American Traction Systems

Electric Propulsion Systems and Accessories

Product Catalog

A DRIVING FORCE IN POWER

About American Traction Systems

American Traction Systems has been providing power conversion solutions to a variety of industries since our inception in 2008. We expanded the technology developed for underground mining vehicles by our sister company, Saminco International (established in 1992), and applied it to above ground applications where we have continued to develop our product lines to new industries and services. We received the SIL2 Certificate of Assessment for the EN50128:2011 standards for our locomotive propulsion software. We have also received certificates from ABS, Lloyds of London, and the U. S. Coast Guard. For Rapid Transit Systems, we have successfully passed electromagnetic compatibility testing for Radiated Interference, Inductive Interference, Conductive Interference, and CAB Signal Interference.

We specialize in the design and manufacture of high power AC, DC, Permanent Magnet, and Induction Motor Control products primarily for traction and propulsion applications. Our solid state electric vehicle traction controllers are powered by batteries, diesel-electric, generators, fuel cells or power centers for passenger vessels, on and off road electric vehicles, locomotives, fuel cell buses and automobiles, hybrid trucks and buses, as well as streetcars, airline ground support vehicles, and electric powered vehicles of all types.

We are dedicated to providing our customers with exceptional products and services designed to the highest standards of quality, through a unique blend of high caliber engineers and technicians, a sound understanding of basic engineering principles, and an ability to develop innovative solutions. We have the flexibility to design custom solutions by working directly with our customers to determine their exact needs.

While standard manufacturing is our mainstay, constant research and development keeps ATS at the forefront. We are based in Fort Myers, FL with on-premise departments including board design, software and hardware engineering design, CAD, manufacturing, panel wiring, testing and quality control. We are able to conceptualize and complete projects entirely in-house with more than 1MVA of available power for full load testing of all products. Installation, commissioning, and training services are also available.

Our customers span the globe from North and South America, to Europe, Africa, Asia, and Australia. We have factory trained technicians in North America, Europe, South Africa and Asia.

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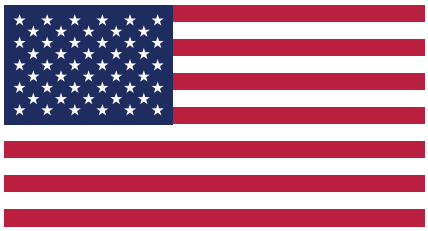


American Traction Systems
American Owned • American Made

Since 2008

A few of our accomplishments:

1997 (as Saminco International)
Ballard / XCELLSiS Phase 1-5 Bus Program
Hydrogen Fuel Cell Bus
650V DC 350kW VFD system

2008
New Orleans Streetcars
64 Dual 90 kW DC Propulsion Systems

2008
Alcatraz Hybrid Passenger Ferry
Dual 300 kW AC Propulsion Hybrid System
1st North American Hybrid Passenger Ferry

2009
Brookville Co-Gen Locomotives
1.5 MW DC Propulsion Systems

2010
Loram RG400 series MoW Grinder
1.5 MW DC Propulsion Systems

2010
Norfolk Southern 999 Locomotive
500 kW DC Propulsion Battery System

2012
Baltimore Metro
DC to AC Mini-VFD Inverter for
Traction Motor Blowers

2012
Alcatraz Clipper Passenger Ferry
Dual 700 kW AC Propulsion Hybrid System
Battery Chargers
Auxiliary Power Supplies

2013
Deutsche Bahn (Loram Rail Grinder)
1st AC Traction System commissioned

2014
Buckeye Bullet 1 - 3
Quad 385 kW Permanent Magnet System
271 mph Battery EV

2015
Miami Dade Transit Authority
DC to AC Mini-VFD Inverter for Traction
Motor Blowers

2016
Network Rail (Loram Rail Grinder), UK
EN50128 SIL2 certified AC Traction
MOW System
Our 150th System

2017
El Paso- Camino Real Regional Transit
PCC Streetcar Propulsion
and Brake Converters

2017
Los Angeles Metro
DC to AC Traction Motor Blower Inverter

2018
Gees Bend Ferry, Alabama
1st All-electric Passenger Ferry in the US
Battery Chargers, Propulsion and
Power Distribution

2018
Niagara Frontier Transportation Authority
Air Compressor Inverter Unit

2019
MBTA - Boston Streetcar
PCC Streetcar Propulsion and
Brake Converters

2020
Galveston Island Trolley
Diesel Electric Streetcar

2021
New Jersey Transit
Auxiliary Power Converters
Traction Rectifier

2021
Loram RGS Series MoW Grinder, Australia
AC Traction System for Dual AC motors

Typical ATS Locomotive Propulsion Systems

Battery Locomotive DC Traction System
- Armature Choppers
- Compressor and Blower Inverters
- On-Board 125kW Battery Charger
- Wayside 400kW (800kW) Battery Charger

Conventional Main Line AC Traction Locomotive
- Traction Inverters
- Generator Excitation Controller
- Compressor and Blower Inverters
- Six Axle 3500HP Tractive Effort

AC Traction Rail Grinder
- AC Traction Inverters
  - SIL2 Compliant
  - EN45545 Compliant Power Modules
  - Single or Dual Traction Lockers

Dual Genset Switching DC Traction Locomotive
- Armature Controllers
- Separately Excited Field Controller
- Common DC Bus

Triple Genset DC Traction Locomotive
- Armature Controllers
- Field Controller
- Dynamic Brake Controller
- Compressor and Blower Inverters
- Generator Controllers

Single Genset DC Traction Rail Grinder
- Armature Controllers
- Fast Field Reversal
- DC Bus Rectifiers

ATS Locomotive Propulsion Systems and Products

American Traction Systems designs and manufactures high efficiency locomotive propulsion systems and accessories for new or remanufactured locomotives using AC or DC Traction Motors, with more than 300 locomotive propulsion systems in operation since 2008.

We offer solutions for new or refurbished switching, short and mainline freight or passenger service locomotives, and specialize in IGBT based chopper and inverter drives operating off of a common DC bus. ATS propulsion systems will operate from main alternators, induction generators, gensets and batteries. All ATS drives use a common power module with an application specific control module. Power modules are interchangeable. Train protection up to SIL2 is available.

ATS drives are running the rails in the United States, Africa, Canada, South America, Australia and Europe.

ATS Manufactured Components

Propulsion Modules
- 1,600A Continuous Output Current (DC Motors)
- 1,100A Continuous Output Current (AC Motors)
- "Fast Field" Reversing Field Controllers
- Automatic Anti-Wheel Slip Control
- Motor Over Load Protection
- Wheel Diameter Monitoring and Calibration

Generator Excitation Controller
- <150A at full Voltage (Main Generator)
- 80VAC at idle for Companion Alternator

Induction Generator Module
- Output 750VDC at any engine speed
- 800A Continuous Output Current
- Bi-directional for Engine Starting

Dynamic Brake Module
- 2800A Brake Current

Rectifiers
- Up to 4,500 Amps

Auxiliary Inverters
- Radiator Fans
- Cooling Pumps
- Air Compressors
- Traction Motor Blowers

Battery Charger
- 24VDC, 37VDC and 74VDC output up to 200A

Safety Features
- SIL2 (Safety Integrity Level) Certification Available
- EN45545 Flammability Certification Available

Complete Traction Lockers
- Turnkey AC or DC Traction Lockers
- Auxiliary Inverters
- Battery Chargers
- Dynamic Brake Controllers
- Generator Excitation Controllers
- Axle Generators

AC Traction Products
- Inverters

Propulsion Rack Assemblies

Fully built and tested
Ready to be wired into the locomotive
Assembles include:
- Frame
- Cooling Hoses
- Cooling Manifolds
- Back-plane Assembly
- Miscellaneous Hardware

DC Traction Products
- Armature Choppers
- Field Controllers

ATS AC Propulsion System Description

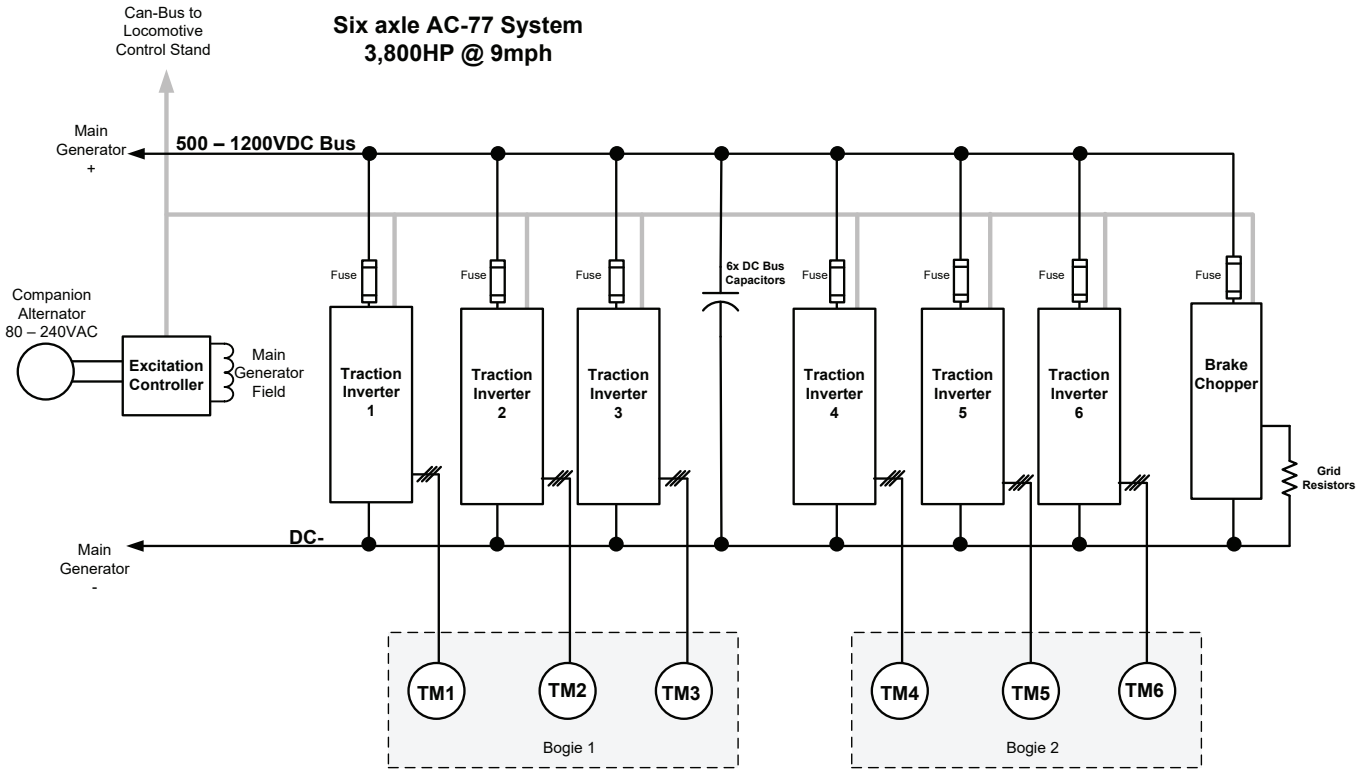
The American Traction Systems locomotive control system performs all of the functions of traction power control and dynamic braking in diesel-electric locomotives with up to six axles powered by AC induction motors. The operating voltage of the system is up to 1250VDC which allows the use of typical prime movers and main generators with minimal change. Individual control of the currents in each AC motor by IGBT inverters provides the benefits of excellent traction control, wheel spin and slide correction, and smooth dynamic brake control at all speeds. These benefits have particular value for maximizing the train weight that can be handled by low-speed switching and general-purpose locomotives.

The control algorithms implemented in the power semiconductor converters interact with each other and perform all of the functions that require rapid response to varying conditions. This allows very simple interfacing with the remainder of the locomotive power management system or PLC. The electrical control system responds to changes in traction demand and dynamic brake demand very quickly and is capable of loading the system to full power in less than five seconds. This is considerably faster than the speed response of typical turbocharged engines, however, appropriate modulation of a single control signal by the power management system is all that is necessary to schedule the loading at a rate consistent with the engine characteristics and to take corrective action in the event of excessive engine load.

