

APPLICATION GUIDE

For MWM[®]/DEUTZ[®] Gas Engines



GAS ENGINE TECHNOLOGY

reliable • efficient • worldwide

Ignition Coils

Ignition Coils



■ ALTRONIC® Style ignition coil

- (+) ground
- For use with D.I.S. ignition controllers
P/N 1214 0986 (791508-102), 1215 2810 (791506-102) e.g.
- For G/TBG 232, G/TBG 234, G/TBG 604 series

P/N 06.50.053

Equivalent to:

MWM®/DEUTZ® P/N	1215 3964
ALTRONIC® P/N	291001



■ ALTRONIC® Style ignition coil

- (-) ground
- For use with DISN and TEM-ZS ignition controllers
P/N 1214 1847 (791816-104C), 1229 8101, 1232 0993 e.g.
- For G/TBG 232, G/TBG 234, G/TBG 604, TBG 616, TBG 620, TBG 632, TCG 2016, TCG 2020, TCG 2032 series

P/N 06.50.055

Equivalent to:

MWM®/DEUTZ® P/N	1215 3965
ALTRONIC® P/N	501061

Accessories



■ Ignition coil boot

- For primary side, 180° outlet
- Made of silicone
- Fits ALTRONIC® ignition coil P/N 1215 3964, 291001, 1215 3965, 501061

P/N 06.80.036

Equivalent to:

MWM®/DEUTZ® P/N	1212 8245
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■ Ignition coil boot

- For primary side, 180° outlet
- Made of silicone
- Fits MOTORTECH ignition coil P/N 06.50.053, 06.50.055

P/N 06.80.005

Ignition Coils



Accessories

- **Ignition coil boot**
- For primary side, 90° outlet
- Made of silicone
- Fits ALTRONIC®/MOTORTECH ignition coil P/N 1215 3964, 291001, 1215 3965, 501061, 06.50.053, 06.50.055

P/N 06.80.037



Tools & Test Equipment

- **SparkView high voltage indicator incl. SparkView high voltage clamp**
- For use with spark plug leads

Quick and comfortable monitoring on a running engine makes it possible to detect:

- Wear of spark plugs
- Failure of the ignition system (damaged ignition coil, spark plug lead or ignition controller)
- Faulty compression of a cylinder

P/N 06.90.099-100 For use with spark plug leads



- **Ignition coil tester**
- Professional tool to test all different kinds of ignition coils
- Built in CD ignition, high voltage clamp and a spark gap allow realistic testing
- Incl. standard adaptor kit for ALTRONIC® style ignition coils

Features

- 110/230 VAC powered
- Built-in CD ignition
- Primary voltage adjustable with potentiometer
- Built-in inductive voltage clamp
- Variable spark gap
- Grounding probe for surface scan
- BNC connector for connection of an oscilloscope
- Various adaptor kits for different ignition coils included
- Packaged in rigid portable aluminum case

P/N 06.98.054



■ Pickups & Trigger Drives

Pickups



■ Hall effect pickup – Active Low

- Thread size 5/8-18 UNF
- 2.50 in. length
- For use with D.I.S. and DISN ignition controllers
P/N 1214 0986 (791508-102), 1214 1847 (791816-104C) e.g.
- For G/TBG 232, G/TBG 234, G/TBG 604 series e.g.

Equivalent to:

P/N 66.60.002-250 MWM®/DEUTZ® P/N 1215 3985
791050-2



■ Hall effect pickup – Active Low

- Thread size 5/8-18 UNF
- 4.50 in. length
- For use with D.I.S. and DISN ignition controllers
P/N 1214 0986 (791508-102), 1214 1847 (791816-104C) e.g.
- For G/TBG 232, G/TBG 234, G/TBG 604 series e.g.

Equivalent to:

P/N 66.60.002-450 MWM®/DEUTZ® P/N 1214 1858
ALTRONIC® P/N 791050-4



■ Active pickup

- Thread size M18x1
- 4.50 in. length
- For use with TEM-ZS ignition controllers P/N 1229 8101, 1232 0993 e.g.
- For TBG 616, TBG 620, TBG 632, TCG 2016, TCG 2020, TCG 2032 series e.g.

