



Maritime

Maritime
instrumentation



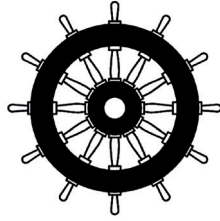
Reliable indication is vital in all use

Manoeuvring large maritime vessels today, often in congested port environments, has a heavy demand on the visibility, accuracy and reliability of instrumentation as well as the skills and experience of the crew/pilot. Both have to offer unquestioned dependability.

Nieaf-Smitt maritime instruments are designed, engineered and manufactured for bridge, bridge-wing and control/rudder room applications on board of ships. Prime applications such as propulsion, steering and navigation are covered with a wide range of dedicated products.

All are made to the strictest prevailing standards and carry type approval and MED certification (Marine Equipment Directive) for applications such as speed, RPM, rudder angle, pitch and rate of turn.

Seagoing merchant vessels, cruise & ferry lines, naval ships, special work boats, inland shipping and tugs or dredging vessels all are served with specialized instrumentation. Most units are tailored to specific client requirements.



Maritime equipment directive

The EU Directive on Marine Equipment entered into force 1 January 1999. The directive requires that certain marine equipment is certified and specifies basic requirements to manufacturers as well as products. The directive applies to equipment manufactured and being placed on board of a new or existing ship under flag of the EFTA countries (EU, Norway and Iceland).

Purpose of the Marine Equipment Directive (MED) is to:

- Enhance safety at sea and the prevention of marine pollution through uniform application of international instruments (IMO Conventions, Resolutions, Circulars and relevant international testing standards) related to the equipment in question
- Ensure the free movement of equipment within the European Economic Area (EEA), consisting of the EU and EFTA Member States

The MED directive states: The International Maritime Organisation and the European standardisation organisations have adopted standards, including detailed testing standards, for a number of items of equipment which are listed in Annex A.2 to Directive 96/98/EC or which, albeit not listed, are considered relevant for the purpose of the said Directive. Therefore such items of equipment should be included in Annex A.1 or transferred from Annex A.2 to Annex A.1, as appropriate.

For indicators 5 directives are stated:

- A.1/4.7 Speed and distance measuring equipment (SDME)
- A.1/4.9 Rate of turn indicator
- A.1/4.20 Rudder angle indicator
- A.1/4.21 Propellor revolution indicator (RPM)
- A.1/4.22 Pitch indicator

Each directive refers to testing standards for indication on board of vessels. The standards define accuracies of systems and indicators.

Tailored indicators for ultimate flexibility



Serving safety

Wabtec Netherlands has certified quality and environmental management systems according to the leading international standards. ISO 9001:2000 and ISO 14001 are obtained.

Wabtec Netherlands not only has a clear eye directed at reliability, dependability, safety and cost-effectiveness, but also to the demands of our planet.

Environmental consciousness is woven closely into design, manufacturing and commercial operations. The company is contributing to the safety of the world in more ways than one.



Models

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Maritime instruments

Wabtec Netherlands produces analogue indicators for maritime applications. Keyword for our production and R&D is flexibility. All instruments are produced on customer request and built to order.

We primarily produce navigation instruments for bridge, bridge wing and control room installation. For example for speed, RPM, rate of turn, and pitch. Especially rudder indication is an important application.

Coming from traditional electromechanical technology, the latest developments in maritime instrumentation are based on processor controlled stepper motor technology. Offering ultimate flexibility in terms of interfacing with 'the outside world'.

For heavy-duty applications like marine/submarine ships we manufacture series of shockproof instruments.

Submarine x-rudder instrument. Four pointers in 1 instrument provide rudder angle information of all 4 rudders.

Besides the input and scale printing we can design and produce these instruments for specific applications on customer request.



