BTB COMPACT

Controller for bus tie-breaker applications

The **BTB COMPACT** is one controller of a complete range for Energy sources and power plant management: Generators, Mains, Photovoltaic, Batteries storage, Tie breakers.

This controller is made to manage bus tie-breaker applications up to 32 bus tie-breaker. It operates in combination with **GENSYS COMPACT PRIME** (for generators) and **MASTER COMPACT/MASTER COMPACT 1B** (for mains) modules. It offers flexibility and time saving thanks to its simple wiring and easy programming.
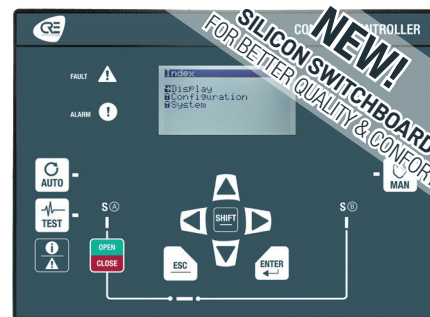
HARDWARE AND DISPLAY
The **BTB COMPACT** is available in both switchboard panel mounted version with display, or core base mounted version and compatible with **i4Gen** touchscreen color display range.

SOFTWARE
The **BTB COMPACT** is configurable from its front panel display, from **i4Gen HMI**, or through the free **i4Gen Suite** software.
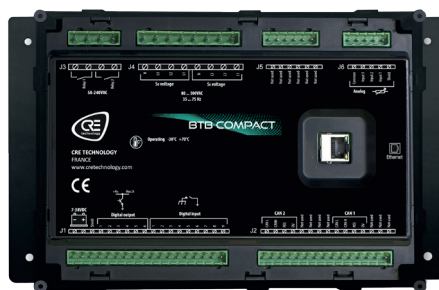
CORE BASE DIN RAIL MOUNTED VERSION

SWITCHBOARD MOUNTED VERSION WITH DISPLAY

FEATURES

CONTROL AND MANAGEMENT
- Electrical parameters acquisition from wiring (PT) and from CANbus (KW, KVAR) of **GENSYS COMPACT PRIME** and **MASTER COMPACT**.
- Synchronization: Frequency, Phase and Voltage synchronization from Source A to Source B or from Source B to Source A (Synchro scope display available on screen). Synch check (ANSI 25) + Phase sequence protection. Phase shift between 0 and 360 degrees could be added on the synch check relay function (for example to compensate DYN11 MT/BT transformers).
- Adjustable KW ramp and KVAR ramp after synchronization. The 2 ramps are independents and allow managing properly the active and reactive power equalization if KW/KVAR ratio are different on source A and source B before tie-breaker closure.
- Optimized frequency/KW and Voltage/KVAR regulation which does not require PID adjustment in the **BTB COMPACT** (except for the phase synchronization). The PID control is managed by each generator with **GENSYS COMPACT PRIME**.
- Automatic detection of mains paralleling on source A or source B. Synchronization from mains to generators will be detected and not allowed. Only synchronization from generators to generators and from generators to mains will be allowed.
- 3 password levels: end user, technician, advanced technician.
- Automatic management of CANbus inhibitions according with tie-breaker closed or opened
- Automatic clock synchronization by CANbus.

DISPLAYED INFORMATIONS
- Source A electrical parameters:
  - Voltage (3 phases RMS, L-L and L-N)
  - Frequency
  - Active and reactive power (from CANbus)
  - Power factor (from CANbus)
- Source B electrical parameters:
  - Voltage (3 phases RMS, L-L and L-N)
  - Frequency
  - Active and reactive power (from CANbus)
  - Power factor (3 phases + total) (from CANbus)
- Synchroscope, differential voltmeter and frequency

meter, Synch check relay authorization values.
- Record of 500 events/alarms/faults with timestamps. Displayed on controller screen and i4Gen with advanced filter.
- Configurable event logger and info pages.

CONFIGURABLE EVENTS LOGGER
- Configurable list of parameters needed
- Configurable frequency record
- 1350 logged events with timestamp and real-time value are available, on non volatile memory.