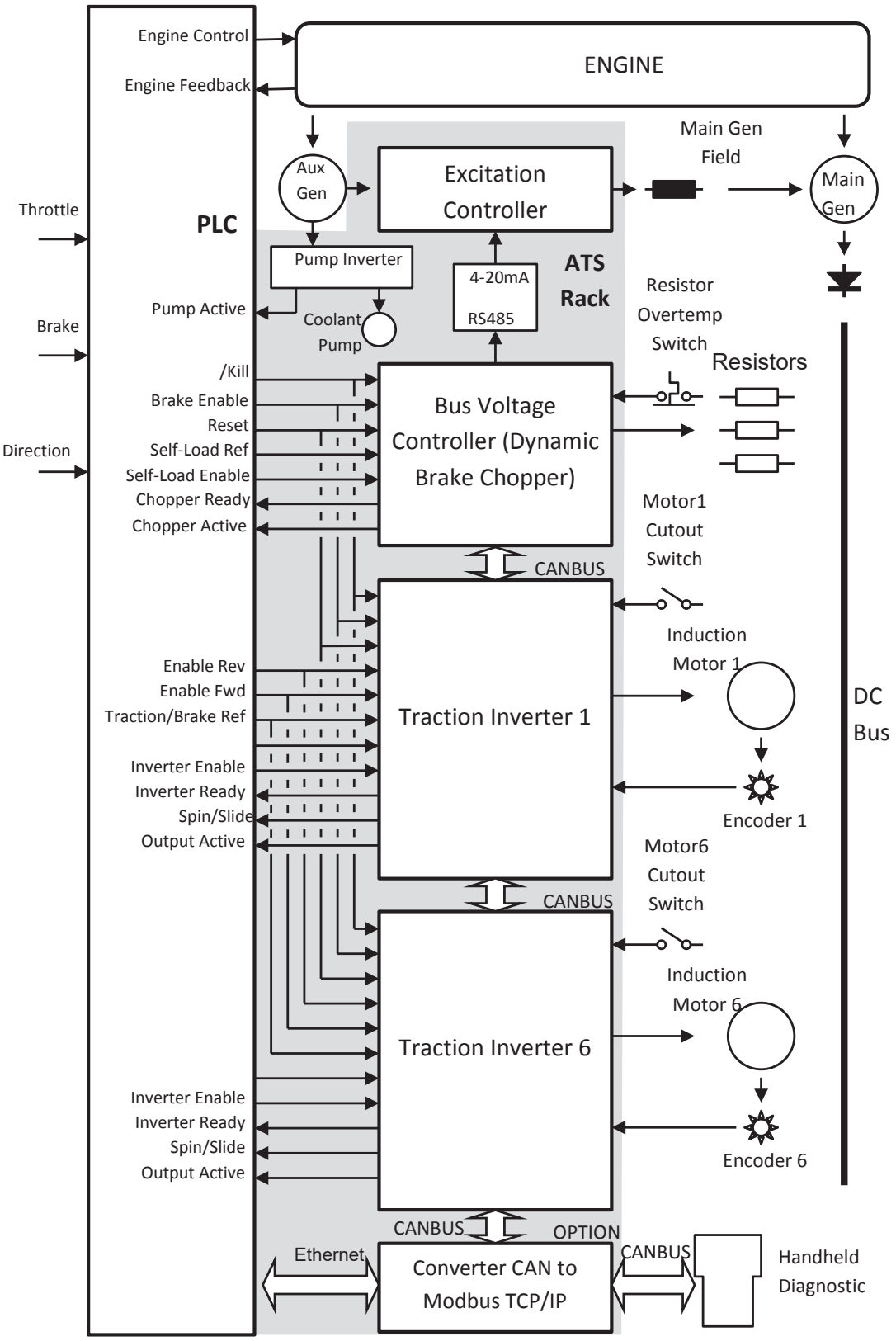
The power schematic shows a typical arrangement of the ATS power converter rack in relation to the main generator and traction motors. Elimination of all high-power mechanical switchgear reduces the amount of cabling and simplifies maintenance.

The control system architecture block diagram on the next page shows the main signal flow paths. For simplicity, interlocks and protective functions are omitted from this diagram. Many of the control signal paths are implemented using CAN communication between modules. This is also used for diagnostics and parameter adjustment and can be extended to system monitoring.

AC Propulsion Power Schematic



AC Control System Architecture



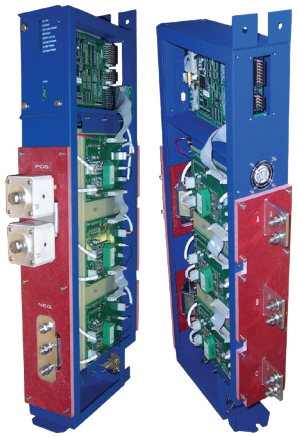
Locomotive Propulsion Modules

Power Conversion Equipment

The ATS power conversion equipment is based upon a set of compact liquid-cooled Insulated Gate Bipolar Transistor (IGBT) modules operating from a common DC bus. The modules are designed to fit the entire propulsion system into extremely tight quarters. Modules are sold individually, or an entire system can be mounted and wired on racks or in lockers at our factory. Over 1,200 modules are in daily operation in Marine, Locomotive, Off-road, and Military applications.

The same power module is used for DC to DC Choppers or DC to AC Inverters. The function of the power module is determined by the application-specific control module installed into the power module.

All modules are bi-directional. They can absorb power from or deliver power to the DC bus.



ATS Power Module (front and back with side panel removed)

Module Descriptions

A300641 Armature Module (Series Field) and A300791 Armature Module (Separate Field)

ATS armature modules are used to control the armature of a DC traction motor. They also receive speed feedback from the axle that it is driving and continuously compares the measure axle speed with a reference input derived from a non-driven axle. To see more on wheel slip control, see page 13.

- Series Field armatures are used for locomotives that require only slow speeds such as switching locomotives.
- Separate Field armatures allow for faster speeds as required by freight locomotives.

A300677 Field Controller and A310106 Bi-Directional Field Controller

The field controller regulates the current in the field winding of a separately-excited DC motor. The bi-directional field controller achieves fully-electronic bi-directional control of current to the field eliminating reversing contactors.

Specifications for Armature Modules and Field Controllers

Part Number	Armature Module Series Field A300641		Armature Module Separate Field A300791		Field Controller A300677		Bi-Directional Field Controller A310106	
	Input	Output	Input	Output	Input	Output	Input	Output
Rated Power @Rated Volts	750kW	747kW	750kW	747kW	152kW	150kW	750kW @ 1000V DC	748kW
Frequency range	DC	DC	DC	DC	DC	DC	DC	DC
Voltage Range**	600 - 750V	0 - Input	600 - 750V DC	0 - Input	600 - 750V	0 - Input	450 - 1150VDC	0 - Input
Amps @ Rated Power	1000A	1000A	1000A	1000A	1000A	1000A	750A	750A
Ambient Operating Temperature Range	-20°C to 60°C		-20°C to 60°C		-20°C to 60°C		-20°C to 60°C	
Coolant Temperature Range	-40°C to 70°C		-40°C to 70°C		-40°C to 70°C		-40°C to 70°C	
Control Supply Voltage	22 to 28V DC		22 to 28V DC		22 to 28V DC		22 to 28V DC	
Control Supply Current	1.5A DC		1.5A DC		1.5A DC		1.5A DC	
Minimum Coolant Flow	3 gal/min (11.25 l/min)		3 gal/min (11.25 l/min)		3 gal/min (11.25 l/min)		3 gal/min (11.25 l/min)	
Maximum Coolant Pressure	50 psig (3.5 bar)		50 psig (3.5 bar)		50 psig (3.5 bar)		50 psig (3.5 bar)	

***Other voltages are available. Contact ATS representative for more information.**

Locomotive Propulsion Modules

A300693 Dual DC/AC Inverter

This module is a liquid-cooled power semiconductor converter module suitable for use as a component of a traction electric propulsion system. It may be used for:

- Induction motor drive for main traction
- On-board 3-phase AC power for auxiliary power units
- Rectification of 3-phase AC power from AC generator to supply the common DC Bus

Dual DC/AC Inverter Module

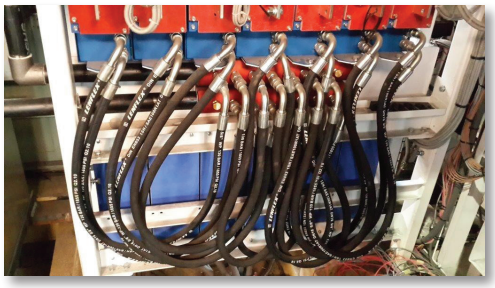
A300640 Traction Inverter and A300635 Brake Chopper Module

These modules are power converters designed to operate over a DC bus voltage range of 500V to 800V. They are used as components of a power conversion system consisting of several modules sharing a common DC bus filter capacitor.

- The **A300640 Traction Inverter Module** can be used to control an AC traction motor, and it can also operate very effectively as a dynamic brake down to very low speeds.
- The **A300635 Dynamic Brake Chopper** is used to control the delivery of power to the dynamic brake resistors. The resistor currents are controlled so as to limit the voltage rise of the DC bus when power is being absorbed from the traction motors.

Typical Module Dimensions	
Height	864mm (34”)
Width	127mm (5”)
Depth	447mm (17.6”)
Weight	46.7kg (103 lbs)

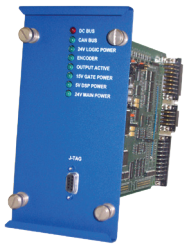
Modules are liquid-cooled using cooling hoses and manifolds.



Specifications for Inverters and Brake Choppers

Part Number	Dual Inverter A300693		Traction Inverter A300640		Brake Chopper A300635	
	Input	Output	Input	Output	Input	Output
Rated Power @Rated Volts	302kW @ 650V	2x149kW (2 x 200HP)	480kW	480kW	1500kW	1495kW
Frequency range	DC	0 - 120Hz	DC	0 - 170Hz	DC	DC
Voltage Range**	360 - 750VDC	0 - 0.7 x DC INPUT	500 - 800V	0 - 480V	600 - 750V	0 - Input
Amps @ Rated Power	465A DC	2 x 300A	600A	600A	2000A	2 x 1000A
Ambient Operating Temperature Range	-25°C to 50°C		-20°C to 60°C		-20°C to 60°C	
Coolant Temperature Range	Dew point to 65°C		-40°C to 70°C		-40°C to 70°C	
Control Supply Voltage	22 to 28V DC		22 to 28V DC		22 to 28V DC	
Control Supply Current	1.5A DC		1.5A DC		1.5A DC	
Minimum Coolant Flow	3 gal/min (11.25 l/min)		4 gal/min (11.25 l/min)		3 gal/min (11.25 l/min)	
Maximum Coolant Pressure	50 psig (3.5 bar)		50 psig (3.5 bar)		50 psig (3.5 bar)	

***Other voltages are available. Contact ATS representative for more information.**



ATS Control Card Assembly

Locomotive Propulsion Modules

A300660 Rectifier Module for Genset Locomotives
This module converts 460V 3-phase AC power to 650V DC power by delivering pulses of current into the DC bus capacitors.

A300691 Dual Buck / Boost Chopper for Hybrid / Battery Locomotives
This is a liquid-cooled power semiconductor converter module suitable for use as a component of a hybrid/ battery electric propulsion system. It may be used for interfacing energy storage batteries to a constant-voltage DC bus.

Specifications				
Part Number	Rectifier Module A300660		Dual Buck / Boost Controller A300691	
	Input	Output	Input	Output
Rated Power @Rated Volts	964kW	960kW	400kW @ 650V	2 x 200kW @ 500V
Frequency range	60Hz	DC	DC	DC
Voltage Range	380 - 525V	640V	360 - 650V DC	360 - 650V DC
Amps @ Rated Power	1388	1500A	615A	2 x 400A
Ambient Operating Temperature Range	-20°C to 60°C		-25°C to 50°C	
Coolant Temperature Range	-40°C to 70°C		Dew point to 65°C	
Control Supply Voltage	22 to 28V DC		22 to 28V DC	
Control Supply Current	1.5A DC		1.5A DC	
Minimum Coolant Flow	3 gal/min (11.25 l/min)		4 gal/min (11.25 l/min)	
Maximum Coolant Pressure	50 psig (3.5 bar)		50 psig (3.5 bar)	

Dual Buck / Boost Controller

Main Generator Excitation Controller

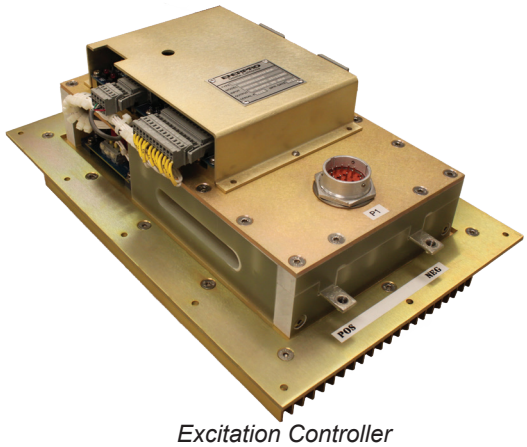
For Conventional Locomotives

ATS System Part # *A310109*
(See your Sales Rep for specific ordering information)

The Rectifier/Excitation Controller Module controls the field excitation current of the main generator to maintain the DC bus voltage and current required to maintain the requested tractive effort. The rectifier module consists of a half-controlled SCR / Diode bridge for the purpose of limiting the charging current drawn by the bus capacitors during power up.

Specifications	
Part Number	Excitation Controller A310400
Input	90 - 240V AC
Output	0 - 80A
Frequency In	47 - 120Hz
Frequency Out	DC
Dimensions	
Height	195mm (7.6")
Width	305mm (12")
Depth	457mm (18")

Excitation Interface Module
ATS Part # A310401



Excitation Controller
ATS Part # A310400

Dynamic Brake Chopper Modules

ATS Part # Various

Applications

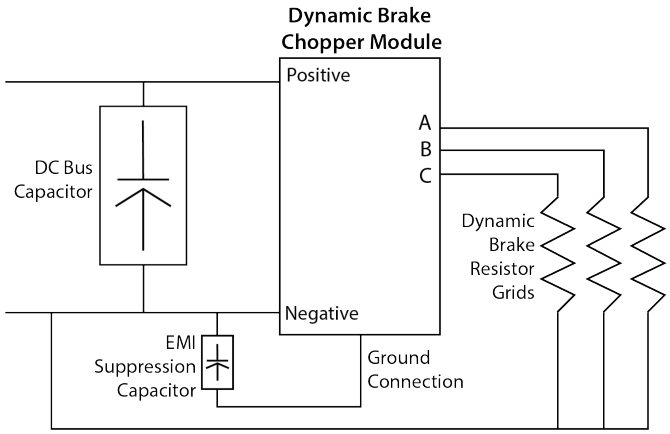
- Light Rail
- Streetcar
- Monorail

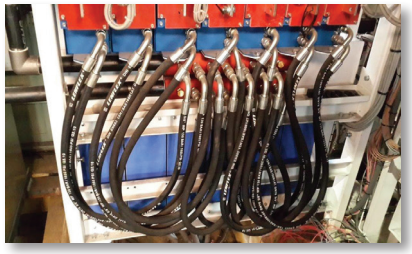
Features

The brake module is a power converter designed to operate over a DC bus. Voltage ranges vary depending on brake module. It is a component of a power conversion system consisting of several modules sharing a common DC bus filter capacitor.

