ALL-IN-ONE
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.

Integrated functions such as fully automatic synchronization or uninterruptible back-synchronisation in mains parallel operation as well as integrated solutions for multi-unit operation, load sharing or automatic operating hours adjustment of the individual units are standard features of the AIO generator & CHP control system. Up to 32 units can be combined in one group.

AIO supports many standard ECU (electronic control unit) types from which it can read relevant control data via Bus. A powerful graphic display with user-friendly controls allows any operator to find the information they need. The display on the basic version is capable of displaying graphical characters (e.g. Chinese).

Benefits
- Support of engines with ECU (electronic control unit)
- Individually configurable 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 engines (requires additional hardware dongle)

Features
- CHP support (programmable PID control 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 power factor control (AVR)
- Generator measurement: U, I, Hz, kW, kVAR, kVA, PF, kWh, kWhr
- 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
- 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 current protection
- 3 phase integrated mains protections (U + f)
- Vector shift protection
- All binary/analog inputs free configurable for various protection types
- Additional 160 programmable protections configurable for any measured value to create customer-specific protections
- Application security
System Overview

**IntelliMains**
- Import/export
- Load sharing
- Power management
- Grid monitoring
- Running hours optimization

**IntelliPro**
- Designed to meet utility protection requirements
- Combines standard and optional features
- Advanced communications
- Data/event logging

**MainsPro**
- Protective functions
- Free assignment of 5 relay outputs
- 4 binary switches to remotely change operation of the unit
- Last trip recorded in order to provide the evidence of cause of trip

**Mains Circuit Breaker**
- Control
- Reverse synchronization
- Grid monitoring

**Load Monitoring**
- Base load
- Import/export
- Peak shaving

**Generator Circuit Breaker**
- Synchronization control

**Engine Management (ECU Functionality)**
- Speed measurement/control
- Engine monitoring and protection
- Exhaust gas temperature monitoring
- Air/fuel ratio control
- Start/stop routines

**Modem**
- Remote control
- Internet bridge

**GSM**
- Active/passive calls
- SMS service

**PC Monitoring Tool**
- Visualization
- Programming

**IS-AIN8 / IOB8 / I-AOUT8 Modules etc.**
- Digital inputs (80 max)
- Digital outputs (48 max)
- Analog inputs (84 max)
- Analog outputs (33 max)
- All kinds of sensors usable (programmable)
- Status LEDs for In- and outputs

**RS232/RS485**
- Modbus
- Direct PC connection
- Modem connection
- SMS management
- Active calls
- Internet

**Engine**
- 3 Phase monitoring
- Over/under frequency
- Over/under voltage
- Interrupt free reverse synchronizing
- Overload protection
- TempByPower load control
- Reverse power protection
- Load surge protection
- Voltage and PF control (AVR)
Comparison AIO.GAS/AIO.NTC

ALL-IN-ONE.GAS

The ALL-IN-ONE.GAS is an industrial control system for gas generators, which is mainly used in CHP and power generation plants. As the successor model for the ALL-IN-ONE.NTC control, the ALL-IN-ONE.GAS offers more computing power and memory which offers potential for next 5 years. The ALL-IN-ONE.GAS controls, monitors and protects the generator according to defined setpoints and its configuration. Preconfigured functions, scalable and configurable I/Os, a large built-in PLC interpreter, extensive communication options and easy-to-change software enable the controller to be adapted to different applications with minimum effort.

General Features

- Predefined adjustable functions for gas gen-set
- Large built-in PLC interpret to suit individual needs and design demanding applications like CHP’s
- SIL2 certification for selected channels
- Grid codes requirements support (e.g. VDE-AR-N 4105, BDEW Richtlinien)
- Support wide range of applications – from single to multiple, from island to network parallel operation
- Power management function including new mode of effective engine run in network parallel operation
- Plug&Play support of ALL-IN-ONE.Vision display family
- Automatic synchronization and power control (via speed governor or ECU)
- Baseload, Imp/Exp, TempByPower, Peakshaving, Voltage and PF control (AVR bias output)
- Event-based and PreMortem history with customer selectable list of stored values; RTC; statistic values
- Overspeed and emergency stop detection

