Remote Analogue Input, Current

The RAIC400 is an interface module between the Serial Process Bus and analogue input signals.

Features

• Up to 32 analogue inputs
• 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 normal operation or error condition
• Loop-check and debugging from operator station and local data terminal
• Short-circuit proof loop current driver
• Dual watch-dogs
• Fail-safe settings activated by watch-dog if communications fail
• Built-in test for self diagnostics and fault identification
• Single units are SIL 1 and SIL 2 compliant
• Line Fault Detection (LFD)
• Earth Fault Detection (EFD)

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 RAIC400 is an interface module between the SPBus and analogue inputs from field instruments. 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.
## Analogue Input

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels:</td>
<td>32 current inputs</td>
</tr>
<tr>
<td>Current input:</td>
<td>0-20 mA (input resistor 220 ohm)</td>
</tr>
<tr>
<td>Current accuracy:</td>
<td>+/- 0.2% of full scale</td>
</tr>
<tr>
<td>Current input filter:</td>
<td>RC = 33 µs</td>
</tr>
<tr>
<td>Digital resolution:</td>
<td>12 bits</td>
</tr>
<tr>
<td>Connectors:</td>
<td>screw terminals, 2.5 mm²</td>
</tr>
</tbody>
</table>

## 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

## 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

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>355 mm</td>
</tr>
<tr>
<td>Width</td>
<td>158 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>87 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.35 kg</td>
</tr>
</tbody>
</table>

## Electrical

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

## Environmental Specifications

- **Ambient temperature operational:** 0°C to 70°C
- **Ambient temperature storage:** -25°C to 70°C
- **Ambient humidity operational:** up to 100% relative humidity
- **Ambient 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 the following standards:
- IEC 61131-2, IEC 60945 and IACS E10.

## CE Marking

The module satisfies the relevant EU directives.

## Approvals

The RAIC400 is approved by Det Norske Veritas (DNV) for ships and Mobile Offshore Units, the American Bureau of Shipping (ABS) for Mobile Offshore Drilling Units and ships and by TÜV in SIL3 functions as dual I/O and SIL2 with single I/O in accordance with IEC 61508.

## Block Diagram

- **Fully earthed to PE or IE**
- **Monitored earth across a 0.1 ohm resistor**
- **Insulated by 500 Kohm and monitored leakage to earth**

## Article Number

- RAIC400: 600120