ELECTRICAL PROTECTIONS:
- Source A electrical protections:
  - <F, >F: ANSI Code 81L, 81H
  - <U, >U, U unbalance: ANSI Code 27, 59, 47
- Source B electrical protections:
  - <F, >F: ANSI Code 81L, 81H
  - <U, >U, U unbalance: ANSI Code 27, 59, 47

BREAKERS CONTROL
- The breakers positions feedback could be connected or not.
- Adjustable pulses or latched contact for breaker closing.
- Adjustable pulses or latched contact for breaker opening.
- MN/MX coil management.
- Alarm management for closing failure, opening failure, unexpected closure, unexpected opening.

PROGRAMMING FEATURES
- Alternative selection: up to 16 parameters values can be modified by triggering any digital input or ModBus TCP variable.
- Scheduler: Specific functions or modes (ex: auto start, test mode Boost…) can be programmed on scheduled operation (cyclic or one-time).
- Easy Flex :
  - 50 lines of programming with logic and arithmetic operators and conditions.
  - All inputs/outputs and variables available.
  - **New** : Debug mode which display in real time all programming lines variables state or value.
- Generic filling feature:
  - High and low set point from digital or analog input.
  - Up or down direction configurable.
- User variables:
  - 100 user variables are available for programming.

- Each variable has its own label + unit + accuracy.

AUTOMATIC FIRMWARE UPDATE
When module is connected to **i4Gen Suite** PC software, you will automatically be suggested for a firmware update to the latest version if applicable.

MODBUS TCP SLAVE & SLAVE COMMUNICATION PORT
In Slave application :
- All data are accessible by ModBus TCP locally or remotely (web, GPRS).
- Read and write functions + 300 free ModBus TCP addresses available for custom mapping.

New - In Master application :
- Possibility to create and configure customized frames

REMOTE SUPERVISION WITH I4GEN (7, 10 OR 15 INCHES)
- Internet connection: Wan port or Wifi hotspot or 4G modem or Smartphone Access point.
- Visualization - configuration - programming - remote power plant control.
- Up to 10,000 power plants with a single Zoho Assist account. (Zoho Assist PC, MAC, Smartphone application).
- **New :** Monitoring and control of the complete power plant (generators, mains, photovoltaic, batteries storage,..) through a single line diagram generated automatically.
- 1 single i4Gen can monitor the entire power plant.
- Sending emails on events.

Part numbers:
A56-BTB-10 Core base mounted version
A56-BTB-00 Switchboard mounted version with display

RELATED PRODUCTS AND CABLES
i4Gen Touchscreen color display range – Ref A56Vxx
GENSYS COMPACT PRIME – Ref A56-PRIME
MASTER COMPACT– Ref A56-MAST
MASTER COMPACT 1B – Ref A56-MAS1B
Additional I/O – Ref BK5150 + KL1488 + KL2408 …
PC Connection Ethernet cable – Ref A53W1
CRE/CANopen communication cable – Ref A40xx

APPLICATIONS

BTB COMPACT associated with **GENSYS COMPACT PRIME** and **MASTER COMPACT** allows full automatic operation with the best easy way of the market:

- 32 modules **BTB COMPACT** and **MASTER COMPACT** + 32 modules **GENSYS COMPACT PRIME** limited to 40 modules in total could be used together on the same application.

- The complete power plant is divided in segments. A segment is a group of **MASTER COMPACT** and **GENSYS COMPACT PRIME** module which will always communicate each other. Each **BTB COMPACT** has a different segment on source A side and on source B side.

- When the tie-breaker is opened, modules of segment on source A communicate each other but do not communicate with modules of segment on source B. When the tie-breaker is closed, modules of segment on source A communicate each other but also with modules of segment on source B.

- When manual "start" or remote automatic "start" is activate on **BTB COMPACT**, synchronization signal will be sent through CANbus to all operating **GENSYS COMPACT PRIME** of segment A to synchronize frequency, phase and voltage with segment B (or **GENSYS COMPACT PRIME** of segment B with segment A according with your configuration).