Dv... models



Moving coil indicator


Indicators for maritime applications, pointer rotation max. 90 °



White scale, IP54



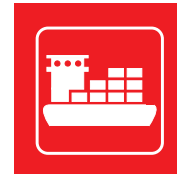
Black scale, IP54

| Model | Dimensions | Weight | Standards |
|---|----------------------|---|---|
| Dv48S | 48 x 48 mm / 52 mm | 100 g | DIN 43700 |
| Dv72S | 72 x 72 mm / 60 mm | 210 g | DIN 43701 |
| Dv96S | 96 x 96 mm / 60 mm | 270 g | DIN 43718 |
| Dv144S | 144 x 144 mm / 60 mm | 350 g | DIN 43802 |
| | | | EN 60051 |
| Dv48/66 | 58 x 58 mm / 52 mm | 130 g | Compliance |
| Dv72/66 | 86 x 86 mm / 60 mm | 250 g | EN 61554 |
| Dv96/66* | 112 x 112 mm / 60 mm | 350 g | ISO 20673:2007 |
| Dv144/66* | 158 x 158 mm / 60 mm | 500 g | ISO 22554:2007 |
| | | | ISO 22555:2007 |
| | | | EN 60051 |
| | | | EN 60945:2002 |
| | | | MED directives |
| | | | - Speed A.1/4.7 |
| | | | - Rudder A.1/4.20 |
| | | | - RPM A.1/4.21 |
| | | | - Pitch A.1/4.22 |
| | | |  |
| Illumination options | | | |
| Illuminated pointer | | 24 VDC | |
| Illuminated scale by LED's | | 24 VDC | |
| Input options | | Load | |
| 0...10 V | | 10 kΩ | |
| 0...12 V | | 12 kΩ | |
| 10...0...10 V | | 20 kΩ | |
| 12...0...12 V | | 24 kΩ | |
| 0...20 mA / 4...20 mA | | < 30 Ω | |
| 1...0...1 mA | | < 30 Ω | |
| 10...0...10 mA | | < 30 Ω | |
| 20...0...20 mA | | < 30 Ω | |
| <i>Other voltages and currents on request</i> | | | |
| Scale options | | | |
| Background | | black / white | |
| Inscription | | black / white / yellow | |
| Coloured marks and bands | | On customer request | |
| Company logo | | On customer request | |
| Pointer options | | | |
| Deflection | | 90 degrees | |
| Colour | | black / white / yellow | |
| | | <i>Other pointer colours on request</i> | |
| Temperature ranges | | | |
| Operation | | -25...0...70 °C | |
| Storage | | -40...0...80 °C | |
| Influence on accuracy | | 0.5 % / 10 °C | |
| Vibration test | | | |
| 3...13.2 Hz | | 2 mm | |
| 13.2...100 Hz | | 0.7 g | |
| General | | | |
| Glass | | low-reflecting glass | |
| Protection class | | IP54 (standard) / IP66 (optional) | |
| Accuracy | | Class 1.5 | |
| Mounting | | In all positions mountable | |

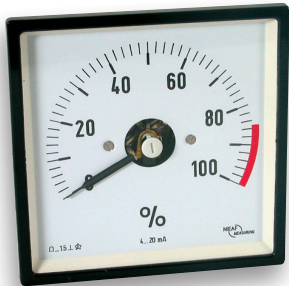
* BCI housing available

D3v... models

Moving coil indicator



Indicators for maritime applications, pointer rotation max. 240 °



White scale, IP54



Black scale, IP54



Black scale, IP66

| Model | Dimensions | Weight |
|--------------------|----------------------|--------|
| D3v48S | 48 x 48 mm / 52 mm | 190 g |
| D3v72S | 72 x 72 mm / 60 mm | 310 g |
| D3v96S | 96 x 96 mm / 60 mm | 400 g |
| D3v144S | 144 x 144 mm / 60 mm | 530 g |
| D3v192S | 192 x 192 mm / 60 mm | 600 g |
| D3v48/66 | 58 x 58 mm / 52 mm | 230 g |
| D3v72/66 | 86 x 86 mm / 60 mm | 340 g |
| D3v96/66* | 112 x 112 mm / 60 mm | 480 g |
| D3v144/66* | 158 x 158 mm / 60 mm | 680 g |
| D3v192/66** | 208 x 208 mm / 60 mm | 680 g |

