



# PERKINS® 4000 Series Repowering MOTORTECH System Upgrade



**MOTORTECH System Upgrades**  
reliable • efficient • worldwide

## ■ General Information

### PERKINS® 4000 Series Repowering

MOTORTECH now offers complete system upgrade for the PERKINS® 4000 series gas engines. Increase reliability and efficiency by adding the following components:

- State of the art MOTORTECH MIC4 series ignition controller
- High performance ignition coils
- Easy to understand HMI module of the AIO controller
- All modules pre-mounted and wired in optional enclosure for easy installation
- DetCon20 detonation monitoring system for knock detection and control
- Precise mixture control with VariFuel2 air/gas mixer with throttle body with integrated stepper motor, controlled by VariStep3 stepper motor driver
- MOTORTECH's proven AlphaRail system for ignition wiring



### Benefits of the upgrade at a glance

#### Before

##### Ignition System: ALTRONIC® DISN 800

- Primary energy 160/180 mJ
- Set spark duration
- No connection to controller

##### Mixture Control: mechanical

- No free access
- No remote access

##### Detonation Control: none

- No knock detection

##### Wiring Rail: not applied (TESI Design)

- complex disassembly of all individual components during maintenance and repairs, wiring is loosely attached to the motor and is not protected against vibration

#### After

##### Ignition System: Digital Ignition Controller MIC4

- Primary energy 300 mJ
- Spark duration can be freely customized
- Connection to controller and mixture control

##### Mixture Control: VariFuel2 Air/Gas Mixer

- Automated configuration of mixture control (reduces consumption)
- Free access to entire power range of mixture control in automatic operation
- Cylinder benches can be individually compared
- Quieter engine operation
- Remote access possible (lower maintenance costs)

##### Detonation Control: DetCon20 Anti-Knock Controller with MIC4

- Delay of ignition time if knocking is detected (reduces engine damage)

##### Ignition Wiring Rail: AlphaRail

- It is possible to swap individual ignition components, resulting in material cost savings, rails are filled with special foam to ensure that all wires are separated from ground and will not vibrate