- After breaker closure, **BTB COMPACT** will send KW control signal and KVAR control signal through CANbus to equalize smoothly with adjustable ramp the active and reactive power of segment A and segment B.

APPLICATION EXAMPLE WITH MULTI BTB COMPACT AND MULTI MASTER COMPACT AND MULTI GENSYS COMPACT PRIME, AND PARAMETERS CONFIGURATION FOR EACH MODULE:
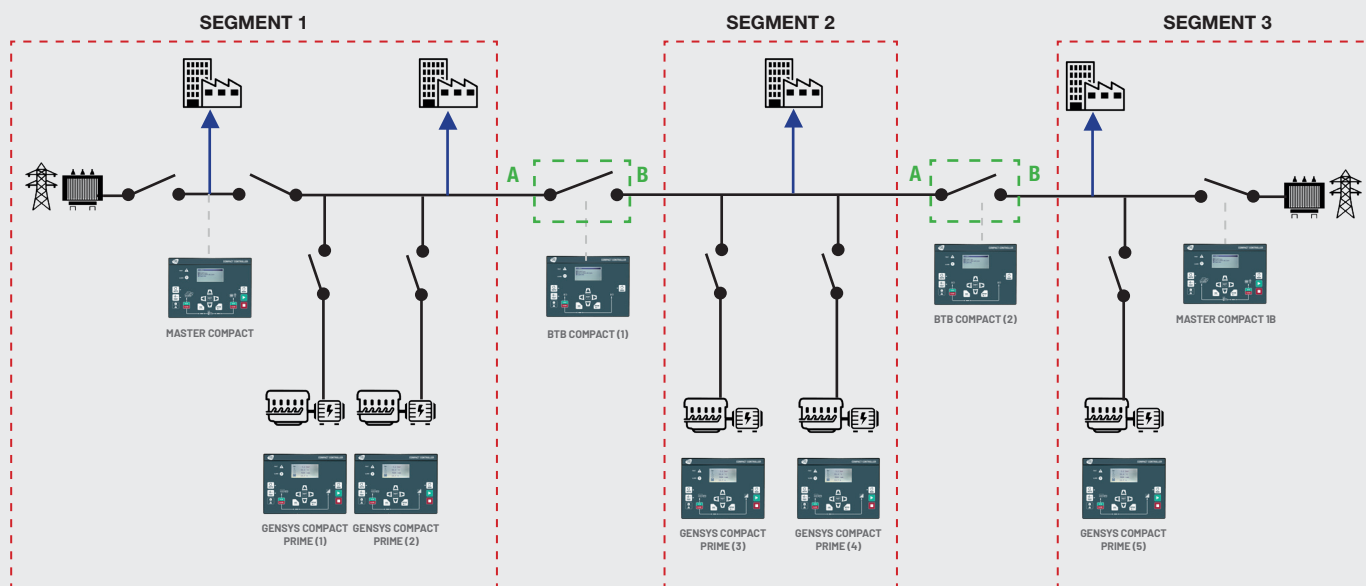
MODULE	PRODUCT NUMBER	QUANTITY OF GENSYS COMPACT PRIME	QUANTITY OF MASTER COMPACT/ BTB COMPACT	SEGMENT	SEGMENT A	SEGMENT B
MASTER COMPACT	1	5	4	1	NOT AVAILABLE	NOT AVAILABLE
MASTER COMPACT 1B	2	5	4	3	NOT AVAILABLE	NOT AVAILABLE
BTB COMPACT 1	3	5	4	NOT AVAILABLE	1	2
BTB COMPACT 2	4	5	4	NOT AVAILABLE	2	3
GENSYS COMPACT PRIME 1	1	5	4	1	NOT AVAILABLE	NOT AVAILABLE
GENSYS COMPACT PRIME 2	2	5	4	1	NOT AVAILABLE	NOT AVAILABLE
GENSYS COMPACT PRIME 3	3	5	4	2	NOT AVAILABLE	NOT AVAILABLE
GENSYS COMPACT PRIME 4	4	5	4	2	NOT AVAILABLE	NOT AVAILABLE
GENSYS COMPACT PRIME 5	5	5	4	3	NOT AVAILABLE	NOT AVAILABLE

For direct connection multiple mains application, it is mandatory to use 2 breakers and MASTER COMPACT controller. One breaker and MASTER COMPACT 1B controller will not allow to manage all sequences.

