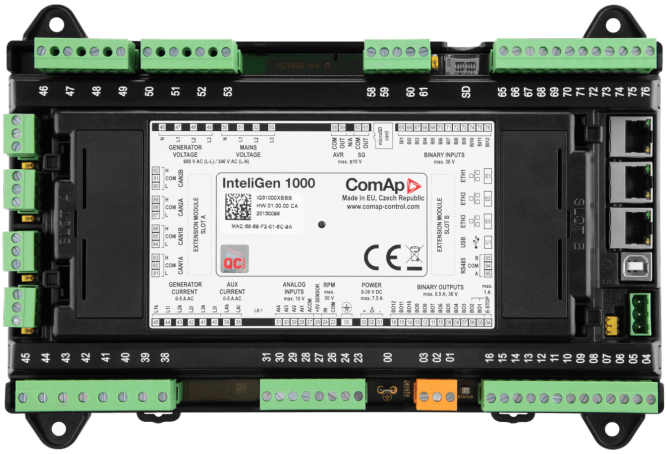
ComAp
The heart of smart control

InteliGen 1000



Order code: IG31000XBBB

Datasheet

Gen-set controller for complex applications

Product description

InteliGen 1000 is the most advanced gen-set controller for multiple gen-sets with paralleling operations, with or without connection to the mains or other source. Intended primarily for complex applications, this high-end controller will help you control and monitor demanding projects with critical infrastructures such as datacentres, hospitals and banks.

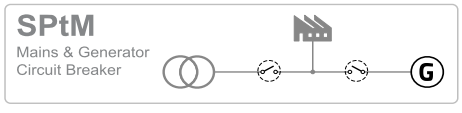
Key benefits

- **Great flexibility** for the most complex applications
  - Large in-built PLC interpreter, user-defined protections and parameters and easy extension via plug-in modules, CAN modules and SW key features
- **Ready for mission critical** installations
  - Inter-controller communication and controller redundancy
- **Communication capabilities and protocols**
  - USB, 4 CAN ports, 3 ethernet ports, RS485
  - Modbus Client/Server over RTU/TCP, SNMP v1, v2c and v3, J1939
- **Cyber security by design** to protect your business
  - Meeting requirements of ISA 62443 level 2-3