- The **A300635 Dynamic Brake Chopper** operates over a voltage range of 500V to 800V DC and is used to control the delivery of power to the dynamic brake resistors. The resistor currents are controlled so as to limit the voltage rise of the DC bus when power is being absorbed from the traction motors.
- The **A300826 Brake Chopper** can be stacked (two brake choppers and one capacitor bank) in an assembly rack and is used to limit bus voltage to 800V within a vehicle. One module will act as the leader and the other as a follower.
- The **A310107 Brake Chopper** module operates over a voltage range of 500V to 1200V DC.

Typical power connections for the Dynamic Brake Chopper grid.



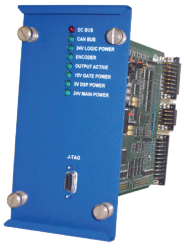


Modules are liquid-cooled using cooling hoses and manifolds.

Specifications for the Dynamic Brake Chopper				
Part Number	Dynamic Brake Chopper A300635		Stackable Brake Chopper A300826	
	Input	Output	Input	Output
Rated Power @Rated Volts	1500kW	1495kW	750kW @750V	746kW
Frequency Range	DC	DC	DC	DC
Voltage Range**	600 - 750V	0 - Input	600 - 750V	0 - Input
Amps @ Rated Power	2000A	2 x 1000A	1000A	3 x 333A
Ambient Operating Temperature Range	-20°C to 60°C		-20°C to 50°C	
Coolant Temperature Range	-40°C to 70°C		-40°C to 70°C	
Control Supply Voltage	22 to 28V DC		22 to 28V DC	
Control Supply Current	1.5A DC		1.5A DC	
Minimum Coolant Flow	3 gal/min (11.25 l/min)		3 gal/min (11.25 l/min)	
Maximum Coolant Pressure	50 psig (3.5 bar)		50 psig (3.5 bar)	

Other voltages are available. Contact ATS representative for more information.

Typical Module Dimensions	
Height	864mm (34”)
Width	127mm (5”)
Depth	447mm (17.6”)
Weight	46.7kg (103 lbs)



ATS Control Card Assembly

Locomotive Power Conversion Modules

A300845 Dual Supply/ Charge

This module is a dual drive module consisting of a 3-phase inverter and a 3-phase to DC battery charger with each having a capacity of 250kVA. The AC supply inverter is used to provide on-board utility power at 60 Hz. (default). The battery charger converts either AC or DC voltage inputs to a DC voltage output that charges batteries. The input current and output voltage are regulated with programmable limits that may vary when CAN Control is selected. Subject to the capacity of the land supply connection, up to 150kW can be consumed from the DC bus for the purpose of battery charging, engine starting or operation of the propulsion motors at low power.

Applications

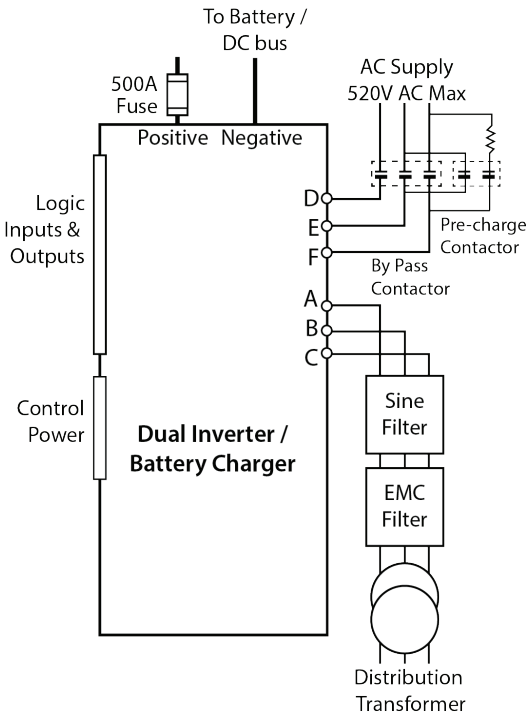
- Hybrid Systems
- Battery Systems

A300691 Dual Buck / Boost Chopper for Hybrid / Battery Systems

This is a liquid-cooled power semiconductor converter module suitable for use as a component of a hybrid/battery electric propulsion system. It may be used for interfacing energy storage batteries to a constant voltage DC bus.

Protection Scheme

The module uses current, voltage, and temperature sensors along with analog and digital circuitry to protect itself with various hardware and software faults and warnings.



Dual Buck / Boost Module

Specifications				
Part Number	Supply/ Charger Dual Module A300845		Dual Buck / Boost Controller A300691	
	Input	Output	Input	Output
Rated Power @Rated Volts	456kW	2x 225kW @ 0.8pf	400kW @ 650V	2 x 200kW @ 500V
Frequency range	DC	1x 60Hz / 1x 0 - 60Hz	DC	DC
Voltage Range	700 - 750V	2x 440 - 480VAC	360 - 650V DC	360 - 650V DC
Amps @ Rated Power	650A	2x 353A rms 3ph	615A	2 x 400A
Ambient Operating Temperature Range	-20°C to 60°C		-25°C to 50°C	
Coolant Temperature Range	-40°C to 70°C		Dew point to 65°C	
Control Supply Voltage	22 to 28V DC		22 to 28V DC	
Control Supply Current	1.5A DC		1.5A DC	
Minimum Coolant Flow	4 gal/min (15 l/min)		4 gal/min (15 l/min)	
Maximum Coolant Pressure	50 psig (3.5 bar)		50 psig (3.5 bar)	

Typical Module Dimensions	
Height	864mm (34”)
Width	127mm (5”)
Depth	447mm (17.6”)
Weight	46.7kg (103 lbs)

Independent Axel Wheel Slip Control

While wheel slip control is essential in any traction application, it is even more critical in rail-bound vehicles. Caused by a variety of reasons, a wheel slip event would see one or more wheels exceed the adhesion limit between the wheel and the ground (the rail in the case of a locomotive). When this occurs, the wheel's rotational speed starts increasing quickly even though its rotation does not translate into linear movement of the vehicle. In rail applications, excessive and/or repetitive wheel slip can cause wheel and rail damage while reducing the maximum tractive effort. Furthermore, wheel slip can cause motor damage in applications with electric traction.

ATS traction drives utilize state-of-the-art traction motor control algorithms to actively monitor and minimize wheel slip. For this purpose, a speed sensor is fitted to each motored axle. Each motor controller receives an input from its axle speed sensor and calculates the actual speed of the motor. The controller reports the motor speed by a CAN data message that is visible to all other modules on the CAN network. Each controller looks at speed data in the CAN messages as well as its own speed and makes the proper adjustments to determine the lowest axle speed, called the speed reference.

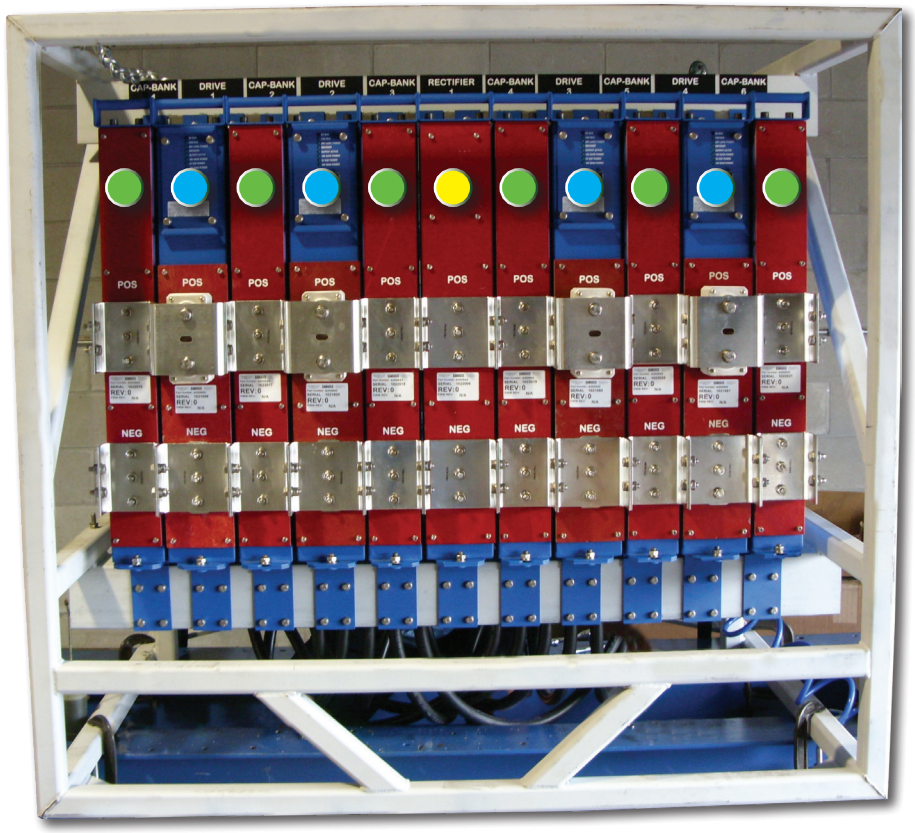
Under normal operation, all motors will be running at a speed slightly below the speed reference. The speed loop will try to drive the axle to the slightly higher speed but current is limited to match the throttle demand. If a wheel slips, its speed will increase to a value higher than the speed reference. As soon as the wheel speed exceeds the speed reference, a speed loop overrides the throttle demand and cuts back the current. The wheel reaches a stable speed value and when adhesion is restored, the tractive effort is again limited by the throttle and the wheel slows down.

Custom Configured and Modular Designed

ATS has the ability to create a custom power system to fit a customer's specific needs as all parts are modular and designed to fit neatly together. Our racks and lockers are designed with a unique hinge that allows each module to swing down for maintenance or replacement. Below is a rack assembly for a typical four axle Genset switching locomotive.

Typical Four Axle Genset Switching Locomotive Rack Assembly

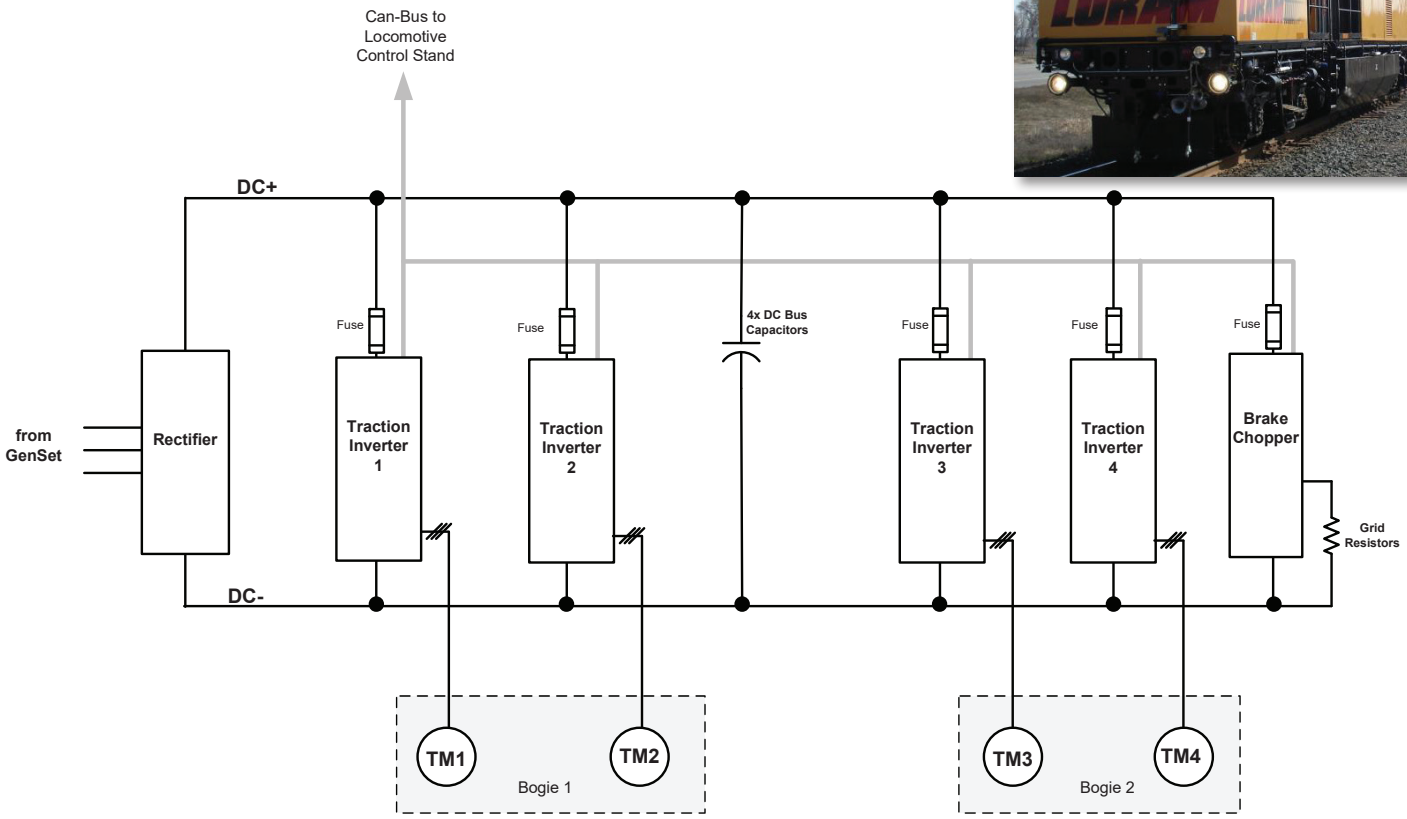
- Traction Modules
- Rectifier
- Capacitors



