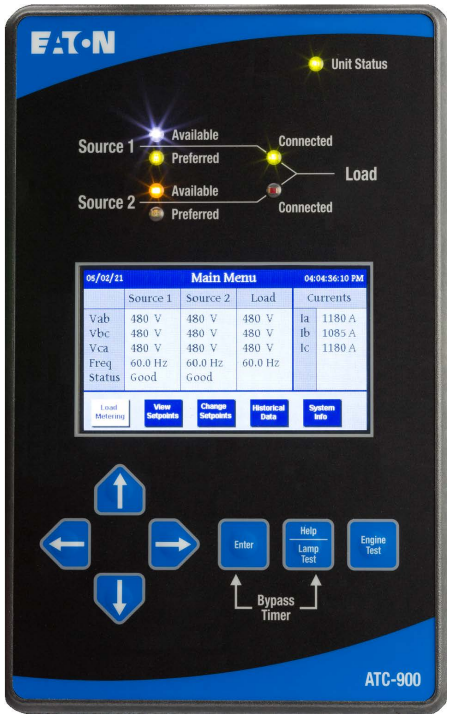
ATC-900 automatic transfer switch controller



Introduction

Description

The ATC-900 automatic transfer switch (ATS) controller brings intelligence, adaptability, and enhanced supervisory and programming capabilities to Eaton's complete transfer switch product offering including contactor, molded case, and power frame type transfer switches.

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 system arrangements 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, time delayed, load voltage decay), or closed transition platforms.

Powering Business Worldwide

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. Refined data screens provide for ease of viewing and edits.

The one standard model concept offers a variety of monitoring and control features, selective load shedding, and remote load testing, along with event logging/recording and industry standard 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.

Primary functions

The ATC-900 ATS controller offers these standard features:

- Monitor normal and alternate source voltages and frequencies
- Provide transfer and retransfer control signals
- Provide engine-generator start and shutdown signals
- Permit user programming of operational setpoints
- Display real-time and historical information
- Permit system testing
- Store customer and factory-established parameters in nonvolatile memory
- Provide faceplate LED status indication

Features and benefits

- ATS Health reports equipment performance, tolerance excursions, and component health
- Maintenance Watch™ provides automated notification and task guidance when quarterly inspection and annual maintenance is due
- LCD screen for system status, programming, system diagnostics, help, and troubleshooting
- Event logging and recording, 450 time-stamped events
- Field-programmable system voltage and flexible configuration with assignable inputs and outputs
- Three-source ATS control—primary and secondary controller functionality
- Selective, automatic load shedding
- Industry standard communication protocols
- USB port for uploading/downloading metering data, historical information, setpoint configuration files, and firmware updates

Table 1. ATC-900 features

Features	ATC-900
Hardware	
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 supply power input	Optional
Metering	
True rms voltage sensing of Source 1, Source 2, and Load	■
Frequency sensing of Source 1, Source 2, and Load	■
Voltage/current unbalance and phase rotation sensing	■
Load current sensing	Optional
Sampling at 64 samples per cycle	■
Source 1 voltages (Vab, Vbc, Vca, Va, Vb, Vc)	■
Source 2 voltages (Vab, Vbc, Vca, Va, Vb, Vc)	■
Load voltages (Vab, Vbc, Vca, Va, Vb, Vc)	■
Source 1 frequency	■
Source 2 frequency	■
Load frequency	■
Load currents (Ia, Ib, Ic)	Optional
Load kW	Optional
Load kvar	Optional
Load kVA	Optional
Power factor	Optional
Programming	
Programmable setpoints stored in nonvolatile memory	■
System monitoring with historical data storage and display	■
Digital setpoints for accurate and consistent performance	■
Password-protected access to control functions and setpoint programming	■
Four programmable control inputs	■
Four programmable relay outputs (Form C)	■
Expandable up to 20 control inputs and 20 relay outputs	Optional
Two programmable automatic engine/plant exercisers—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	■
Communications	
Serial RS-485 (Modbus® RTU)	■
Ethernet	Optional
USB 2.0 port for data, setpoint file, and firmware download/upload	■
Event history	
450 time-stamped events (100 summaries, 350 details)	■
2 seconds of metered data stored before and after a transfer event	Optional

Table 2. Technical specifications

Parameter	Specification
Control power	120 Vac (50/60 Hz) (operating range 65–160 Vac) or 24 Vdc (±10%) with optional DCT module
Power consumption	20 VA
Environmental conditions	
Storage temperature	–22 to +176 °F (–30 to +80 °C)
Operating temperature	–4.0 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	Three-phase or single-phase Low-voltage: up to 600 Vac Medium-voltage: up to 46 kVac (external PT required) Frequency: 50 or 60 Hz
Voltage measurements	Source 1, Source 2, and Load
Voltage measurement range	Up to 720 Vac rms
Voltage measurement accuracy	±1%
Frequency measurements	Source 1, Source 2, and Load
Frequency measurement range	40–80 Hz
Frequency measurement accuracy	±0.2 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, 61000-4-6, and 61000-4-11 Complies with CISPR 11, Class B Complies with FCC Part 15, Subpart B, Class B
CSA® conformance	C22.2 No. 178-1978 (reaffirmed 1992)

Reference documents and resources

- Instructional booklet: IB140012EN
- Design guide: DG140004EN

Simple, powerful user interface

LED mimic diagram

Status indication: *Source 1 available* (white), *Source 1 preferred* (green), *Source 2 available* (amber), *Source 2 preferred* (green), *Source 1 connected* (green), *Source 2 connected* (red).