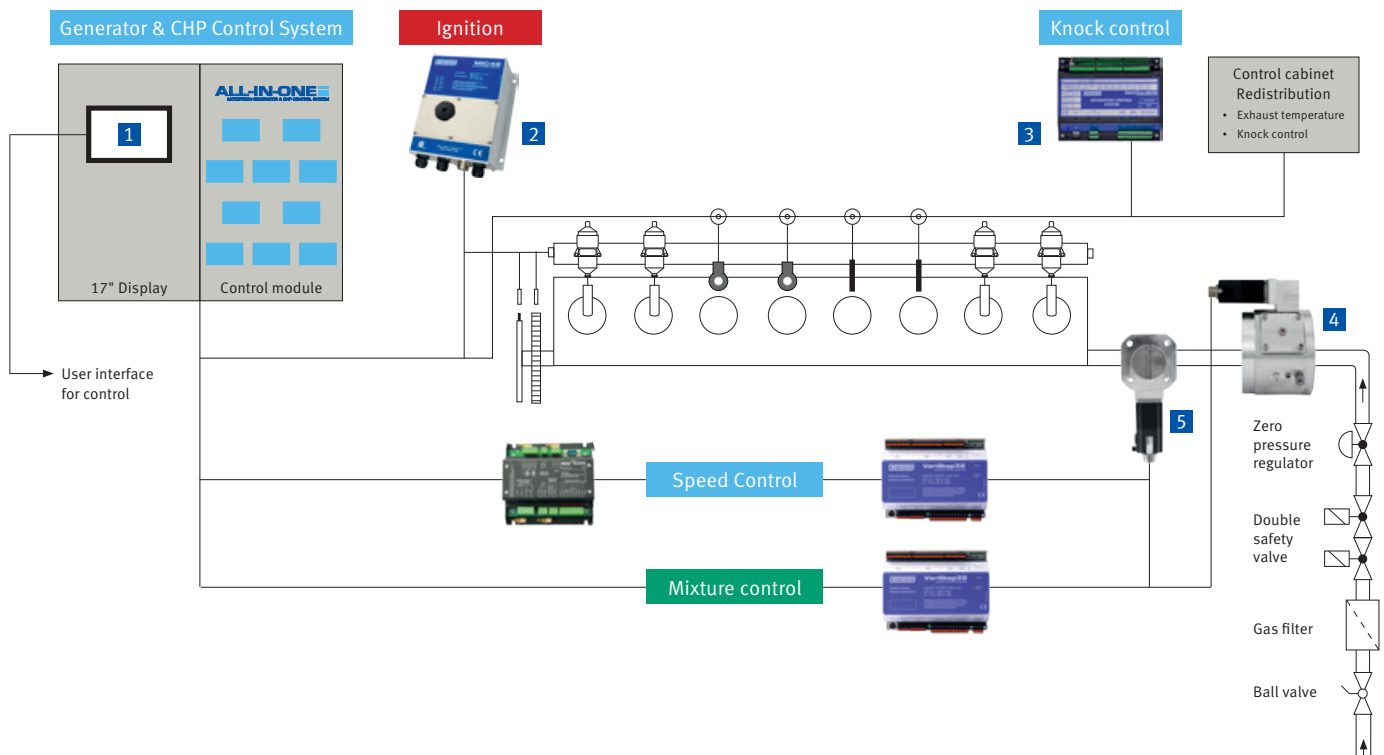
# System Overview



Sample image – Actual product may differ



## System Overview



# Components

## 1 ALL-IN-ONE MOTORTECH GENERATOR & CHP CONTROL SYSTEM

ALL-IN-ONE is a complete gas engine management system (upper controller). It allows you to monitor, control, regulate and protect your entire system. This controller will open new cost reduction possibilities in the service sector, thanks to the remote data access and long distance data transmission features. All system parameters, performance and historical data can be transferred via modem, internet or SMS. These features will significantly increase your customer's system availability.

- Engine monitoring (P, T, p, min-1, etc.)
- Lean Burn control
- Speed measurement and control
- CAN Bus Interface
- Extendable up to 32 modules
- Binary input (status LED on board)
- Binary output (status LED on board)
- Analog input (mA, PT100, NiCr-Ni, etc.)
- Analog output (mA, V)

- Alarm list records and historial data
- 7 levels of password protection
- Remote control via modem, internet, GMS connection
- SMS, e-mail, and warning call service



## 2 MIC4 MOTORTECH IGNITION CONTROLLER

The ignition controllers of the MIC4 series convince with a future oriented electronical concept for morepower and a significantly higher degree of efficiency. High ignition energy, accurate spark timing and diversified online diagnostics help to improve engine efficiency, spark plug life and availability of the equipment under the strictest emission regulations. The controller is fully customer configurable via Laptop.

- Adjustable spark duration and intensity
- Constant spark intensity via adjusted duration
- 300mJ primary energy
- Ignition diagnostics (primary and secondary)

- Fault memory with trend data
- Integrated CANopen and Modbus RTU interface
- Easy access per USB port





## Components



### 3 DetCon MOTORTECH DETONATION CONTROL SYSTEM

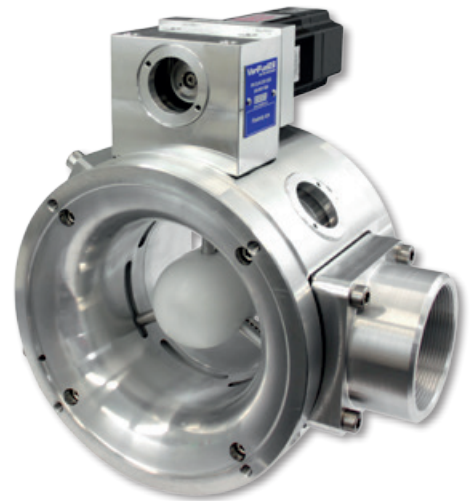
The DetCon20 control device offers complete protection for gas, diesel, and dual fuel engines with 2 to 20 cylinders. It is microprocessor-controlled, recognizes any knocking early on and sends an analog signal (4-20 mA/0-5 V) to the ignition system to shift the ignition timing to “retard” in a linear function. A signal for load reduction or, ultimately, a stop signal is sent to the motor controller if the knocking cannot be eliminated. CAN Bus Interface included.