Standards
DIN 43700
DIN 43701
DIN 43718
DIN 43802
EN 60051

Compliance
EN 61554
ISO 20673:2007
ISO 22554:2007
ISO 22555:2007
EN 60051
EN 60945:2002

MED directives
- Speed A.1/4.7
- Rudder A.1/4.20
- RPM A.1/4.21
- Pitch A.1/4.22



| | |
|----------------------------|---------------|
| Illumination options | |
| Illuminated pointer | 24 VDC |
| Illuminated scale by LED's | 24 VDC |
| Input options | Load |
| 0...10 V | 10 k Ω |
| 0...12 V | 12 k Ω |
| 10...0...10 V | 20 k Ω |
| 12...0...12 V | 24 k Ω |
| 0...20 mA / 4...20 mA | < 30 Ω |
| 1...0...1 mA | < 30 Ω |
| 10...0...10 mA | < 30 Ω |
| 20...0...20 mA | < 30 Ω |

Other voltages and currents on request

| | |
|--------------------------|------------------------|
| Scale options | |
| Background | black / white |
| Inscription | black / white / yellow |
| Coloured marks and bands | On customer request |
| Company logo | On customer request |

| | |
|-----------------|---|
| Pointer options | |
| Deflection | 240 degrees |
| Colour | black / white / yellow |
| | <i>Other pointer colours on request</i> |

| | |
|-----------------------|-----------------|
| Temperature ranges | |
| Operation | -25...0...70 °C |
| Storage | -40...0...80 °C |
| Influence on accuracy | 0.5 % / 10 °C |

| | |
|----------------|-------|
| Vibration test | |
| 3...13.2 Hz | 2 mm |
| 13.2...100 Hz | 0.7 g |

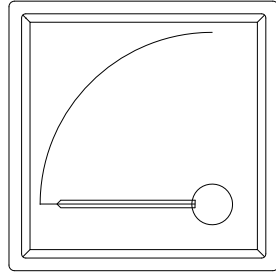
| | |
|------------------|-----------------------------------|
| General | |
| Glass | low-reflecting glass |
| Protection class | IP54 (standard) / IP66 (optional) |
| Accuracy | Class 1.5 |
| Mounting | In all positions mountable |

