



GAC SOLUTIONS for GASEOUS ENGINES



GOVERNORS AMERICA CORP.

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GAC offers a wide range of solutions for gaseous powered engines, from simple black smoke solutions to an advanced cost-effective gaseous-fueled engine management system with exhaust emissions control to meet worldwide standards.

SIMPLE SOLUTIONS

From black smoke control to engines that run on natural, propane or biofuel gasses, GAC offers simple solutions to common issues.

FIMS EPA APPROVED SOLUTION

GAC also offers emission control standard solutions, with the basic fuel and ignition management system (FIMS) for low-pressure applications using a venturi mixer and stepper motor control valve.

GAC designed the free software. The system most often includes a built-in engine speed governor and two separate modules which can operate as a stand-alone system depending on your application needs.

The complete-system approach results in a cost-effective solution that offers the most significant potential for engine efficiency and exhaust emissions improvements.

- **Clean burn** – Closed-loop exhaust oxygen sensor control
- **Natural gas** - GAC ATBs resist the harshest gaseous fuel types using spring return butterfly valves, precision bearings, and idle air adjustment for safe, maintenance-free solutions. High temperature sealed (5 bar), position feedback sensor, mechanical position indicator. Hazardous/explosive environment versions are also available.
- **Low-pressure design** - perfect for stationary applications using shale gas, digester gas, biogas, landfill gas, wellhead gas, coalbed/seam gas
- **Reliable** - industrial grade - GAC provides quality design production using signature potted controls for extreme vibration and temperature capability & durability. All products leave GAC 100% tested, so our quality is of the highest caliber, with no downtime
- **Economical** pricing - no need to buy a separate speed controller; fully integrated into AFR
- GAC developed & controlled software - customizable, easy-to-use, quick turnaround for modifications and changes
- Complete kits available – A full range of venturi mixer sizes with integrated or separate fuel control valves. GAC can supply all the necessary hardware from sensors, coils, spark plugs & wires, harnessing, and regulators.

ARROW A-32, A-42, AND A-62 NATURAL GAS ENGINES

OIL AND GAS INDUSTRY GENERATOR

[Arrow Engine Company](#), building natural gas engine solutions for the oil and gas industry since 1955, has used GAC products for over 35 years as an integral part of the engines. The GAC throttle body (ATB) controls fuel flow, working with the carburetor.

The GAC ESD2401 speed control unit is located in an enclosed box on the flywheel housing, making it easy to update if required.



ESD2401



ATB452T2F14



NOTE: All components are sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB452T2F14-24	ATB T2 Series Integral Throttle Body Electric Actuators
Speed Controllers	ESD2401	ESD2400 Series Isochronous electronic controller

ARROW A54 Natural Gas

OIL AND GAS INDUSTRY GENERATOR

The [Governor Shop](#) has been providing solutions around Western Canada since 2012. This modification to an Arrow A54 5.4L to a gaseous generator uses a GAC throttle body (ATB T2) in an oil field pump generator.

The engines use a process input (4-20 mA) from a Lufkin panel controlled by a GAC EEG6550. This solution can also be used on the A-32 and A-42 Arrow engines.



EEG6550



ATB452T2F14



NOTE: All components are sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB452T2F14-24	ATB T2 Series Integral Throttle Body Electric Actuators
Speed Controllers	EEG6550	Series Enhanced Electronic (EEG) Controller with droop

ARROW A90 NATURAL GAS

OIL AND GAS INDUSTRIAL GENERATOR

SES Arrow Generator out of Tulsa OK, USA builds custom generators for oil industry customers. This 25 KW unit built on an Arrow A90 8.8L uses a GAC throttle body, ATB452T2N14-24, controlled using the GAC ESD5131.

SES Arrow relies on GAC products to support its industry customers. Their solutions cannot fail during operation; that is why they choose GAC for dependable, innovative solutions.