Status screen

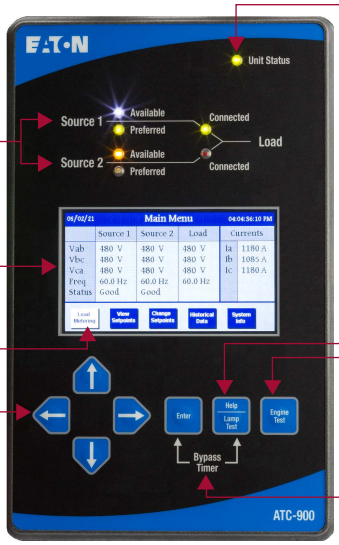
The ATC-900 *Main Menu* screen provides transfer switch status at a glance. *Source 1*, *Source 2*, and load-metering data are displayed as well as any active alarms.

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 setpoint 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 setpoints. 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.

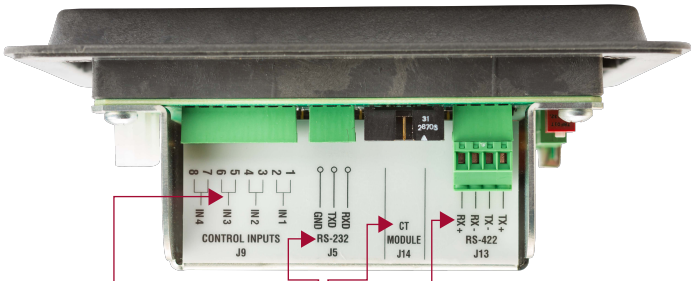
Engine test

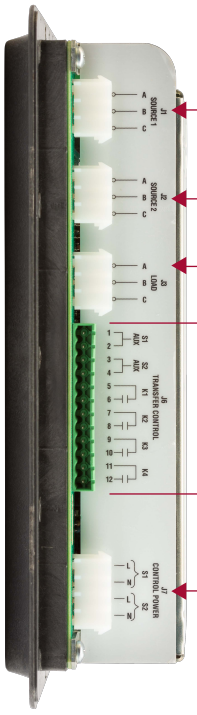
Performs an engine test using the programmed engine run and cooldown times. This is a password-protected feature.

Bypass time delays

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

Figure 1. ATC-900 user interface





Configurable inputs

System inputs are "wetted" contacts (24 Vdc at 10 mA) and 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

Voltage/frequency sense inputs for monitoring Source 1, Source 2, and Load connections. All phases (A, B, C) are monitored for a three-phase system. Only A and B phases are monitored for a single-phase system.

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, rated 10 A at 250 Vac/30 Vdc, 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 (with optional DCT module).

RS-422

DCT module

RS-232

Serial RS-485 (Modbus RTU)

Accessory I/O port

USB port

Earth ground

Provides a connection point for the common system ground.

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 A at 250 Vac/30 Vdc.

Configurable outputs

Four Form C dry relay contacts that can be configured to perform a preset list of functions. Contacts are rated 10 A at 250 Vac/30 Vdc.

Note: A factory-programmed output, pre-wired to dedicated hardware, cannot be reconfigured in the field.

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 setpoints. Contacts are rated 10 A at 250 Vac/30 Vdc.

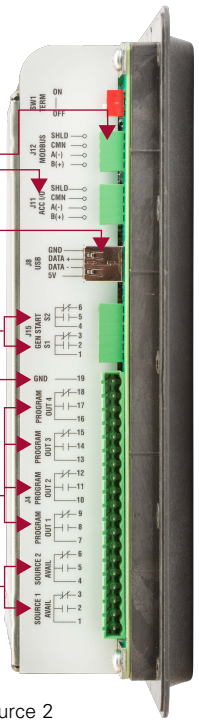


Figure 2. ATC-900 connections

ATC-900 programmable setpoints

Table 3. Features and setpoints

Option number	Description	Range	Factory default
General settings			
—	Set new password	0000–9999	0900
—	Nominal frequency	50 or 60 Hz	As ordered
—	Nominal voltage	120–600 V	As ordered
—	Number of phases	1 or 3	As ordered
—	System amperage rating	30–5000 A	As ordered
—	Number of generators	0, 1 or 2	1
—	Preferred source	Source 1, Source 2, External ① or None	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/Primary or Secondary ①	Primary
—	Phase sequence check	ABC, CBA or Off	Off
—	Commitment to transfer in TDNE	Yes or No	No
—	Manual retransfer	Auto, Manual ① or External ①	Auto
—	Modbus configuration	Enabled/Disabled	Enabled
—	Modbus address	1–247	1
—	Modbus baud rate	0 = 9600, 1, Even	9600
		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	—
—	Modbus writes	Enabled/Disabled	Enabled
—	Time sync	Off, with PLC, with Meter, via Modbus	Off
Transition settings			
47	Closed transition		
	Closed transition	Disable or Enable (alarm or fallback to open transition upon sync fail)	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	Disable or Enable (alarm or fallback to open transition upon sync fail)	As ordered
	In-phase frequency difference	0.0–3.0 Hz	1.0
—	Synchronization timer	1–60 minutes	5
32a/32d	Open—time delayed transition		
	Time delay neutral	0–600 seconds	0
	Load voltage decay	2–30% of nominal voltage	6%
Time delays			
1a	Time delay normal to emergency	0–9999 seconds	0:00
3a	Time delay emergency to normal	0–9999 seconds	5:00
—	Time delay normal disconnect	0–10 seconds	0
—	Time delay normal reconnect	0–60 seconds	0
—	Time delay emergency disconnect	0–10 seconds	0
—	Time delay emergency reconnect	0–60 seconds	0
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	15,540 seconds ②	0:03
—	Time delay engine 2 start	15,540 seconds ②	0:03
4A	Time delay engine cool-off	0–9999 seconds	5:00
7A	Time delay engine fail timer	0–60 seconds	0:06
—	Unbalance/phase loss time delay	0–30 seconds	0:20

① Requires control input to be programmed and may require additional hardware.