* BCI housing available
** BCI and NOA housing available

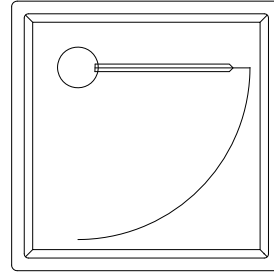


Pointer postions

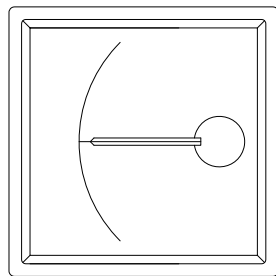
Pointer rotation max. 90 °



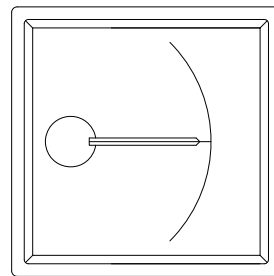
Bottom, right



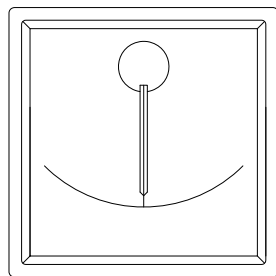
Upper, left



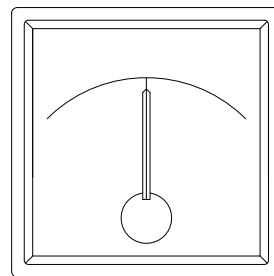
Middle, right



Middle, left

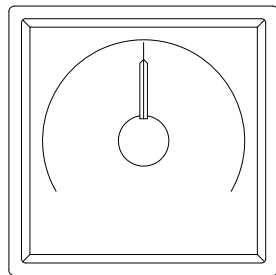


Centre, up

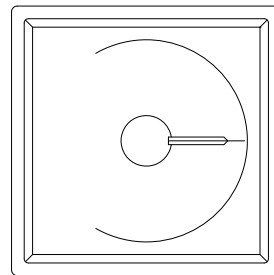


Centre, bottom

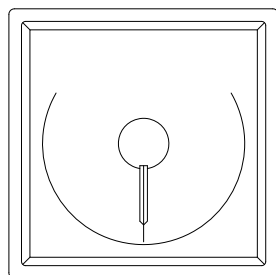
Pointer rotation max. 240 °



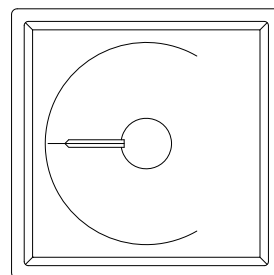
Centre, pointing up



Centre, pointing right



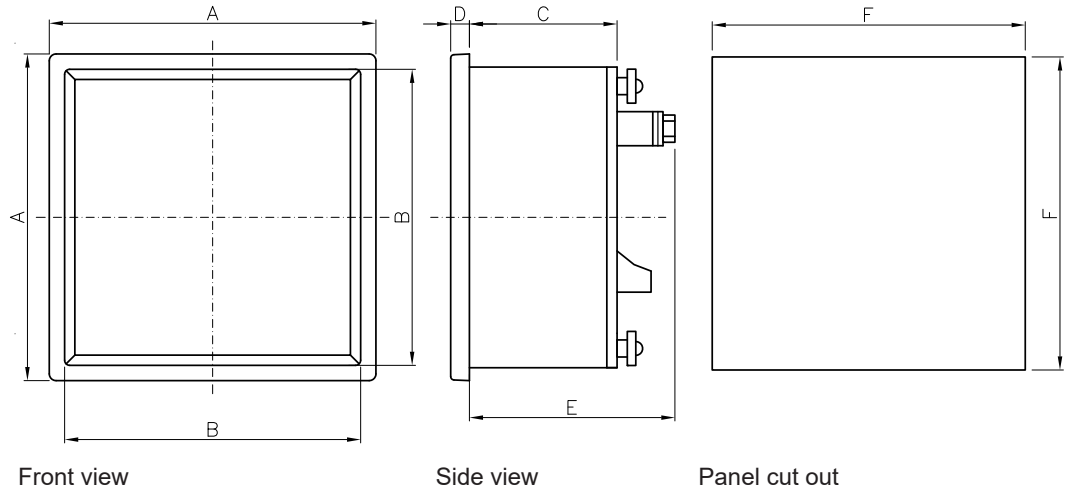
Centre, pointing down



Centre, pointing left

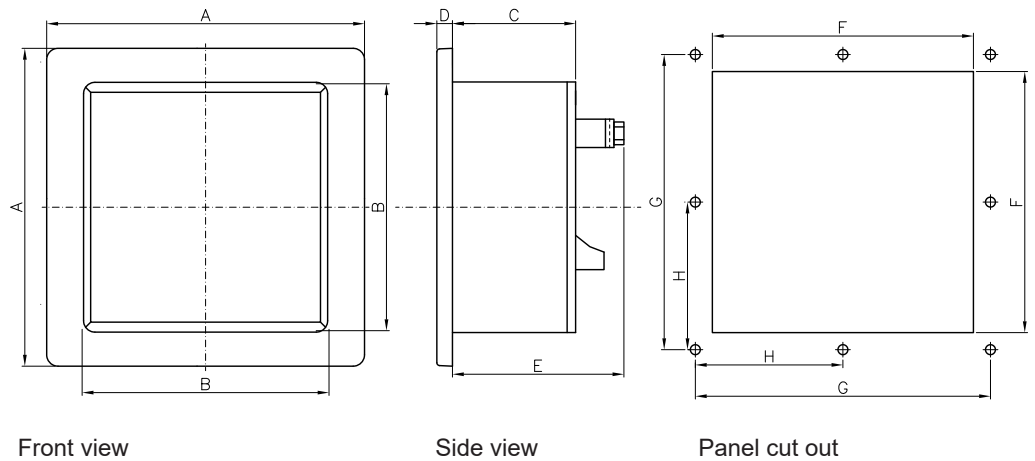


Front protection class, IP54



| | A | B | C | D | E | F |
|-----------|-----|-----|----|-----|----|---------|
| D(3)v48S | 48 | 42 | 44 | 5 | 52 | 45+0.6 |
| D(3)v72S | 72 | 63 | 43 | 5 | 60 | 68+0.7 |