ESD5131



ATB452T2N14-24



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB452T2N14-24	ATB Series integral throttle body electric actuators controls air/fuel mixture to a gaseous-fueled engine
Speed Controller	ESD5131	Multi-V DC • Switchable Soft Coupling and Lead Circuit with adjustable PID and idle speed adjustment.

CATERPILLAR 3408 18 L NATURAL GAS

INDUSTRIAL POWER

This application uses the GAC Ignition Control Module (ICM) paired with an ESD5330 Speed controller to run the ignition system in this wasted spark, crankshaft triggering, CAT 3408, 18 L, V-8, with 136 flywheel teeth.

While the ICM tends to the spark, the ESD5330 ensures smooth running.



ICM200-4



ESD5330



ACB2001



NOTE: All components are sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ACB2001	Rotary output, 24 V, linear torque proportional electric servo torque to 16.3 Nm
Ignition Control	ICM200-4	Charges a high-energy inductive ignition coil using technology with fixed and variable timing modes and in-field timing trim/offset
Speed Controller	ESD5330	Speed control unit designed to precisely control engine speed and provide fast precise response to transient engine loads using the ACB2001.

CATERPILLAR G3406 14.6L

INDUSTRIAL POWER

The Governor Shop, of Alberta Canada upgraded a 14.64L, 6 cylinder Caterpillar G3406 natural gas engine to a GAC control system using an ATB652T2N-24 with an ESD5526E speed controller and an EAM121 as an interface. The GAC solution provided easy installation and superior performance.

The ESD5526E, with its anti-windup feature, is specifically designed for gaseous fueled engine control.



ESD5526E



EAM121



ATB652T2N-24



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2N-24	Integral Throttle Body Electric Actuator controls air or air/fuel mixture to a gaseous-fueled engine
Speed Controller	ESD5526E	Speed control unit is a closed loop control, with low current optimized PID
Interface Module	EAM121	Interface module designed to communicate between ± 3 V DC output to nominal 5.0 V.

CHEVY 8.1L NATURAL GAS

COMBINED HEAT AND POWER (CHP)

Aegis Energy Services provides turnkey installation of modular combined heat and power systems using a natural gas-fueled Chevrolet 8.1 L engine.

Using a GAC EEG6500 and an ATB552T2F14 55 mm throttle body, Aegis meets the required strict performance and reliability requirements. A GAC MSP6723 is used for speed reference.

The ATB552T2F14 features a position feedback sensor used by the air-fuel ratio system to determine the actual throttle position for precise control.

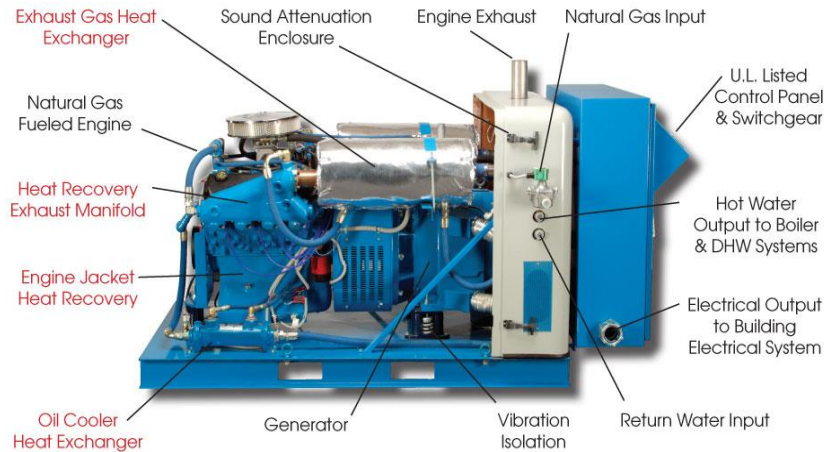
The ESD6500 provides multiple PID, using GAC SmartVu configuration software, and is environmentally sealed and tamper resistant.