AC Traction Locomotive System - Typical Application

MOW | Genset

Loram AC Traction Rail Grinder

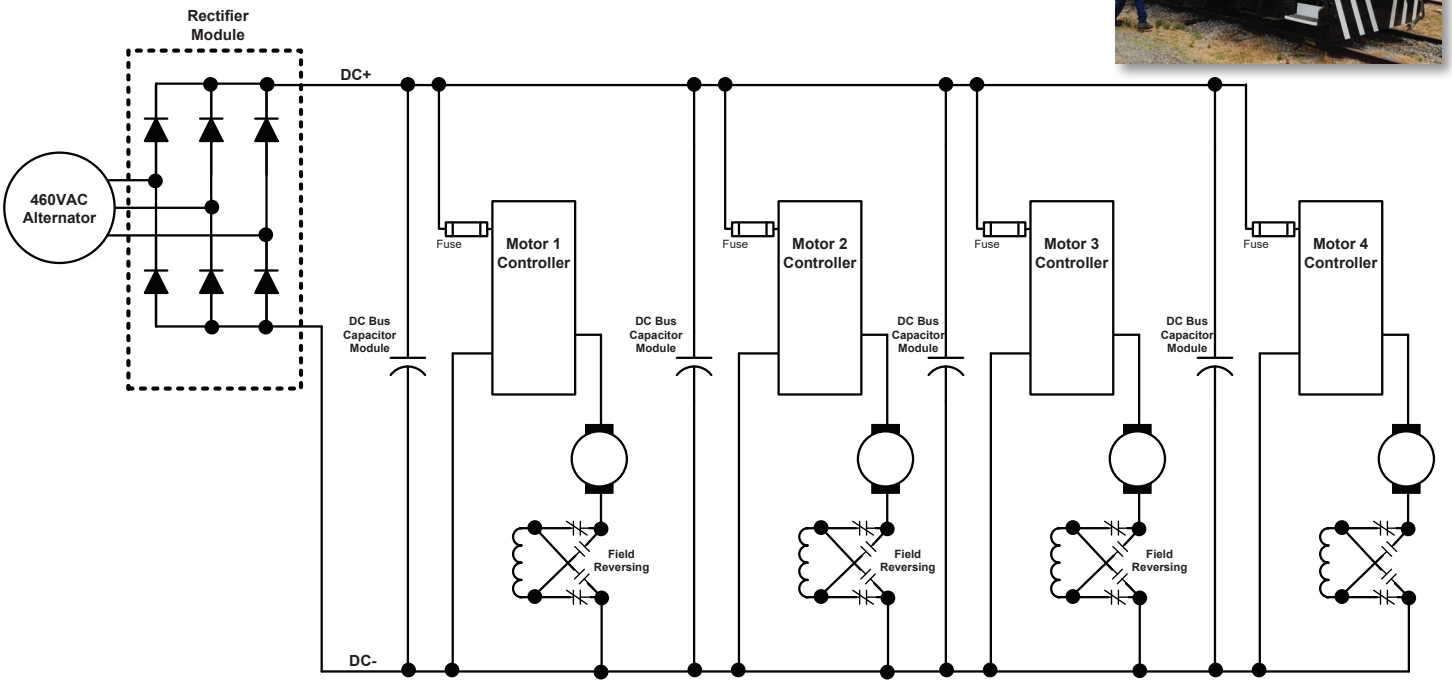


Traction Lockers contain complete set of inverters, rectifiers, capacitors, controls system and more. All panel wiring done in house.

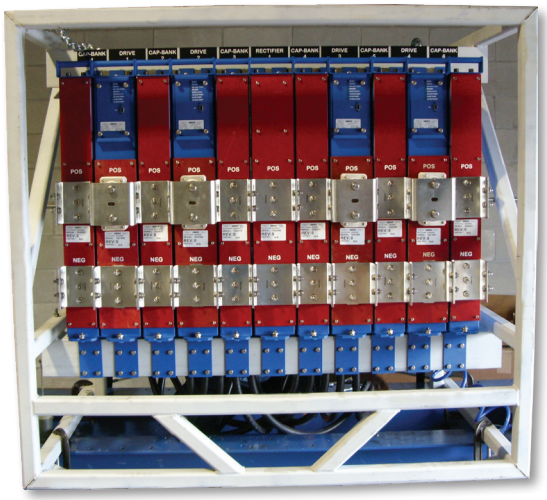
Common DC Bus Genset Locomotive - Typical Application

4 x D78 Traction Motor Locomotive System

Railserve LEAF locomotive for Duke Power



Complete system with inverters, rectifiers, capacitor banks, bus bars and more. In-house panel wiring on custom fitted, drop-in rack.



Railserve LEAF Switching Locomotive

DC Traction Systems

ATS Part # Various
(See your Sales Rep for specific ordering information)

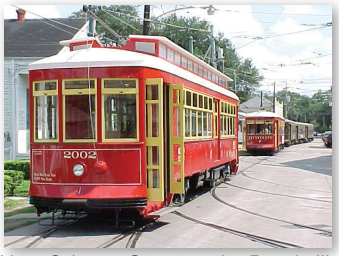
Dual or single motor systems designed specifically for the unique needs of Streetcar and Trolley Bus systems.

Applications

- Streetcars
- Trolley
- Light Rail

Features

- Dual or single motor systems
- Complete, compact system
- Solid state reversing
- 300A dynamic brake controller
- 1000V 1250A DC rated contactor
- Forced air cooling
- Modular design
- Common and differential mode EMI filter
- High efficiency power conversion
- Safety circuits for maximum protection of personnel and components
- External drive display for ease of monitoring and troubleshooting
- Power semiconductors used wherever possible to replace electro-mechanical switchgear
- Step-less acceleration and braking
- Selectable dynamic braking or line regenerative braking blended with dynamic braking
- Wheel slip and slide detection
- CAN-bus control and diagnostics



New Orleans Streetcar by Brookville

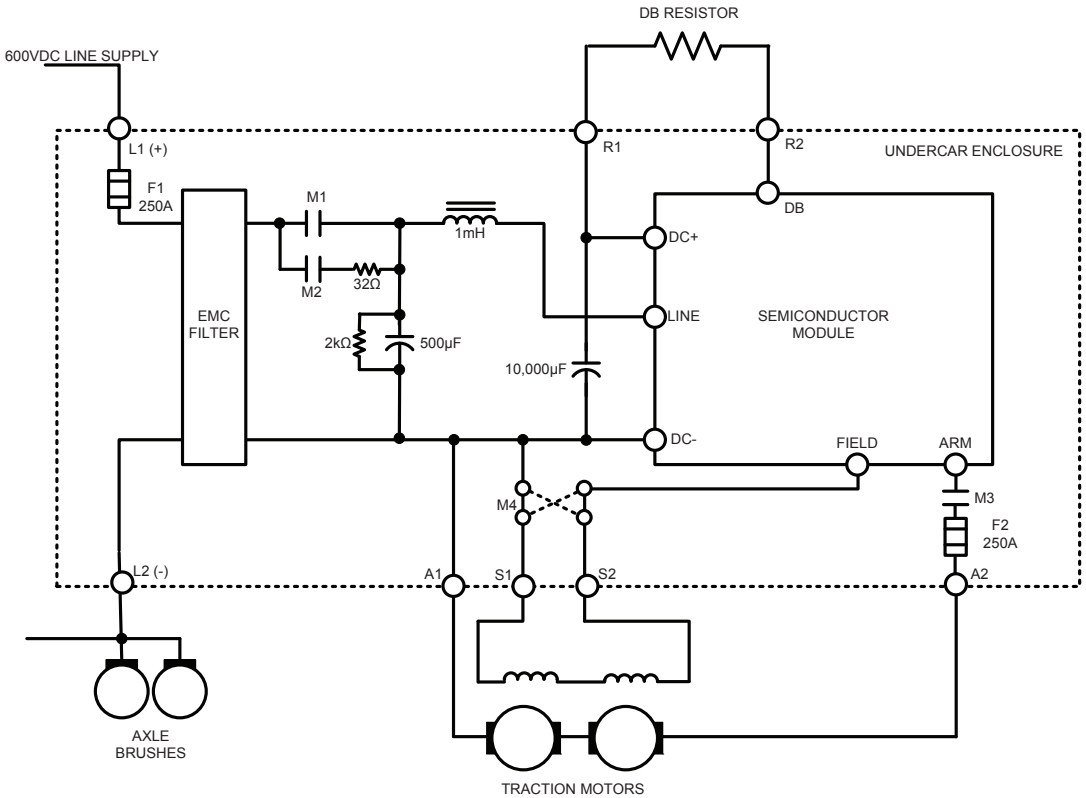

Taiwan Trolley by Gomaco


El Paso Streetcar by Brookville


Galveston Trolley by Gomaco


Boston Streetcar by Brookville

Example diagram of typical streetcar system.



DC Traction Systems

Enclosure

Designed for an under mount installation on the vehicle, enclosure has easy access via pull out tray to all drive hardware.

System for operating two series field DC motors, using the PCC Gen II chopper drives.

Dimensions *(all are approximate as enclosures may vary depending upon system)*		
System Description	Dual Operating System	Quad Operating System
Height	48 cm (19”)	61 cm (24”)
Length	137 cm (54”)	251 cm (99”)
Depth	65 cm (26”)	74 cm (29”)
Weight	272 kg (600 lbs.)	544 kg (1200 lbs.)

Quad motor traction system for series field DC motors, using the DC/DC 75kW drive stacked with a 4,600µF DC capacitor.

Electrical Specifications				
System Description	Rated Power @ Rated Volts	Frequency Range	Voltage Range	Amps @ Rated Power
Quad DC Motors at 25HP each	*Input:* 80kW @ 480V AC *Output: (*4x) 19kW @ 600V	*Input:* 50 / 60 Hz *Output:* DC	*Input:* 432 - 528VAC *Output:* 0 - Input	*Input:* 167A *Output: (*4x) 32A
Dual DC Motors at 45HP each	*Input:* 70kW @ 600V DC *Output: (*2x) 34kW @ 600V	DC	*Input:* 400 - 925VDC *Output:* 0 - Input	*Input:* 117A @ 34kW *Output: (*2x) 56A @ 34kW
Dual DC Motors at 60HP each	*Input:* 90kW @ 600V *Output:* 87.5kW	DC	*Input:* 350 - 750V *Output:* 0 - Input	*Input:* 150A *Output:* 175A
Dual DC Motors at 60HP each OR single 120HP DC motor	*Input:* 114kW @ 650V DC *Output:* 90kW @ 500V DC	DC	*Input:* 420 - 720V DC *Output:* 0 - Input	*Input:* 175A *Output:* 175A

Environmental Specifications	
Vibration	3g 10Hz to 500hz, meets IEC61373
Shock	50g ½-sine wave, 10ms, meets IEC61373
Ingress Protection Level	NEMA 12
Ambient Operating Temperature Range	-20°C to +50°C
Cooling Type	Forced air (fan)
Operating Altitude	1000 m, De-Rate 1% Power for each additional 100 m
Relative Humidity	>95% non-condensing

Low Voltage Power System (LVPS)

ATS Part # A520016

6.5kW Low Voltage Power Supply

Applications

- Light Rail
- Streetcar
- Monorail

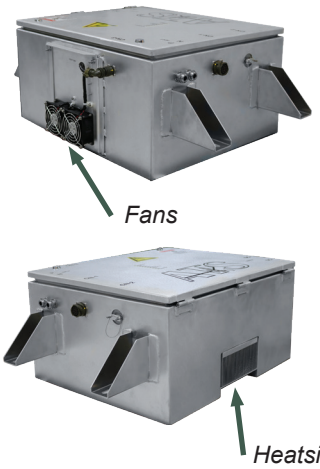
Features

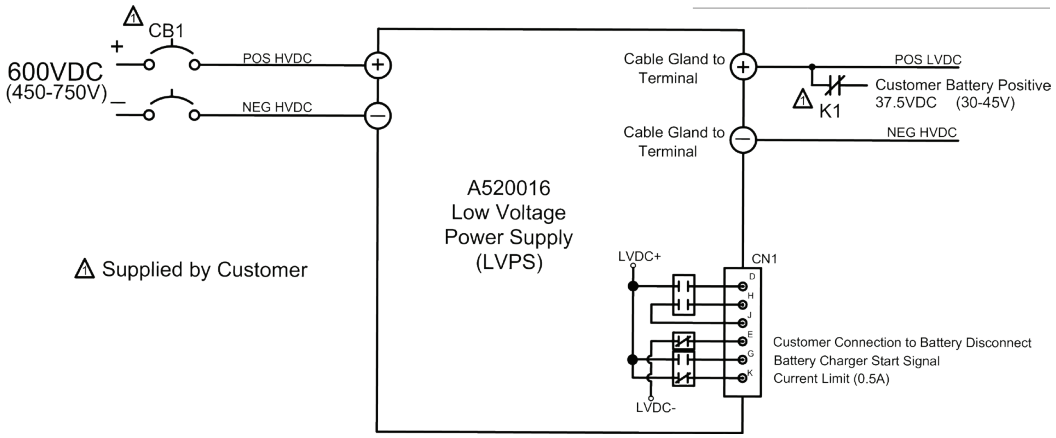
- 38V DC power supply (Factory adjustable for other voltages)
- Provides low voltage DC output (LVDC) from high voltage DC (HVDC)
- IP65 enclosure
- Encapsulated transformer and single encapsulated inductor to improve resistance to shock and vibration
- CANBus communication
- Complies with IEC 1287-1: 1995 Figure 4 curve 2.

The A520016 LVPS is a DC/DC Constant Voltage/Constant Current 38 VDC nominal, 173 A continuous power supply operating from a nominal 600 VDC supply. The LVPS is self-powered from HVDC but can utilize control power from LVDC when present. As a further backup, if HVDC drops out, the LVPS has a built-in capability for the battery system to supply power to the LVPS to sustain CAN communications and display indicator lights.

