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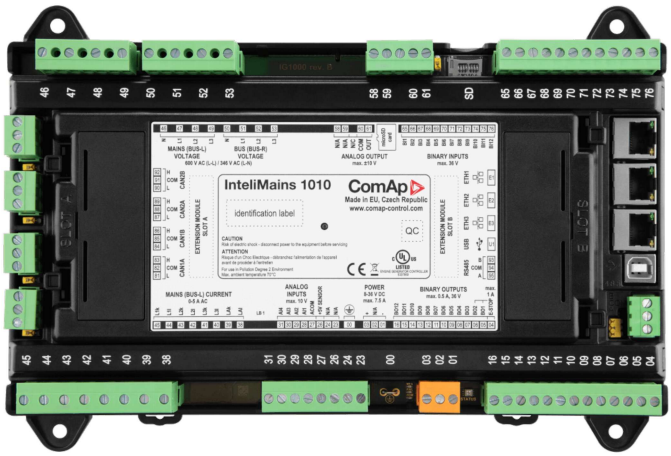
The heart of smart control

# InteliMains 1010




**Order code: IM31010XBBB**

# Datasheet

## Mains supervision/utility breaker controller

## Product description

InteliMains 1010 is the most advanced mains/utility/tie-breaker supervision controller for complex applications. Designed following top IT security standards to protect your operations, the InteliMains 1010 acts as a relay for mains protection and helps synchronise your gen-sets to the mains/utility for switchgear applications and critical infrastructure installations, such as datacentres, hospitals or banks.

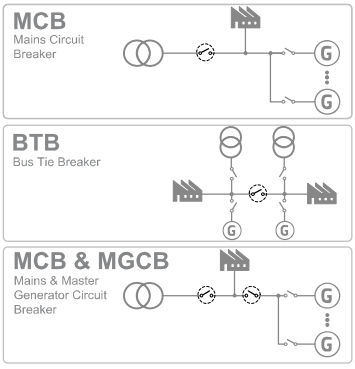
## Key benefits

- **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

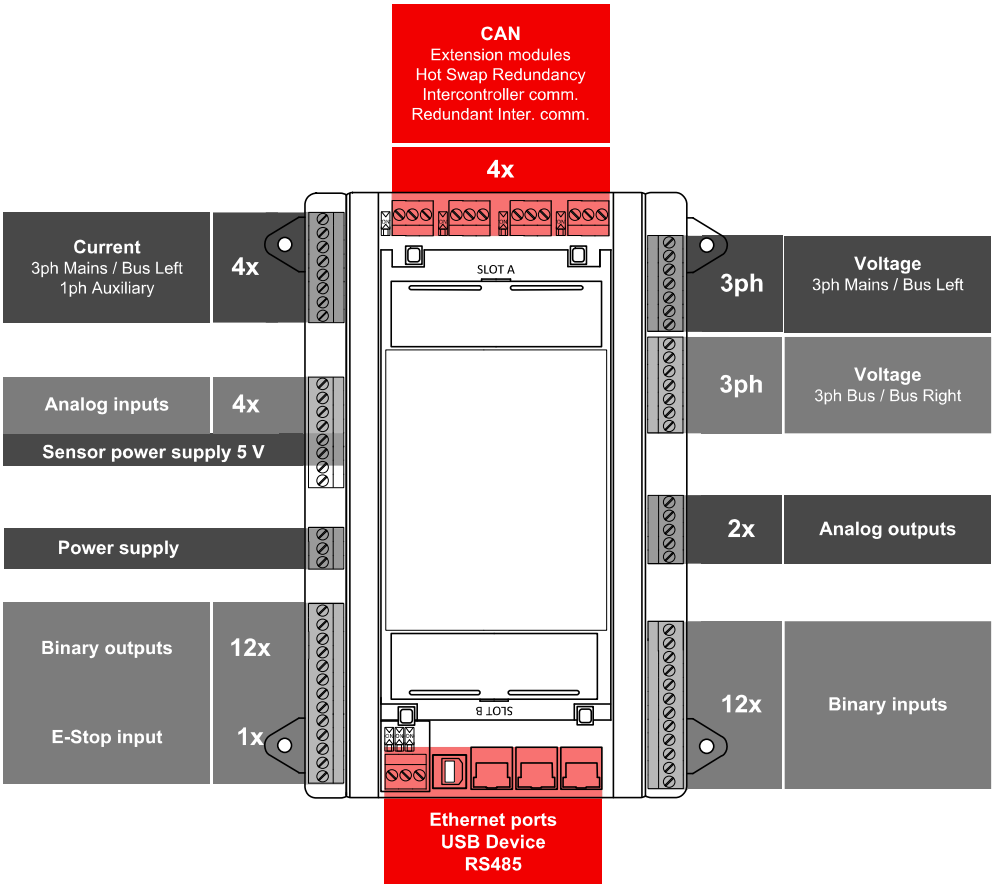
- **CAN FD communication protocol** enabling cooperation with **up to 64** gen-sets/mains/tie controllers
- **State of the art AC accuracy measurements** to participate on primary frequency control mechanism, grid balancing and demand response projects
- **Hot-swap redundancy** enabling a redundant unit 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**
- In-built **CAN bus logger and event-based history** for easy and fast troubleshooting
- **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