EEG6500



ATB552T2F14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2N-24	Integral Throttle Body Electric Actuator controls air or air/fuel mixture to a gaseous-fueled engine
Speed Controller	EEG6500	Speed control unit with multi-V DC and built-in display
Magnetic Pickup Sensor	MSP6723	M16 x 1.5 Threaded MSP Series

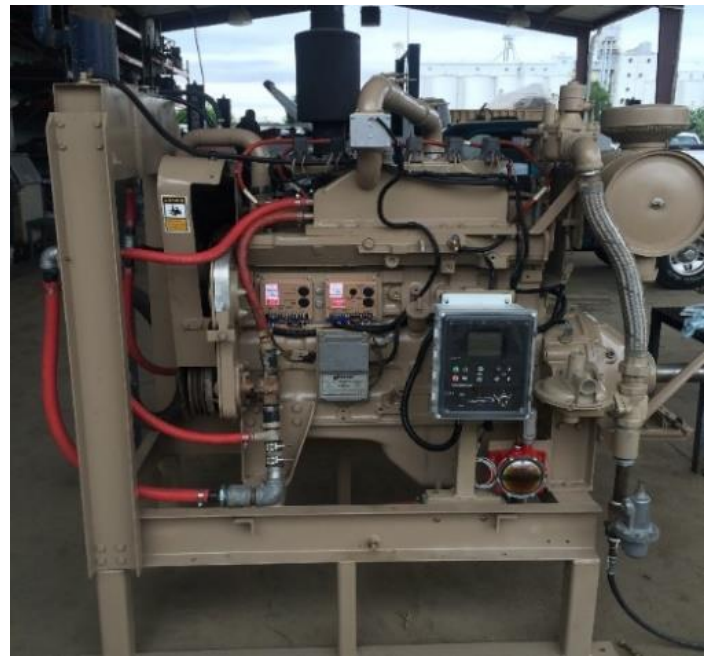
CUMMINS GTA855 14L AND 8.3L 6 CYLINDER TURBO

INDUSTRIAL / GEN SET / IRRIGATION

These irrigation pumps were in need of an overhaul. The upgrade to GAC components improved the function and ease of setup.



GTA 8.3L



GTA855

ESD5526E



RSC671



ATB652T2N



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2N-24	Integral Throttle Body Electric Actuator controls air or air/fuel mixture to a gaseous-fueled engine
Speed Controller	ESD5526E	Speed control unit is a closed loop control, with low current optimized PID
Ramp Speed Controller	RSC671	Linear, electronic speed control module designed to smoothly accelerate and decelerate an engine at independently adjustable rates.

CUMMINS VT1710 - 28.0L, V12 ENGINE

IRRIGATION

GAC's dual driver solutions support for gaseous and diesel engines using sensors to share information and balance dual engines.

The Cummins VT1710 engine requires two gaseous throttle body Actuators, each receiving equal fuel levels.

Two GAC - Integrated Actuator Throttle Bodies (ATB's) with feedback capability - one on each fuel flow bank. Two thermocouples measure, track, and trim the balance based on exhaust temperatures.

GAC's ESD5111 speed controller controls the load response of both balanced actuators.

The Dual Driver Module (DDM101) regulates the fuel in each cylinder using fuel and exhaust temperature balance.



ESD5111



DDM101



ATB652T2F14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2F14-24	Integral Throttle Body Electric Actuator controls air or air/fuel mixture to a gaseous-fueled engine
Driver	DDM101	This module drives two independent, feedback actuators from one GAC speed controller.
Speed Controller	ESD5111	Speed controller provides fast and precise response to transient load changes with adjustable PIB and idle.

CUMMINS 855 NATURAL GAS / PROPANE

IRRIGATION

GAC worked with [Johnson Irrigation Engine Service](#), a third-generation full-service engine and generator support company, to determine their irrigation engines' optimal natural gas control system.

This Cummins 855 14L uses GACs throttle body and EDG5500 speed controller to provide a smooth system.



EDG5500



ATB652T2N



NOTE: All components sold separately.