Key features

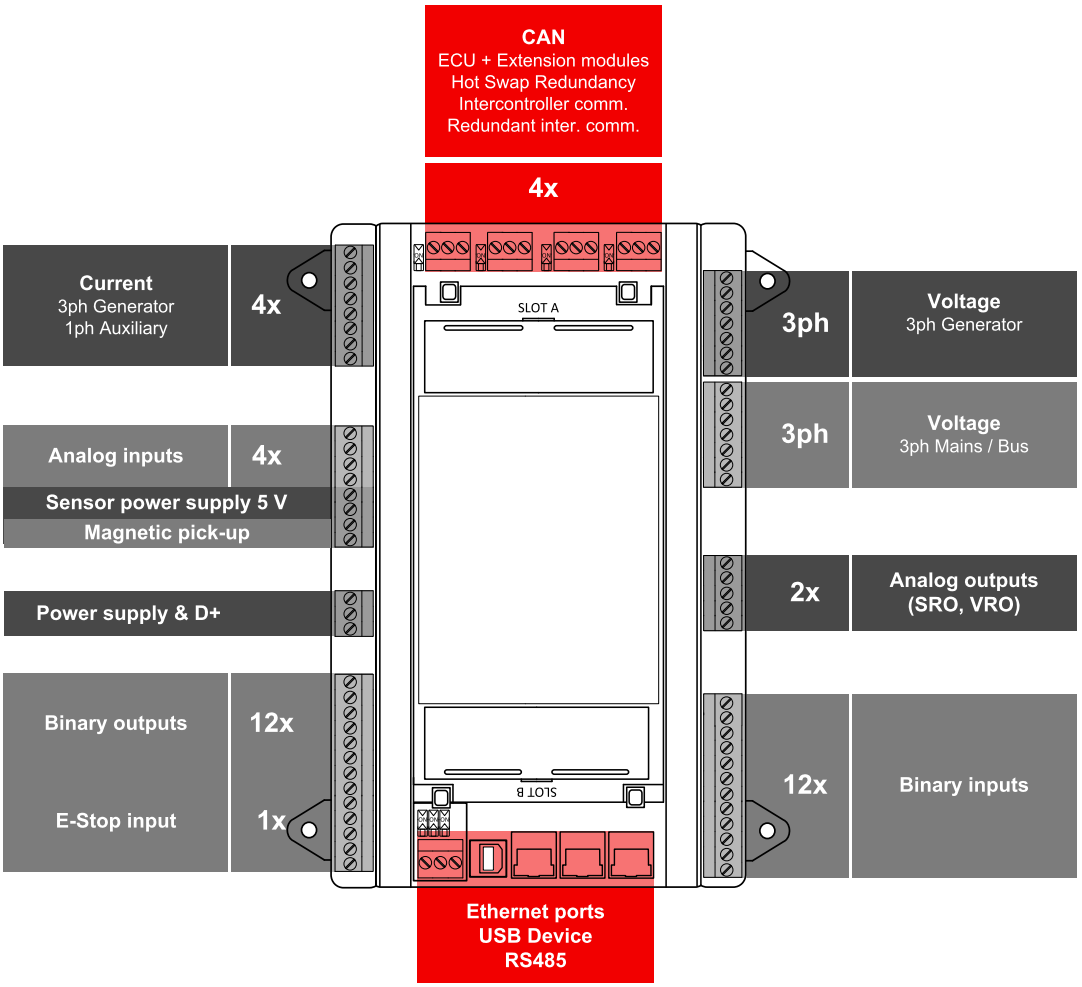
- **CAN FD communication protocol** enabling cooperation with **up to 64** gen-sets/mains/tie controllers
- **State of the art AC accuracy measurements** to participate on primary frequency control mechanism, grid balancing and demand response projects
- **Hot-swap redundancy** enabling a redundant unit to take over in case the primary controller fails, helping to minimise solution downtime*
- **CAN bus redundancy** ensuring that a redundant CAN line be created and take over in case of CAN failure*
- **Compliant with international grid codes**
  - European EN 50549, including national implementations as VDE-AR-N 4110:2018, VDE-AR-N 4105:2018, G99, TÖR, American IEEE 1547 and others
- **Compatible load/VAr sharing and power management** with other ComAp solutions
- Several load transfer options with possibility of **less than 100 ms load transfer**
- **Multi ECU** (Electronic Control Unit) for communication with more independent J1939 devices such as engine ECUs, digital AVRs, breakers, etc.
- In-built **CAN bus logger and event-based history** for easy and fast troubleshooting
- **Start-up synchronisation** to minimise start sequence time and get the gen-set system up with minimal possible delay
- **Remote connection and monitoring**
  - **AirGate 2.0**—easy connection to your equipment remotely, without worrying about your asset's IP address
  - **WebSupervisior**—the cloud-based tool for fleet monitoring