Equivalent to:

P/N 66.60.023-450 MWM®/DEUTZ® P/N 1229 9989
ALTRONIC® P/N 791037-4

■ Spark Plug Leads & Extensions



Spark Plug Leads

■ Spark plug lead

- Spark plug connector made of silicone
- Fits spark plug P/N 0426 9126, 14GZ6-77-2, B4321 e.g.
- Fits ignition coil P/N 1247 9550 e.g.
- For TCG 1015, TCG 2015 series e.g.

P/N 06.85.730-10 Equivalent to: MWM®/DEUTZ® P/N 0426 9082

Optional to P/N 06.85.730-10

■ PolyMot™ spark plug lead

- Spark plug connector made of Teflon®
- Fits spark plug P/N 0426 9126, 14GZ6-77-2, B4321 e.g.
- Fits ignition coil P/N 1247 9550 e.g.
- For TCG 1015, TCG 2015 series e.g.



P/N 06.85.949-10

■ PolyMot™ spark plug lead

- Spark plug connector made of Teflon®
- Fits spark plug P/N 1215 3992, RN79G-015, GE3-1 e.g.
- Fits ignition coil P/N 1215 3964, 291001, 1215 3965, 501061, 06.50.053 e.g.
- For G/TBG 232, G/TBG 234 series

P/N 06.85.320H-18 Equivalent to: MWM®/DEUTZ® P/N 0009 1424

■ PolyMot™ spark plug lead

- Spark plug connector made of Teflon®
- Fits spark plug P/N 1215 3992, RN79G-015, GE3-1 e.g.
- Fits ignition coil P/N 1215 3965, 501061, 06.50.055 e.g.
- For TBG 441 series

P/N 06.85.231 Equivalent to: MWM®/DEUTZ® P/N 1228 1191,
0009 1425



■ Spark Plug Leads & Extensions



Spark Plug Leads

- **PolyMot™ spark plug lead**
- Spark plug connector made of Teflon®
- Fits spark plug P/N 1242 0290, RB75WPCC-1, GL3-3 e.g.
- Fits ignition coil P/N 1215 3965, 501061, 06.50.055 e.g.
- For TBG 616, TBG 2016 series

Equivalent to:
P/N 06.85.310H-11 MWM®/DEUTZ® P/N 1227 8370,
 0009 1426



- **PolyMot™ spark plug lead**
- Spark plug connector made of Teflon®
- Fits spark plug P/N 1242 0290, RB75WPCC-1, GL3-3 e.g.
- Fits ignition coil P/N 1215 3965, 501061, 06.50.055 e.g.
- For G/TBG 604, TBG 620, TCG 2020 series

Equivalent to:
P/N 06.85.179-20 MWM®/DEUTZ® P/N 1230 0136,
 0009 1423

Accessories for Spark Plug Leads



- **Silicone seal rings**
- For PolyMot™ spark plug Leads
- Pack of 100 pcs.

Fits Spark Plug Lead

P/N 06.84.033-100	MOTORTECH P/N	06.85.949-10
P/N 06.84.059-100	MOTORTECH P/N	06.85.231, 06.85.320H-18
P/N 06.84.040-100	MOTORTECH P/N	06.85.310H-11, 06.85.179-20

■ Spark Plug Leads & Extensions



Wiring Rails

■ Wiring Rails for MWM® TBG 620, TCG 2016 and TCG 2020 Series

- Delivery with MOTORTECH ignition coil P/N 06.50.055, equivalent to MWM® P/N 1215 3965 (ALTRONIC® P/N 501061) and compatible with ZS ignition controllers
- Individually replaceable
- Rail pro les made of aluminum

TBG 620 V16	Equivalent to:		
P/N 1229 9422-MOT	MWM®/DEUTZ® P/N	1229 9422	
P/N 1229 9443-MOT	MWM®/DEUTZ® P/N	1229 9443	

TCG 2016 V08 C	Equivalent to:		
P/N 1232 3581-MOT	MWM®/DEUTZ® P/N	1232 3581	
P/N 1232 3582-MOT	MWM®/DEUTZ® P/N	1232 3582	

TCG 2016 V12 C	Equivalent to:		
P/N 1232 3536-MOT	MWM®/DEUTZ® P/N	1232 3536	
P/N 1232 3761-MOT	MWM®/DEUTZ® P/N	1232 3761	
P/N 1232 3537-MOT	MWM®/DEUTZ® P/N	1232 3537	