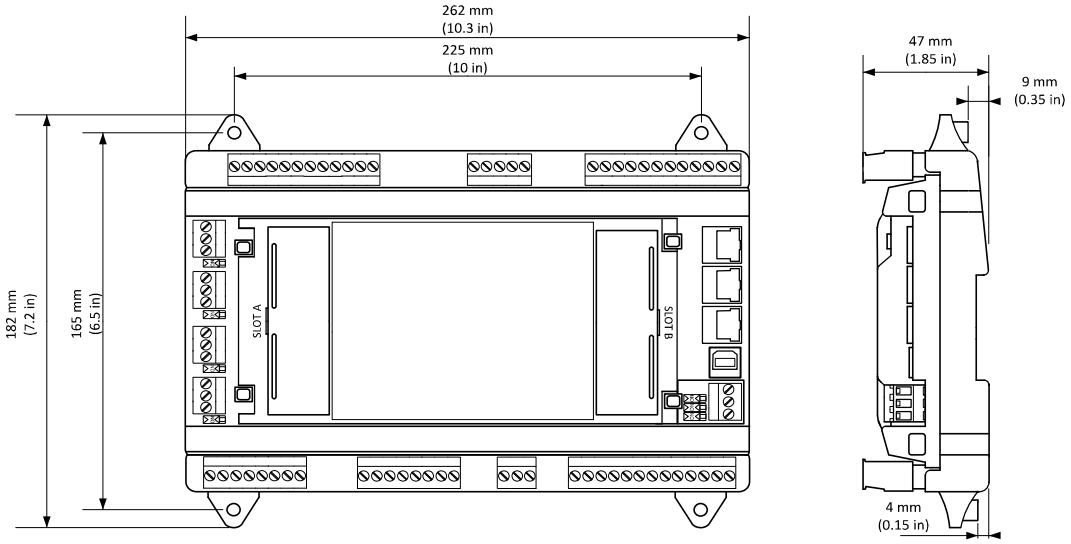
## Application overview




*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 |

## 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<br>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

| |
|---|
| Physically disconnects BO 1 & BO 2 from power supply. |

## Binary inputs

| | |
|---|---|
| **Number** | 12, non-isolated |
| **Close/Open indication** | 0-2 V DC close contact<br>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<br>R: 4% from value for 250-2500 Ω<br>R: 6 % from value for 5000-10000 Ω<br>U: 1% from value ±100 mV<br>I: 1% from value ±200 uA |

