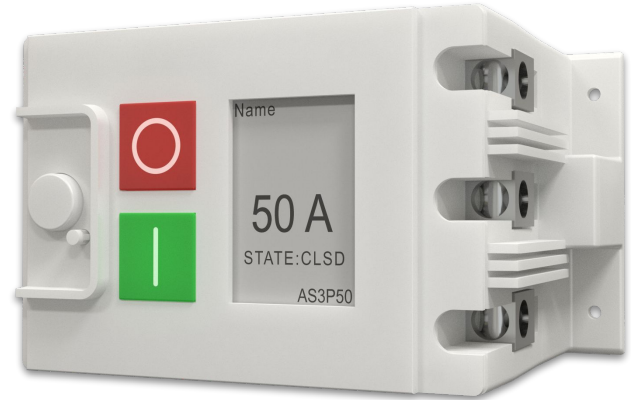


AS3P50

50A Atom Switch™ Solid State Circuit Breaker Generation 2



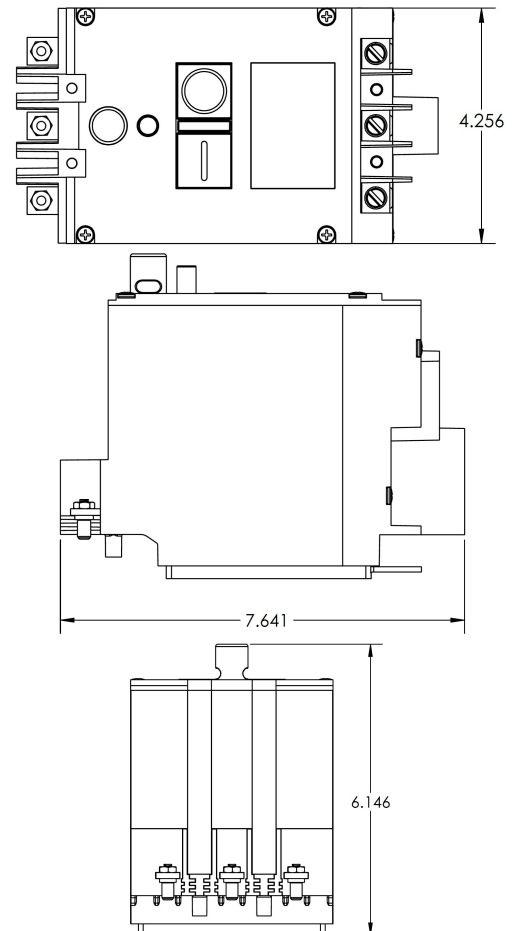
Features

- Ultra-fast Circuit Protection
- Mitigates Fault before Propagation
- Remote Open/Close
- Power Flow Scheduling
- Low Impedance Arc Flash Mitigation
- Dynamic & Adjustable Time Current Curve
- Integrated Motor Soft-Starting
- Motor Overload Protection
- Revenue Grade Metering
- Virtual Relays

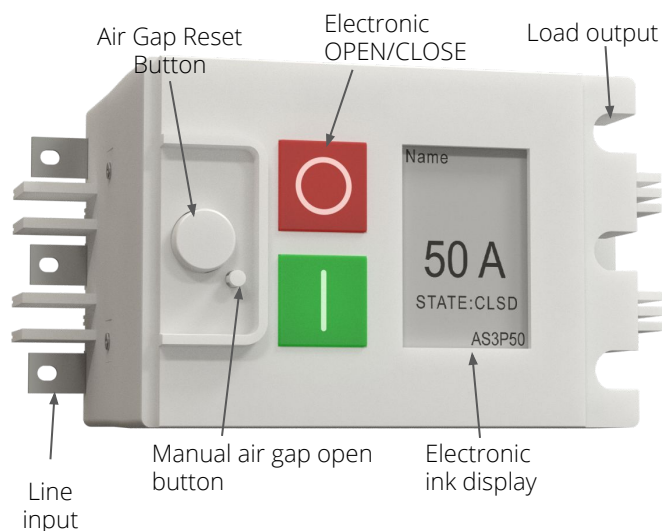
Applications

- Motor Controls
- Critical to Safety
- High Density EV Chargers
- Transfer Switching
- Distributed Energy Resources (DER)
- Anywhere for Remote Operation