TCG 2016 V16 C	Equivalent to:		
P/N 1232 3762-MOT	MWM®/DEUTZ® P/N	1232 3762	
P/N 1232 3480-MOT	MWM®/DEUTZ® P/N	1232 3480	

TCG 2020 V12 C	Equivalent to:		
P/N 1232 3818-MOT	MWM®/DEUTZ® P/N	1232 3818	1247 9560
P/N 1232 3819-MOT	MWM®/DEUTZ® P/N	1232 3819	1247 9562

TCG 2020 V16 C	Equivalent to:		
P/N 1232 3822-MOT	MWM®/DEUTZ® P/N	1232 3822	
P/N 1232 3823-MOT	MWM®/DEUTZ® P/N	1232 3823	

■ Spark Plugs & Accessories

Spark Plugs (M14x1.25 Thread Size – 0.750 in. Thread Reach)



- **CHAMPION® spark plug**
- Fine wire electrode (Au/Pd)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural gas
- For G/TBG 232, G/TBG 234 series

P/N RN79G-015

Equivalent to:

MWM®/DEUTZ® P/N

1215 3992



Optional to P/N RN79G-015

- **DENSO® spark plug**
- J-type electrode (Ir/Pt)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural gas

P/N GE3-1



Optional to P/N RN79G-015

- **DENSO® spark plug**
- J-type electrode (Ir/Ir)
- HEX 13/16 in. (20.8 mm)
- Recommended for special gas

P/N GE3-5



- **MOTORTECH MHP spark plug**
- J-type electrode (Ir/Ir)
- HEX 5/8 in. (16.0 mm)
- Recommended for natural/special gas
- For TCG 1015, TCG 2015, G/TBG 232, G/TBG 234 series

P/N B4321 ¹⁾

Equivalent to:

MWM®/DEUTZ® P/N

0426 9126,

14GZ6-77-2,

0422 9132, 14GZ3

¹⁾ Due to longer insulator of B4321, a special spark plug lead is required when used on G/TBG 232, G/TBG 234 series. Please consult factory.

Spark Plugs & Accessories



Spark Plugs (M18x1.5 Thread Size - 0.750 in. Thread Reach)

■ CHAMPION® spark plug

- J-type electrode (Ir/Pt)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural gas
- For G/TBG 604, TBG 616, TBG 620 series

P/N RB75WPCC-1 Equivalent to:
MWM®/DEUTZ® P/N 1242 0290,
1230 1248,
0117 9705



■ BERU® spark plug

- J-type electrode (Ir/Pt)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural gas
- For G/TBG 604, TBG 616, TBG 620 series

P/N 18GZ5-77-2 Equivalent to:
MWM®/DEUTZ® P/N 1242 0480,
1230 1188,
0118 0987



Optional to P/N RB75WPCC-1 & 18GZ5-77-2

■ MOTORTECH MHP spark plug

- J-type electrode (Ir/Ir)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural/special gas

P/N B8324



Optional to P/N RB75WPCC-1 & 18GZ5-77-2

■ DENSO® spark plug

- J-type electrode (Ir/Pt)
- HEX 13/16 in. (20.8 mm)
- Recommended for natural gas

P/N GL3-3



■ Spark Plugs & Accessories

Spark Plugs (M18x1.5 Thread Size - 0.750 in. Thread Reach)



Optional to P/N RB75WPCC-1 & 18GZ5-77-2

- **DENSO® spark plug**
- J-type electrode (Ir/Ir)
- HEX 13/16 in. (20.8 mm)
- Recommended for special gas

P/N GL3-5

Tools



- **Spark plug gap setting tool**
- For easy setting of spark plug gaps
- Basic kit includes M14x1.25 or M18x1.5 thread adaptor
- Required accessory kit needs to be ordered separately

P/N 07.98.120-14
P/N 07.98.120-18

Fits Spark Plugs with Thread Size
M14x1.25
M18x1.5



- **Accessory kit for J-type spark plugs**
- Including base insert and feeler gauge

P/N 07.98.122-A



P/N 07.98.037
P/N 07.98.059
P/N 07.98.034
P/N 07.98.035
P/N 07.98.036

- Feeler gauge clamp
- Feeler gauge, gap 0.008 in./0.20 mm
- Feeler gauge, gap 0.010 in./0.25 mm
- Feeler gauge, gap 0.012 in./0.30 mm
- Feeler gauge, gap 0.014 in./0.35 mm