### 4 VariFuel2 MOTORTECH AIR/GAS MIXER

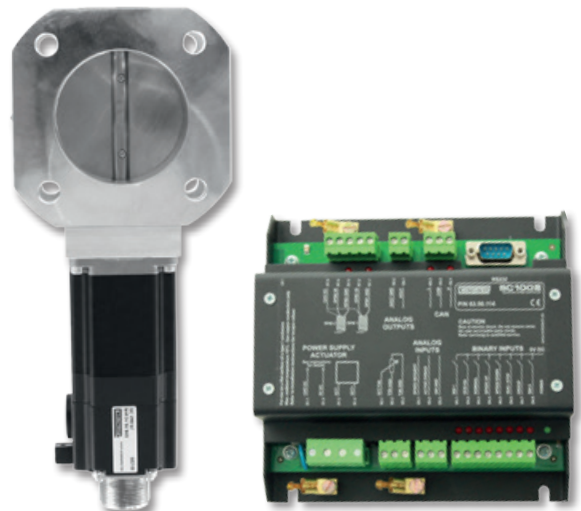
VariFuel2 is a variable high-tech venturi air mixer that constantly adjusts to fuel changes and allows the engine to work at maximum efficiency. The series 100, 140, 200, 250, 300 and 350 are suitable for engines with an air requirement of up to 12.000 m<sup>3</sup>/h. Connected to a mixture controller — lean-burn or stoichiometric — it precisely regulates the mixture. It is particularly suited for applications with constant change in the calorific value of the fuel.

The VariFuel2 air/fuel ratio mixer is driven by a high-precision stepper motor. Different flow inhibitors and variable intake and outlet configurations allow for the air/fuel ratio mixer to be flexibly adjusted to the relevant requirements.



### 5 Speed Control Systems

The throttles are equipped with an integrated stepper motor, eliminating linkage components. All moving parts are made of stainless steel to survive in the harshest environments including H<sub>2</sub>S. The SC100 guarantees precise and fast speed control of industrial gas engines in variable load applications (island operation) and precise load control in network parallel operation.



## ■ Components



### High Performance Ignition Coils

Several EPOXY ignition coils with different ignition characteristics are available for unshielded applications. These coils feature a screw type high voltage termination and are designed to function with the appropriate high voltage indication systems.



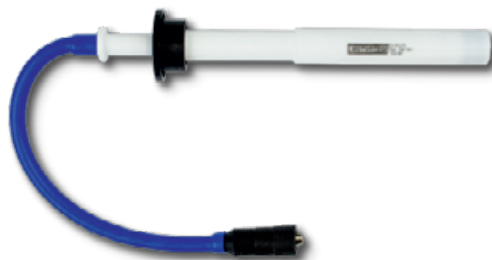
### Ignition Wiring Rails

MOTORTECH stainless steel, vibration resistant rail assembly will withstand any harsh environment commonly found in oil & gas industry. The proven design is made for engine manufacturers and the global aftermarket.

Do not go low-tech and take the risk of engine down time because of equipment being under repair. Eliminate the need for constant rewiring, connector exchanges or straightening out weak and bent aluminum wiring rails.

### DENSO® High Performance Spark Plugs

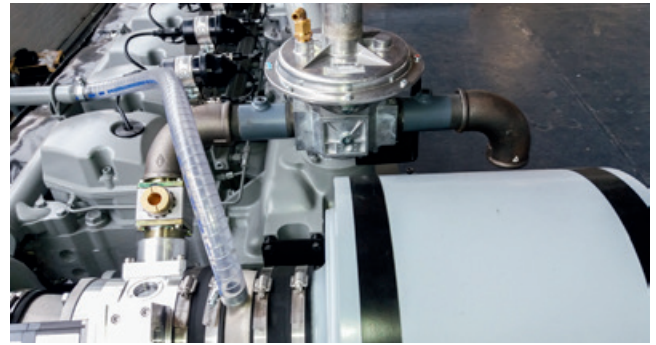
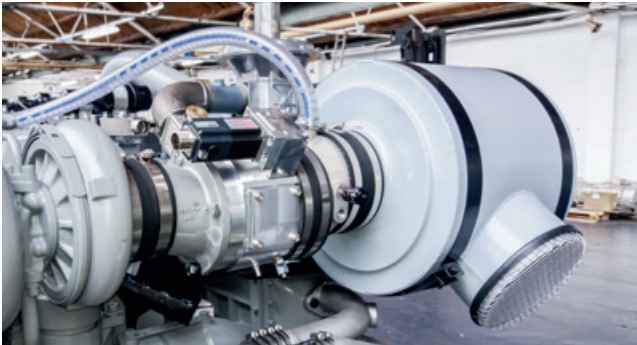
The unique and specialist technology used in the Iridium Saver and Iridium Saver Performer spark plugs range extends their lifespan, making them ideal for high-compression lean-burn engines. Iridium Saver and Iridium Performer spark plugs also help to maximise engine performance and deliver extra durability. Because they require minimal maintenance compared to standard plugs, Iridium Saver and Iridium Saver Performer spark plugs increase service interval times.



