



■ General Information

ALL-IN-ONE

MOTORTECH GENERATOR & CHP CONTROL SYSTEM

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)
- Voltage and power factor 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
- 2x RS232/RS485 interface with Modbus protocol
- Support; Analog/GSM/ISDN/CDMA modem communication support; SMS messages; ECU Modbus interface; secondary RS485 converter is isolated

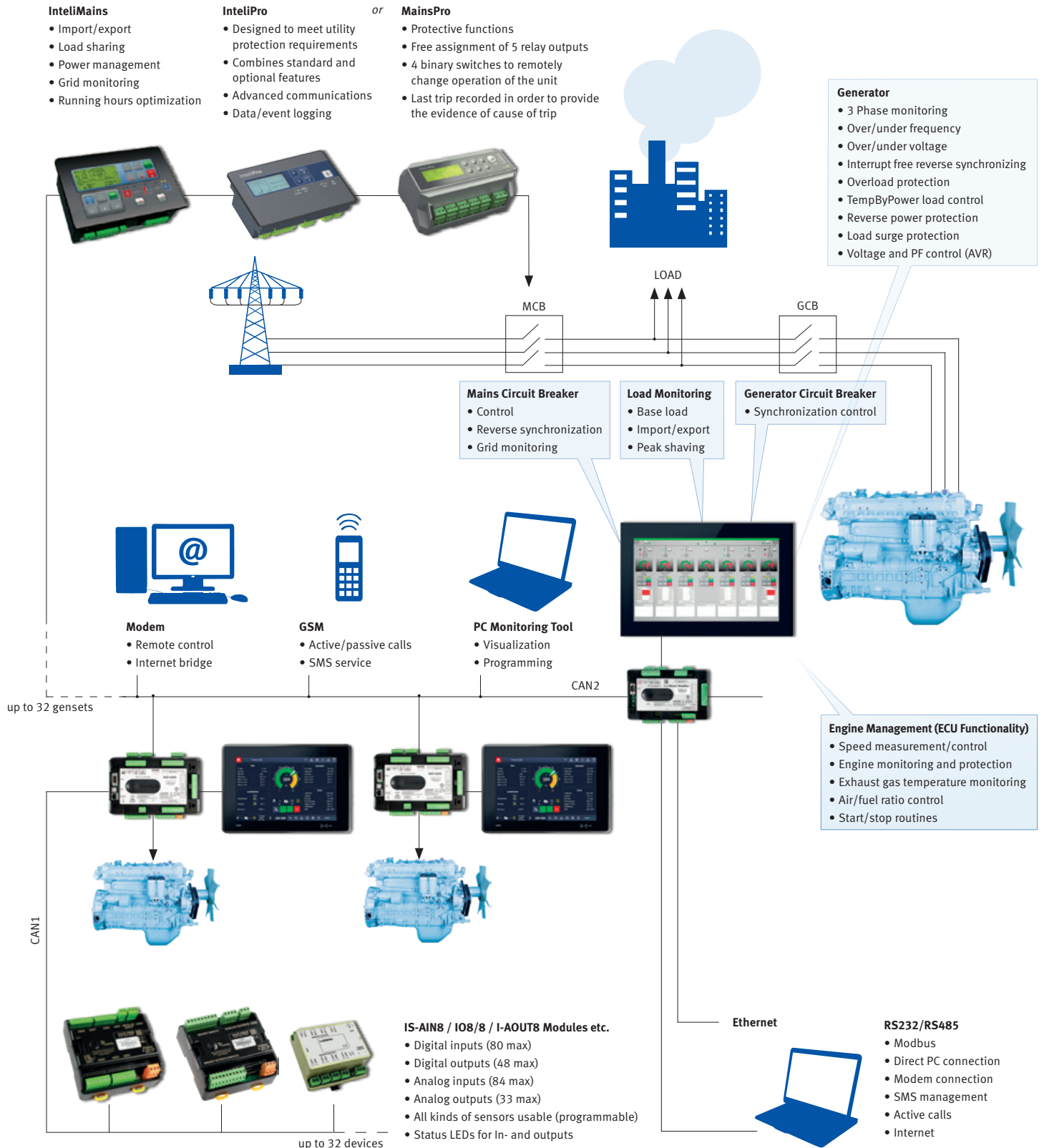
Features

- 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
- 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 (3x 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
- Phase rotation and phase sequence protection
- Additional 160 programmable protections configurable for any measured value to create customer-specific protections
- Application security

System Overview



■ 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.

