour, Minute for Test Event) (0 – 600 Minutes Test Length)	23K	(Daily, 7, 14 or 28-Day Cycle), (No Load or Load) (Day, Hour, Minute) (0 – 600 Minutes Test Length)
Source 1 (All Phase) Undervoltage Sensing	26A	UV Dropout: 50% – 97% of Nominal UV Pickup: (Dropout +2%) – 99% of Nominal
Automatic Operation	29A	N/A
Seismic Zone 4 Qualification	42	N/A
Nominal Frequency Nominal Voltage	N/A N/A	50 or 60 Hz 120 – 600 Vac
System Phases Engine Test Run Duration for Engine Test Pushbutton and Plant Exerciser Duration	N/A N/A	1 or 3 0 – 600 Minutes
Optional		
Source 2 Single-Phase Overvoltage and Overfrequency Sensing	5C	OV Dropout: 105% – 120% of Nominal OV Pickup: 103% of Nominal to (Dropout -2%) OF Dropout: 103% – 110% of Nominal OF Pickup: 101% of Nominal to (Dropout -1 Hz)
Source 2 Single-Phase Undervoltage	5D	UV Dropout: 50% – 97% of Nominal UV Pickup: (Dropout +2%) – 99% of Nominal
Source 2 Single-Phase Overvoltage	5E	OV Dropout: 105% – 120% of Nominal OV Pickup: 103% of Nominal to (Dropout -2%)
Source 2 3-Phase Undervoltage	5F	UV Dropout: 50% – 97% of Nominal UV Pickup: (Dropout +2% – 99% of Nominal)
Source 2 3-Phase Overvoltage	5G	OV Dropout: 105% – 120% of Nominal OV Pickup: 103% of Nominal to (Dropout -2%)
Source 2 Phase Reversal	5H	0 = Disabled, 1 = ABC, 2 = CBA
Source 2 3-Phase Overvoltage and Overfrequency Sensing	5K	OV Dropout: 105% – 120% of Nominal OV Pickup: 103% of Nominal to (Dropout -2%) OF Dropout: 103% – 110% of Nominal OF Pickup: 101% of Nominal to (Dropout -1 Hz)
Source 2 3-Phase Voltage Unbalance	5L	(0 = Disabled, 1 = Active), (Dropout = 5% – 20%) (Pickup = 3% – (Dropout -2%)
Source 1 Overvoltage Sensing	26C	OV Dropout: 105% – 120% of Nominal OV Pickup: 103% of Nominal to (Dropout -2%)
Go to Source 2	26D	N/A
Source 1 Underfrequency Sensing	26E	UF Dropout: 90% – 97% of Nominal UF Pickup: (Dropout +1 Hz) – 99% of Nominal
Source 1 Overfrequency Sensing	26F	OF Dropout: 103% – 110% of Nominal OF Pickup: 101% of Nominal to (Dropout -1 Hz)
Source 1 Phase Reversal	26H	0 = Disabled, 1 = ABC, 2 = CBA
Source 1 3-Phase Voltage Unbalance	26L	(0 = Disabled, 1 = Active), (Dropout = 5% – 20%) (Pickup = 3% – (Dropout -2%)
Time Delay Neutral (TDN)	32A	0 – 120 Seconds
In-Phase Transition with Selectable (Enable or Disable), (Frequency Difference 0 – 3 Hz), (Synchronization Time 1 – 60 Minutes) and Default to Time Delay Neutral	32E	(Enable or Disable) (Frequency Difference 0 – 3 Hz) (Synchronization Time 1 – 60 Minutes)
Pretransfer Contacts (1NO/1NC)	35A	N/A

ATC-300 Upgrade Module

If an optional feature needs to be added after a transfer switch is in the field, contact the factory for availability of field upgrades with the ATC-300 Upgrade Module. This module can download new programs into the Automatic Transfer Controller (ATC-300) via connection to the communication module connector on the rear of the Automatic Transfer Controller device.