② For values exceeding 2 minutes, the ATC-900 controller must remain powered, otherwise the engine start signal will be issued (fail safe) after 2 minutes.

Table 3. Features and setpoints (continued)

Option number	Description	Range	Factory default
Source settings			
26J/5J	Source 1/2 undervoltage dropout	70–97% of nominal	80%
	Source 1/2 undervoltage pickup	(dropout +2%) to 99% of nominal	90%
26K/5K	Source 1/2 overvoltage dropout	105–120% of nominal (0 = disabled)	115%
	Source 1/2 overvoltage pickup	103% of nominal to (dropout –2%) (0 = disabled)	115%
26J/5J	Source 1/2 underfrequency dropout	90–97% of nominal (0 = disabled)	94%
	Source 1/2 underfrequency pickup	(dropout +1 Hz) to 99% of nominal (0 = disabled)	96%
26K/5K	Source 1/2 overfrequency dropout	103–110% (0 = disabled)	106%
	Source 1/2 overfrequency pickup	101% to (dropout –1 Hz) (0 = disabled)	104%
26L/5L	Source 1/2 voltage unbalance ① dropout	5–20% (0 = disabled)	12%
	Source 1/2 voltage unbalance ① pickup	3% to (dropout –2%) (0 = disabled)	10%
26M/5M	Source 1/2 voltage phase loss ① dropout	20–60% (0 = disabled	40%
	Source 1/2 voltage phase loss ① pickup	18% to (dropout –2%)	30%
Engine test/plant exerciser (PE1 and PE2 are independently programmable)			
6B	Engine test pushbutton on panel		
	Test mode	No load, load transfer, external ②	Load transfer 30 minutes
	Engine run test time	0–600 minutes	
23M	PE time delay normal to emergency	0–9999 seconds	00:02
	PE time delay emergency to normal	0–9999 seconds	00:02
	PE time delay engine cooldown	0–9999 seconds	5 minutes
	PE1/PE2 test mode	No load, load transfer, external ②, 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)	
	PE1/PE2 calendar date	Month: 1–12; Day: 1–31	
	PE1/PE2 day of week	1 Sunday, 2 Monday, 3 Tuesday, 4 Wednesday, 5 Thursday, 6 Friday or 7 Saturday	
	PE1/PE2 plant start time	HH:MM AM/PM	
ATS Health and Maintenance Watch (default setpoints)			
11A	ATS Health	Enable/Disable	Enable
11B	Maintenance Watch	Enable/Disable	Enable
	Major maintenance	Enable/Disable	Enable
	Major maintenance date	Month: 1–12; Day: 1–31	04/01
	Quarterly inspection	Enable/Disable	Enable
	Q1 inspection date	Month: 1–12; Day: 1–31	02/15
	Q2 inspection date	Month: 1–12; Day: 1–31	05/15
	Q3 inspection date	Month: 1–12; Day: 1–31	08/15
	Q4 inspection date	Month: 1–12; Day: 1–31	11/15
	Load test cadence	Disable, monthly, quarterly	Quarterly

① Incorporates symmetrical component calculation, providing enhanced detection of an abnormal condition.

② Requires control input to be programmed and may require additional hardware.

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 standard configuration provides four control inputs and four relay outputs. Each input/output can be programmed for a specific function as outlined in the list below. The number of inputs/outputs can be expanded by daisy-chaining up to four accessory I/O modules. Each I/O module provides four additional control inputs and four additional relay outputs.

- Inputs
  - Disabled
  - Monitor mode
  - Bypass timers
  - Lockout
  - Manual retransfer enable
  - Manual retransfer
  - Secondary controller
  - Remote engine test
  - Preferred source selection
  - Go to emergency
  - Emergency inhibit
  - ATS on bypass
  - Go to neutral
  - Safety interlock
  - Closed transition inhibit
  - Remote I/O
  - Engine test mode select
  - Source 1 breaker health
  - Source 2 breaker health
  - Source 1 surge protection
  - Source 2 surge protection
  - Load surge protection
- Outputs (control)
  - Load sequence
  - Selective load shed
  - Load bank control
  - Pre-/post-transfer
  - Pre-transfer
  - Post-transfer
  - Remote I/O
- Outputs (status/alarms)
  - Disabled
  - 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
  - ATC status
  - Generator 1 start status
  - Generator 2 start status
  - Emergency inhibit on
  - ATS on bypass
  - Waiting on synchronization

Figure 3. I/O module

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 20 outputs.

Metering

Optional integral metering requires the addition of a DCT module that mounts directly to the rear side of the controller.

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 multifunction 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.

