

General Information



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 un-interruptible 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).



Ready for **VDE-AR-N 4105**,
VDE-AR-N 4110 and **G99***

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



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* In combination with mains decoupling relay P/N 63.50.139 – Type tested (TT) compliance according ENA EREC G99

System Overview



InteliMains

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

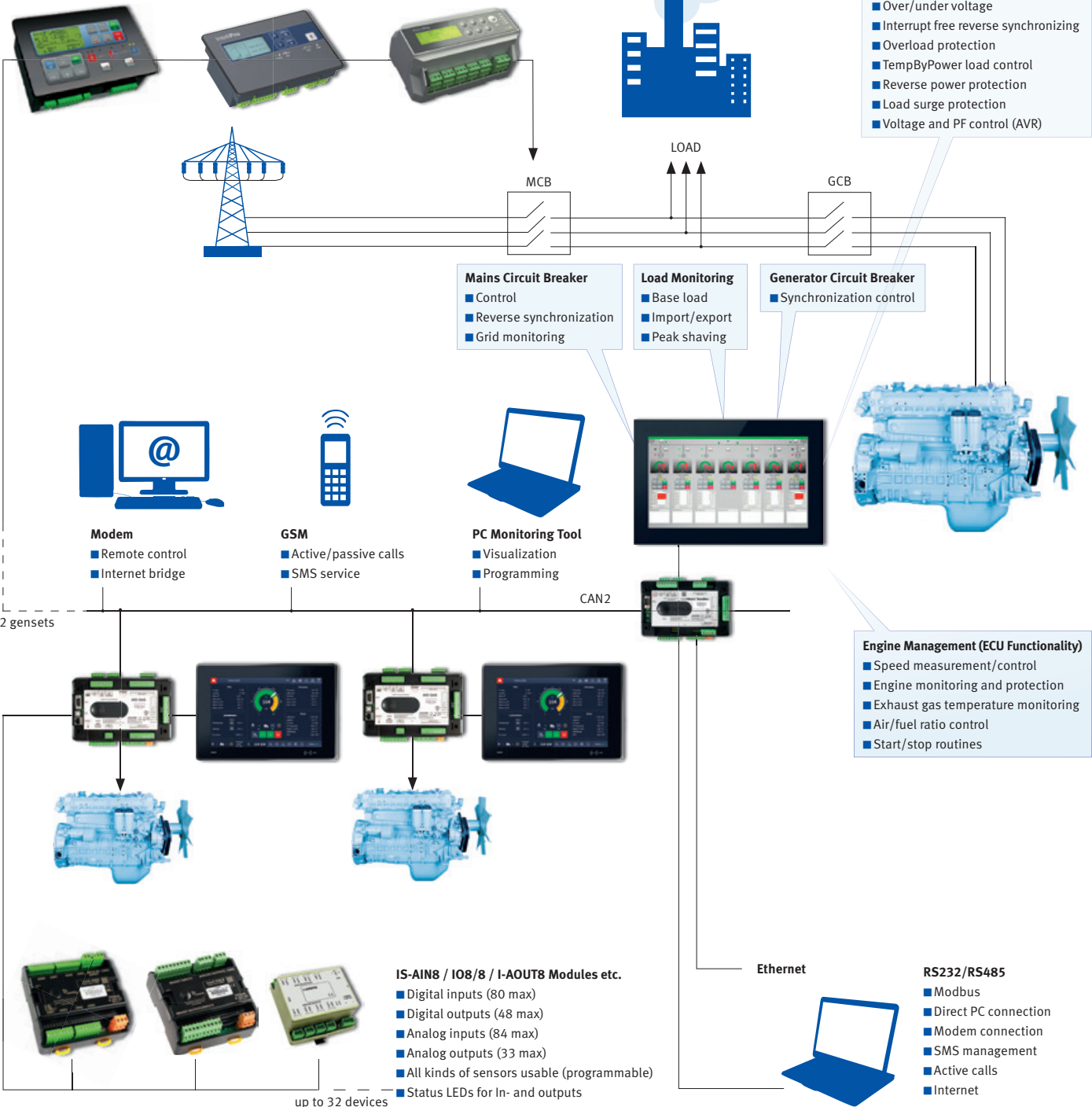
InteliPro

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

or

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



- ### Generator
- 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)