Dimensions & Connections

ALL-IN-ONE.GAS

ALL-IN-ONE.NTC
### Comparison AIO.GAS/AIO.NTC

<table>
<thead>
<tr>
<th>Feature</th>
<th>ALL-IN-ONE.GAS</th>
<th>ALL-IN-ONE.NTC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrated PLC</strong></td>
<td>▪ PLC functions:</td>
<td>▪ PLC functions:</td>
</tr>
<tr>
<td></td>
<td>– Up to 32 PID blocks, 16 of them with binary outputs, 16 of them with analogue outputs</td>
<td>– Up to 22 PID blocks, 16 of them with binary outputs, 6 of them with analogue outputs</td>
</tr>
<tr>
<td></td>
<td>– Up to 256 AND/OR functional blocks</td>
<td>– Up to 100 AND/OR functional blocks</td>
</tr>
<tr>
<td></td>
<td>– Up to 48 delay PLC blocks</td>
<td>– Up to 24 delay PLC blocks</td>
</tr>
<tr>
<td></td>
<td>– Up to 32 ana switch PLC blocks</td>
<td>– Up to 16 ana switch PLC blocks</td>
</tr>
<tr>
<td></td>
<td>– Up to 80 comparators PLC blocks</td>
<td>– Up to 40 comparators PLC blocks</td>
</tr>
<tr>
<td></td>
<td>▪ Up to 256 PLC BOUT can be used</td>
<td>▪ Up to 64 PLC setpoints can be used</td>
</tr>
<tr>
<td></td>
<td>▪ Up to 96 PLC AOUT can be used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Up to 128 PLC setpoints can be used</td>
<td></td>
</tr>
<tr>
<td><strong>ECU support</strong></td>
<td>▪ Supports up to 8x ECU blocks</td>
<td>▪ Supports up to 3x ECU blocks</td>
</tr>
<tr>
<td></td>
<td>– 128 analogue inputs over J1939</td>
<td>– 48 analogue inputs over J1939</td>
</tr>
<tr>
<td></td>
<td>– 128 binary inputs over J1939</td>
<td>– 48 binary inputs over J1939</td>
</tr>
<tr>
<td></td>
<td>– 16 analogue outputs over J1939</td>
<td>– 12 analogue outputs over J1939</td>
</tr>
<tr>
<td></td>
<td>– 64 binary outputs over J1939</td>
<td>– 48 binary outputs over J1939</td>
</tr>
<tr>
<td><strong>Support of Start-Up Syncronization (SUS)</strong></td>
<td>▪ Dedicated for installations where multiple sets shall be synced to common bus in very short time</td>
<td>▪ No support</td>
</tr>
<tr>
<td></td>
<td>▪ Dedicated for applications where e.g. soft magnetizing of a transformer is needed</td>
<td></td>
</tr>
<tr>
<td><strong>Communication plug-in modules</strong></td>
<td>▪ Support of 2 I-CB modules</td>
<td>▪ Support of 1x I-CB modules</td>
</tr>
<tr>
<td></td>
<td>AIO-Gas does support connection of up to 2x I-CB modules, means there can be simultaneous:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– I-CB Modbus, acting as a Modbus master</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– I-CB for e.g. MWM® engines with TEM control system</td>
<td></td>
</tr>
<tr>
<td><strong>Number of supported modules</strong></td>
<td>▪ Up to 15 AIN8 or AIN8TC</td>
<td>▪ Up to 10 AIN8 or AIN8TC</td>
</tr>
<tr>
<td>(new I/O modules)</td>
<td>▪ Up to 15 IO8/8 modules</td>
<td>▪ Up to 12 IO8/8 modules</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Support of the new AIO9/1 module</strong></td>
<td>▪ 4 analogue inputs for battery measurement up to 60 V</td>
<td>▪ 4 analogue inputs for battery measurement up to 60 V</td>
</tr>
<tr>
<td></td>
<td>▪ 4 analogue inputs for thermocouples measurement</td>
<td>▪ 4 analogue inputs for thermocouples measurement</td>
</tr>
<tr>
<td></td>
<td>▪ 1 analogue output (PWM, mA, V)</td>
<td>▪ 1 analogue output (PWM, mA, V)</td>
</tr>
<tr>
<td><strong>Air/Fuel ratio algorithm</strong></td>
<td>▪ Improved behavior for island applications – faster reaction of the mixer thanks to predefined fixed position</td>
<td>▪ Standard behavior</td>
</tr>
<tr>
<td></td>
<td>▪ Adjustable PID speed – for stoichiometric applications with variable load</td>
<td>▪ Non adjustable PID speed</td>
</tr>
<tr>
<td></td>
<td>▪ 2 independent AFR maps for 2 engine banks (V-engines) or 2 different fuel types (e.g. Biogas or Natural gas)</td>
<td>▪ 1x AFR map</td>
</tr>
<tr>
<td><strong>Languages</strong></td>
<td>multiple languages (minimum 6)</td>
<td>English or English + 1 (depends on size of configuration)</td>
</tr>
</tbody>
</table>
# Ordering Information