Figure 4. DCT module

Voltage inputs (measurement category)

- Range: universal, auto-ranging up to 416 Vac L-N, 720 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 maximum
- Burden: 0.0115 VA per phase maximum at 5 A
- Pickup current: 0.1% of nominal
- Connections: screw terminals
- Maximum input wire gauge: AWG 14 (direct connect); AWG 6–22 (using shorting block provided)
- 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 measures readings simultaneously
- A/D conversion: 16 simultaneous 12-bit analog to digital converters

Table 4. Current, voltage, and frequency metering data

	Units	Accuracy	Notes
Current metering			
IA, IB, IC	Amperes	±1% of reading	—
Voltage metering			
VAB, VBC, VCA	Volts	±1% of reading	Line-to-line voltage
Frequency metering			
Frequency	Hz	±0.2 Hz of reading	Range is 20–255 Hz

Table 5. Power metering data

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

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

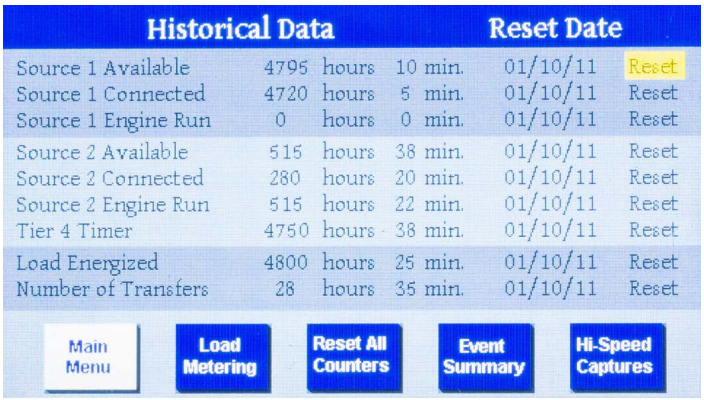


Figure 5. Historical data display

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

Figure 6. Event summary display

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

Events include:

- Actions of the transfer sequence
- Alarms
- Changes to the setpoints
- Changes to the time/date
- Resetting a historical counter
- Engine run test

Time-stamping resolution of 0.1 seconds.

Event details

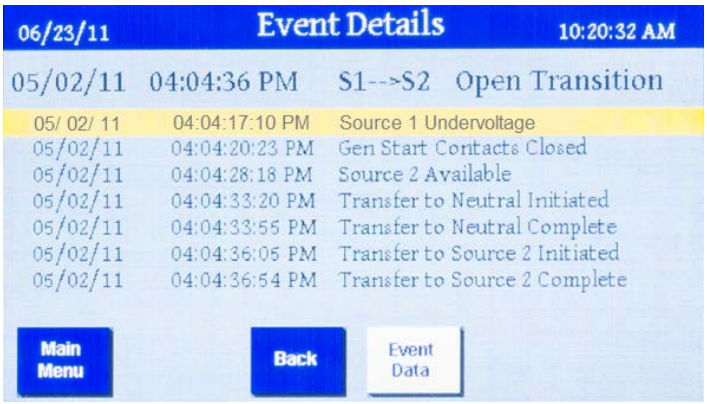


Figure 7. Event details display

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

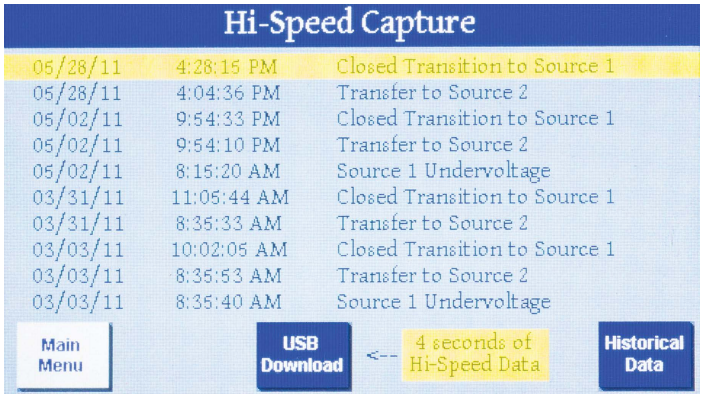


Figure 8. Hi-speed capture display, pre- and post-event

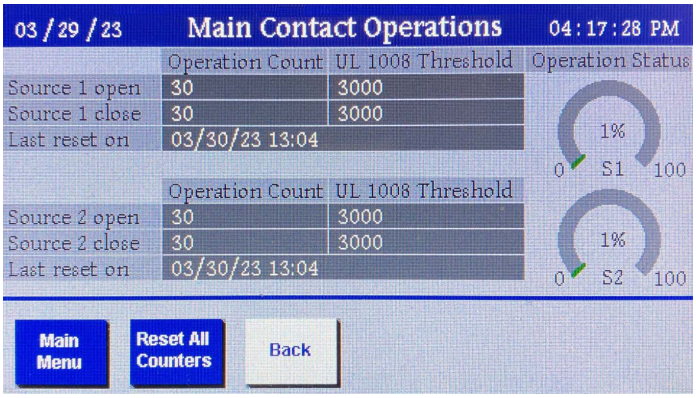


Figure 9. Main contact operations

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 via USB or displayed graphically.

Events include:

1. Source unavailability actions that initiate a transfer sequence (undervoltage, overvoltage, etc.)
2. Successful transfers (at the point of breaker/contactor closure)
3. Unsuccessful transfers (at the point of breaker/contactor failure to close or open)

ATS Health and Maintenance Watch

An ATS is an essential element in the power distribution chain and is responsible for providing continuous power to critical loads in emergency, legally required, optional standby, and critical operation power systems.