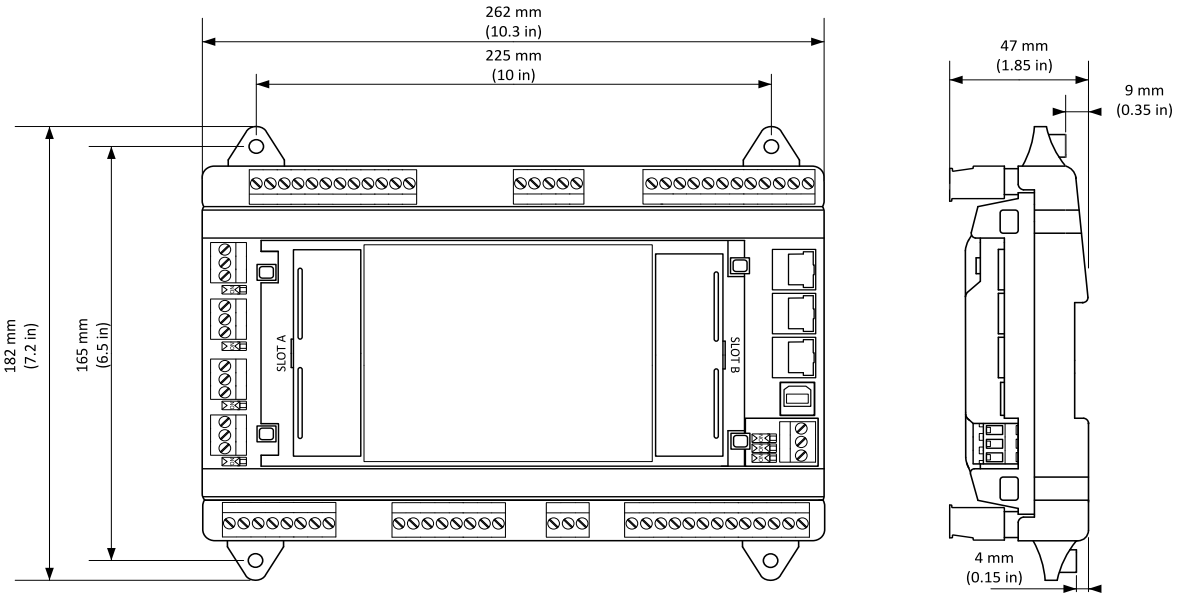
Application overview



*Extended feature (SW key required)

Terminals and dimensions





Technical data ⚠⚠

Power supply

Power supply range	8-36 V DC
Power consumption	16 W
RTC battery	Replaceable, type CR1632 3V
Fusing power	8 A
Consumption	2.5 A Controller + 10 x 0.5 A BOUTs @ 8 V
Fusing E-STOP	2 A
Max. Heat Dissipation	16 W

D+

Max. excitation current	250 mA
Charging fail threshold	0 .. 100 % of voltage supply

Operating conditions

Operating temperature	-40 °C to +70 °C
Storage temperature	-40 °C to +80 °C
Operating humidity (norm 60068-2-30)	25/55°C, 48hours,95 % non-condensing (EN 60068-2-30)
Protection degree (enclosure)	IP20
Vibration	5-25 Hz, ± 1.6 mm 25-100 Hz, a = 4 g
Shocks	a = 500 m/s^2
Surrounding air temperature rating 70 °C.	
Suitable for pollution degree 2.	

E-Stop

Dedicated terminal for safe Emergency Stop input.
Physically disconnects BO 1 & BO 2 from power supply.

Binary inputs

Number	12, non-isolated
Close/Open indication	0-2 V DC close contact 6-36 V DC open contact
Configurable	Pull-up / Pull-down
Pulse input	Bin 9 and 10 max. 50 Hz

Binary outputs

Number	12, non-isolated
Max. current	0.5 A
Switching to	Positive supply terminal

Analog inputs

Number	4, switchable (R/U/I)
Range	R = 0-10000 Ω; U = 0-10 V; I = 0-20 mA
Accuracy	R: 2 % from value for 0-250 Ω R: 4% from value for 250-2500 Ω R: 6 % from value for 5000-10000 Ω U: 1% from value ±100 mV I: 1% from value ±200 uA

Voltage regulator output

Protection	Reinforced isolation
Type	Switchable: U ±10 V, I ±20 mA, PWM: 0 V/5 V
Accuracy	U: 1 % from value ±100 mV I: 1 % from value ±200 uA

Speed governor output

Protection	Basic isolation
Type	Switchable: U ±10 V, I ±20 mA, PWM: 0 V/5 V
Accuracy	U: 1 % from value ±100 mV I: 1 % from value ±200 uA

Magnetic pick-up

Minimum input voltage	4 V pk-pk to 50 V pk-pk in range 4 Hz to 1 kHz
Working voltage range	6 V pk-pk to 50 V pk-pk in range 4 Hz to 5 kHz 10 V pk-pk to 50 V pk-pk in range 4 Hz to 10 kHz
Frequency input range	4 Hz to 10 kHz
Frequency measurement tolerance	0.2 % from range 10 kHz

AC Current measurement

Measurement inputs	3 phase Generator current 1 phase Mains current (Aux current)
Measurement range	1 A / 5 A
Maximum continuous current	2 A / 10 A
Allowed overload	18 A for 15 sec.
Accuracy	±3 mA / ±15 mA for 0.0 to 0.4 A / 0.0 to 2.0 A 0.75 % of value for 0.4 to 1.0 A / 2.0 to 5.0 A
Frequency range	33-67 Hz (accuracy 0.002 %) 267-520 Hz (accuracy 0.01 %)
Sampling frequency	6.4kHz (50Hz) / 7.68kHz (60Hz)
Input impedance	< 0.1 Ω