| D(3)v96S | 96 | 86 | 43 | 5 | 60 | 92+0.8 |
| D(3)v144S | 144 | 134 | 45 | 5 | 60 | 138+1.0 |
| D3v192S | 192 | 164 | 45 | 7.5 | 60 | 186+1.1 |

Front protection class, IP66



| | A | B | C | D | E | F | G | H |
|----------------|-----|-----|----|-----|----|---------|-----|----|
| D(3)v48S/IP66 | 58 | 42 | 44 | 5 | 52 | 45+0.6 | 51 | - |
| D(3)v72S/IP66 | 86 | 63 | 43 | 5 | 60 | 68+0.7 | 78 | - |
| D(3)v96S/IP66 | 112 | 86 | 43 | 5 | 60 | 92+0.8 | 104 | - |
| D(3)v144S/IP66 | 158 | 134 | 45 | 5 | 60 | 138+1.0 | 150 | 75 |
| D3v192S/IP66 | 208 | 164 | 45 | 7.5 | 60 | 186+1.1 | 198 | 99 |

S4v... models



Stepper indicator with sin/cos pointer 24 V

Maritime bridge & bridge-wing instrument based on hybrid stepper motor technology.

The pointer needle is full scale 360° rotated in over 6.400 micro-steps, resulting in 0.25 % accuracy.

With this accuracy the SXv96 stepper indicator complies with all latest standards and MED regulations and is considered to be the best available in the market.