■ Spark Plugs & Accessories



Tools

■ Spark plug cleaning kit

- Removes oil residues and deposits in the electrode area by high pressure
- Special blasting grit for gentle cleaning of the electrode and thread area
- Only for use with spark plugs without pre-chamber

P/N 44.01.023



■ Extended barrel magnetic spark plug sockets

- 1/2 in. drive

P/N 07.99.022-5-10	HEX 5/8 in. (16.0 mm)	Fits Spark Plug 0426 9126, 14GZ6-77-2, B4321
P/N 07.99.022-4-12	HEX 13/16 in. (20.8 mm)	Fits Spark Plug 1215 3992, 1242 0290, 1242 0480, RB75WPCC-1, 18GZ5-77-2, GL3-3, GL3-5, B8324



■ Spark plug socket for MWM®/DEUTZ® pre-chamber spark plugs

- 1/2 in. drive
- HEX 7/8 in. (22.2 mm)

P/N 07.99.022-6-2



■ Torque wrench

- 1/2 in. drive

P/N 07.98.065



■ Seat & thread reconditioner

- Available for different thread sizes
- 3/4 in. thread reach

P/N 07.98.114-34	Thread Size M14x1.25
P/N 07.98.118-34	M18x1.5



■ Sensor Systems

Tools



- **SparkView high voltage indicator incl. SparkView high voltage clamp**
- For use with spark plug leads

Quick and comfortable monitoring on a running engine makes it possible to detect

- Wear of spark plugs
- Failure of the ignition system (damaged ignition coil, spark plug lead or ignition controller)
- Faulty compression of a cylinder

P/N 06.90.099-100

For use with spark plug leads

Accessories



- **Spark plug gaskets**
- Available for different thread sizes
- Pack of 100 pcs.

P/N 02.85.015-100

Thread size

M14x1.25

Equivalent to

1215 6461

P/N 02.85.016-100

M18x1.5

1221 1061,

0117 4200

P/N 02.85.017-100

M22x1.5



- **Thread lubricant**

- Can 4 oz / 115 g

P/N 07.98.718

Thermocouples

- **Thermocouple**
- Type K (NiCrNi), 180°
- For TBG 616, TBG 620 series

P/N 1229 3602

- **Thermocouple**
- Type K (NiCrNi), 180°
- For TBG 616 series

P/N 1229 6754

- **Thermocouple**
- Type K (NiCrNi), 180°
- For TBG 616, TCG 2016 series

P/N 1229 9487

- **Thermocouple**
- Type K (NiCrNi), 180°
- For TCG 2016 series

P/N 1232 2279

- **Thermocouple**
- Type K (NiCrNi), 180°
- For TBG 616, TBG 620, TCG 2016, TCG 2020 series

P/N 1232 3810



Air/Fuel Ratio Control

VariFuel2-TEM Air/Gas Mixer for TCG 2016 V08 C, V12 C, V16 C



- **The VariFuel2-TEM is a high-tech variable venturi type mixer**
- Easy replacement of original gas mixer without mechanical reconfiguration of the engine
- Plug and play — Connects to existing TEM modules for direct control
- Improved start behavior and optimized performance during operation with special gases
- Low-maintenance components make the constant use of expensive repair sets unnecessary
- Improved regulatory behavior through regulation via the variable fuel ring

P/N 30.45.200-120DG-XA

Equivalent to:

MWM/DEUTZ® P/N 1234 2481
(TCG 2016 V08 C)
1234 2482
(TCG 2016 V12 C,
TCG 2016 V16 C)

Question form to identify your suitable flow body for VariFuel2-TEM Air/Gas Mixer:

VariFuel2 
MOTORTECH AIR/GAS MIXER

Engine manufacturer	Series	Engine model
Nominal speed		
Engine power (kW)	kW value	<input type="checkbox"/> Mechanical <input type="checkbox"/> Electrical
Fuel		
Calorific value of fuel (kWh Nm ³) (or gas analysis)		
Fuel consumption (Nm ³ /h) (data sheet)		
Air consumption (Nm ³ /h)		
AFR Lambda at full load		

Flow Bodies for VariFuel2-TEM Air/Gas Mixer

Need to be ordered separately with each air/gas mixer.

