

# Distributed Processing Units Generator Protection (C3GPxe)



KONGSBERG

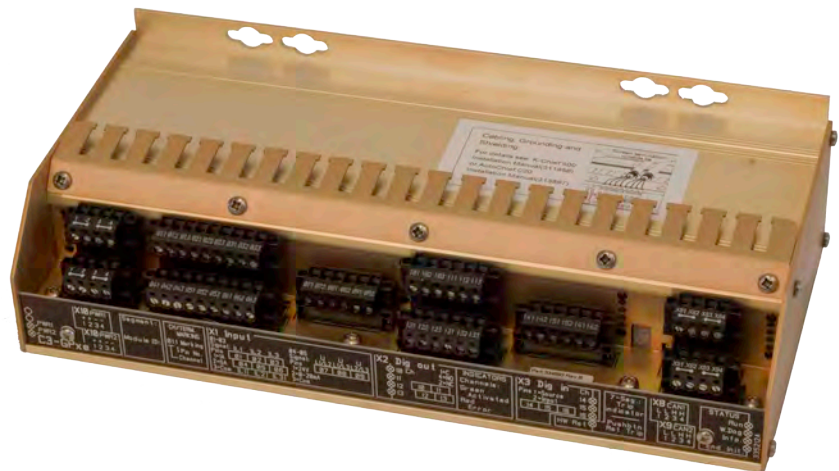
## Description

The C3GPxe module is a Generator Protection module designed to protect maritime generators against electrical damage by tripping the circuit breaker.

The C3GPxe 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 Uninterruptible 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.



## 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  $\phi$ )

## Features

- All parameters are stored in nonvolatile 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



## Technical Specifications

### Supply voltage

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

### Power consumption

- 10W @ 24 VDC

### Operating temperature

- - 15°C to +70°C

### Storage temperature

- - 25°C to +70 °C

### Max relative humidity

- 96% non-condensing

### IP Code

- IP20

### ENV properties

- IACS E10 (2001)
- IEC 60945 (1996/2002)
- IEC 60255

### Vibration

- 4 G

### Weight of unit

- 1.7 kg

### Mounting

- Screws (4 pcs M5)
- Pluggable screw terminals: 2.5mm<sup>2</sup>

### 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

### Serial interfaces

- 2 CAN ports for redundant communication interface

### 4 Digital outputs

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

### 3 phase VAC input

- Voltage input: 0-36 Vrms
- Maximum readable input: 36V
- 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: 0-1A or 0-5A
- Over current: 320 %
- Maximum readable input: 320 % maximum 0.5s
- Technical units: free range
- Accuracy: ±1 % (over current: ±1.5 %)

### 3 x 0-20mA input (differential current)

- 24V output: fused @ 100 mA
- Current input: 0-20 mA
- Maximum readable input: 30 mA
- Technical units: free range
- Accuracy: ±0.5 %

### 3 Digital inputs

- Require dry contact or opto coupler.

### Trip display and reset switch

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

### BIST (Built In Self Test)

- Module temperature, sensor excitation overload

### Type approval

- DnV, LRS, BV, GL, RINA, NKK, ABS, KR, RMR, CCS (allows direct mounting on engines, compressors, etc. in suitable cabinets)