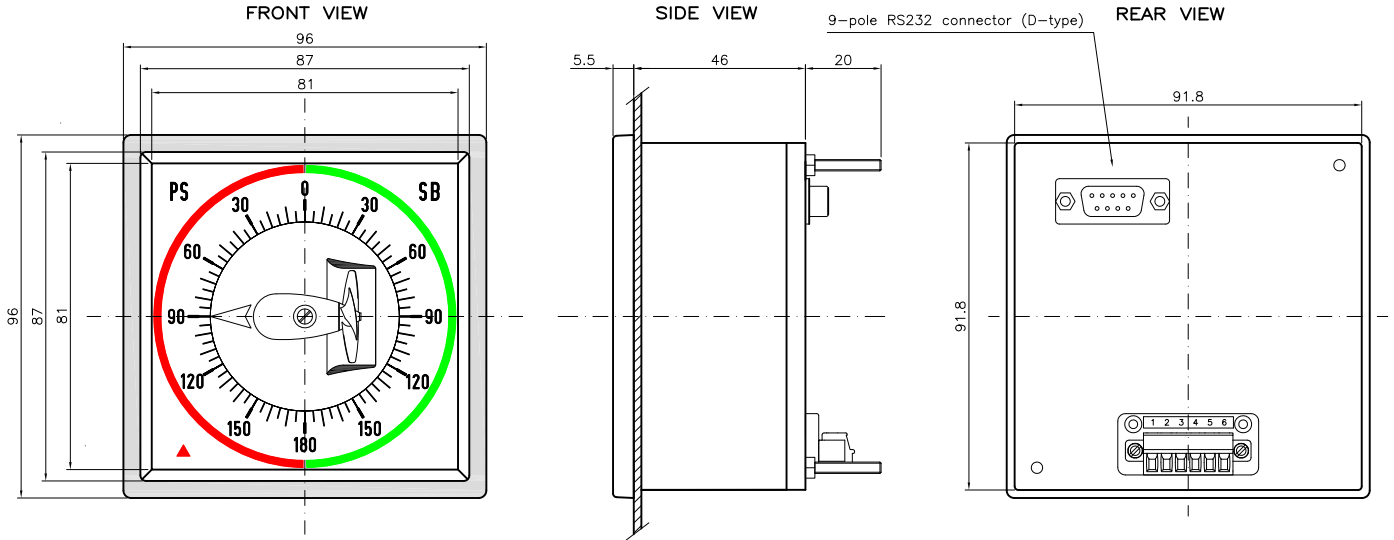
| | | | |
|---|------------------------|---|---|
| Model | Dimensions | Weight | Standards |
| S4v96 | 96 x 96 mm / 75.1 mm | 430 g | DIN 43700 |
| S4v144 | 144 x 144 mm / 87.1 mm | 800 g | DIN 43701 |
| Illumination options | | | DIN 43718 |
| Illuminated pointer | | 24 VDC | DIN 43802 |
| Illuminated scale by LED's | | 24 VDC | EN 60051 |
| Input | | | Compliance |
| 24 V 4-wire potmeter input from SFCP-50A-4517 2k5 or equivalent | | | EN 61554 |
| | | | ISO 20673:2007 |
| | | | EN 60051 |
| <i>Other voltages and currents on request</i> | | | MED directives |
| | | | - Rudder A.1/4.20 |
| Supply | | 24 VDC | |
| Scale options | | |  |
| Background | | black | |
| Inscription | | white / yellow | |
| Coloured marks and bands | | On customer request | |
| Company logo | | On customer request | |
| Disc options | | | |
| Deflection | | 360 degrees | |
| Colour | | black | |
| | | <i>Other pointer colours on request</i> | |
| Temperature ranges | | | |
| Operation | | -25...0...70 °C | |
| Storage | | -40...0...80 °C | |
| Influence on accuracy | | 0.05 % / 10 °C | |
| Vibration test | | | |
| 3...13.2 Hz | | 2 mm | |
| 13.2...100 Hz | | 0.7 g | |
| General | | | |
| Glass | | low-reflecting glass | |
| Protection class | | IP54 (standard) / IP66 (optional) | |
| Accuracy | | Class 1.5, 6400 steps over 360° | |
| Mounting | | In all positions mountable | |