■ **Flowbody for TCG 2016 V08 C**

- Biogas
- Diameter 85.0 mm

P/N 31.01.720-85.0-3

■ **Flowbody for TCG 2016 V08 C**

- Natural gas
- Diameter 70.0 mm

P/N 31.01.720-70.0-3

■ **Flowbody for TCG 2016 V12 C**

- Biogas
- Diameter 60.0 mm

P/N 31.01.720-60.0-3

■ **Flowbody for TCG 2016 V12 C**

- Natural gas
- Diameter 30.0 mm

P/N 31.01.720-30.0-3

■ **Flowbody for TCG 2016 V16 C**

- Biogas
- Diameter 65.0 mm

P/N 31.01.720-65.0-3

■ **Flowbody for TCG 2016 V16 C**

- Natural gas
- Diameter 50.0 mm

P/N 31.01.720-50.0-3



Please note that mentioned flow bodies are specified on basis of available engine data and are for reference only. Please consult the factory or your nearest MOTORTECH Sales Partner to get the correct flow body specified for your engine application.



■ Gas Engine Accessories

Coolant Filtration

- **Bypass filter with stainless steel filter element**
- Cleans and maintains coolant system from rust and contaminants
- Increases water pump life cylinder head efficiency
- Stainless steel filter elements can be cleaned – NO WASTE
- Easy to install and to service – Ideal for retrofitting



P/N 25.00.009-50

- 50 micron element
 - 9 in. length
 - Flow indicator
-



P/N 25.00.009-50-30

- 50 micron element
 - 9 in. length
 - Flow indicator
 - 30 in. stand
-

Repair & Overhaul



Repair and Overhaul Service – With One Year Warranty

Based on years of technical experience MOTORTECH offers a comprehensive repair and overhaul service for almost all popular ignition controllers.

Our economically remanufacturing process covers intensive inspections, parts replacement, extensive reconditioning and full operational test procedures. Within an average of four weeks (depends on customer location) we return a fully functional product that looks as good as new.

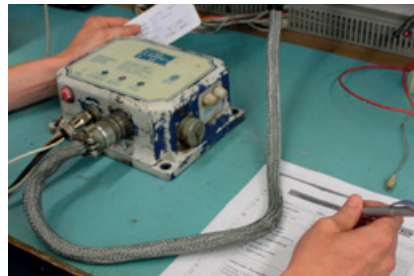
Flatrate Overhaul of:

- ALTRONIC® D.I.S./DISN series
- All MOTORTECH ignition controllers



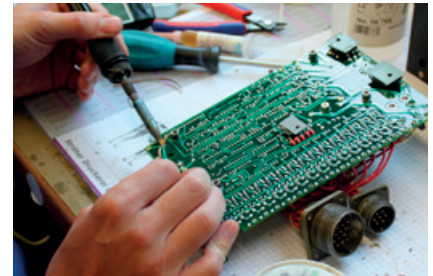
Pre-Cleaning

Pre-cleaning of highly contaminated units.



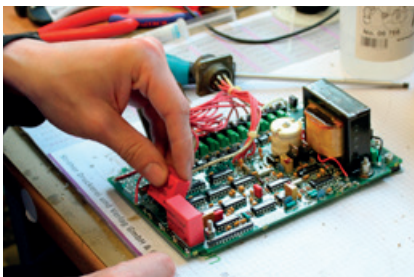
Test Bench Check (Prior to Repair)

Intensive function test and determination of malfunctions.



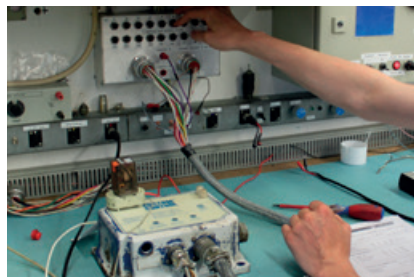
Repair

Replacement of all known plus individual analyzed defects.



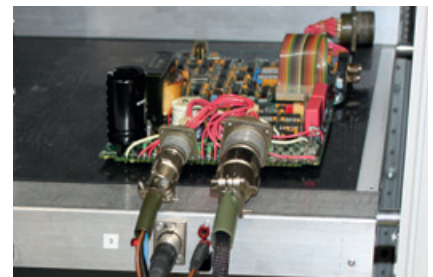
Exchange of Components

Exchange of all defective parts and ageing components.