SPECIFICATIONS

ELECTRICAL SYSTEM

Compatible with 3 or 4 wires three-phase, or two-phase or single phase systems.

VOLTAGE AND FREQUENCY

- DC Power supply: 7...38V_{DC}, Max voltage 45V_{DC} during 15mn, current consumption at 24V_{DC} = 130mA + the sum of maximum consumption of each logic output.
- AC Voltage inputs: 80...500V_{AC}. Consumption = 100mA max. Accuracy: 1%. 3ph + N for Source A / 3ph + N for Source B. Neutral terminal does not need to be connected.
- AC Frequency measurement: 35...75Hz; 15V_{AC} minimum between phase and neutral.

INPUTS, OUTPUTS

- 9 x Digital inputs: NO or NC to ground. Adjustable timer On and Off.
- 32 x Digital inputs expansion via CANopen.
- 3 x Analog inputs: Resistive (0...500Ω) or 0...20mA (with external resistor). Could be used as digital input.
- Library of sensors available. Configuration curve with up to 31 points.
- 16 Analog inputs expansion via CANopen (0-20mA, 0-10VDC, PT100, Thermocouple,…).
- 6 x Digital outputs: NE or ND. 1.8A, over-current protected. Adjustable timer.
- 32 x Digital outputs expansion via CANopen.
- 2 x Relay outputs (breaker control): 5A, 240V_{AC}
- 2 x Analog outputs +/-10VDC: isolated output with adjustable span and offset.

COMMUNICATION PORTS

3 isolated ports available:
- 1 CANbus: I/O extensions.
- 1 CANbus : CRE protocol for communication between all COMPACT controllers.
- 1 Ethernet: PC communication/ModBus TCP.

ENVIRONMENT

- Operating temperature: -30... 70°C (-22...158°F).
- Storage temperature: -40...70°C (-40...158°F).
- Humidity: 95% non-condensing.
- IP Front: IP65/NEMA rating 4 - IP20/NEMA rating 1 for core base.
- IP Rear: IP20/NEMA rating 1.

DIRECTIVES

- EMC Directive 2014/30/UE - EMC General Requirements EN 61326-1: Immunity according with EN 61000-6-2 and Emission according with EN 61000-6-4.
- Electrical Safety Directive 2014/35/UE: According with EN 60950-1.
- Vibrations and shocks: According with EN(IEC) 60068-2-6 and IEC 60068-2-27.
- Temperature: EN(IEC) 60068-2-30; EN(IEC) 60068-2-1; EN(IEC) 60068-2-2; EN 60068-2-78.