Input Voltage	208/120VAC - 480/277VAC
Poles	3
Frame Size	50A
Long Time Trip Setting Range	15A - 50A
Long Time Trip Settable Increments	15, 20, 25, 30, 35, 40, 45, 50 amp
Minimum Opening Time	3 μ S
Input Frequency	50Hz - 400Hz
Interrupting Rating	100kA across all voltage classes
Max. Ambient Operating Temperature	40°C max.
Storage temperature	-50°C - 85°C
Load Side Connection	#14AWG - 1/0AWG, Cu/Al
Standards	UL 489
Metering	Volts, Amps, KVA +/- 1% accuracy
Over/under voltage Relay	+/- 0-30%, 1-20s
Over/under frequency Relay	+/- 0.1-1Hz, 1-20s
Voltage Balance Relay	+/- 0-30%, 1-20s
Current Balance Relay	+/- 0-30%, 1-20s
Undercurrent Relay	1-99A, 1-10s
Soft Starting (step-in)	1-20s, 30-100% voltage
Soft Stopping (step-out)	1-20s
Motor Overload Class (future)	10, 20, 30 (selectable)
Kick Start (future)	0.1-2s, 30-100% voltage

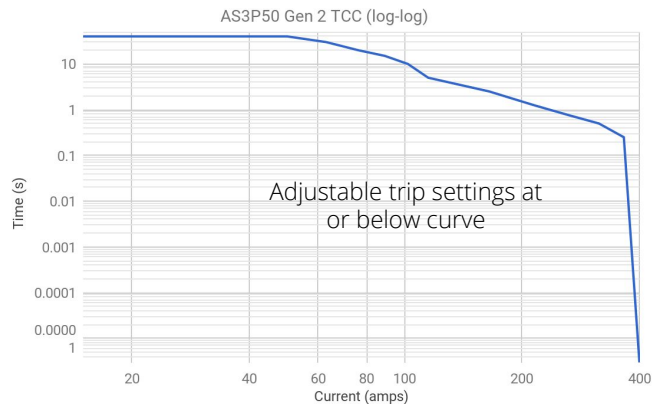
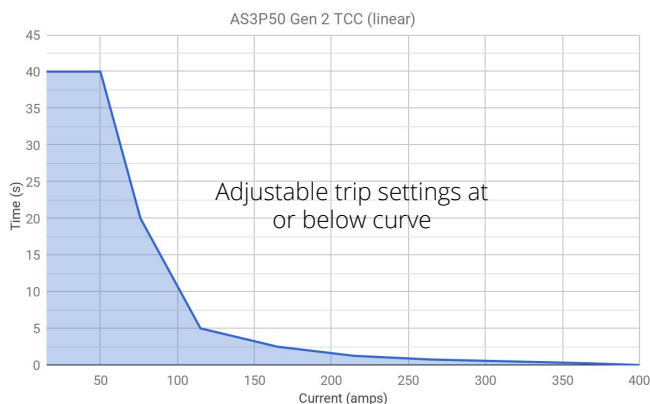


Operational Overview

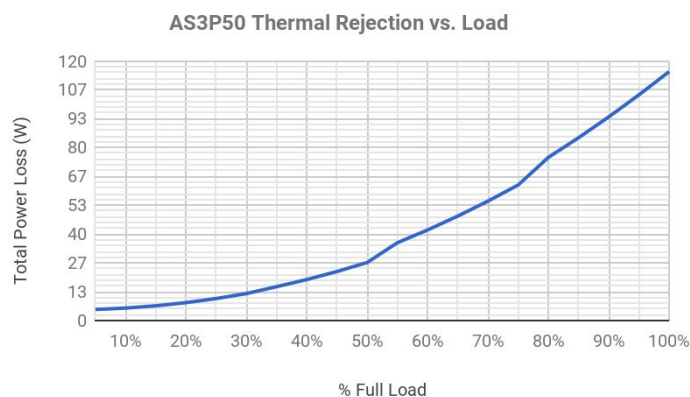
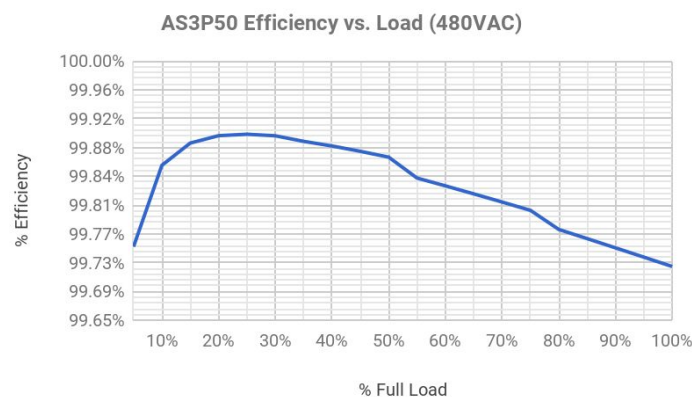