Test Bench Check (After Repair)

Intensive function test with renewed components.



Burn in Test

48 hours stress test with maximum parameters in a furnace at 50 °C (122 °F).



Assembling

Assembling of the controller. Replacing of the gaskets and protective caps.



Final Test (End of Line Test)

Final operational test to control all functions.



Return to Customer

Creation of a repair and customer report. Units are safely packed for return to customer.

■ Conversion

MWM® Engine Conversion with MOTORTECH Visualization

In order to improve the performance, reliability as well as operation of MWM® gas engines, we recommend retrofitting the existing system with a MOTORTECH ignition system with MIC4 ignition controller and the TEM control system with the MOTORTECH visualization with a 17" color screen.



Benefits of the Conversion at a Glance

Before

Ignition: High Voltage Capacitor Ignition

- Primary energy 130 mJ
- Set spark duration
- Connection to controller

Mixture Control: RMG Mixer

- Higher maintenance and wear costs due to larger number of mechanical components
- No feedback signal

Controller: TEM/Kuhse/Klaschka

- 3 screens
- No remote access
- No free access

Original Wiring Rail

- If ignition/temperature components are defective, entire rails must be changed, leading to high material costs

After

Ignition: Digital Ignition Controller MIC4

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

Mixture Control: VariFuel2 – Air/Gas Mixer

- Low maintenance costs
- Available feedback signal

Controller: ALL-IN-ONE Generator & CHP Control System

- 1 touch screen with MOTORTECH visualization
- Low service costs through remote access
- Free access

Wiring rail: AlphaRail

- It is possible to swap individual ignition/knock control/temperature components, resulting in material cost savings.