## Controllers

<table>
<thead>
<tr>
<th>P/N</th>
<th>Supersedes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50.096</td>
<td></td>
<td>ALL-IN-ONE.GAS controller – universal gen-set controller (incl. AFR control (^1) and AirGate(^3) technology)</td>
</tr>
<tr>
<td>63.50.104</td>
<td>63.50.102</td>
<td>ALL-IN-ONE.NTC controller – universal gen-set controller (incl. AFR control (^1) and AirGate(^3) technology)</td>
</tr>
<tr>
<td>63.50.104-HSS</td>
<td>63.50.102-HSS</td>
<td>ALL-IN-ONE.NTC controller – universal gen-set controller P/N 63.50.104 incl. Plug-on module I-HSS-BIN6/10</td>
</tr>
<tr>
<td>63.50.082</td>
<td></td>
<td>Mini-ALL-IN-ONE controller – universal controller for small gen-sets (incl. AFR control (^2) – for applications up to 75 kWe only)</td>
</tr>
</tbody>
</table>

\(^1\) Requires hardware dongle P/N 63.50.061 or 63.50.062 for activation.

\(^2\) Requires hardware dongle P/N 63.50.085 for activation (for applications up to 75 kWe only).

## Display Units for ALL-IN-ONE.NTC/.GAS Controllers

<table>
<thead>
<tr>
<th>P/N</th>
<th>Supersedes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50.105</td>
<td></td>
<td>ALL-IN-ONE.Vision5 display – 5.7 in color display unit for ALL-IN-ONE.NTC and ALL-IN-ONE.GAS controllers</td>
</tr>
<tr>
<td>63.50.101</td>
<td></td>
<td>ALL-IN-ONE.Vision8 display – 8.0 in color display unit for ALL-IN-ONE.NTC and ALL-IN-ONE.GAS controllers</td>
</tr>
<tr>
<td>63.50.097</td>
<td></td>
<td>ALL-IN-ONE.Vision12 display – 12.0 in color touch display unit for ALL-IN-ONE.NTC and ALL-IN-ONE.GAS controllers</td>
</tr>
<tr>
<td>63.50.129</td>
<td>63.50.115, 63.50.120</td>
<td>ALL-IN-ONE.Vision18 display – 18.5 in color touch display unit for ALL-IN-ONE.NTC and ALL-IN-ONE.GAS controller</td>
</tr>
</tbody>
</table>

## Dongles

<table>
<thead>
<tr>
<th>P/N</th>
<th>Supersedes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50.061</td>
<td></td>
<td>Hardware dongle for ALL-IN-ONE.NTC/.GAS controllers – AFR-PCM&lt;br&gt;Enables single island or single parallel with mains operation&lt;br&gt;■ Air/fuel ratio function for lean burn gas engines</td>
</tr>
<tr>
<td>63.50.062</td>
<td></td>
<td>Hardware dongle for ALL-IN-ONE.NTC/.GAS controllers – AFR-PCM+PMS&lt;br&gt;Enables multiple island parallel or multiple parallel with mains operation&lt;br&gt;■ Power management operation via CAN bus&lt;br&gt;■ Digital load sharing&lt;br&gt;■ Digital VAR sharing&lt;br&gt;■ Optimizing number of running engines: kW, kVA, load percentage or running hours based power management&lt;br&gt;■ Air/fuel ratio function for lean burn gas engines</td>
</tr>
<tr>
<td>63.50.085</td>
<td></td>
<td>Hardware dongle for Mini-ALL-IN-ONE – miniAFR-PCM&lt;br&gt;Enables single island or single parallel with mains operation&lt;br&gt;■ Air/fuel ratio function for lean burn gas engines&lt;br&gt;■ For applications up to 75 kWe only</td>
</tr>
</tbody>
</table>