Dimensions	
Height	498mm (19.6”)
Width	820mm (32.3“)
Depth	286mm (11.3”)
Weight	47.2kg (104 lbs)

Cooling: Air is pulled across heat sink by fans located on side of unit.





Specifications		***Contact Sales Rep for additional voltages.*
	Input	Output
Rated Power @ Rated Volts	7.1kW @ 600V DC	6.6kW @ 38V DC
Frequency Range	DC	DC
Voltage Range	450 - 750V DC**	38V DC**
Amps @ Rated Power	11.8A @ 7.1kW	173A @ 6.6kW
Short-time Output current	225A for 3.5 minutes	
Ambient / Operating Temperature Range	-20°C to 50°C	
Control Supply Voltage	HVDC or 38V DC	
Control Supply Current	<0.1A for HVDC or <2A @ 37.5V DC	

Regenerative Protection Module

ATS Part # Various

Applications

- Light Rail
- Streetcar
- Monorail

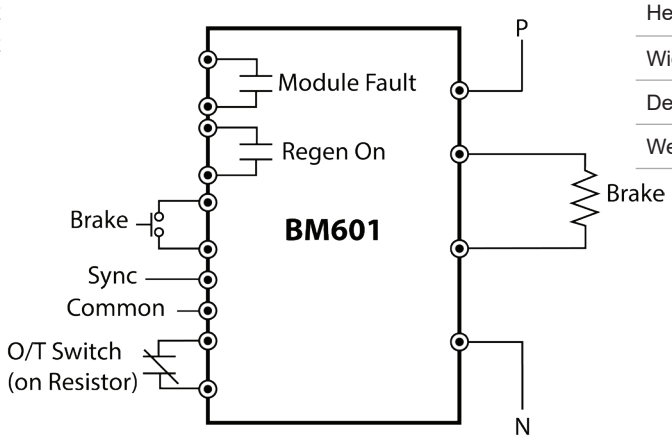
Description

The ATS Regen Protection Module (sometimes referred to as a brake chopper) can be used with any DC, AC, Permanent Magnet, Switched Reluctance, or other types of motors.

During regenerative braking, the DC bus begins to rise. If the regen voltage rises too high, damage may occur to the supply battery and other equipment tied to the DC bus. The RPM module will turn on at a predefined voltage to protect all equipment on the DC bus.

Features

- Two versions are available, the BM601 absorbs over voltage surges on DC voltage supplies due to regenerative braking of DC or AC propulsion drives — adjustable from 272VDC to 768VDC. The BM301 will absorb over voltages of 200 - 660VDC,
- Capable of dumping up to 600A into braking resistor.
- 10% duty cycle (for example, 6 seconds on, every 60 seconds)
- Contains provision for resistor over temperature protection via resistor OT sensor.
- Compact, single enclosure houses all components, including internal isolated power supply.
- Brake On and Brake Fault output via relay contacts
- Able to sync up to 5 modules with "first triggers all" concept (no master unit required) for a total of 3000A braking current.
- Battery Condition Monitoring feature outputs signal indicating repeated brake cycles, warning the operator to check the battery condition.



Dimensions	
Height	152mm (6")
Width	356mm (14")
Depth	254mm (10")
Weight	5.9kg (13 lbs)

Electrical Specifications	BM301 (Part #A500950)		BM601 (Part #A800993)	
	Input	Output	Input	Output
Rated Power @ Rated Volts	44.6kW @ 600V DC	44.5kW @ 600V DC	120kW @ 750V DC	120kW @ 750V DC
Frequency Range	DC	DC	DC	DC
Voltage Range	200 - 660V DC	0 - Input	256 - 800V	0 - Input
Amps @ Rated Power	62A	146A	200A peak	-
Duty Cycle	10% (e.g. 6 seconds on, every 60 seconds)			

Environmental Specifications	
Description	Specifications
Ambient Operating Temperature	-20°C to +50°C (-4°F to 122°F)
Storage Temperature	-40°C to +65°C (-40°F to 149°F)
Relative Humidity	<90% No condensation
Altitude	3300 feet (1000 meters) - de-rate above 3000 meters

Diode Rectifier

ATS Part # A300478

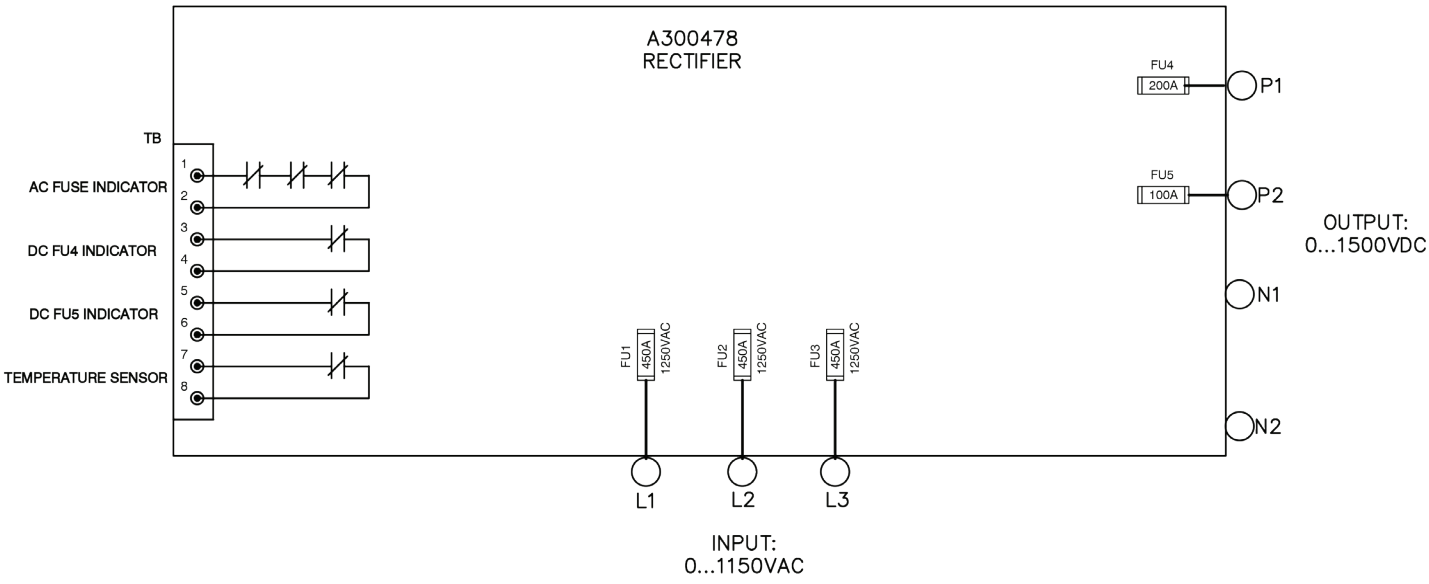
450kW 200A Rectifier

Description

This rectifier can be used with any 3 phase generators that produce 0 - 1150V AC at 450A. The output of the rectifier will vary from 0 - 1500V DC.

Features

- Diodes are isolated from the copper base and can mounted on a single grounded heatsink.
- Simplified mounting arrangements and power cable connections.
- Fuses included in the AC connections.



Electrical Specifications	Input	Output
Power @ Rated Volts	450kW	450kW
Frequency Range	0 - 120 Hz	DC
Voltage Range	0 - 1150V AC	0 - 1500V DC
Amps @ Rated Power	450A AC	300A DC
Environmental Specifications		
Ambient Operating Temperature Range	-20°C to +50° (-4°F to 122°F)	
Recommended airflow for heatsink	450ft /min	
Pollution Degree	2	

Dimensions	
Height	296mm (11.7”)
Width	635mm (25”)
Depth	502.4mm (19.8”)

Locomotive Traction Generator Rectifier

ATS Part # A300485

Description

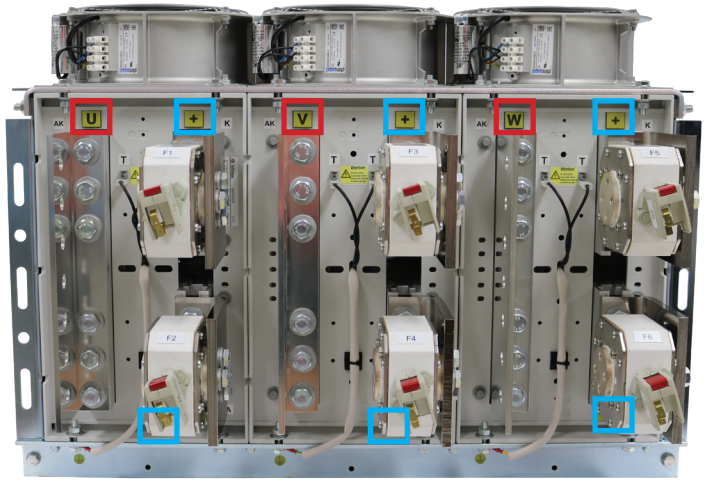
High power three phase rectifier suitable for Tier 4 locomotive traction systems. This is an air-cooled single module design.

Applications

- Rail
- Marine
- Transit

Features

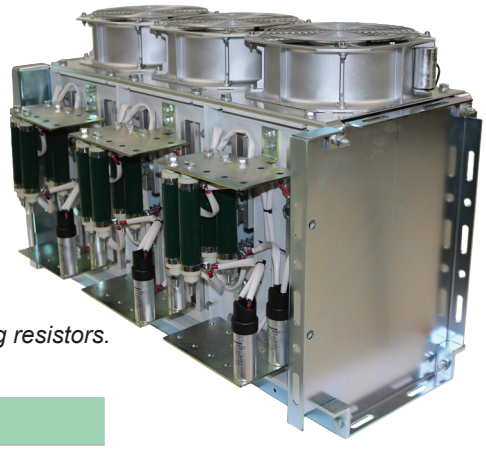
- Compact package
- Blown fuse detection on DC output
- Compatible with all locomotive AC/DC bus systems
- Low maintenance
- High capacity, high overload capability
- Simple installation



Inputs: U-V-W *Outputs: +/-*

(Contact Factory for output bus bar configuration.)

Front showing fuses.



Back showing resistors.

Electrical Specifications	
Input Voltage	278 - 704V AC (Typical)
Input Frequency	30 - 90 Hz
Nominal Output	950V DC @ 3,456A
Output Voltage	375 - 950V DC
Continuous Output Current	3,456A
Environmental Specifications	
Ambient Operating Temperature Range	-25°C to +60° C (-13°F to +140°F)
Recommended Airflow	200 l/s

Conformities and Standards	
Directive 2015/868/EU amending Annex II to Directive 2011/65/EU	RoHS

Dimensions*	
Height	527 mm (21”)
Width	741 mm (29”)
Depth	590 mm (23”)
Weight	100 kg (220 lbs)

Auxiliary Inverters

ATS Part # Various

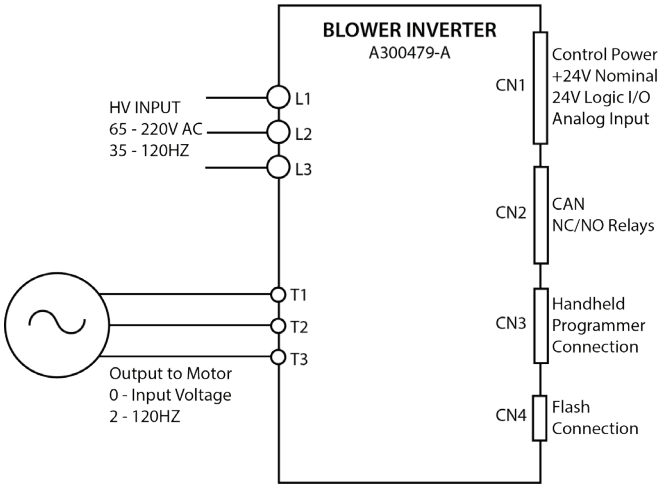
Features

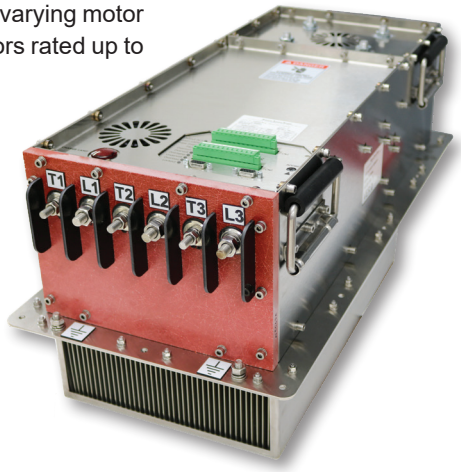
- CANbus Communications
- Multiple Control Modes
- Air-cooled
- Easy to read LED panel

Applications

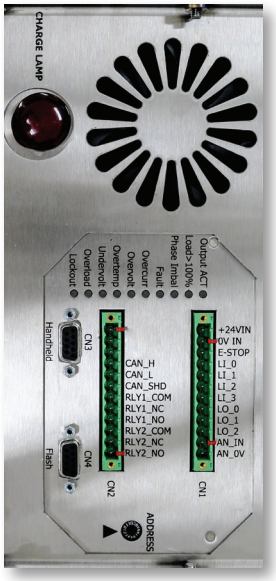
- Light Rail
- Locomotives
- Monorail

This inverter is a variable frequency drive (VFD) that controls AC motor speed and torque by varying motor input voltage and frequency. It can be used for different applications driving 3 phase AC motors rated up to 60HP such as air compressors, blowers, and other AC motors at variable output frequency.