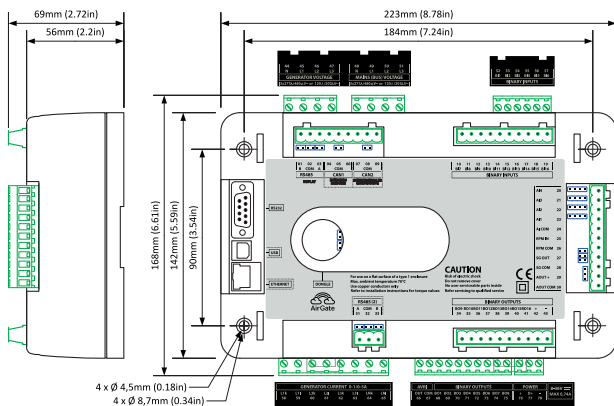


General Features

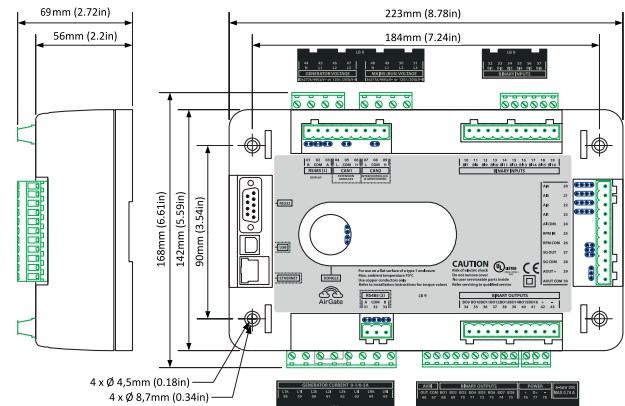
- Predefined adjustable functions for gas gen-set
- Large built-in PLC interpret to suit individual needs and design demanding applications like CHP's
- SIL2 certification for selected channels
- Grid codes requirements support (e.g. VDE-AR-N 4105, BDEW Richtlinien)
- Support wide range of applications – 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