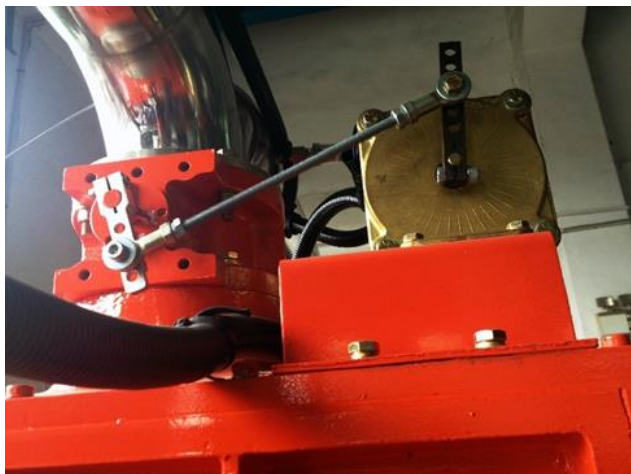
COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2N-24	Integral throttle body electric actuator controls air or air/fuel mixture to a gaseous-fueled engine
Speed Controllers	EDG5500	Digital speed controller with built-in display, regulates engine speed on diesel and gasoline reciprocating engines.

CUMMINS 37.8 L NATURAL GAS

GENERATOR

A generator manufacturer asked GAC for a solution for their 500 kW gaseous gen-set built on the Cummins KT38 37.8L engine.

The ACB2001 provides the required power, while the ESD5330, specifically designed to run the ACB2001, ensures stability and smooth results.



ESD5330



ACB2001



NOTE: All components sold separately.

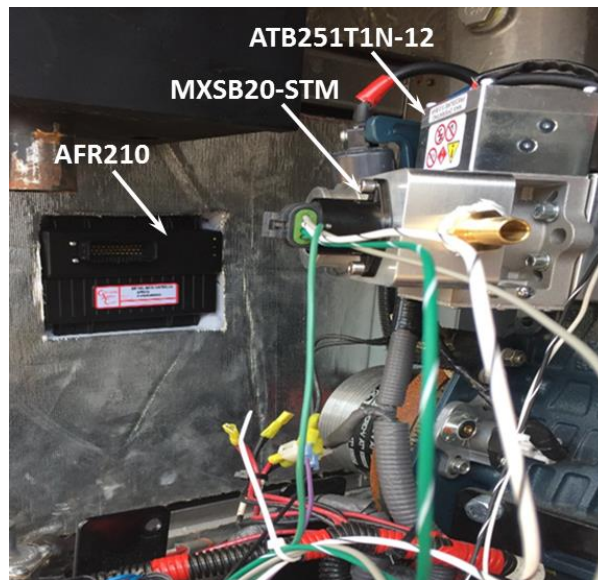
COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ACB2001	Rotary output, 24 V, linear torque proportional electric servo torque to 16.3 Nm
Speed Controllers	ESD5330 or ESD5340	Speed control unit designed to precisely control engine speed and provide fast precise response to transient engine loads using the ACB2001.

KUBOTA WG752 3 CYLINDER, 0.74L ENGINE

COMBINED HEAT AND POWER (CHP)

Cogeneration through combined heat and power (CHP) is the simultaneous production of electricity with the recovery and utilization of heat.

GAC's AFR210 offers an 'Anti-Wind-Up' PID feature that minimizes RPM overshoot and/or under-shoot.



AFR210



ATB251T1N1



MXB20-STM



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Speed Controller	AFR210	Air fuel management system controller
Actuator	ATB251T1N-12	ATB T1 Integral Throttle Body Electric Actuators are designed to control the air or air/fuel mixture to a gaseous-fueled engine
Other Items	MSP6728C MXB20-STM	Magnetic Speed Pickup Mixer

MAN E2876 150 KW NATURAL GAS

COMBINED HEAT AND POWER (CHP)

[Co-Energy America](#), now part of Clarke Energy, builds combined heat and power (CHP) solutions across the east coast, including various New England health care facilities and schools looking to reduce energy costs, enhance energy reliability, and reduce emissions. GAC's ATB and SDG solution create a simple, effective solution that Co-Energy America accounts on.