Top panel with fan exhaust, indicator lights and I/O connections



Description	AC/AC 220V AC System	DC/AC 220V AC System
Part Number	A300479-A	A300906
Input Voltage	55 -265V AC	120 - 500V DC
Input Frequency	30 to 120 Hz	DC
Input Choke	0.22mH (150A)	Not Fitted
Input Capacitance	4 x 1100µF (600V DC)	4 x 1100µF (600V DC)
Continuous Output Power	45kW (60.3 HP)	45kW (60.3 HP)
Output Voltage	0...Input Voltage	0...0.7V in
Output Frequency	2...120 Hz	2...120 Hz
Output Current Continuous	150A	150A
Control Power	18...30V DC	18...30V DC
Logic Control Voltage	18...30V DC	18...30V DC
Heatsink Losses at Rated Output	1030W	650W
Heat Rejected to Ambient Air at Rated Output	120W	70W
Ambient Operating Temperature Range	-40°C to +50°C	-40°C to +50°C
Recommended Airflow	175CFM (800LFM) 44Pa	44CFM(200LFM) 7.5Pa
Storage Temperature	-40°C to +75°C	-40°C to +75°C
Relative Humidity	<90% No Condensation	<90% No Condensation
Communication	CAN	CAN

Dimensions	
Height	301mm (11.9”)
Width	321mm (12.6”)
Depth	693mm (27.3”)
Weight	51kg (112 lbs)

Light Rail Air Compressor VFD

ATS Part # A510008

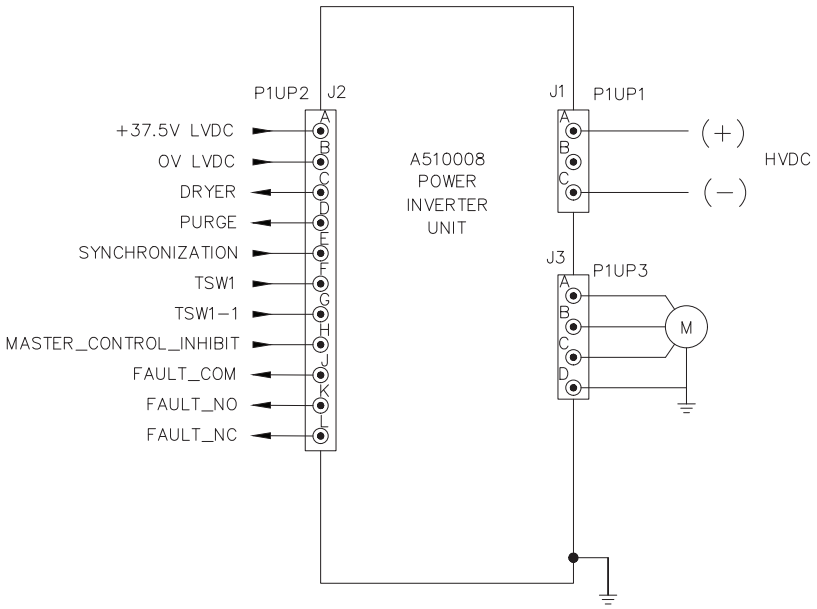
Air Cooled 650VDC | 9kVA | VFD

Applications

- Light Rail

Features

- Controls an induction motor that operates an air compressor used in the air supply unit (ASU) of a light rail vehicle. The ASU supplies air to sub-systems such as friction brakes and car doors.
- Energy efficient V/f soft start of induction motors using PWM technology
- 37.5 VDC digital output signals control Purge Valve and Air Dryer
- Programmable Purge Cycle Scheduling using Real Time Clock to regularly dissipate moisture from the compressor and control of dryer signal used to enable an air dryer.
- Programmable motor and inverter parameters via Handheld Programmer
- Fault Log with date and time stamp
- LED Status Indicator
- Automatic start and lockout features
- Broadcasting of inverter telemetry via CAN



Dimensions	
Height	546mm (20.75”)
Width	396mm (15.6”)
Depth*	255mm (12.4”)
Weight	27.2kg (60 lbs)
*Includes heatsink, not shown	

***Contact Sales Rep for additional voltages.*

Electrical Specifications		
	Input	Output
Rated Power @ Rated Volts	9.1kW @ 650V	8.6kVA @ 380V
Frequency Range	DC	0 - 60 Hz
Voltage Range	500 - 800V**	(0 - 0.7) x V input
Amps @ Rated Power	14A	13A
Ambient [Operating] Temperature Range	-29 [-29]°C to 40 [50]°C	
Control Supply Voltage	37.5VDC	
Control Supply Current	1A (max)	

DC to AC VFD - Mini-VFD Inverter for Traction Motor Blowers

ATS Part # A300505

750VDC to 480VAC, 3HP Blower System

Features

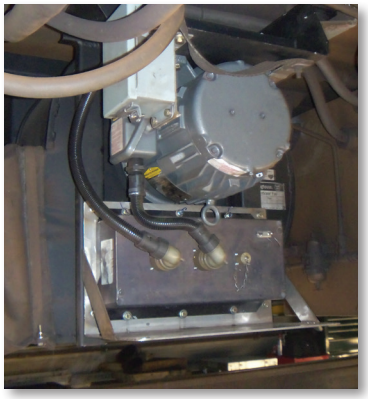
For blowers, compressors, evaporators, and air handlers

- Designed as a drop in replacement for DC motors operating off the third rail or catenary
- Operates AC induction motors from DC line voltage
- Operating range of 450VDC to 900VDC
- Reverse polarity protection
- IP-67 rated
- In case of power loss, Auto Restart with automatic Motor Speed Search for uninterrupted operation
- Uses electronic motor thermal overload protection

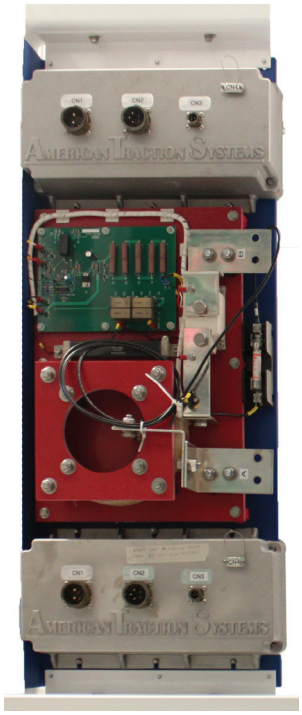
Applications

- Blowers
- Compressors
- Evaporators
- Air Handlers

Example of Mini-VFD attached to blower motor



Baltimore Metro blower

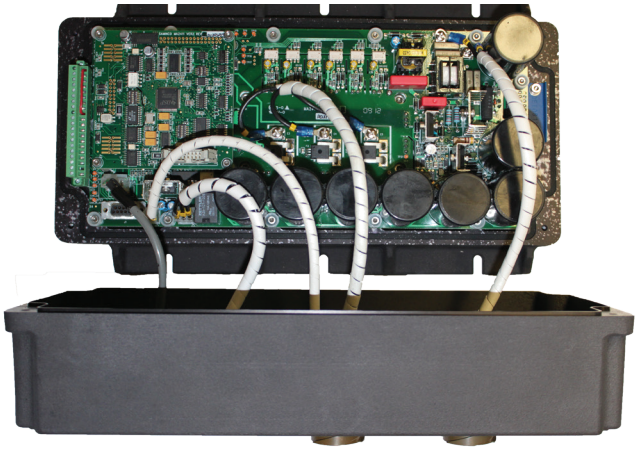


AMPS locomotive blowers

Description	Specification
Power	
Input Voltage	750VDC or 450VDC to 900VDC Contact factory for other ranges
Output Current	15A RMS Continuous (with 2.5m/s airflow) 9A RMS Continuous without airflow
Output Frequency	0 - 125Hz
Control I/O	
Reverse Polarity	Software and hardware detection
Power Loss	Auto restart with automatic motor speed search to continue operation.
Load Short Circuit	Current Control Overload Trip IGBT Over Current Protection
Thermal Protection	Heat Sink Over-temperature Alarm at 75°C Shutdown at 80°C
Motor Overload	Electronic Time trip
Overcurrent Protection	Programmable

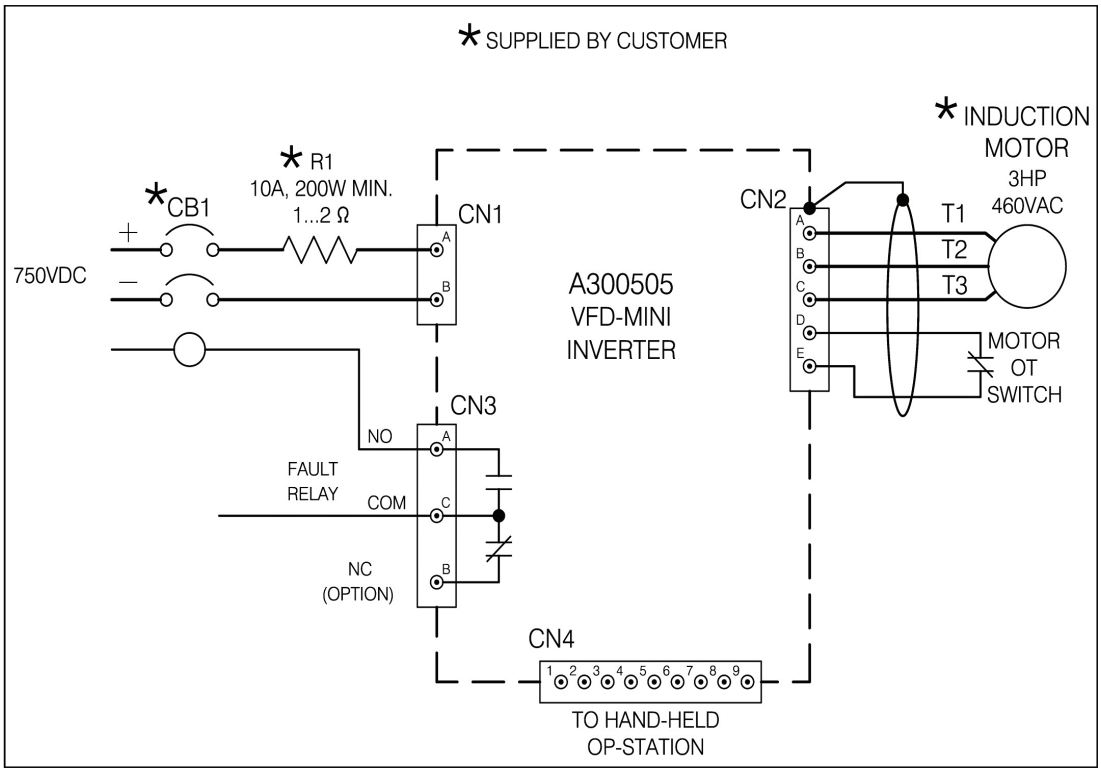
DC to AC VFD - Mini-VFD Inverter

ATS Part # A300505



Input	Description
CN1	DC Input
CN2	AC to Motor
CN3	Fault Relay
CN4	Diagnostic Port

Dimensions	
Height	102mm (4”)
Width	356mm (14”)
Depth	229mm (9”)



Buck Inverter

3 phase, 50/60 Hz
450-800V DC input
Output ≤ 350V peak voltage loads

ATS Part # A520017
(See your Sales Rep for other input voltages)

Applications

- Light Rail
- Streetcar
- Monorail

Features

- Suitable for light rail, marine and locomotive auxiliary loads
- For systems requiring 3-phase 50/60 Hz power with source DC voltages in the range of 450 - 800V with loads requiring peak voltages less than 350V.
- Reduces potentially damaging high input voltage supplies to appropriate levels for motors and other equipment.
- Generates a mid-bus voltage based on a user-defined reference voltage (325V default) through an IGBT Buck Chopper to a programmable mid-bus voltage.
- Includes a pre-charge circuit controlled by the inverter so DC bus voltage may be applied to the inverter without ramping the supply to its nominal value.
- Air-cooled, compact unit
- Conforms to IEC 1287-1: 1985
- All customer logic provided by solid state relays using voltage provided by customer.
- Additional voltage ranges available on request.