S4v... models

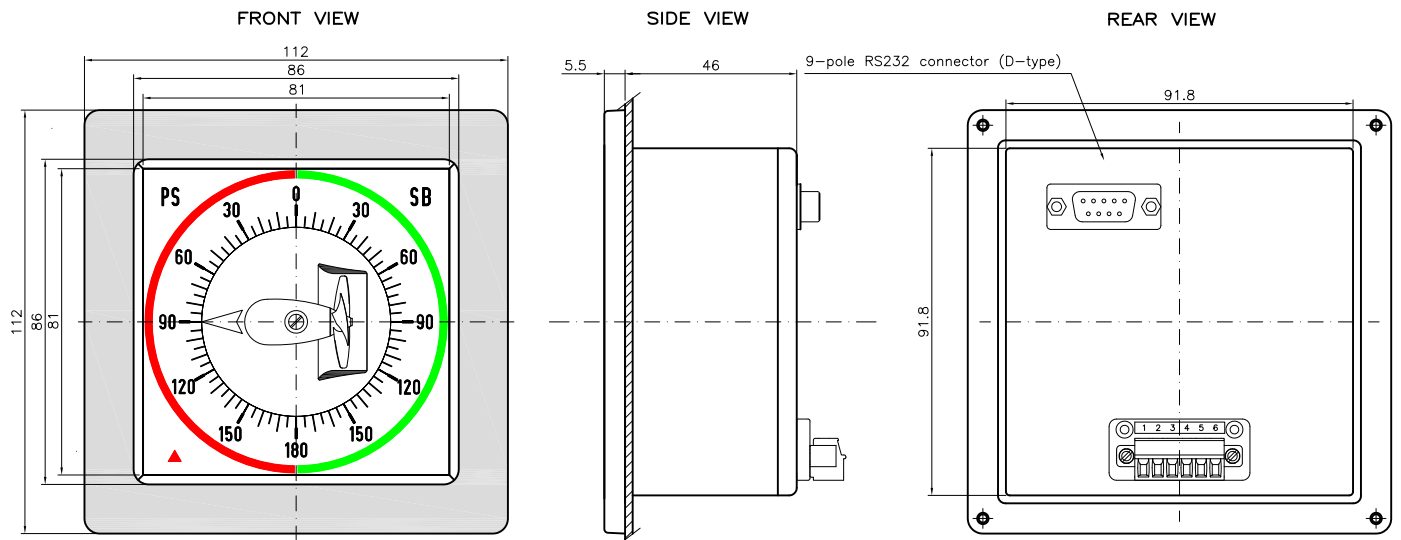


Dimensions

S4v96S



S4v96S/66



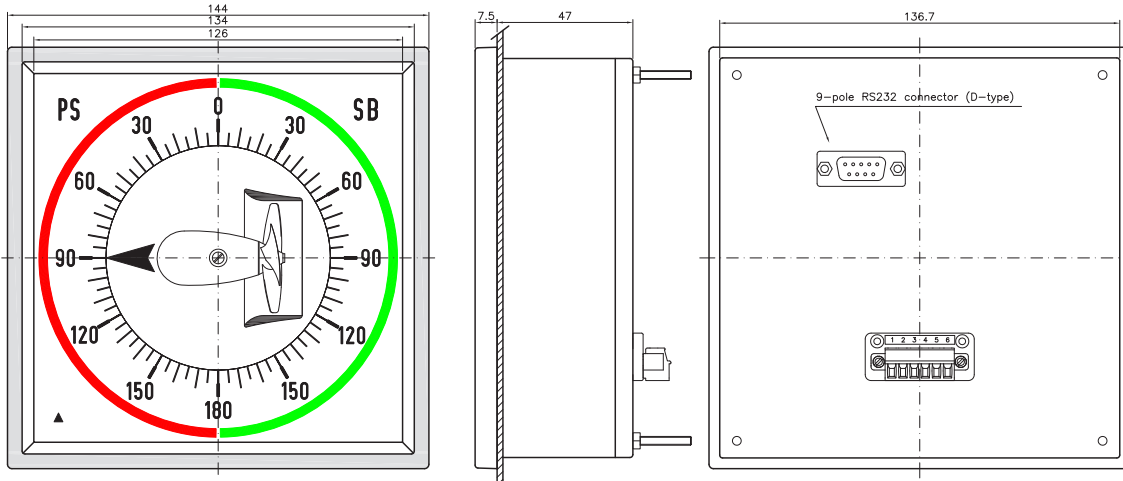
104

S4v... models

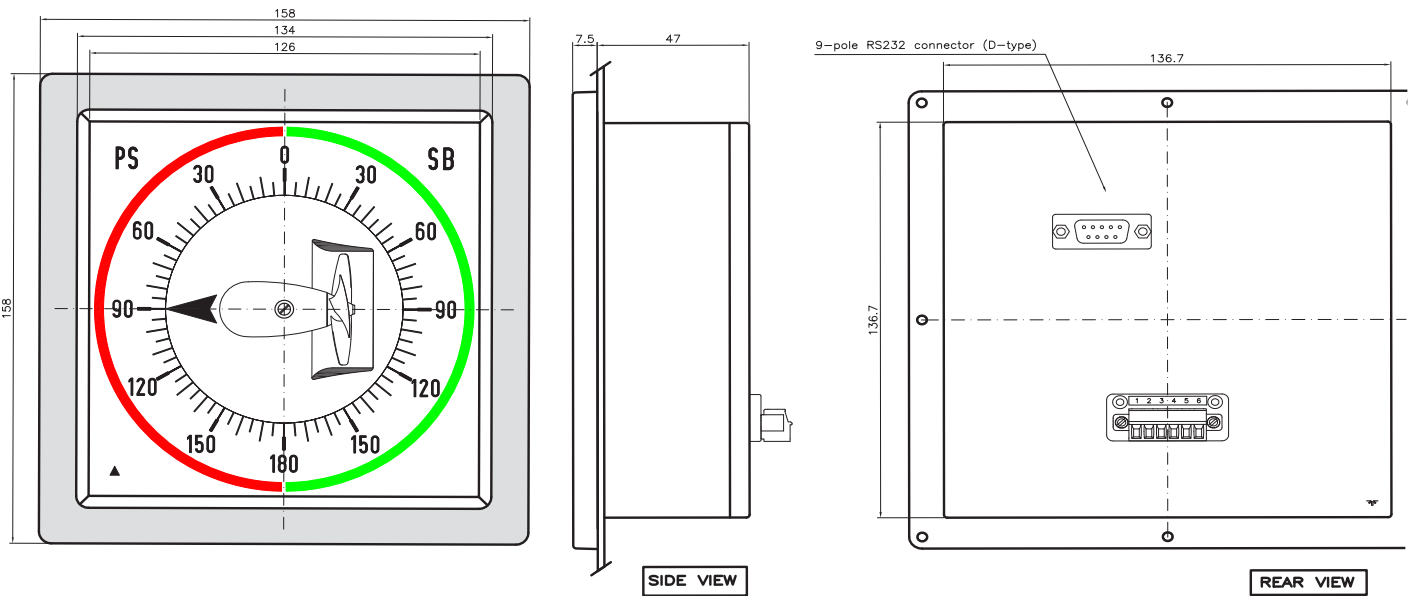


Dimensions

S4v144S



S4v144S/66





BCI... housing



Housing for 1, 2, 3 or 4 indicators, IP66

The Dv.../66 and D3v.../66 bridge instrument models can be supplied in a 'ready to mount' housing. The BCI housing system is available as a single instrument system, but also for 2, 3 or even 4 instruments in one housing.