The Atom Switch provides critical information at glance. The green "close" button lights up when the circuit is closed, and the red "open" button lights up solid red to indicate "standby mode" or flashes to indicate an open air gap. Standby Mode is a condition where the air gap is closed but the solid-state devices have opened the circuit, usually through the Atom OS. This enables the remote operation. When the Atom Switch is closed, pressing the manual air gap open button will open the circuit and trigger the AIR GAP OPEN condition. When the air gap is open the air gap reset button ejects. The air gap reset button also functions as a safety lockout/tagout device with a hole through the button, allowing lockout devices to easily be installed. Each Atom Switch has a user-assigned name which shows up on its e-ink display along with breaker trip status and trip rating. E-ink technology keeps this information on screen even after power loss. After any trip, one of 5 fault types will be displayed: Overload, Short Circuit, Manual Trip, Relay Trip (e.g. Overvoltage).

Time-Current Curves

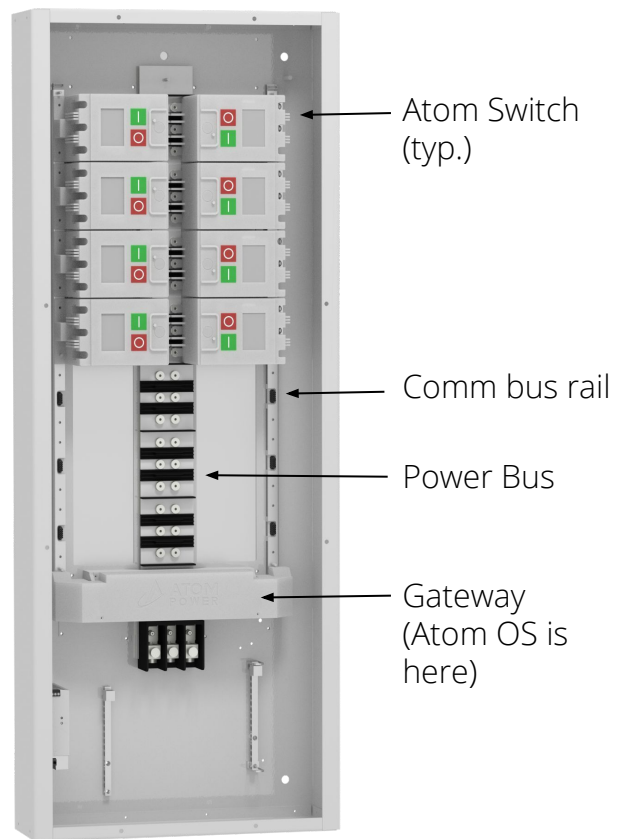


Efficiency & Thermal Rejection



Atom Panel™ Integration

The Atom Panel houses the Atom Switch circuit breakers and provides the necessary communication of all Atom Switches to the Gateway which provides the Atom OS web application to the user. All Atom Switches communicate via CAN bus communication to the Gateway, the Gateway provides the aggregation of all CAN bus data and outputs this through the Atom OS via one (1) ethernet connection and one (1) IP address to the user. This provides the user access to the Atom OS without downloading any software and can be used on any device, anywhere with the necessary credentials.



Network Architecture & Security

General Overview:

Atom Switches send and receive information to/from the Gateway Controller through the CAN bus. The Gateway Controller processes the data and organizes it in a database through the Backend Service and hosts the data on the Atom OS. Conversely, The Atom OS also takes user inputs and the Frontend service sends this data to the Backend Service, and eventually to the Atom Switches over the CAN bus. The data is exchanged in the JSON format in between the services, and this exchange takes place only when the HTTP requests are authenticated with Tokens. The http protocol operates over TCP/IP in the underlying layers.