CHP provides both energy conversion and overall savings of 40% compared to the separate purchase of electricity from a utility company's electrical grid and a separate gas boiler for onsite heating.



SDG514



ATB652T2F14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2F14-24	Integral throttle body electric actuator with feedback sensor controls air or air/fuel mixture
Smart Digital Governor	SDG514	Smart Digital Governor designed for industrial applications using a solid-state microprocessor.

SCANIA SGI-12-ST BIO_GAS

BIO-FUEL CONVERSION

When an EU farm wanted to use its available methane supply better, they converted their SGI-12 to a 12-liter dual fuel SGI-12 gas engine to bio-fuel.

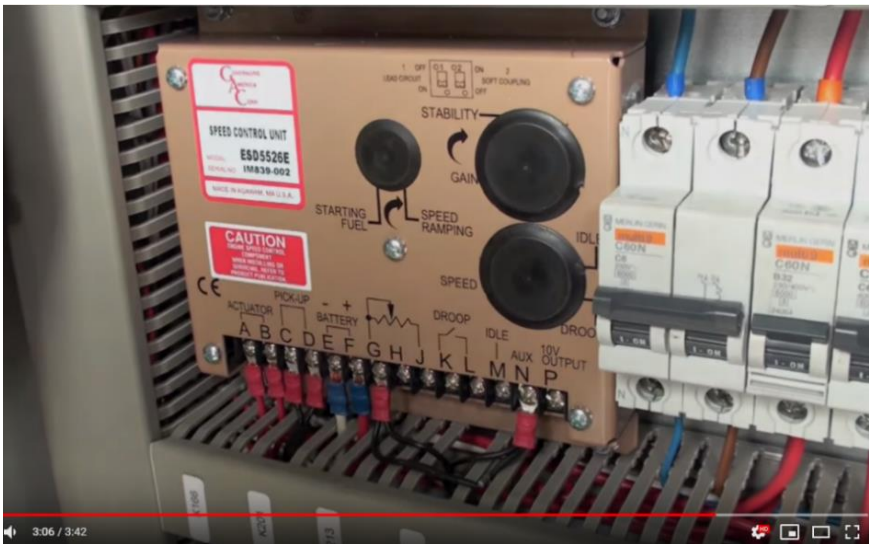
Now running on 45 to 60% Methane, the engine can also use LNG, CNG, LBG, or Natural Gas.



ESD5526E



ATB652T2F14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2F14-24	Integral throttle body electric actuator with feedback sensor controls air or air/fuel mixture
Speed Controller	ESD5526E	Speed control unit is a closed loop control, with low current optimized PID

TEDOM NATURAL GAS GENERATOR

POWER GENERATION

Tedom natural gas generator sets for industrial locations. It is tuned with an ESD5550 controller, making this 100 – 180 kW, 1.9 liter, a lean burn system.



ESD5550



ATB652T2F14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB652T2F14-24	Integral throttle body electric actuator controls air or air/fuel mixture to a gaseous-fueled engine
Speed Controllers	ESD5550	Speed control with fuel adjustments to help minimize startup issues and black smoke.

SCANIA 6 CYL ENGINES 270KW GENERATOR

VILLAGE WATER PUMP

Two Scania DC13 072A engines supported by a GAC solution provide power for three water pumps in a Brazilian town.

The GAC throttle body combines with the AFR speed controller to provide the tools to run lean, while protecting the engine.

This generator runs efficiently, consumes less fuel than a normal engine, and produces more power.



AFR210



ATB75T4N14



NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB75T4N14-24	ATB T4 Series Integral Throttle Body Electric Actuators
Controller	AFR210	Air-Fuel ratio management controller
Other	MXLB75	Mixer, large bore.

EPA APPROVED NATURAL GAS ENGINE

KEEPING IT CLEAN

GAC's FIMS fuel management system allowed this Wisconsin motors engines to become EPA certified, running down 60% methane content in the fuel.