AC Voltage measurement

Measurement inputs	3 phase Generator voltage 3 phase Mains voltage
Measurement range	Nominal: 115 V L-N / 200 V L-L suitable also for VT output, VT not present Maximal: 144 V L-N / 249 V L-L
	Nominal: 230 V L-N / 400 V L-L Maximal: 289 V L-N / 500 V L-L
	Nominal (UL, cUL): 347 V L-N / 600 V L-L Maximal: 433 V L-N / 750 V L-L
Accuracy	0.25 %
Frequency range	33-67 Hz (accuracy 0.002 %) 267-520 Hz (accuracy 0.01 %)
Sampling frequency	6.4kHz (50Hz) 7.68kHz (60Hz)
Input impedance	0.68 MΩ L-L , 0.34 MΩ L-N
Upper-harmonics filtering	Active Low-Pass filter Cutoff frequency 3100Hz (-3bB)
Measurement category CAT III, overvoltage category III	

Communications

USB Device	Basic isolation, USB type B
RS 485	Basic isolation
ETH1 / ETH2 / ETH3	10/100 Mbit
CAN1A / CAN2A CAN1B / CAN2B	Basic isolation, nominal impedance 120 Ω CAN1 data rate: 500/250/50 kbps CAN2 data rate: 2000/1000/400/250/125/50 kbps
Protocols	Modbus RTU/TCP SNMP v1/v2c/v3, J1939

Weight

Controller / Package	750 g / 920 g

Available plug-in modules

Product	Description	Order code
CM-4G-GPS	An easy-to-use and efficient solution for connecting controllers online via 4G.	CM24GGPSXBX
CM-RS232-485	Communication module for integration of controllers into a local monitoring system.	CM223248XBX
***EM-BIO8-EFCP**	Binary I/O plug-in module with 8 binary inputs or outputs.	EM2BIO8EXBX

Note: *Controller has 2 slots for plug-in modules.*

Note: **EFCP is already included on the CU as aux current measurement, EFCP on BIO8 module is not available.*

Note: *Plug-in modules are supported on controller HW version 01.01.xx and higher.*

Available extension modules

Product	Description	Order code
Inteli AIN8	CAN module with 8 analogue inputs and 1 RPM/impulse input.	I-AIN8
Inteli AIN8TC	CAN module with 8 analog inputs for termocouples measurement.	I-AIN8TC
Inteli AIO9/1	CAN module with 9 analog inputs and 1 analog output.	I-AIO9/1
Inteli IO8/8	CAN module with 8 binary inputs and 8 binary outputs, or 16 binary inputs.	I-IO8/8
IGS-PTM	CAN module with 4 analog inputs, 1 analog output, 8 binary inputs and 8 binary outputs.	IGS-PTM
I-AOUT8	CAN module with 8 analog outputs.	I-AOUT8
IS-AIN8	CAN module with 8 analog inputs.	IS-AIN8
IGL-RA15	Remote annunciator with 15 programmable LEDs	EM2IGLRABAA
ECON 4	Digital speed governor dedicated for speed control of gas or diesel engines.	ECON-4
InteliGateway 100	A communication gateway for connection of multiple Modbus devices to WebSupervisor and InteliScada monitoring systems.	CM2GW100BAB
InteliGateway 101	Similar as InteliGateway 100 with 4G cellular connectivity and GNSS capability.	CM2GW101BAB
InteliGateway 300	A communication gateway for connection of multiple Modbus devices to WebSupervisor and InteliScada monitoring systems and to ComAp controllers.	CM2GW300BAB
InteliGateway 301	Similar as InteliGateway 300 with 4G cellular connectivity and GNSS capability.	CM2GW301BAB
I-CR	CAN repeater module, compatible with 32C/8C CAN intercontroller communication modes (CAN FD not supported).	I-CR
I-CR-R	CAN redundancy module (CAN FD not supported).	I-CR-R