Gateway Controller:

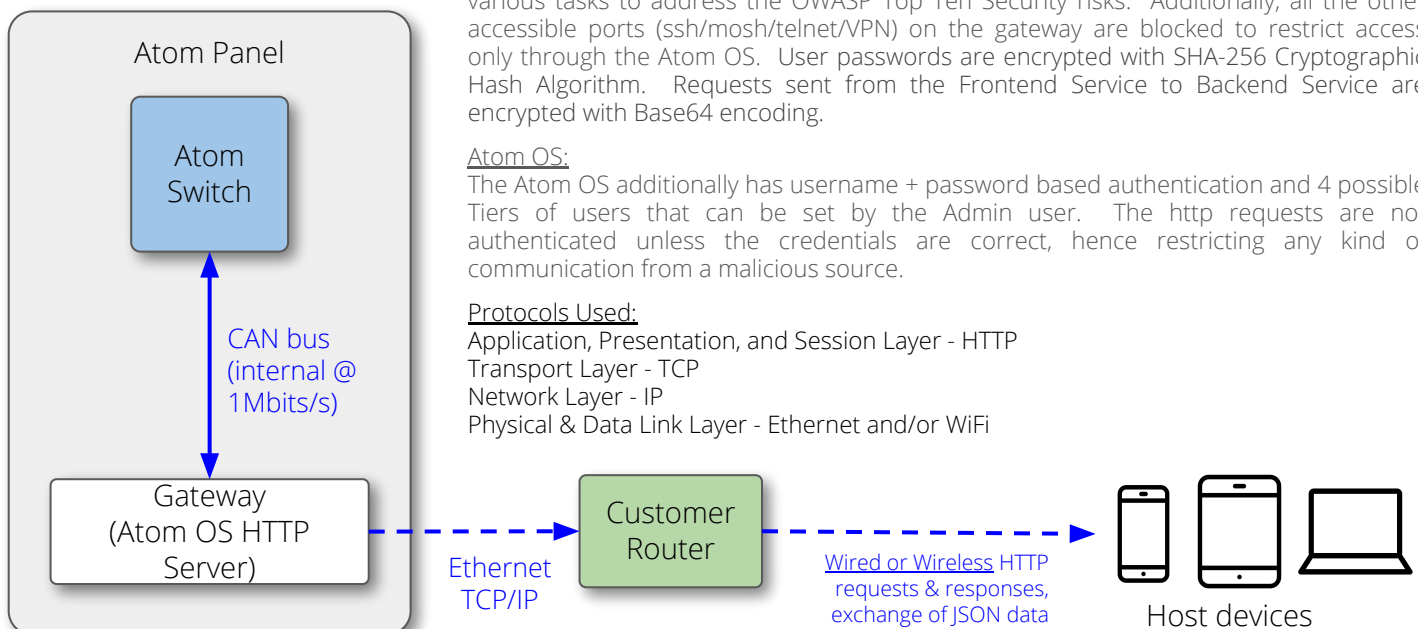
The Gateway runs a linux based OS. Hence, the default linux firewall "IPtables" is used for various tasks to address the OWASP Top Ten Security risks. Additionally, all the other accessible ports (ssh/mosh/telnet/VPN) on the gateway are blocked to restrict access only through the Atom OS. User passwords are encrypted with SHA-256 Cryptographic Hash Algorithm. Requests sent from the Frontend Service to Backend Service are encrypted with Base64 encoding.

Atom OS:

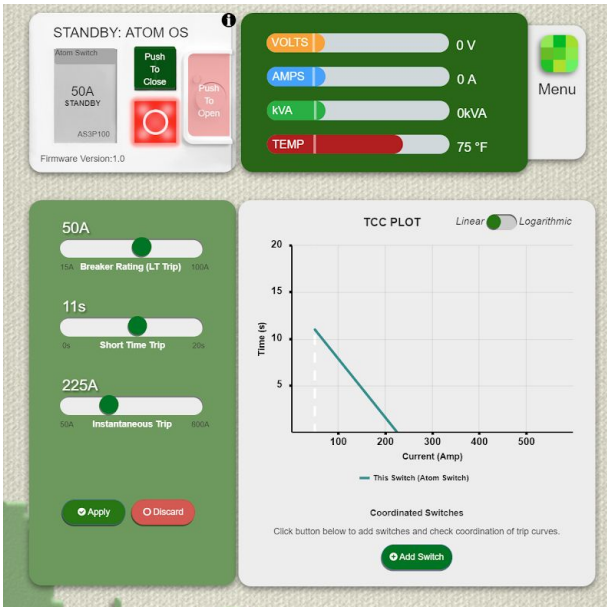
The Atom OS additionally has username + password based authentication and 4 possible Tiers of users that can be set by the Admin user. The http requests are not authenticated unless the credentials are correct, hence restricting any kind of communication from a malicious source.