Specifications	Input	Output
Rated Power @ Rated Volts	Variable	28kVA @ $230V_{RMS}$
Frequency Range	DC	50/60 Hz
Voltage Range	450 - 800V DC	$230V_{RMS}$
Amps @ Rated Power	150 A	$70A_{RMS}$
Short-time Output Current	200 A_{RMS}	
Ambient Operating Temperature Range	-20°C to +50°C (-4°F to 22°F)	
Safe Operating Temperature	-20°C to +80°C (-4°F to 176°F)	
Cooling Method	Forced-air cooling	
Control Supply Voltage	36.5V DC (27 - 59V DC)	
Control Supply Current	0.5A nominal (2A max)	
Weight	47.2kg (104 lbs)	
Dimensions (H x W x L)	544mm (21.4”) x 406.2mm (16”) x 263mm (10.4”)	

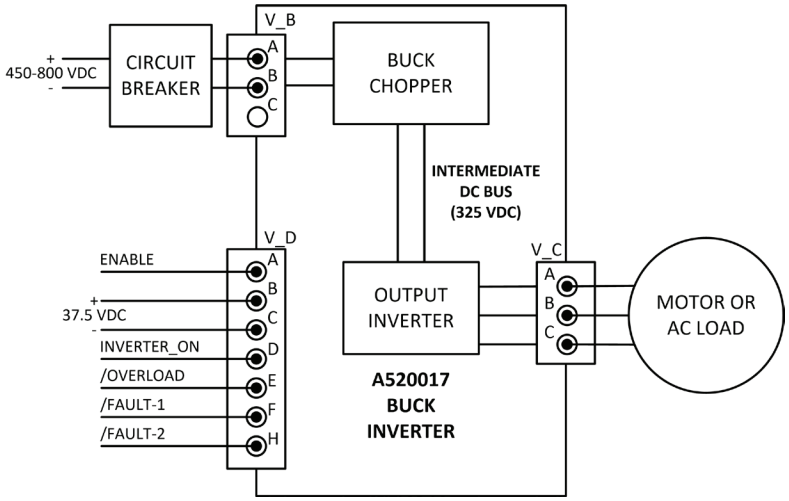
The values above are typical and are dependent on the motor and application

Buck Inverter

Description

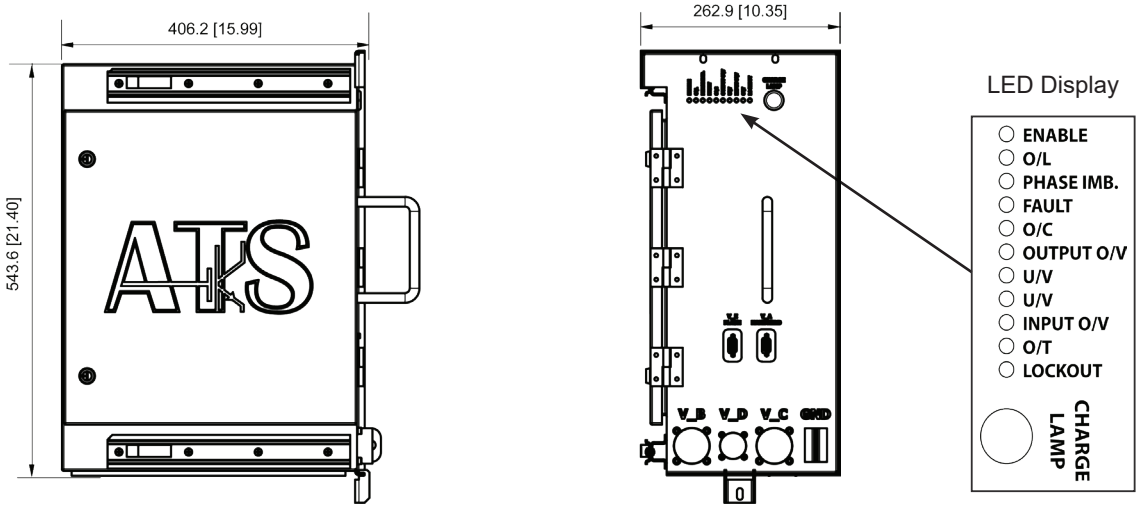
The Buck Inverter is a 3-phase inverter designed to output voltage waveforms at a lower peak level than the DC bus voltage and in a fixed pattern to limit total harmonic distortion. The Buck Inverter generates a mid-bus voltage based on a user-defined reference voltage (325V default) by applying pulses of the DC bus voltage (450 – 800 V) through an insulated-gate bipolar transistor (IGBT) to an intermediary DC mid-bus voltage. The Buck Inverter applies pulses of the intermediary DC mid-bus voltage through IGBTs connected in a half-bridge circuit to produce quasi-sinusoidal voltage waveforms at a user-defined fundamental frequency (60 Hz default), 120° out of phase from each other, with a peak amplitude equal to the user-defined reference voltage. The sinusoidal 3-phase voltages (230 VRMS default) are produced at the output of the Buck Inverter by connecting the pulsed quasi-sinusoidal voltages to a 3-phase sine filter.

Connection Diagram



Example of Buck Inverter installed on light rail vehicle.

Dimensional Drawing



Hermes Traction Inverter

ATS Part # A300835, A300847, A300848 (800V 600A)
A300832 (1100V 600A)
(See your Sales Rep for other input voltages)

Permanent Magnet and Induction Motor Control
Liquid Cooled
375 kW (700 V_{IN}) and 490 kW (1000 V_{IN}) Versions
600 A_{PK-RMS}
100+ Programmable Parameters

Applications

- Heavy duty trucks
- City buses
- Mining Vehicles
- Marine Vessels
- Utility trucks
- All-terrain vehicles
- Motor test stands
- Motor sport

Features

- Permanent Magnet or Induction motor control
- Adaptive Torque Control — No look-up tables required
- Torque and Speed Control Modes
- Generator Mode with programmable cranking and idle speeds
- Automated Resolver Offset Calibration Mode
- DC Capacitor Discharge Feature
- Up to 1,400 Hz output frequency
- Continuously Variable Switching Frequency—Increases with motor RPM and reduces losses (2 to 14 kHz — Double-edge PWM)
- Discontinuous Pulse Width Modulation (DPWM)
- Smart OV, UV, and Temperature Power Limiting
- Four-quadrant operation
- Validated on motors with up to 40 poles
- Up to 15 inverters on one CAN control bus
- IP67 aluminum enclosure
- Built-in DC bus voltage pre-charge circuitry (optional)
- Embedded Y-Capacitor
- Motor Select parameter for easy setup
- 150+ programmable parameters via CAN for advanced users
- 10 slot fault log with time stamp information

Specifications

	Part #	Description	Minimum	Nominal	Maximum
DC Bus Voltage (V)	A300835 A300847 A300848	8 glands, PMAC control 6 glands, ACIM control 6 glands, PMAC control	-	700	800
	A300832	6 glands, PMAC control	-	1000	1100
Output Voltage (V_{RMS})				0 - 0.7 x DC Bus Voltage	
Continuous Output Current (A_{RMS})	A300835/ A300847/ A300848		-	600 @ f_{sw} = 2 kHz 400 @ f_{sw} = 14 kHz	-
	A300832		-	550 @ f_{sw} = 2 kHz 350 @ f_{sw} = 14 kHz	
Peak Output Current (A_{RMS})				600	
Continuous Output Power (kW)	A300835/ A300847/ A300848		-	375	-
	A300832		-	490	-
DC Control Volts			22	24	28
Control Supply Current (A)			2	-	-
Logic Input Supply Voltage (V)			6	12	26
Ambient Operating Temperature (°C)			-20	-	60
Inlet Cooling Temperature (°C)			-40	-	50
Coolant Type			-	50/50 WEG	-
Coolant Flow (gal/min) [l/min]			3 [11.3]	-	-
Coolant Pressure Drop (psig @ 3 gal/min) [bar]			-	0.6 [0.04]	-
Weight				38.5kg (85 lbs)	
Dimensions (H x W x L)				207mm (8.2") x 583mm (23") x 434mm (17")	

The values above are typical and are dependent on the motor and application

Hermes Traction Inverter

Product Description

The Traction Inverter is designed to control permanent magnet or AC induction motors and is suitable for propulsion and auxiliary motor applications.

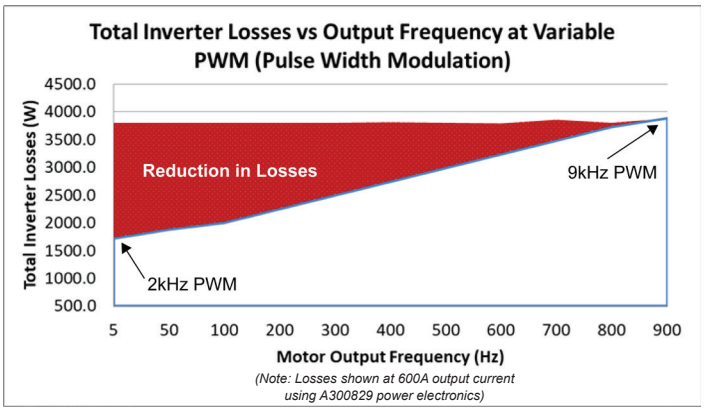
Adaptive Torque Control

The motor control algorithm, Adaptive Torque Control (ATC) is a more accurate Field-Oriented Control (FOC) capable of operating in a wide range of power factors. ATC optimizes performance (torque and power) by accounting for a varying supply voltage, motor inductances, motor resistances, motor temperature, motor speed, and slip. In induction motors, this enables operation at or near the breakdown torque of the motor and in PM motors, it utilizes the synchronous reluctance effect to maximize torque.

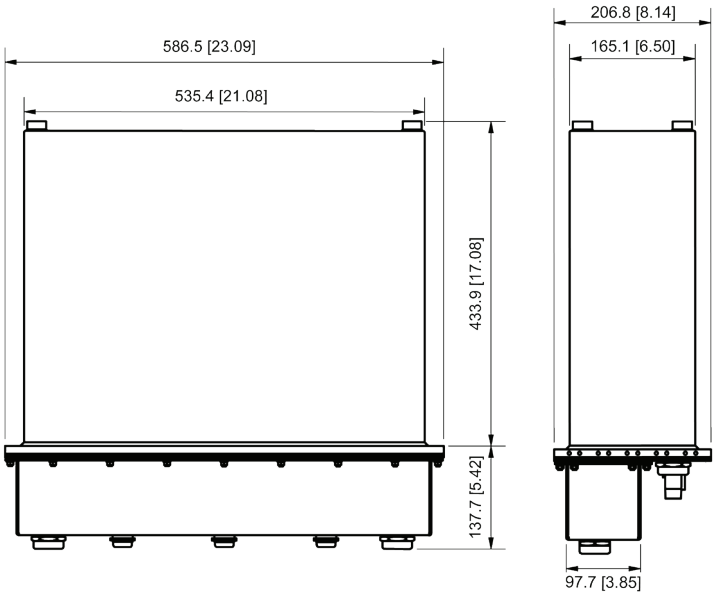
ATC uses models based on the physics of the motor — not lookup tables. With 150+ programmable parameters for setup and tuning, the inverter can operate many different motors.

Variable Switching Frequency

By continuously varying the switching frequency proportional to speed, the inverter achieves an optimal balance of switching losses in the inverter and current ripples in the motor. Particularly at lower speeds, the reduced PWM frequency yields improved efficiency as shown in the red area of the following chart.

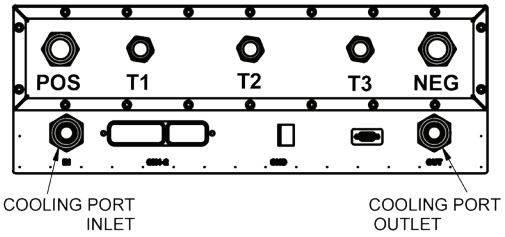


Dimensional Drawing



Hardware Description

- Double isolation between power components and control interface
- 12V emergency stop input
- 1 NTC input
- 2 RTD inputs
- 2 12V analog inputs
- 8 logic inputs
- Normally open/closed fault outputs
- RS-232 serial interface for programming and debugging
- Resolver and 5/15V encoder feedback
- CAN-bus control and diagnostics



IGBT Fault Interrupter

Instantaneous (<10µs) interruption of high current faults

ATS Part # Various
(See your Sales Rep for specific ordering information)

Applications

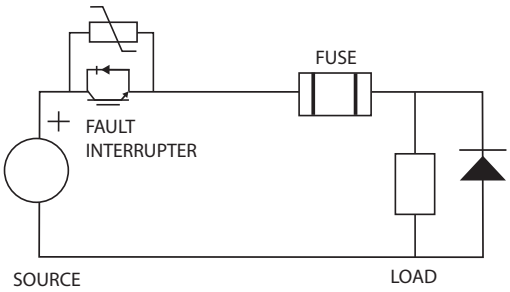
- Bus systems
- Marine
- Rail

Description

The ATS IGBT (Insulated Gate Bipolar Transistor) Fault Interrupter is used to interrupt short circuit fault currents from large battery banks. The solid state circuit limits the energy caused by the fault to levels much lower than conventional electromechanical circuit breakers and fuses. It is intended to operate with conventional protective devices to prevent the melting of fuses and activation of overcurrent protection, allowing the battery power source to remain available for continued operation after the faulty circuit has been isolated and repaired.

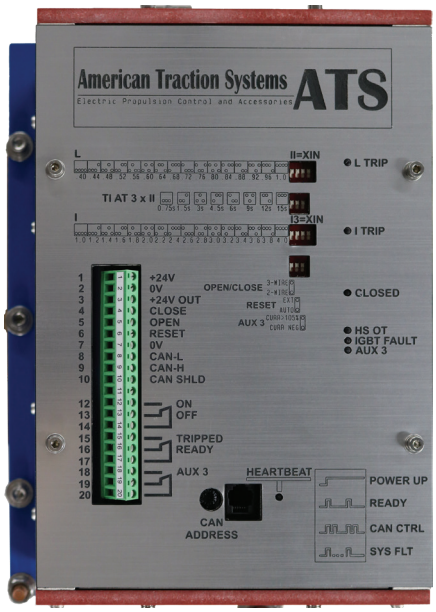
Features

- Uses electronic current measurement and fast switching capability of the IGBT to detect and clear a short circuit fault in less that 10µs.
- Allows battery power source to remain active by isolating faulty circuit.
- For common DC Bus systems, marine re-charging stations, rail and electric vehicle traction applications operating from battery voltages up to 750 V_{DC}
- Selectable trip levels
- CAN-Bus monitoring and control



The IGBT switch is a 3300V IGBT protected by a MOV. The collector voltage is limited to approximately 2200V while absorbing the inductive switching energy.

Dimensions	
Height	215mm (8.5”)
Width	216mm (8.5”)
Depth	323mm (12.7”)
Weight	9 kgs (20 lbs)



Electrical Specifications		
	A300466	A300486
Voltage Range Input	0 - 1100 V_{DC}	0 - 700 V_{DC}
Rated Power @ Rated Volts Input	375kW	420kW
Frequency Range	DC	DC
Amps @ Rated Power Input	500A	600A

Environmental Specifications	
Description	Specifications
Ambient Operating Temperature	-20°C to +50°C (-4°F to 122°F)
Heatsink Temperature	110°C (230°F) Maximum
Storage Temperature	-40°C to +60°C (-40°F to 140°F)
Relative Humidity	<90% No condensation
Altitude	1000 meters (3300 feet) de-rate above 3000 meters

Battery Charger

Universal Source Active Battery Charger

ATS Part # various

(See your Sales Rep for specific ordering information)

Description

The Universal Source Active (USA) Battery Charger converts 3-phase AC voltage input to a controlled DC charging power source. Its novel control algorithm regulates the input current, output current and output voltage to either preset programmable limits or to "on-the-fly" limits received from the Battery Management System.