### PolyMot™ Spark Plug Leads

MOTORTECH's PolyMot™ spark plug lead was globally patented in 1996. Since then more than one million leads were manufactured to this design. These spark plug leads are unique and offer several advantages when being compared to the OEM or aftermarket competition. The unique structure has achieved tremendous reliability records in the field.

## ■ Components



## VariStep3

MOTORTECH STEPPER MOTOR DRIVER

The stepper motor driver control developed by MOTORTECH guarantees the ideal control of the various types of MOTORTECH VariFuel2 air/gas mixers and throttle bodies with integrated stepper motor.

- Precise mixer and throttle adjustment due to microstep operation
- Very fast response times
- Increased power output provides high torque and quick movement even when driving big stepper motors
- Accelerated reference run
- LEDs displaying unit status and activity
- Combination of several units without signal amplifier/splitter
- Integrated CANopen and Modbus RTU interface
- Configuration via MICT software

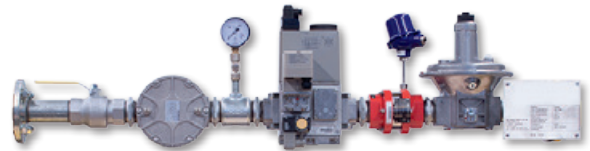


- Error data logging for improved diagnostic options
- Compact design
- Plug-in terminals
- Easy access to connectors and switches
- Switch board installation on DIN rail

## Gas Train

MOTORTECH supplies complete gas trains for use on optimized gas engines with different gas types. The customer receives a tailor-made system solution according to the application.

- Design according to motor type and performance data
- Vibration-tested multiple actuators
- Use of energy-efficient fittings
- Check for function and tightness
- Welding parts are tested for strength, sand blasted and fired




- X-ray inspection of all welded joints and seams
- Electrical wiring
- Solutions for all gas types
- Ready-to-connect system



-  Headquarter
-  Office
-  Sales Partner

 **MOTORTECH GmbH**  
Hogrevestr. 21-23  
29223 Celle  
Germany  
Phone: +49 (5141) 93 99 0  
Fax: +49 (5141) 93 99 99  
[www.motortech.de](http://www.motortech.de)  
[sales@motortech.de](mailto:sales@motortech.de)

 **MOTORTECH Americas, LLC**  
1400 Dealers Avenue, Suite A  
New Orleans, LA 70123  
USA  
Phone: +1 (504) 355 4212  
Fax: +1 (504) 355 4217  
[www.motortechamericas.com](http://www.motortechamericas.com)  
[info@motortechamericas.com](mailto:info@motortechamericas.com)

 **MOTORTECH Shanghai Co. Ltd.**  
Room 1018 Enterprise Square,  
No. 228 Meiyuan Road,  
Zhabei District, 200070 Shanghai  
China  
Phone: +86 (21) 6380 7338  
[www.motortechshanghai.com](http://www.motortechshanghai.com)  
[info@motortechshanghai.com](mailto:info@motortechshanghai.com)



Distribution partner for DENSO spark plugs



P/N 01.05.003-EN | Rev.10/2017 | MOTORTECH PERKINS® 4000 Series Repowering

#### Copyright

The copyright for all materials used in this MOTORTECH publication is reserved. Any kind of duplication or use of objects such as pictures or texts in other electronic or printed publications without approval by MOTORTECH is not permitted.

#### Trademark Information

MOTORTECH products and the MOTORTECH logo are registered and/or common law trademarks of MOTORTECH GmbH.

All OEM names and part numbers shown are for reference purposes only. All trademarks, logos and symbols used or shown in this MOTORTECH publication are exclusive objects to the right of their owners and are used for reference purposes only.

Distribution: