Remote Analogue Input and Output

The RAOC400 is an interface module between the Serial Process Bus and analogue input or output signals.

Features

- Up to 24 analogue inputs (16 current and 8 voltage) and 8 analogue outputs, individually defined as current or voltage
- Dual Serial Process Bus (SPBus) interfaces to allow optional redundancy
- Each SPBus interface ensures electrical isolation from the control system
- Easy installation and replacement:
  - DIN standard rail-mounting
  - plug-in connections
- Status LED for run and error
- Loop-check and debugging from operator station and local data terminal
- Short-circuit proof analogue input loop current driver
- Fail-safe activation of outputs by watch-dog upon loss of communications
- Built-in test for self diagnostics and fault identification
- Earth Fault Detection (EFD)
- Line Fault Detection (LFD)
- Dual watch-dogs

Description

The Kongsberg Maritime Remote Input and Output system (RIO400) uses a Serial Process Bus (SPBus) between a controller computer in the process network and the input and output (I/O) signals to remote devices such as valves, relays and temperature sensors.

The RAOC400 is an interface module between the SPBus and analogue inputs or outputs to and from field devices.

The RIO400 system provides a cost-effective solution for connecting any number of inputs and outputs to a Kongsberg Maritime automation system, independent of the distance between the remote equipment and the controller computer.
### Technical Specifications

**Analogue Input**
- **Number of channels:** 16 current and 8 voltage inputs
- **Current input:** 0 to 20 mA (input resistor 220 ohm)
- **Current accuracy:** +/- 0.2% of full scale
- **Voltage input:** +/- 10 VDC
- **Voltage input impedance:** 3.3 Mohm
- **Voltage accuracy:** better than +/- 0.1% of full scale (typically +/- 0.05%)
- **Digital resolution:** 12 bits
- **Connectors:** screw terminals, 2.5 mm²

**Loop Current Driver**
- **Loop driver:** 1 A, short-circuit proof “High-Side” driver (HSD)
- **Loop driver trip current:** approximately 1.4 A (reset by command)
- **Loop driver OFF leakage:** maximum 2 mA at 24 VDC loop voltage

**Analogue Output**
- **Number of channels:** 8 current or voltage
- **Current output:** 0 to 20 mA (loop power maximum 30 VDC)
- **Voltage output:** 0 to 10 V
- **Current accuracies at 300 ohm load and 24 VDC loop voltage**
  - **Linearity:** +/- 0.1% of full scale
  - **Offset:** +/- 0.2% of full scale
  - **Gain:** +/- 0.2% of full scale
- **Temperature drift:** 60 ppm/°C
- **Voltage output:** 0 to 10 VDC
- **Digital resolution:** 12 bits
- **Output resistance:** 70 ohm
- **Connectors:** screw terminals, 2.5 mm²

**SPBus Interface**
- **SPBus interfaces:** 2
- **Power supply voltage from SPBus:** 10 to 28.8 VDC
- **SPBus connector:** 9-pin male DSUB
- **SPBus isolation:** 500 V (optocoupler)
- **SPBus type:** RS-485 (multidrop)
- **SPBus frequency:** maximum 2 MHz
- **SPBus signal code:** Manchester encoded (self-clocked)

**Dimensions**
- **Height:** 355 mm
- **Width:** 158 mm
- **Depth:** 87 mm
- **Weight:** 1.35 kg

**Electrical**
- **Input voltage:** 24 VDC +/- 20%
- **Power consumption:** maximum 21.6 W
- **Connectors:** screw terminals, 2.5 mm²

**Environmental Specifications**
- **Ambient temperatures**
  - operational: 0° C to 70° C
  - storage: -25° C to 70° C
- **Ambient humidity**
  - operational: up to 100% relative humidity
  - storage: up to 100% relative humidity
- **Heat dissipation:** maximum 10 W
- **Protection standard:** IP20
- **EMC according to:** EN50081-2, EN50082-2, EN60945 and EN61135-2

**Standards Applied**
The equipment is designed to conform to IEC 61131-2, IEC 60945 and IACS E10.

**CE Marking**
The module satisfies the relevant EU directives.

**Approvals**
The RAOC400 is approved by Det Norske Veritas (DNV) for ships and Mobile Offshore Units and by the American Bureau of Shipping (ABS) for Mobile Offshore Drilling Units and ships.