Protocols Used:

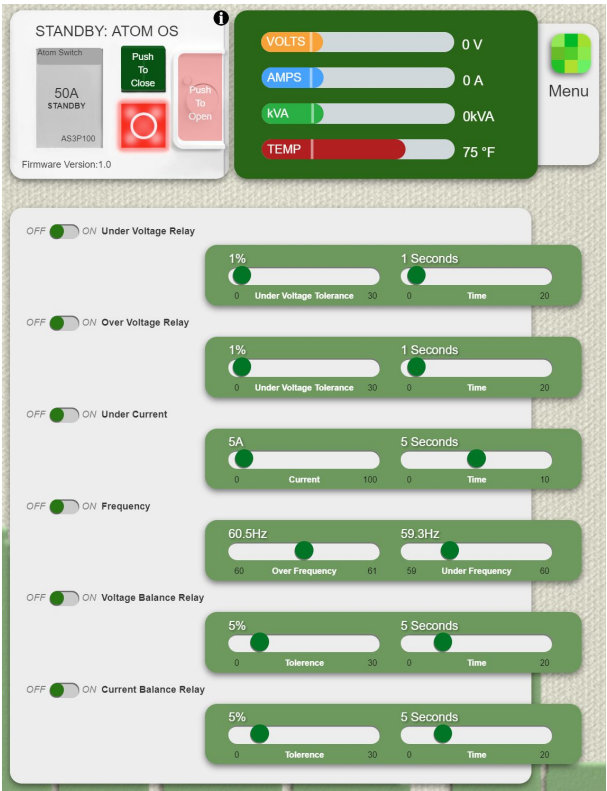
Application, Presentation, and Session Layer - HTTP
 Transport Layer - TCP
 Network Layer - IP
 Physical & Data Link Layer - Ethernet and/or WiFi



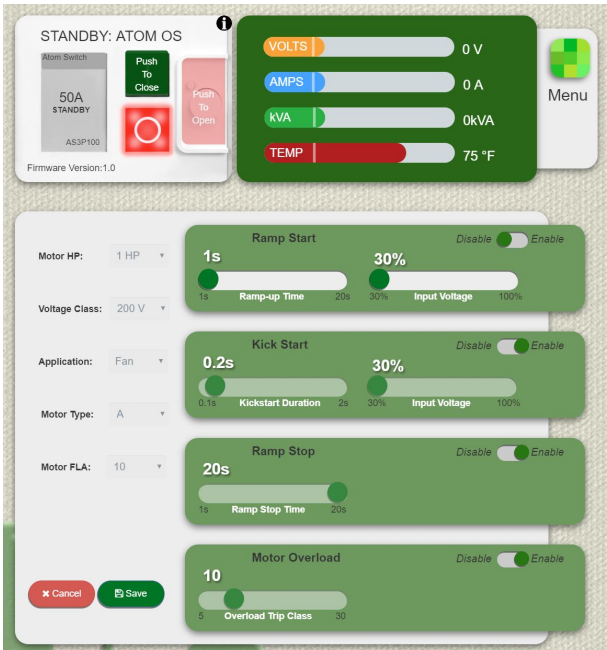
Atom OS™ Enablement of Atom Switch features



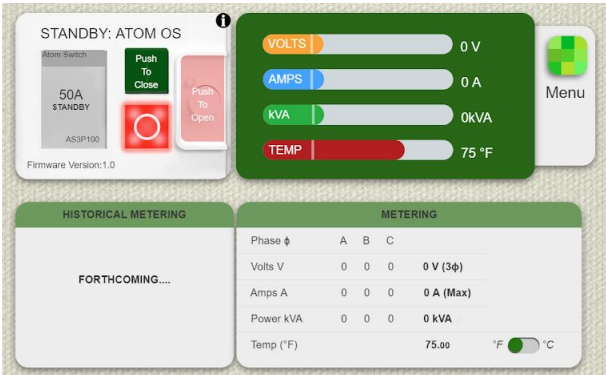
TCC Menu on Atom OS



Virtual Relay Menu on Atom OS



Motor Controls Menu on Atom OS



Metering Menu on Atom OS