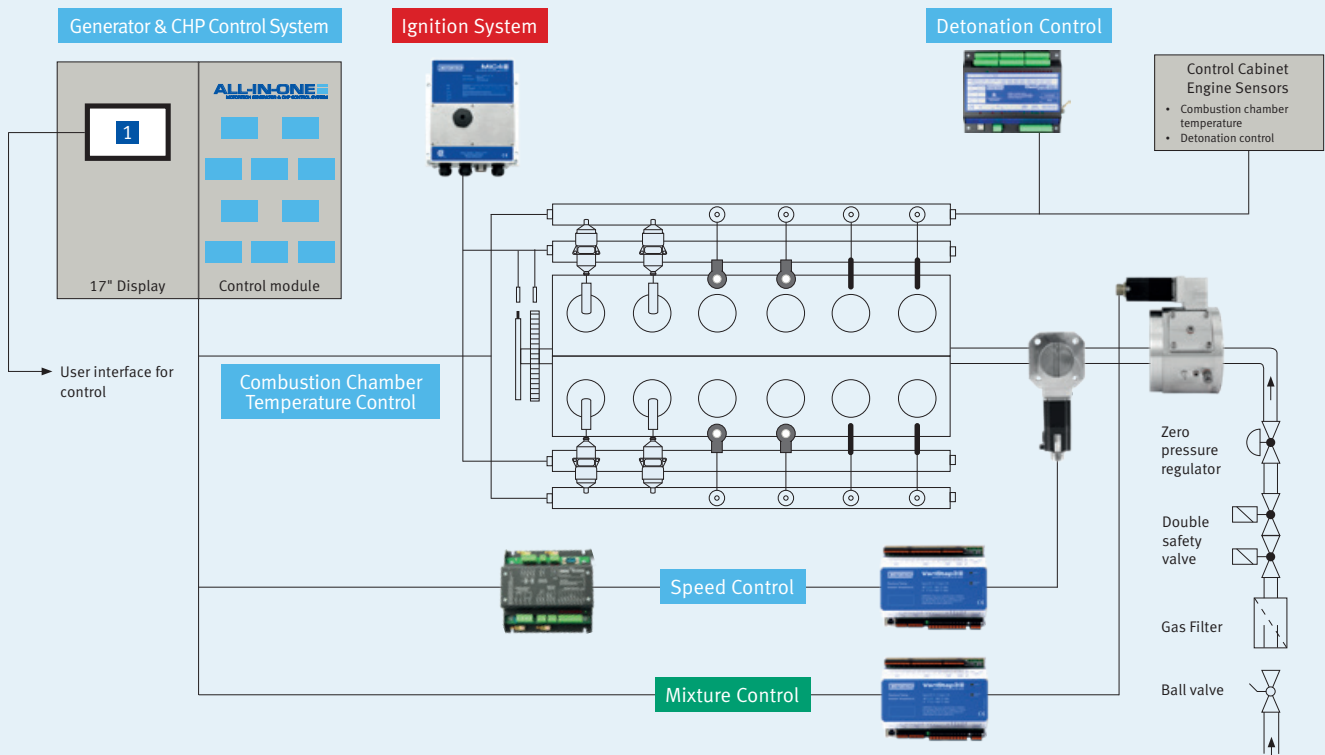
Conversion



Sample model – Fig. identical!



System Overview

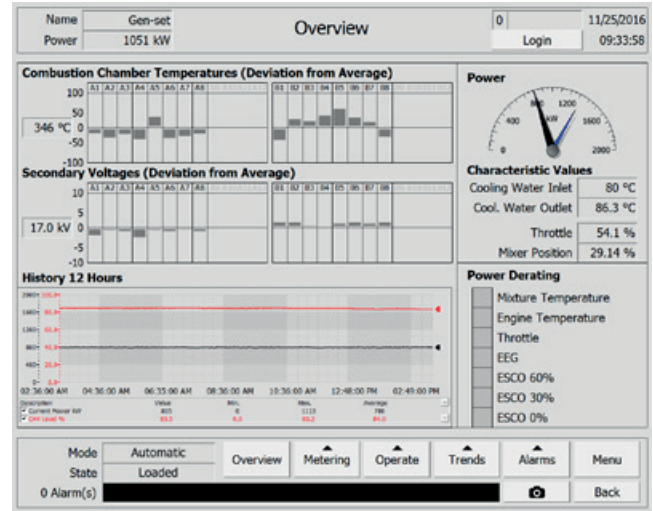


Conversion

1 Visualization – Example Screens

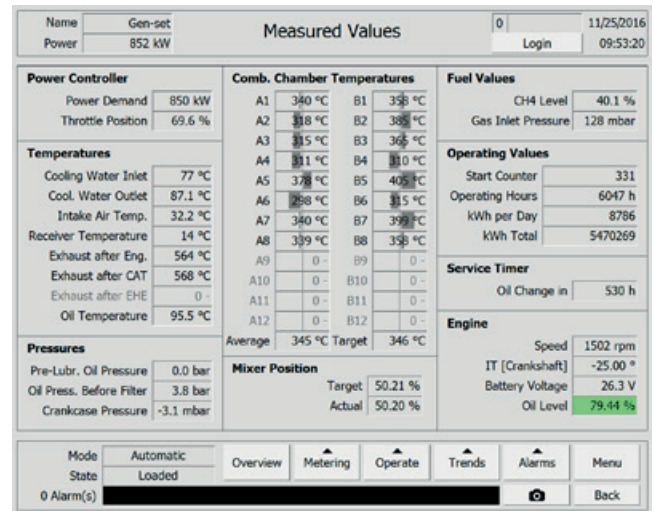
Overview

In the view *Overview* you will obtain information about the combustion chamber temperature at a glance (deviating from mean value), the secondary voltages (deviating from mean value) as well as the history of the last 12 hours. The runtime diagram, under *Power* shows the current gen-set power as well as the methane level of the supplied gases for the last 12 hours under CH4 level. Through the meter's *Power* indicator, you will also obtain information about the current gen-set power in comparison with the power demand as well as an overview of cooling water temperature and the position of the throttle and the mixer.