USABC 75

Part # A801116

USABC 110

Part # A801114

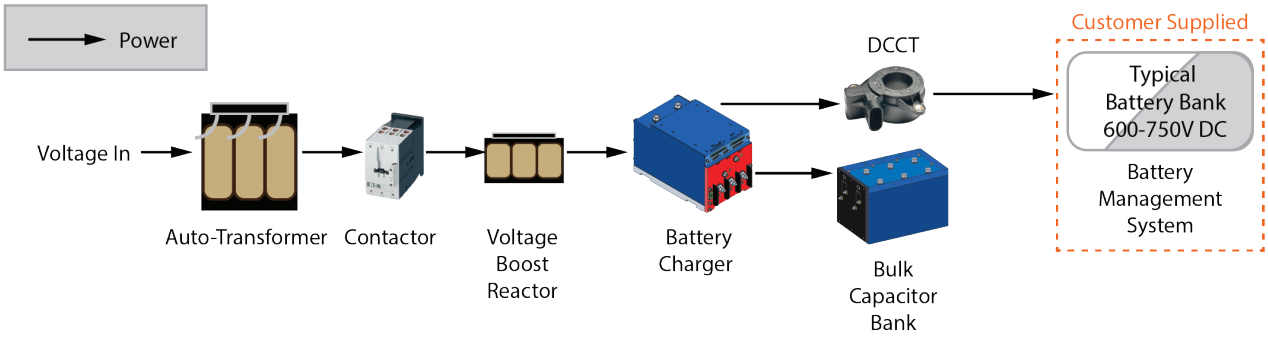
Features

- Accepts wide range of 3-phase AC sources with multi-tap auto-transformer
- Smart OV and Temperature Power Limiting
- Up to 15 chargers on one CAN control bus
- Built-in DC bus voltage pre-charge circuitry
- Battery Select parameter for selection between multiple manufacturer communication protocols
- 50+ programmable parameters via CAN for advanced users
- 10 slot fault log with time stamp information

Hardware Description

- Double-isolation between power components and user control interface
- Dual range DC current sensor for full-load and precision trickle current measurements mounted externally to isolate battery current from other loads
- Enable and HV interlock 24V digital inputs
- RS-232 serial interface for programming and troubleshooting
- CAN bus control and diagnostics
- Universal control power (120/240V AC, 150-300V DC)

Example block diagram of battery system setup



Specifications for USABC				
Part Numbers	A801114 (USABC 110)		A801116 (USABC 75)	
Electrical Specifications	Input	Output	Input	Output
Rated Power @ Rated Volts	34kW @ 315V	32.5kW @ 650V	34kW @ 315V	32.5kW @ 650V
Frequency Range	47 to 65 Hz	DC	47 to 65 Hz	DC
Voltage Range	440 to 480V	600 to 770V	300 - 400V AC	600 - 700V DC
Amps @ Rated Power	100A @ 34kW	80A @ 32.5kW	70A @ 34kW	50A @ 32.5kW
Environmental Specifications				
Ambient Operating Temperature	-10°C (no frost) to + 50°C (14°F to 122°F)			
Storage Temperature	-40°C to +60°C (-40°F to 140°F)			
Relative Humidity	<90% No Condensation			
Altitude	3300 Feet (1000 meters) - de-rate above 3000 meters.			

Dimensions		
Part Numbers	A801114 (USABC 110)	A801116 (USABC 75)
Height	249mm (9.8")	210mm (8.3")
Width	330mm (13")	203mm (8")
Depth	378mm (14.9")	356mm (14")
Weight	21kg (46 lbs)	14.5kg (31 lbs)

ATS Part # A800966

LU300b DC to DC Converter

Description

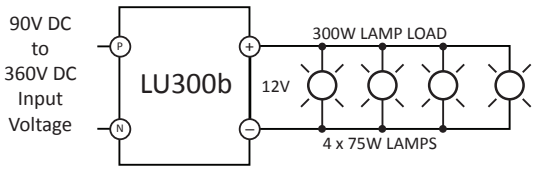
The LU300b is a compact, 12V, 300W supply 25A @ 12V output) for use in battery or trolley-operated vehicles such as buses, locomotives and street cars.

Features

- Wide input voltage range of 90V DC to 360V DC.
- Can be used with positive or negative grounded systems.
- Output is fully isolated from input and is short-circuit protected.
- Input is reverse polarity protected
- Can be connected in series to provide 24V @ 25A or +/- 24V @25A.
- Mount the unit on a solid metal frame to help dissipate heat generated at maximum output.
- Approved for use in Pennsylvania mines (Bote:1754-99)

Dimensions (IP00)	
Height	76mm (3”)
Width	178mm (7”)
Depth	146mm (5.75”)
Weight	.91kg (2 lbs)

Electrical Specifications		
Specifications	Input	Output
Rated Power @ Rated Volts	330VA @ 300	300W
Frequency Range	DC	DC
Voltage Range	90 - 360V	12V
Amps @ Rated Power	1.1A/ 300	25A
Efficiency @ 300W	83% (maximum heat loss is 51W)	



Typical Installation of LU300b Light Supply

ATS Part # A800541-1

LU600b DC to DC Converter

Description

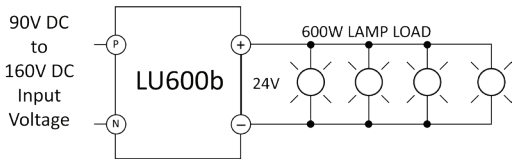
The LU600b is a compact 24V DC, 600W DC, 75A isolated power supply for auxiliary equipment.

Features

- Wide input voltage range: 130V DC to 280V DC. Can be used with positive as well as negative grounded systems.
- Output is fully isolated from input and is short circuit protected.
- Input is reverse polarity protected.

Dimensions (IP00)	
Height	76mm (3”)
Width	178mm (7”)
Depth	150mm (5.9”)
Weight	.91kg (2 lbs)

Electrical Specifications		
Specifications	Input	Output
Rated Power @ Rated Volts	720W @ 160V DC	600W
Frequency Range	DC	DC
Voltage Range	90 - 160V	24 - 28V
Amps @ Rated Power	4.5A	22 - 26V DC
Efficiency @ 300W	83% (maximum heat loss is 51W)	



Typical Installation of LU600b Light Supply

Environmental Specifications for Power Supplies	
Description	Specifications
Operating Temperature Range	-20°C to 60°C (12°F to 140°F)
Thermal Impedance (baseplate to ambient)	0.6°C/ W
Maximum Heatsink Temperature	85°C (185°F)

Isolation Rating for Power Supplies	
Input to base plate	2500V AC, RMS
Input to output	2500V AC, RMS
Output to baseplate	500V AC, RMS

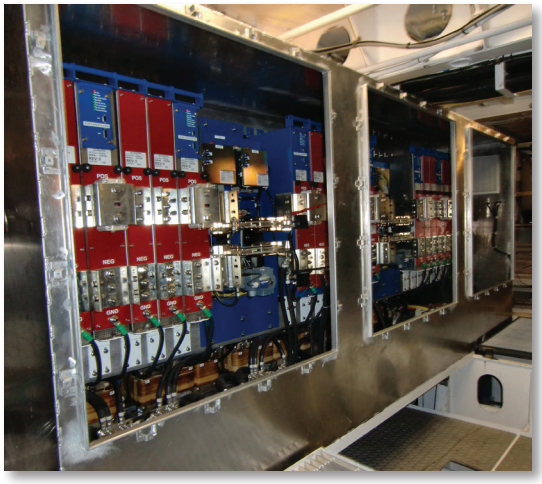
Custom Panels and Propulsion Lockers

Engineering and Test Services

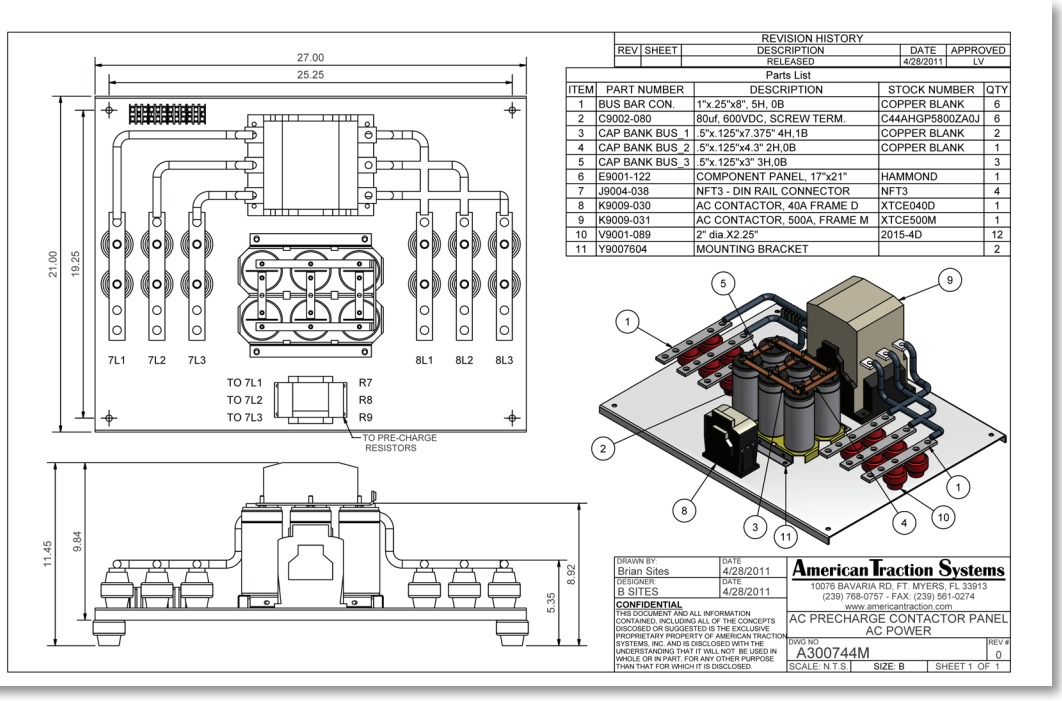
ATS not only provides the fabrication of custom panels, we can also assist in the design (both mechanical and electrical) and testing to your specifications. We have experience with Programmable Logic Controllers (PLC's) with integrated touch screen, operator stations, VFD controls, DC drives, switchgear and medium voltage cabinets.

We have five independent test bays powered from a dedicated 480VAC 1000A supply providing regulated DC supplies for full load testing of all panels.

Local Control Box



Installed Propulsion Locker



All panels are designed with 3D modeling software to assure mechanical compatibility and problem free installations.

Complete Bills of Materials are automatically generated by our design software

Custom Panels and Propulsion Lockers

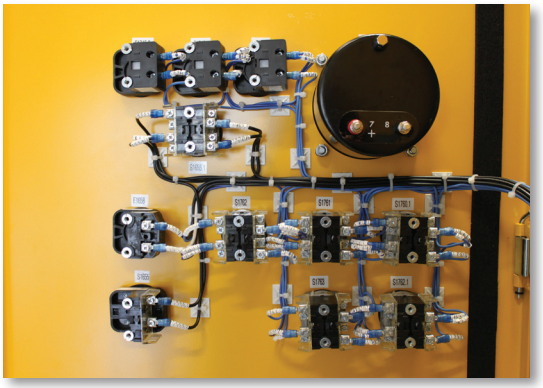
Full Service Panel Shop

ATS has a modern, full service panel shop. ATS can provide the design, assembly, and testing of custom electrical control panels. Our dedicated team takes pride in exceeding our customers needs by implementing flexible and innovated manufacturing procedures.

We promise to deliver the same quality workmanship whether your requirements are for one small panel or multiple 2000HP traction lockers.

Advantages of using ATS

- Experienced wiremen (over 100 total man years on staff)
- Modern, clean facility
- Dedicated purchasing and warehouse staff
- Electrical schematic (ladder and one-line) drafting
- Solid modeling of all mechanical components and assemblies
- Thermal modeling and analysis of all cabinets
- Complete Bills of Materials, wiring diagrams and build instructions
- In-house full load testing before shipment



Custom Panel Work

AC and DC Locomotive Traction Lockers

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- Locomotives
- Genset Locomotives
- MoW (Maintenance of Way)

TRANSIT
- PCC Streetcars Solid State Controllers
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- Auxiliary Systems

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- Military Vehicles
- Trucks
- Fuel Cell Buses and Fleet Vehicles
- On and Off Road Vehicles
- Airline Ground Support Vehicles

OTHER
- Custom Engineering
- Power Centers

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- Traction
- Propulsion
- Auxiliary Supplies
- General Purpose

DC to DC CONVERTERS
- DC Motor Controllers
- Brake Choppers
- Battery Chargers
- Power Supplies

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- Operator Stations
- Blowers and Compressor Controllers
- IGBT Fault Interrupter

American Traction Systems
Electric Propulsion Controls and Accessories

E: sales@americantraction.com • W: www.americantraction.com

FLORIDA
Headquarters
10076 Bavaria Rd.
Ft. Myers, FL 33913
Ph: 239-768-0757
FAX: 239-561-0274

Administration
10030 Amberwood Rd.
Ft. Myers, FL 33913
Ph: 239-561-1561
FAX: 239-561-1502

WEST VIRGINIA
Service Branch
517 Virginia Ave.
Huntington, WV 25701
Ph: 304-523-4700
FAX: 304-523-4039

COLORADO
Service Branch
Cedaredge, CO
Ph: 970-623-0000

SOUTH CAROLINA
Service Branch
Anderson, SC
Ph: 304-654-9054

International Locations:
Boksburg, South Africa