## Analog output 1

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

## Analog output 2

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

## AC Current measurement

| | |
|---|---|
| **Measurement inputs** | 3 phase Mains (Bus left) current<br>1 phase Bus (Bus right) 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<br>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 %)<br>100-200 Hz (accuracy 0.01 %)<br>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 Mains (Bus left) voltage<br>3 phase Bus (Bus right) voltage |
| **Measurement range** | Nominal: 115 V L-N / 200 V L-L<br>suitable also for VT output, VT not present<br>Maximal: 144 V L-N / 249 V L-L |
| | Nominal: 230 V L-N / 400 V L-L<br>Maximal: 289 V L-N / 500 V L-L |
| | Nominal (UL, cUL): 347 V L-N / 600 V L-L<br>Maximal: 433 V L-N / 750 V L-L |
| **Accuracy** | 0.25 % |
| **Frequency range** | 33-67 Hz (accuracy 0.002 %)<br>100-200 Hz (accuracy 0.01 %)<br>267-520 Hz (accuracy 0.01 %) |
| **Sampling frequency** | 6.4kHz (50Hz)<br>7.68kHz (60Hz) |
| **Input impedance** | 0.68 MΩ L-L , 0.34 MΩ L-N |
| **Upper-harmonics filtering** | Active Low-Pass filter<br>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<br>CAN1 data rate: 500/250/50 kbps<br>CAN2 data rate: 2000/1000/400/250/125/50 kbps |
| **Protocols** | Modbus RTU/TCP<br>SNMP v1/v2c/v3<br>J1939 |

## Weight

| | |
|---|---|
| **Controller / Package** | 750 g / 920 g |

## Available plug-in modules

| Product | Description | Order code |
|---|---|---|
| ***EM-BIO8-EFCP** | Binary I/O plug-in module with 8 binary inputs or outputs. | EM2BIO8EXBX |
| **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. RS-232 terminal is not supported.. | CM223248XBX |

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

***Note:*** *Plug-in modules are supported on controller HW version 01.01.xx or HW type PCB 7, and higher.*

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

## 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 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 |
| **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 |

E-mail: info@comap-control.com
Web: www.comap-control.com

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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 and number of PLC blocks. | SKPLCPCKG01 |
| **Emulation tool** | The Emulation tool allows to testing of ComAp solutions in a virtual environment without needing real physical machinery (engines, generators, etc.). | SKEMTOOLXXX |

## Accessories

| Accessories | Description | Order Code |
|---|---|---|
| **Mounting bracket** | The door panel mounting bracket for InteliMains 1010 and InteliVision 5.2 display. | OT1MNT01AXX |

## Functions and protections

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

| Description | ANSI code | Description | ANSI code |
|---|---|---|---|
| **Master unit** | 1 | **Temperature monitoring** | 49T |
| **Multi-function device** | 11 | **Overcurrent** | 50/50TD |
| **Speed and frequency matching device** | 15 | **Overcurrent IDMT** | 51 |
| **Data communications device** | 16ECFM+16SC | **AC circuit breaker** | 52 |
| **Synchronizing-check** | 25 | **Power factor** | 55 |
| **Thermal relay** | 26 | **Overvoltage** | 59 |
| **Undervoltage** | 27 | **Pressure switch** | 63 |
| **Annunciator** | 30 | **Liquid level switch** | 71 |
| **Overload** | 32 | **Alarm relay *** | 74 |
| **Load shedding** | 32P | **Vector shift** | 78 |
| **Master sequence device** | 34 | **Reclosing relay** | 79 |
| **Undercurrent** | 37 | **Overfrequency** | 81H |
| **Unit sequence starting** | 44 | **Underfrequency** | 81U |
| **Current unbalance** | 46 | **ROCOF** | 81R |
| **Voltage unbalance** | 47 | **Auto selective control/transfer** | 83 |
| **Incomplete sequence relay** | 48 | **Regulating device** | 90 |

* 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)

E-mail: info@comap-control.com
Web: www.comap-control.com

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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
- Austrian TÖR Erzeuger Typ A
- Austrian TÖR Erzeuger Typ B

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