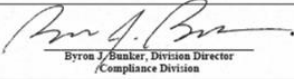
The Wisconsin Motors TM27 is a 4-cylinder, 2.7 L, LP or Natural Gas, 52 HP, 1500, 1800, 2000-2400 RPM, 12 V DC. Using the GAC ATB401T1N-12 with the AFR201 they achieved with EPA approval.

ATB75T4N14



AFR201

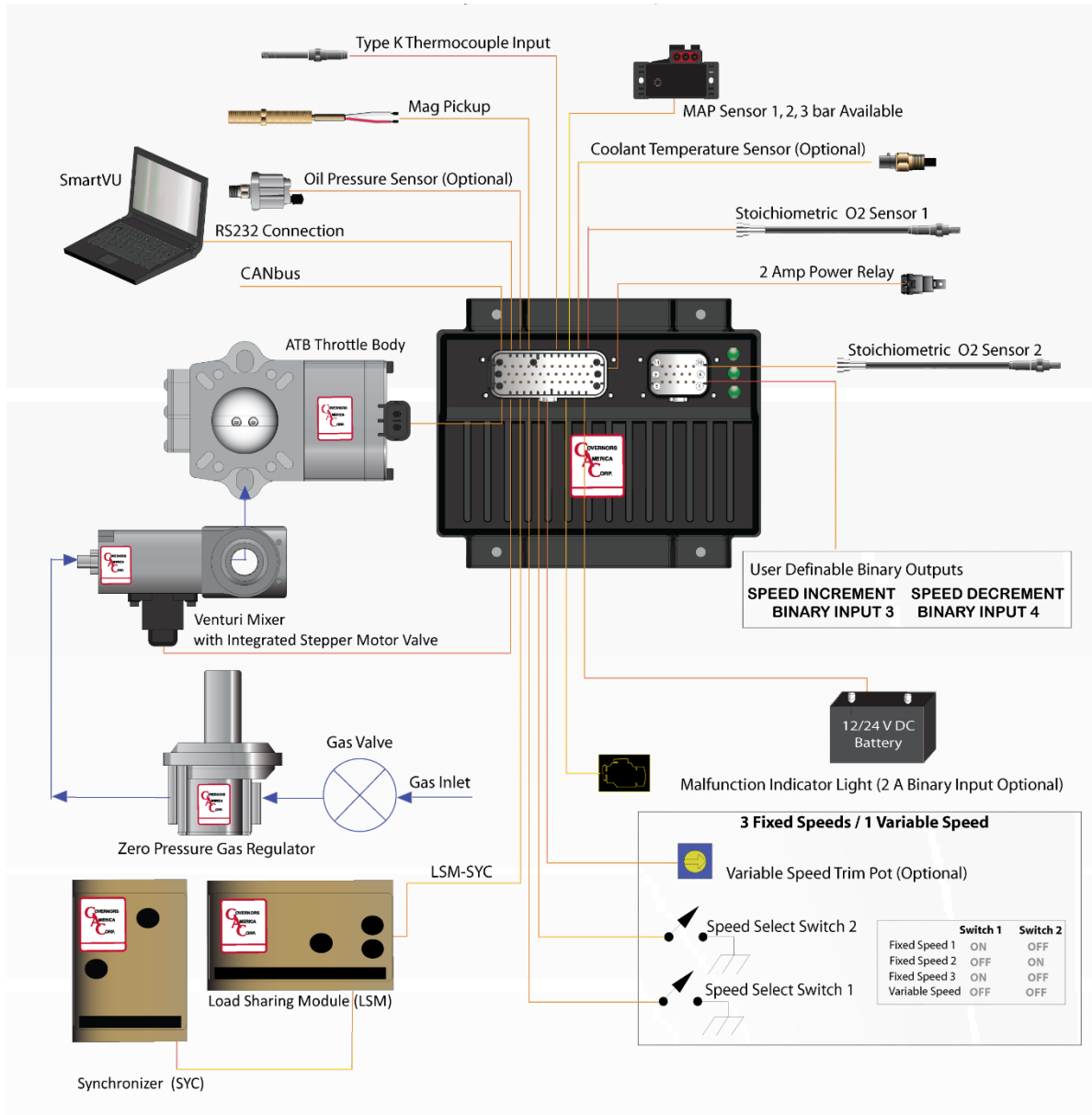


		UNITED STATES ENVIRONMENTAL PROTECTION AGENCY 2013 MODEL YEAR CERTIFICATE OF CONFORMITY WITH THE CLEAN AIR ACT OF 1990		OFFICE OF TRANSPORTATION AND AIR QUALITY ANN ARBOR, MICHIGAN 48105	
Certificate Issued To: Wisconsin Motors, LLC. (U.S. Manufacturer or Importer) Certificate Number: DWMLB02.7TM2-004		Effective Date: 09/26/2013 Expiration Date: 12/31/2013		 Byron J. Bunker, Division Director Compliance Division	
Issue Date: 09/26/2013 Revision Date: N/A		Manufacturer: Wisconsin Motors, LLC. Engine Family: DWMLB02.7TM2 Certificate Number: DWMLB02.7TM2-004 Certification Type: Stationary (Part 60) Fuel: Natural Gas (CNG/LNG) Emission Standards: HC + NOx (g/kW-hr): 2.7 CO (g/kW-hr): 4.4 NMHC + NOx (g/kW-hr): 2.7 Emergency Use Only: N			
Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 754 prescribed in those provisions, this certificate of conformity is hereby issued for nonroad engines, by engine family, more fully described in the doct This certificate of conformity covers only those new nonroad spark-ignition engines produced on or after the effective date of this certificate and which are produced not cover nonroad engines imported prior to the effective date of this certificate. It is a term of this certificate that the manufacturer shall consent to a warrant or court order may lead to revocation or suspension of this certificate if the manufacturer is found to be in violation of the requirements of the Act. This certificate does not cover large nonroad engines sold, offered for sale, or used in the United States.					

NOTE: All components sold separately.

COMPONENT	PART NUMBER	DESCRIPTION
Actuator	ATB75T4N14-24	ATB T4 Series Integral Throttle Body Electric Actuators