SIZE AND WEIGHT

- Switchboard mounted version with display:
  - Dimensions: 245x182x40mm (9.64x7.16x1.57in).
  - Panel cut out: 220x160mm (8.7x6.3 in).
- Core base mounted version:
  - Dimensions: 260x157x44mm (10.24x6.18x1.73in) (depth with connectors).
  - Fixing dimensions (4 screws): 238x129mm (9.37x5.08in). Fixing hole: Ø5.24mm (0.21in).
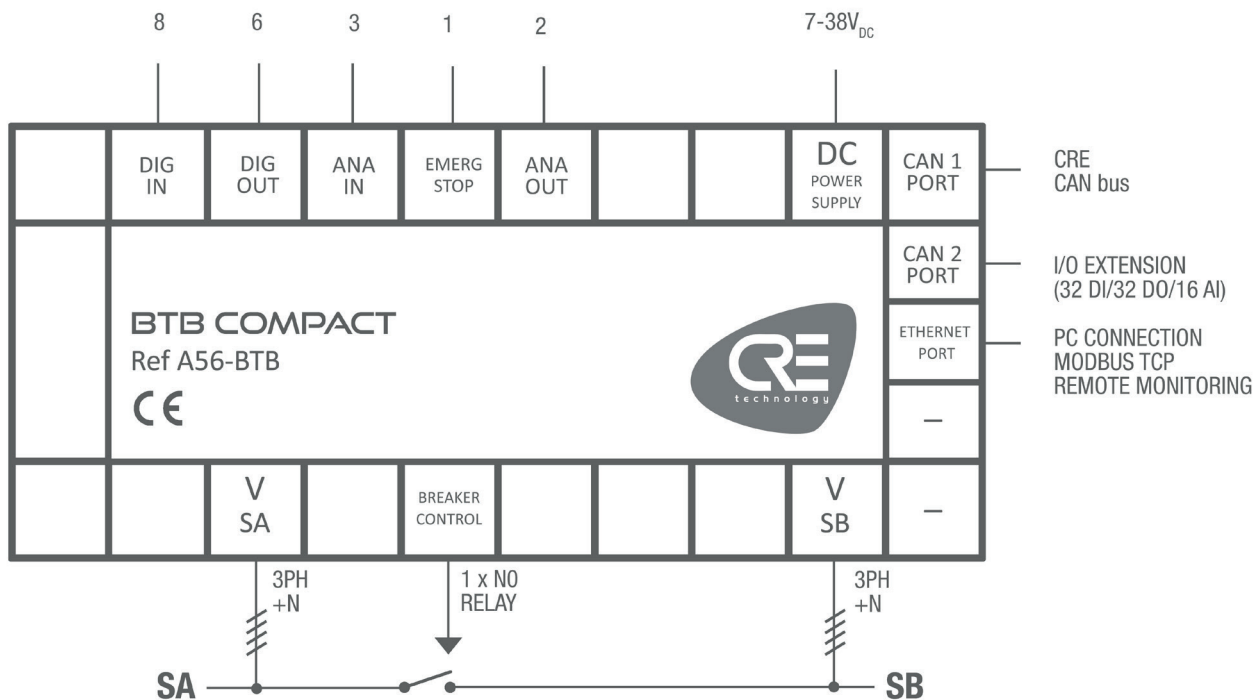 - Optional DIN rail mounting.
- Weight: 0.7Kg (1.54lb).

LCD DISPLAY CHARACTERISTICS

- Size: 40x70mm (1.50 x 2.75in).
- Pixels: 1024x512. Back light: 50cd/m² typical, configurable.
- Contrast: configurable.

LANGUAGES

English, French, Italian, Spanish in standard.
Portuguese, Russian, German and other custom languages are available on request.