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

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

- ### Generator Circuit Breaker
- Synchronization control

- ### Modem
- Remote control
 - Internet bridge

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

- ### PC Monitoring Tool
- Visualization
 - Programming

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

- ### IS-AIN8 / IO8/8 / 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

Comparison AIO.GAS/AIO.NTC



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

Features	ALL-IN-ONE.GAS	ALL-IN-ONE.NTC
Integrated Soft PLC	<ul style="list-style-type: none"> ■ PLC functions: <ul style="list-style-type: none"> – Up to 32 PID blocks, 16 with binary outputs, 16 with analog outputs – Up to 256 AND/OR functional blocks – Up to 48 delay PLC blocks – Up to 32 ana switch PLC blocks – Up to 80 comparator PLC blocks ■ Up to 256 PLC binary outputs can be used ■ Up to 96 PLC analog outputs 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 with binary outputs, 6 with analog outputs – Up to 100 AND/OR functional blocks – Up to 24 delay PLC blocks – Up to 16 ana switch PLC blocks – Up to 40 comparator PLC blocks ■ Up to 64 PLC setpoints can be used
ECU support	<ul style="list-style-type: none"> ■ Supports up to 8 ECU blocks <ul style="list-style-type: none"> – 128 analog inputs via J1939 – 128 binary inputs via J1939 – 16 analog outputs via J1939 – 64 binary outputs via J1939 	<ul style="list-style-type: none"> ■ Supports up to 3 ECU blocks <ul style="list-style-type: none"> – 48 analog inputs via J1939 – 48 binary inputs via J1939 – 12 analog outputs via J1939 – 48 binary outputs via J1939
Support of Start-Up Synchronization (SUS)	<ul style="list-style-type: none"> ■ Dedicated for installations where multiple generator 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"> ■ Supports the connection of up to 2 I-CB modules, means simultaneous use of e.g. <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"> ■ Supports the connection of 1 I-CB module
Number of supported modules (new I/O modules)	<ul style="list-style-type: none"> ■ Up to 15 AIN8 or AIN8TC modules ■ Up to 15 IO8/8 modules 	<ul style="list-style-type: none"> ■ Up to 10 AIN8 or AIN8TC modules ■ Up to 12 IO8/8 modules
Support of the new AIO9/1 module	<ul style="list-style-type: none"> ■ 4 analog inputs for battery measurement up to 60 V ■ 4 analog inputs for thermocouple measurements ■ 1 analog output (PWM, mA, V) 	<ul style="list-style-type: none"> ■ 4 analog inputs for battery measurement up to 60 V ■ 4 analog inputs for thermocouple measurements ■ 1 analog output (PWM, mA, V)
Air/fuel ratio (AFR) control algorithm	<ul style="list-style-type: none"> ■ Improved behavior in island operation – faster reaction of the air/gas mixer thanks to predefined fixed positions ■ Adjustable PID speed – for stoichiometric applications with variable load ■ 2 independent AFR mappings for 2 engine banks on 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 ■ 1 AFR mapping
Languages	<ul style="list-style-type: none"> ■ Minimum of 6 languages 	<ul style="list-style-type: none"> ■ English or English +1 (depending on size of conuguration)

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



Mains Controllers and Protections

P/N	Supersedes	Description	Equivalent to
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	
63.50.107		Mains decoupling relay – MainsPro	
63.50.095		Mains decoupling relay – MainsPro LITE	
63.50.139		Mains decoupling relay – MainsPro G99TT – G99 Type Tested	

Accessories

P/N	Supersedes	Description	Equivalent to
63.50.092		Analog input extension module – I-AIN8	63.50.002 ¹⁾
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 ²⁾	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	

¹⁾ When replacing extension module P/N 63.50.002 (IS-AIN8), please note that extension module P/N 63.50.092 (I-AIN8) does not support thermocouples.

²⁾ If more than 8 binary inputs are used for module P/N 63.50.005 (IS-BIN16/8) to be replaced, two extension modules P/N 63.50.118 (IO8/8) must be ordered as replacements.

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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