Controller	AFR201	Air-Fuel ratio management controller
Other	MXLB75	Mixer, large bore.

GENERIC AFR INSTALLATION



AFR SOLUTION

The Air Fuel Ratio (AFR) 200 series controller is part of the GAC comprehensive fuel management system for gaseous-fueled, spark-ignited engines ranging from 1 L to 13 L+

The AFR used in a fuel management system applies to a wide range of gaseous fueled engines ranging from 1 L to 13 L+. The AFR200 series controllers, when used in conjunction with GAC [ICM200](#) (Ignition Control Module) series, offer a complete Fuel and Ignition Management Solution (FIMS) referred to as the FIMS500 system. Each of these controllers can work independently of the other in the event of a failure.

The AFR supports a universal actuator or a GAC actuator throttle body (ATB). Using engine displacement and operating RPM. Additional details on the complete [AFR Solution installation](#) is available on the GAC website.



SOLUTIONS THAT OUTLIVE THE LIFE OF THE ENGINE

GAC PROVIDES PROVEN RESULTS

GAC's advanced gaseous-fueled engine management system with exhaust emissions control technologies meet the tough standards sanctioned in the United States and the rest of the world. The total system approach results in a cost-effective solution that offers the greatest potential for improvements in both engine efficiency and exhaust emissions while providing many features.

Governors America Corp. (GAC) is a leading provider of innovative engine control products worldwide. As a veteran-owned and operated family business, our dedication and focus on our customers' needs has shaped GAC into a vertically integrated company with complete design, development and manufacturing capabilities.

Our mission is to provide trusted solutions for the innovative equipment that powers and builds our world. GAC's market-focused efforts provide precise electromechanical and electronic engine devices and speed control systems globally.

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