To maintain a high degree of reliability, an ATS must undergo regular inspection, maintenance, and exercise as part of an established program.

To optimize equipment reliability and uptime, ATS Health provides facility service personnel with equipment condition data to make informed maintenance decisions and manage risk. Maintenance Watch issues automated notifications and task guidance to perform scheduled inspection and maintenance based on NFPA® 110—standard for emergency and standby power systems.

ATS Health

ATS Health reports equipment endurance, electrical excursions, performance, and component health that can be viewed locally on the ATC-900 display or monitored remotely via communication. The parametric data reported is:

- Main contact operations
- Load overcurrent
- Source overvoltage
- Transfer switch under load
- Switching device exercise
- Main contact actuation
- Surge protective device
- Circuit breaker health

ATS Health can be enabled or disabled.

Maintenance Watch

Maintenance Watch permits service personnel to schedule four quarterly inspections and one annual major maintenance to a specific calendar date that recurs each year. A load test can be programmed for a monthly or quarterly cadence.

An automated reminder notification is issued 10 days prior to each scheduled due date and includes task information to guide the service technician. Reminder notifications can be postponed up to 21 days, dismissed or marked as complete. Notifications can be viewed locally on the ATC-900 display or monitored remotely via communication.

When a task is marked as complete, a date and time stamp is recorded in a summary table that displays the last seven inspections, seven major maintenances, and seven load tests.

Maintenance Watch or individual elements (quarterly inspection, major maintenance, load test) can be enabled or disabled.

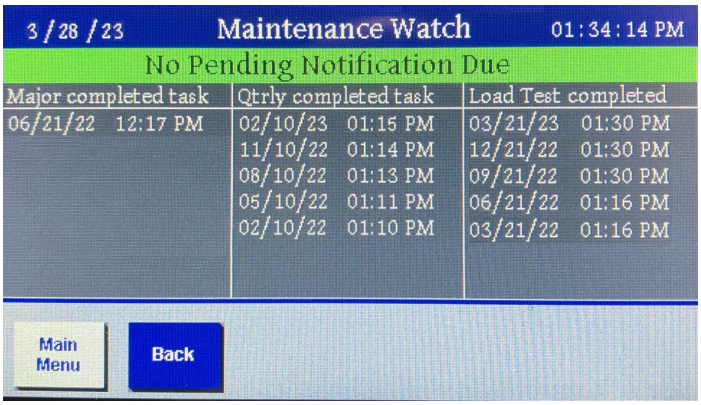
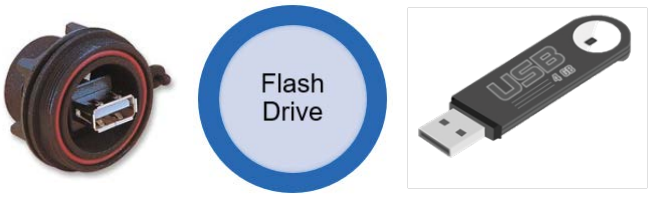


Figure 10. Maintenance Watch summary table

USB port

The ATC-900 includes a USB port to perform the following actions:

- Download metering data for post-event analysis
- Download existing setpoint configuration file for editing with the EASE tool, uploading into other ATC-900 transfer switch equipment or to share with Eaton's dedicated ATS technical support team
- Download detailed event data
- Download historical counter data
- Download high-speed capture waveform data
- Upload a setpoint configuration file
- Upload an ATC-900 firmware file (later/earlier version) to field update



When an engine-test is initiated, or the connected power source becomes unavailable, the ATC-900 calculates the "transfer time" to the alternate power source.