Dimensions in Inches (mm)

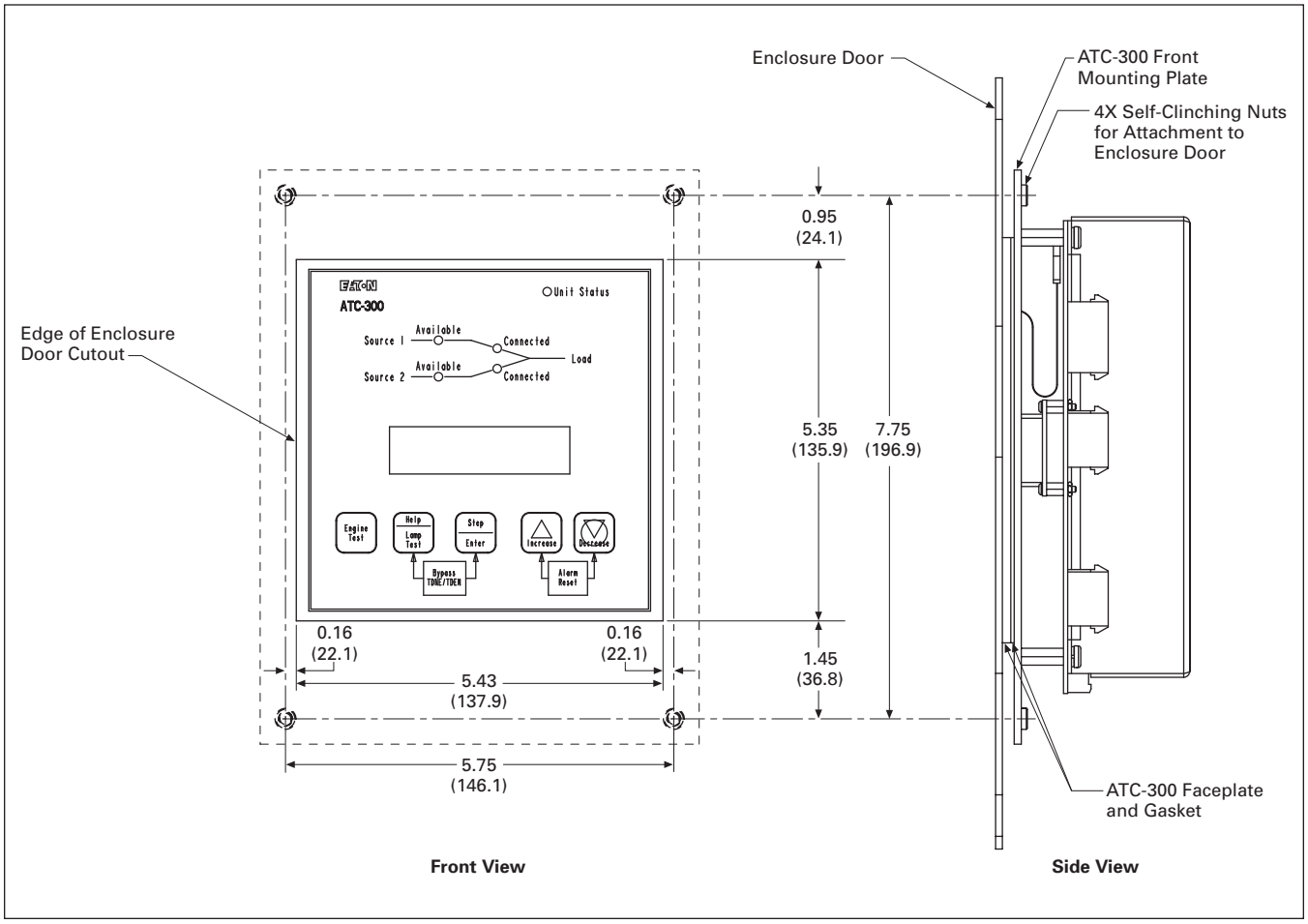


Figure 1. Automatic Transfer Controller (ATC-300)

Dimensions are approximate and should not be used for construction purposes (1 inch = 25.4 mm).

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