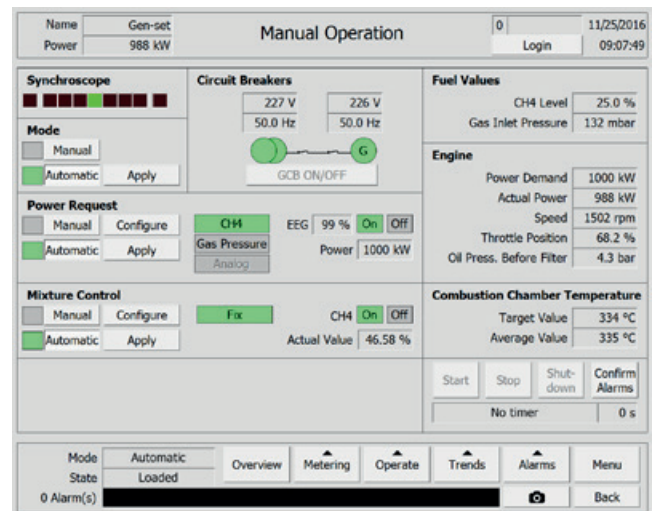
Metering – Measured value

In the view *Measured Values* you will obtain an overview of all current actual and set values that are relevant for the control and monitoring of the gen-set. The section *Operating Values* shows the current system values. The parameters starting value, operating hours and kWh refer to the latest time point at which the parameters concerned were reset in the gen-set controller. The service timer shows when the relevant activities are to be carried out in accordance with the set service timer. You can adjust the service timer *Oil Change* only after an oil change.



Manual Operation

In the view *Manual Operation* you can manually control the gen-set as well as set the gen-set controller into automatic operation. All relevant parameters for manual operation are displayed. The green status box displays the current operation mode of the gen-set controller.



Generator & CHP Control System



ALL-IN-ONE MOTORTECH GENERATOR & CHP CONTROL SYSTEM

For monitoring, controlling, regulating and system protection. ALL-IN-ONE is an expandable controller for both single and multiple gen-sets operating in standby or parallel modes, especially in cogeneration (CHP) and other complex applications.

Modular design (consisting of AIO controller and display unit) allows easy installation with the ability to add many different extension modules designed to suit individual customer requirements.

Built-in synchronizing, digital isochronous load sharing and Air/Fuel Ratio functions (requires additional dongle) allow a total integrated solution for gen-sets in standby, island, parallel or mains parallel. Native co-operation of up to 32 gen-sets is a standard feature.

AIO supports many standard ECU (electronic control unit) types and is specially designed to easily integrate new ones. A powerful graphic display with user-friendly controls allows any user whatever their ability to find the information they need. The display on the basic version is capable of displaying graphical languages (e.g. Chinese).



Benefits

- Support of engines with ECU (Electronic control unit)
- Excellent configurability to match customer's needs exactly
- Complete integrated gen-set solution incorporating built-in PLC and signal sharing via CAN bus – minimum external components needed
- Many communication options – easy remote supervising and servicing
- Perfect price/performance ratio
- Gen-set performance log for easy problem tracing
- Air/Fuel Ratio function for lean burn gas engine (requires additional hardware dongle)

Features

- CHP support (programmable PID loops and other built-in PLC functions)
- Support of engines with ECU (J1939, Modbus and other proprietary interfaces); alarm codes displayed in text form
- Automatic synchronizing and power control (via speed governor or ECU)
- Baseload, Import/Export, TempByPower
- Peak shaving

- Voltage and PF control (AVR)
- Generator measurement: U, I, Hz, kW, kVAr, kVA, PF, kWh, kVAh
- Mains measurement: U, I, Hz, kW, kVAr, PF
- Selectable measurement ranges for AC voltages and currents – 120/277 V, 0–1/0–5 A
- Inputs and outputs configurable for various customer needs
- Controller redundancy
- 2× RS232/RS485 interface with Modbus protocol
- Support; Analog/GSM/ISDN/CDMA modem communication support; SMS messages; ECU Modbus interface; secondary RS485 converter is isolated
- Event-based history (up to 1000 records) with customer-selectable list of stored values; RTC; statistic values
- Integrated PLC programmable functions
- Interface to remote display units (3× AIO.Vision-display)
- USB 2.0 slave interface
- Dimensions 284×180 mm (front panel)
- Sealed to IP65

Integrated fixed and configurable protections

- 3 phase integrated generator protections (U + f)
- IDMT overcurrent + shortcurrent protection
- Overload protection
- Reverse power protection
- Earth fault protection
- 3 phase integrated mains protections (U + f)
- Vector shift protection
- All binary/analog inputs free configurable for various protection types: HistRecOnly/ Alarm Only/Alarm + History indication/Warning/ Off load/Slow stop/BreakerOpen&Cooldown/ Shutdown/Shutdown override/Mains protect/ sensor fail
- Phase rotation and phase sequence protection
- Additional 160 programmable protections configurable for any measured value to create customer-specific protections
- Application security

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