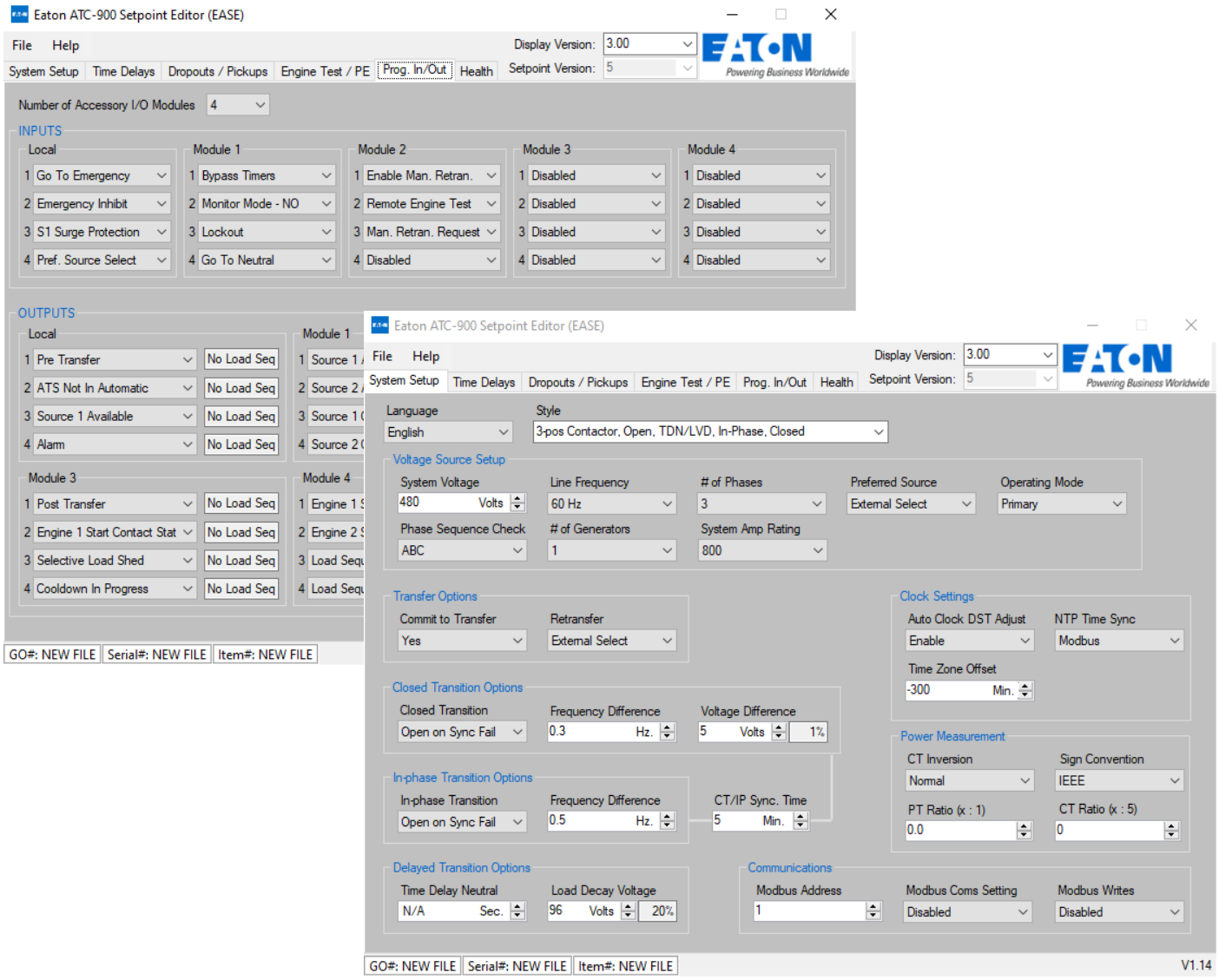
Timestamp	Event ID	Event Code	Event Description	Transfer ID	Transfer Code	Transfer Description	Source 1 Vab (V)	Source 1 Vbc (V)	Source 1 Vca (V)	Source 1 Freq (Hz)	Source 2 Vab (V)	Source 2 Vbc (V)	Source 2 Vca (V)	Source 2 Freq (Hz)	Load Vab (V)	Load Vbc (V)	Load Vca (V)	Load Freq (Hz)	Load Ia (A)	Load Ib (A)	Load Ic (A)	Status Source 1	Status Source 2
2019-11-11 T15:53:30.140	931	0x14	Source 2 Unavailable				482	482	484	60	0	0	0	0	482	482	484	60	321	291	262	Good	Under-V
2019-11-11 T15:53:29.410	930	0x39	Generator Start Relay 2 OFF																				
2019-11-11 T15:53:24.360	929	0x1D	Open Transition to Source 1 Complete	76	0x13	Transfer to Source 1 Complete	482	482	484	60	482	479	481	60	482	482	484	60	321	291	262	Good	Good
2019-11-11 T15:53:24.260	928			76	0x12	Transfer to Source 1 Initiated	487	486	488	60	482	479	481	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:53:21.250	927			76	0x0F	Transfer to Neutral Complete	488	486	488	60	482	479	481	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:53:21.150	926			76	0x0E	Transfer to Neutral Initiated	488	486	488	60	480	476	478	60	480	476	478	60	325	297	272	Good	Good
2019-11-11 T15:53:16.100	925			76	0x08	Preferred Source Available	487	486	488	60	480	476	478	60	480	476	478	60	325	297	272	Good	Good
2019-11-11 T15:53:16.70	924	0x11	Source 1 Available				487	486	488	60	480	476	478	60	480	476	478	60	325	297	272	Good	Good
2019-11-11 T15:52:48.850	923	0x1C	Open Transition to Source 2 Complete	75	0x11	Transfer to Source 2 Complete	0	0	0	0	480	476	478	59.8	480	476	478	59.8	325	297	272	Under-V	Good
2019-11-11 T15:52:48.850	922	0x35	Transfer Time (sec) 8.64																				
2019-11-11 T15:52:48.750	921			75	0x10	Transfer to Source 2 Initiated	0	0	0	0	482	479	481	60	0	0	0	0	0	0	0	Under-V	Good
2019-11-11 T15:52:45.750	920			75	0x0F	Transfer to Neutral Complete	0	0	0	0	482	479	481	60	0	0	0	0	0	0	0	Under-V	Good
2019-11-11 T15:52:45.650	919			75	0x0E	Transfer to Neutral Initiated	0	0	0	0	482	479	481	60	0	0	0	0	0	0	0	Under-V	Good
2019-11-11 T15:52:42.500	918	0x12	Source 2 Available				0	0	0	0	482	479	481	60	482	0	0	0	0	0	0	Under-V	Good
2019-11-11 T15:52:42.410	917	0x00	Power Up - Time OK																				
2019-11-11 T15:52:40.240	916			75	0x0B	Gen Start Contacts Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Under-V	Under-V
2019-11-11 T15:52:40.240	915			75	0x00	Undervoltage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Under-V	Under-V
2019-11-11 T15:52:40.210	914	0x13	Source 1 Unavailable				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Under-V	Under-V
2019-11-11 T15:42:21.370	913	0x14	Source 2 Unavailable				487	486	488	60	0	0	0	0	487	486	488	60	320	290	261	Good	Under-V
2019-11-11 T15:42:20.900	912	0x39	Generator Start Relay 2 OFF																				
2019-11-11 T15:42:10.300	911	0x1D	Open Transition to Source 1 Complete	74	0x13	Transfer to Source 1 Complete	482	482	484	60	482	479	481	60	482	482	484	60	321	291	262	Good	Good
2019-11-11 T15:42:09.930	910			74	0x12	Transfer to Source 1 Initiated	488	486	488	60	482	479	481	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:42:06.930	909			74	0x0F	Transfer to Neutral Complete	488	486	488	60	482	479	481	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:42:06.830	908			74	0x0E	Transfer to Neutral Initiated	487	486	488	60	480	476	478	60	480	476	478	60	322	292	263	Good	Good
2019-11-11 T15:42:01.780	907			74	0x2A	Test Transfer	487	486	488	60	480	476	478	60	480	476	478	60	323	292	266	Good	Good
2019-11-11 T15:42:01.730	906	0x19	Engine Test Successful																				
2019-11-11 T15:40:01.720	905	0x1C	Open Transition to Source 2 Complete	73	0x11	Transfer to Source 2 Complete	487	486	488	60	480	476	478	59.8	480	476	478	59.8	325	297	272	Good	Good
2019-11-11 T15:40:01.720	904	0x35	Transfer Time (sec) 9.66																				
2019-11-11 T15:40:01.620	903			73	0x10	Transfer to Source 2 Initiated	487	486	488	60	480	476	478	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:39:58.610	902			73	0x0F	Transfer to Neutral Complete	488	486	488	60	482	479	481	60	0	0	0	0	0	0	0	Good	Good
2019-11-11 T15:39:58.460	901			73	0x0E	Transfer to Neutral Initiated	484	484	486	60	482	479	481	60	484	484	486	60	321	291	262	Good	Good
2019-11-11 T15:39:53.410	900			73	0x2A	Test Transfer	482	482	484	60	482	479	481	60	482	482	484	60	321	291	262	Good	Good
2019-11-11 T15:39:53.350	899	0x12	Source 2 Available				482	482	484	60	482	479	481	60	482	482	484	60	321	291	262	Good	Good
2019-11-11 T15:39:52.710	898	0x38	Generator Start Relay 2 ON																				
2019-11-11 T15:39:52.000	897	0x18	Engine Test Request																				
2019-11-11 T15:39:16.990	892	0x11	Source 1 Available				482	482	484	60	0	0	0	0	482	482	484	60	321	291	262	Good	