## AIO Controllers

<table>
<thead>
<tr>
<th>AIO.GAS Controller</th>
<th>P/N 63.50.096</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIO.NTC Controller</td>
<td>P/N 63.50.104</td>
</tr>
<tr>
<td>Mini-AIO Controller</td>
<td>P/N 63.50.082</td>
</tr>
</tbody>
</table>

## Available Display Units for AIO.NTC and AIO.GAS Controllers

| AIO.Vision18 | P/N 63.50.129 |
| AIO.Vision12 | P/N 63.50.097 |
| AIO.Vision8  | P/N 63.50.101 |
| AIO.Vision1  | P/N 63.50.105 |
Other Controllers

<table>
<thead>
<tr>
<th>P/N</th>
<th>Supersedes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50.064</td>
<td></td>
<td>Mains supervision controller – IM-NT</td>
</tr>
<tr>
<td>63.50.064-BTB</td>
<td></td>
<td>Mains supervision controller Bus Tie Breaker – IM-NT BTB</td>
</tr>
<tr>
<td>63.50.064-MCB</td>
<td></td>
<td>Mains supervision controller Mains Circuit Breaker – IM-NT MCB</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>P/N</th>
<th>Supersedes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.50.092</td>
<td></td>
<td>Analog input extension module – I-AIN8</td>
</tr>
<tr>
<td>63.50.002</td>
<td></td>
<td>Analog input extension module – IS-AIN8</td>
</tr>
<tr>
<td>63.50.093</td>
<td>63.50.108</td>
<td>Analog input extension module for thermocouples only – I-AIN8TC</td>
</tr>
<tr>
<td>63.50.118</td>
<td>63.50.005</td>
<td>Input/output extension module – IO8/8</td>
</tr>
<tr>
<td>63.50.007</td>
<td></td>
<td>Analog/binary input/output module – IGS-PTM</td>
</tr>
<tr>
<td>63.50.007-HSS</td>
<td></td>
<td>Analog/binary input/output module P/N 63.50.007 incl. plug-on module I-HSS-BIN8</td>
</tr>
<tr>
<td>63.50.011</td>
<td></td>
<td>AVR interface module – IG-AVRi</td>
</tr>
<tr>
<td>63.50.010-100</td>
<td></td>
<td>Power supply transformer for IG-AVRi module, 100-120 VAC, 50-60 Hz</td>
</tr>
<tr>
<td>63.50.010-230</td>
<td></td>
<td>Power supply for IG-AVRi module, 230-480 VAC, 50-60 Hz</td>
</tr>
<tr>
<td>63.50.054</td>
<td></td>
<td>Analog output module – I-AOUT8</td>
</tr>
<tr>
<td>63.50.075</td>
<td>63.50.006</td>
<td>Modem extension unit – I-LB+</td>
</tr>
<tr>
<td>63.50.112</td>
<td>63.50.022</td>
<td>Internet communication module – IB-NT</td>
</tr>
<tr>
<td>63.50.088</td>
<td></td>
<td>CAN repeater module – I-CR</td>
</tr>
</tbody>
</table>

Sample Control Panel

AIO.GAS Controller
P/N 63.50.096

IG-AVRi
P/N 63.50.011

IG-AVRi trans
P/N 63.50.010-xxx

I-LB+
P/N 63.50.075

IB-NT
P/N 63.50.112

I-AIN8
P/N 63.50.092

IO8/8
P/N 63.50.118

IGS-PTM
P/N 63.50.007

I-AOUT8
P/N 63.50.054
Download now!

All Products at a Glance!
For further Information about the MOTORTECH products get our product guide online.

Scan QR-Code to get to the download page

Once a month the latest news!
Subscription also at www.motortech.de/subscribe.html or send a short request via email: direkt@motortech.de

MOTORTECH GmbH
Hogrevestr. 21-23
29223 Celle
Germany
Phone: +49 (5141) 93 99 0
Fax: +49 (5141) 93 99 99
www.motortech.de
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
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
info@motortechshanghai.com

P/N 01.35.003-EN | Rev. 09/2018 | ALL-IN-ONE

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: