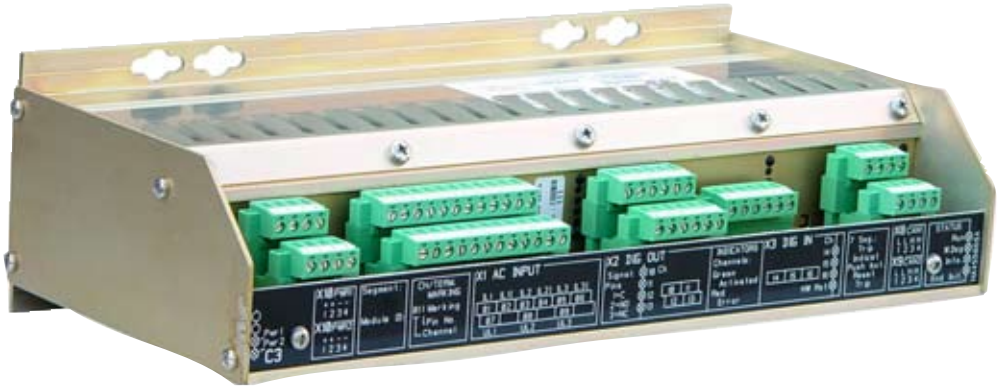
Generator Protection module

KONGSBERG

RIO-C3

The C3 module is a Generator Protection module designed to protect maritime generators against electrical damage by tripping the circuit breaker.



The C3 Generator Protection (GP) module works independent of other systems and Distributed Processing Units (DPU). It works by the use of specialized signal interfaces for connection to voltage and current transformers, as well as switchboard equipment.

Measured voltage and current levels, trip indication and parameters can be observed by using the Midi Operator Station (MOS) or Remote Operator Station (ROS) through the Controller Area Network (CAN) interface. In independent systems without external man-machine interface, a 7-segment display indicates trip information and status.

The module has redundant 24 VDC power connections from an Un-interruptible Power Supply (UPS) and generator voltage supply. The two CAN channels in the module are based on the ISO 11898 standard with optical isolation. Short circuit or malfunction in one CAN channel does not affect the other. The protocol on CAN is based on CiA DS301, CANopen – Communication Profile for industrial systems.

Features

- All parameters are stored in non-volatile memory in the module
- All parameters can be inspected and changed from operator stations (Local Operator Station (LOS), MOS or ROS) connected to the CAN
- Built In Self Test (BIST)
- No parts needing maintenance
- All connections pluggable
- Status LEDs for input/output signals
- 7-segment display
- No hardware configuration

Functions

- Short circuit tripping of generator circuit breaker
- Over current tripping of generator circuit breaker
- Reverse power tripping of generator circuit breaker
- Optional differential current protection
- Over and under voltage protection
- Over and under frequency protection
- VAr import and VAr export protection
- Optional trip timer indication on MOS
- Local indication of reason for trip
- Local reset of tripping
- Calculation of generator load (kW, kVAr)
- Calculation of phase angle between voltage and current (cosine φ)

Technical specifications

Supply voltage
- 18-32 VDC
- Dual power supply connection:
  · Power from UPS
  · Power from generator

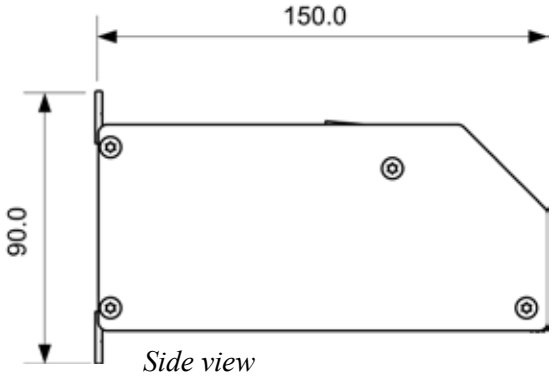
Power consumption
- 15 W @ 24 VDC

Operating temperature
- - 15 °C to +70 °C

Storage temperature
- - 25 °C to +70 °C

Max relative humidity
- 96 % non-condensing

Mechanical environment
- DnV Class B, IACS E10 (Allows direct mounting on engines, compressors, etc.)



Side view

Weight of unit
- 2.0 kg

Mounting
- Screws (4 pcs M5)
- Pluggable screw terminals: 2.5mm²

EMC properties
- According to IACS E10 (2001) and IEC 60945 (1996/2002)

Isolation
- Isolation per module in power port:
  · 50 VDC continuous
  · 50 VAC 1 minute
- 3 ways isolation between:
  · I/O Power
  · I/O CAN bus
  · Power CAN bus

BIST (Built In Self Test)
- Module temperature, sensor excitation overload

Serial interfaces
- 2 CAN ports for redundant communication interface

4 digital outputs
- All outputs maximum 3 A 250 VAC (relay)
- 1 pole change over relay, inductive load

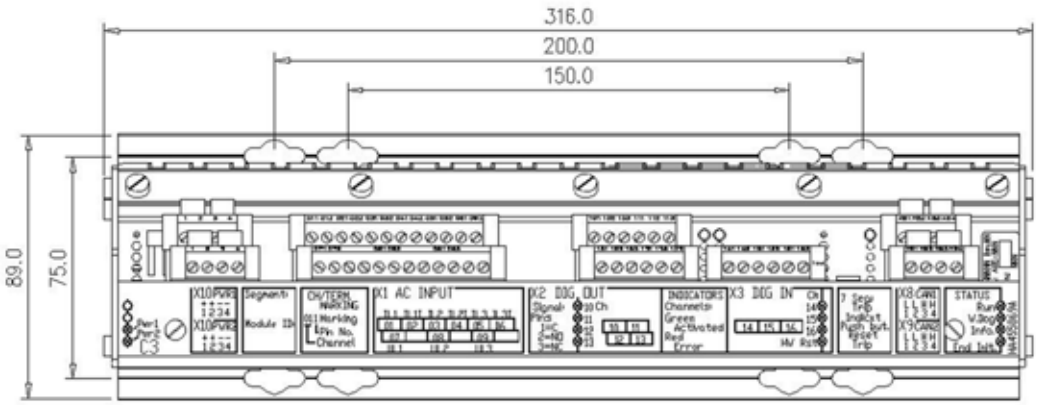
3 phase VAC input
- Voltage input: 0-36 Vrms
- Maximum readable input: 36 V
- Frequency scaling: 0-90 Hz
- Technical units: free range
- Accuracy: ±1 %* @ 45-65 Hz

3 phase IAC Generator current (main switch board panel)
- Current input: 0-1 A or 0-5 A
- Over current: 320 %
- Maximum readable input: 320 % maximum 0.5 s
- Technical units: free range
- Accuracy: ±1 %* (over current: ±1.5 %*)

3 phase IDC Generator current (internal)
- 24 V output: fused @ 100 mA
- Current input: 0-20 mA
- Maximum readable input: 23 mA
- Technical units: free range
- Accuracy: ±1 %*

3 digital inputs
- Require dry contact

Trip display and reset switch
- Local 7-segment display on module, reason for trip indication
- Reset switch on module



Front view

Type approval
- ABS, BV, GL, KR, LR, RRS, NK, PRS, Rina, CCS, DNV

** = Can be calibrated to be better than 0.5%*

AD-00420-B

Kongsberg Maritime AS
Bekkajordet 8A
P.O.Box 1009
NO-3189 Horten
Norway

Telephone: +47 815 73 700
Telefax: +47 850 28 028
www.kongsberg.com
km.sales@kongsberg.com

KONGSBERG