Example of event log with metering data (downloaded via USB port) showing initiation and completion of an engine-generator test followed by a Source 1 unavailable condition. Both events result in a transfer to the alternate power source and calculation of "transfer time".

EASE

Eaton's Setpoint Editor Tool (EASE) allows you to easily create, edit, and save configuration files for upload to your ATC-900 controller via a USB flash drive.

- Create a single configuration file to simplify startup when commissioning one or more transfer switches
- Download an existing configuration file to make setpoint edits, reproduce for use with new transfer switch equipment, create a backup copy, or forward to the Eaton technical support team for assistance with troubleshooting



Industry standard communication protocol

Every ATC-900 controller includes a standard Serial RS-485 (Modbus RTU) communications interface with the option to connect an ATS Ethernet communication adapter module (ECAM).

The ATC-900 is also compatible with Eaton's Power Xpert® Gateway for web-based monitoring, and supports multiple network protocols including Modbus TCP/IP, HTTP/HTTPS, DHCP, SNMP, SMTP, NTP, or BACnet®/IP. The Power Xpert Gateway can be used to consolidate data from up to 64 devices, including ATS 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

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.

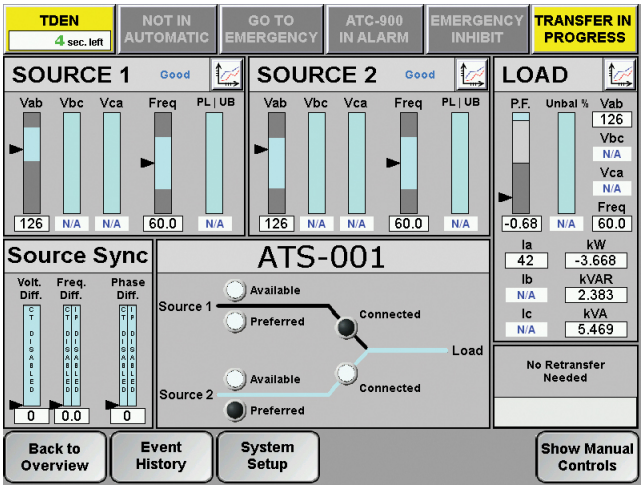
Eaton's HMi remote annunciator controller offers a simple and cost-effective means of remotely monitoring and controlling up to eight ATSs (with ATC-300+ or ATC-900 controller) via serial or Ethernet communication.