Comparison

Feature	ALL-IN-ONE.GAS	ALL-IN-ONE.NTC
Integrated PLC	<ul style="list-style-type: none"> ■ PLC functions: <ul style="list-style-type: none"> – Up to 32 PID blocks, 16 of them with binary outputs, 16 of them with analogue outputs – Up to 256 AND/OR functional blocks – Up to 48 delay PLC blocks – Up to 32 ana switch PLC blocks – Up to 80 comparators PLC blocks ■ Up to 256 PLC BOUT can be used ■ Up to 96 PLC AOUT can be used ■ Up to 128 PLC setpoints can be used 	<ul style="list-style-type: none"> ■ PLC functions: <ul style="list-style-type: none"> – Up to 22 PID blocks, 16 of them with binary outputs, 6 of them with analogue outputs – Up to 100 AND/OR functional blocks – Up to 24 delay PLC blocks – Up to 16 ana switch PLC blocks – Up to 40 comparators PLC blocks ■ Up to 64 PLC setpoints can be used
ECU support	<ul style="list-style-type: none"> ■ Supports up to 8x ECU blocks <ul style="list-style-type: none"> – 128 analogue inputs over J1939 – 128 binary inputs over J1939 – 16 analogue outputs over J1939 – 64 binary outputs over J1939 	<ul style="list-style-type: none"> ■ Supports up to 3x ECU blocks <ul style="list-style-type: none"> – 48 analogue inputs over J1939 – 48 binary inputs over J1939 – 12 analogue outputs over J1939 – 48 binary outputs over J1939
Support of Start-Up Synchronization (SUS)	<ul style="list-style-type: none"> ■ Dedicated for installations where multiple sets shall be synced to common bus in very short time ■ Dedicated for applications where e.g. soft magnetizing of a transformer is needed 	<ul style="list-style-type: none"> ■ No support
Communication plug-in modules	<ul style="list-style-type: none"> ■ Support of 2 I-CB modules <p>AIO-Gas does support connection of up to 2x I-CB modules, means there can be simultaneous:</p> <ul style="list-style-type: none"> – I-CB Modbus, acting as a Modbus master – I-CB for e.g. MWM® engines with TEM control system 	<ul style="list-style-type: none"> ■ Support of 1x I-CB modules
Number of supported modules (new I/O modules)	<ul style="list-style-type: none"> ■ Up to 15 AIN8 or AIN8TC ■ Up to 15 IO8/8 modules 	<ul style="list-style-type: none"> ■ Up to 10 AIN8 or AIN8TC ■ Up to 12 IO8/8 modules
Support of the new AIO9/1 module	<ul style="list-style-type: none"> ■ 4 analogue inputs for battery measurement up to 60 V ■ 4 analogue inputs for thermocouples measurement ■ 1 analogue output (PWM, mA, V) 	<ul style="list-style-type: none"> ■ 4 analogue inputs for battery measurement up to 60 V ■ 4 analogue inputs for thermocouples measurement ■ 1 analogue output (PWM, mA, V)
Air/Fuel ratio algorithm	<ul style="list-style-type: none"> ■ Improved behavior for island applications – faster reaction of the mixer thanks to predefined fixed position ■ Adjustable PID speed – for stoichiometric applications with variable load ■ 2 independent AFR maps for 2 engine banks (V-engines) or 2 different fuel types (e.g. Biogas or Natural gas) 	<ul style="list-style-type: none"> ■ Standard behavior ■ Non adjustable PID speed ■ 1x AFR map
Languages	multiple languages (minimum 6)	English or English + 1 (depends on size of configuration)

Ordering Information



Controllers

P/N	Supersedes	Description
63.50.096		ALL-IN-ONE.GAS controller – universal gen-set controller (incl. AFR control ¹⁾ and AirGate® technology)
63.50.104	63.50.102	ALL-IN-ONE.NTC controller – universal gen-set controller (incl. AFR control ¹⁾ and AirGate® technology)
63.50.104-HSS	63.50.102-HSS	ALL-IN-ONE.NTC controller – universal gen-set controller P/N 63.50.104 incl. Plug-on module I-HSS-BIN6/10
63.50.082		Mini-ALL-IN-ONE controller – universal controller for small gen-sets (incl. AFR control ²⁾ – for applications up to 75 kWel only)

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 kWel only).**

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

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

Dongles

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



AIO Controllers

AIO.GAS Controller
P/N 63.50.096



AIO.NTC Controller
P/N 63.50.104



Mini-AIO Controller
P/N 63.50.082



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.Vision5
P/N 63.50.105

Ordering Information



Other Controllers

P/N	Supersedes	Description
63.50.064		Mains supervision controller – IM-NT
63.50.064-BTB		Mains supervision controller Bus Tie Breaker – IM-NT BTB
63.50.064-MCB		Mains supervision controller Mains Circuit Breaker – IM-NT MCB

Accessories

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

Sample Control Panel

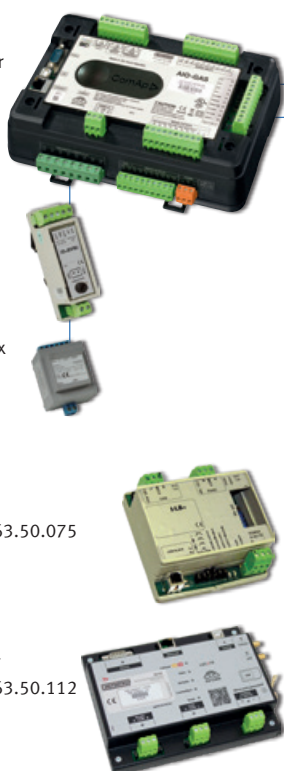
AIO.GAS Controller
P/N 63.50.096

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

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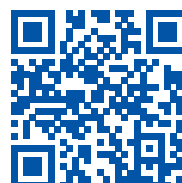


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