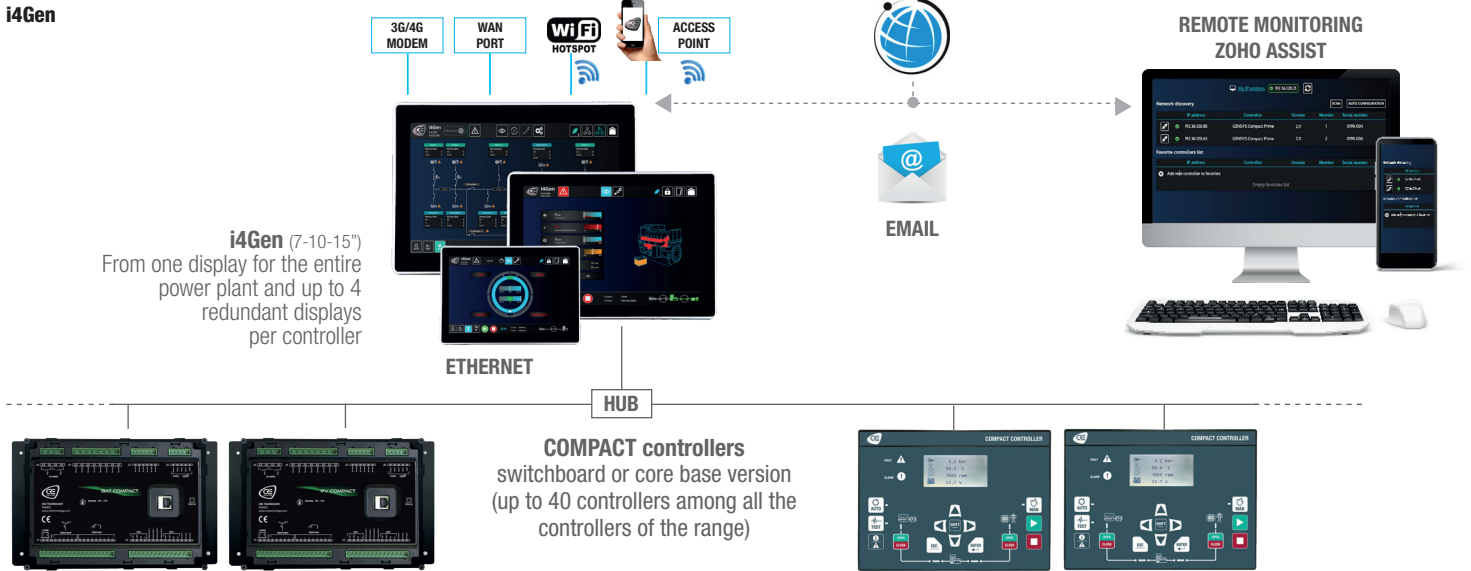## WIRING DIAGRAM

CRE TECHNOLOGY - 130, allée Charles-Victor Naudin - Zone des Templiers - SOPHIA ANTIPOLIS - 06410 BIOT - FRANCE
Phone : + 33 (0)4 .92.38.86.82 - www.cretechnology.com - info@cretechnology.com

BTB COMPACT_SALES DOCUMENTATION_EN_E2022

BTB COMPACT

Controller for bus tie-breaker applications

ASSOCIATED I4GEN MULTI-TOUCHSCREEN RANGE & MAIN FUNCTIONS

i4Gen

3G/4G MODEM — WAN PORT — WiFi HOTSPOT — ACCESS POINT

REMOTE MONITORING ZOHO ASSIST

EMAIL

i4Gen (7-10-15")
From one display for the entire power plant and up to 4 redundant displays per controller

ETHERNET

HUB

COMPACT controllers
switchboard or core base version
(up to 40 controllers among all the controllers of the range)

COMPACT CONTROLLER

INNOVATION!

- The i4Gen touchscreen and color display range (7, 10 and 15 inches) is available for the COMPACT controllers.
- i4Gen offers configuration, control, monitoring and logging (parameters, measures, events) of COMPACT controllers.
- i4Gen display can be duplicated on computer locally by LAN or remotely by internet or GPRS
- Thanks to its WIFI function, i4Gen offers also the capability of remote service and support by connecting your smartphone in connection sharing.

NEW - SINGLE LINE DIAGRAM AUTOMATICALLY GENERATED FROM EACH COMPACT CONTROLLER CONFIGURATION

In addition to its very advanced functions, the i4Gen now offers you the display of the single-line diagram of your complete power plant, as well as the production curves of each source.

EASY FLEX PROGRAMMING EXAMPLE
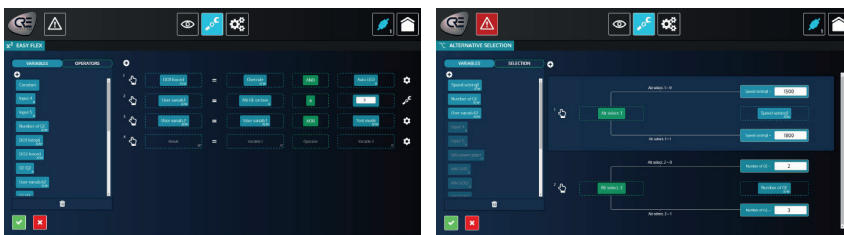
It is possible to customize your application by programming specific features with **Easy Flex**, available directly from **i4Gen Suite** PC software. **Easy Flex** allows user to write up to 50 lines of equation trough an intuitive editor, giving the opportunity to fit with any specific application and to extend standard features. Ex: Programmable relays, timers, sensor treatment, dynamic modification of the power supply…