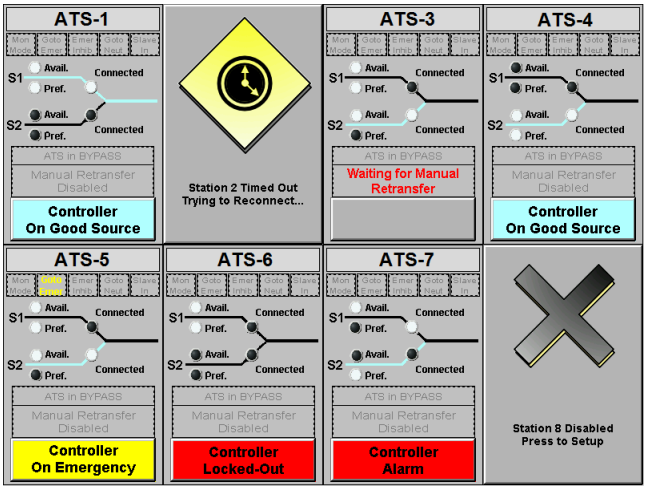
Using one intuitive touch screen interface, users can:

- Monitor source vitals and health
- Analyze metering and trend data of sources and load
- View and program transfer switch controller setpoints, control inputs, and relay outputs
- Start and stop a generator engine test
- Initiate a transfer to the alternate source
- Bypass a time delay countdown
- Initiate a manual retransfer
- View and silence alarms
- Perform basic troubleshooting
- Monitor source synchronization during in-phase or closed transition
- View event history

Overview screen

View an abbreviated status of up to eight transfer switches on a single overview screen.





Special applications

Three-source arrangements

The ATC-900 primary/secondary controller functionality provides the user with the ability to use two independent ATSs in three-source systems consisting of a utility and two generator sources. In a three-source system, the primary ATS controls the engine-generator start/stop signal of the secondary ATS. In the event of a Source 1 power failure, the primary ATS engine-generator start relay signals the secondary ATS to start both generators.

Note: The secondary ATS requires continuous power using the optional DCT module, a UPS, or some other steady-state voltage source.

The primary 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 secondary ATS will initiate a transfer to the non-preferred generator. If "None Preferred" is selected, then both generators will start and the secondary 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.

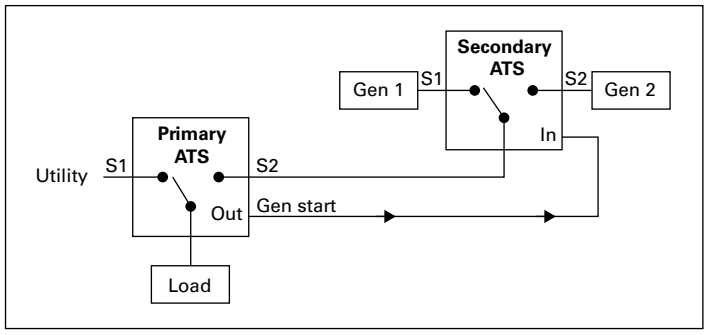


Figure 11. Three-source transfer switch arrangement

Load management

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

- Integral load metering: Provides metering data that allows the user to monitor energy utilization and manage system loading
- Selective load shedding: Selectively drop and pick up non-essential loads when user-defined kW threshold levels are reached when the load is connected to an engine-generator
- Load shed (where ATS construction allows): Provides the ability to disconnect the load from an engine-generator source
- Pre-/post-transfer signals: Provides advance relay signaling of load disconnect/connect during a transfer sequence
- Load bank control: Signals a load bank to disengage if utility power is lost during an engine-generator test
- Load sequencing: Provides capability to sequentially connect one or more loads using programmable time delays

Dimensions in inches (mm)

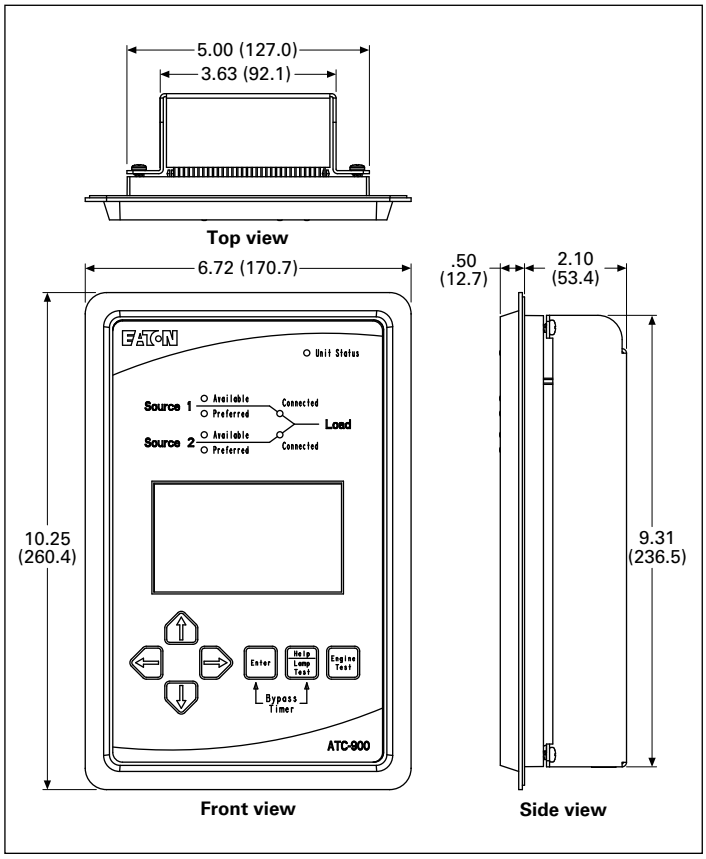


Figure 12. ATC-900

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