Available remote displays

Product	Description	Order code
InteliVision 5.2	5" TFT external display with 800x480 px resolution.	RD2IV5BXBAA
InteliVision 10Touch	10.1" display with pre-installed InteliSCADA Display Pro+.	RD1IV10TBPF
InteliVision 1050	New 10.1" industrial panel PC with pre-installed InteliSCADA Display Lite.	RD21050XBGA
InteliVision 13Touch	13.3" Marine certified display with pre-installed InteliSCADA Display Pro+.	RD1IV13TBME
InteliVision 1550	New 15.6" industrial panel PC with pre-installed InteliSCADA Display Pro+.	RD11550XBGA
InteliVision 18Touch G2	18.5" panel PC with pre-installed InteliSCADA Display Lite.	RD2IV18TBPE

Available simulators

Product	Description	Order code
InteliGen 1000 + IV 5.2 StarterKit	Portable simulator with a InteliGen 1000 gen-set controller and one InteliVision 5.2 colour display.	SM4IG1K5BAB

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Available extended features

Extended Feature	Description	Order Code
Modbus Client	Modbus client functionality for integration of 3rd party devices.	SKMODBCLI01
CAN2 bus redundancy	Inter-controller CAN redundancy to maintain communication between controllers if the primary CAN bus fails.	SKREDCAN201
Controller Hot swap	Hot swap feature allows for a redundant/backup unit to take over control in case a primary controller fails.	SKHOTSWAP01
PLC Package 1	Enhanced PLC capacity (a number of PLC blocks).	SKPLCPCKG01
Bank controller	The Bank controller for large scale projects managing up to 63 source controllers under a single bank controller.	SKBANKCNTRL
Variable speed generator	It supports direct connection of generators to engines without the need for a variable frequency drive.	SW1VSGXXXXX

Functions and protections

Support of functions and protections as defined by ANSI (American National Standards Institute):

Description	ANSI code	Description	ANSI code	Description	ANSI code
Master unit	1	**Reverse power**	32R	**Power factor**	55
Stopping device	5	**Master sequence device**	34	**Overvoltage**	59
Multi-function device	11	**Undercurrent**	37	**Pressure switch**	63
Overspeed	12	**Excitation loss**	40	**Liquid level switch**	71
Underspeed	14	**Unit sequence starting**	44	**Alarm relay ***	74
Speed and frequency matching device	15	**Current unbalance**	46	**Vector shift**	78
Data communications device	16EFT 16SC	**Voltage unbalance**	47	**Reclosing relay**	79
Starting-to-running transition contractor	19	**Incomplete sequence relay**	48	**Overfrequency**	81H
Synchronizing-check	25	**Temperature monitoring**	49T	**Underfrequency**	81U
Thermal relay	26	**Overcurrent**	50/50TD	**ROCOF**	81R
Undervoltage	27	**Earth fault current**	50N+64	**Auto selective control/transfer**	83
Annunciator	30	**Overcurrent IDMT**	51	**Regulating device**	90
Overload	32	**Earth fault current IDMT**	51+64		
Load shedding	32P	**AC circuit breaker**	52		

* extension module IGL-RA15 required

Certifications and standards

- EN IEC 61000-6-2:2019
- EN IEC 61000-6-4:2019
- EN IEC 61010-1:2010/A1:2019/AC:2019-04
- EN IEC 60255-1:2009
- EN IEC 60255-26:2013
- EN IEC 60255-27:2013
- EN IEC 60255-127:2010
- EN IEC 60255-181:2019
- EN 60529:1991/A1:2000/A2:2013/AC:2016-12 (IP20)
- EN 60068-2-1:2007
- EN 60068-2-2:2007
- EN 60068-2-6:2007
- EN 60068-2-27:2008
- EN 60068-2-30:2005
- ULC 6200:2019

* ULC 6200:2019 Certified (see the NFL File for the FW version with the Witness test if it is required by the certification of the end product)

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Grid codes certifications

The product is compliant with global grid codes, but it is certified for the following standards:

- EN 50549-1
- EN 50549-2
- German VDE-AR-N 4105:2018
- German VDE-AR-N 4110:2018
- Austrian TÖR Erzeuger Typ A
- Austrian TÖR Erzeuger Typ B

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