The user friendly dimmer knob, mounted on the front, provides an easy to adjust illumination intensity. This makes the instruments suitable for day/night operation. Equipped with 2 cable glands and venting valve.



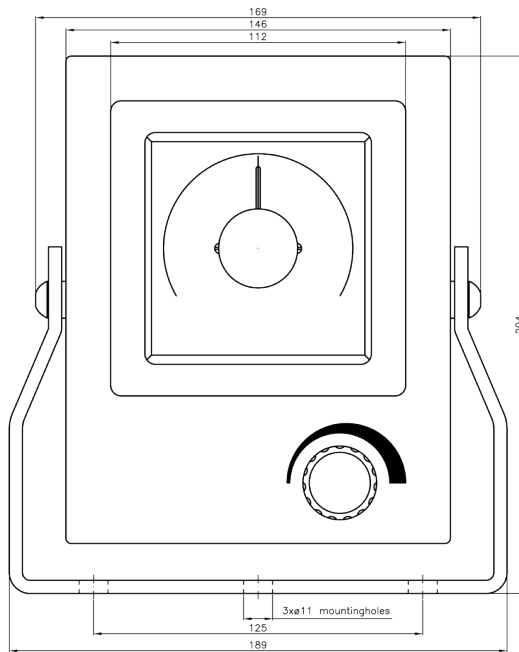
| Model | Description |
|------------------|--|
| BCI-1-96 | Housing for 1 pc. 96 x 96 mm, IP66 instrument |
| BCI-1-144 | Housing for 1 pc. 144 x 144 mm, IP66 instrument |
| BCI-1-192 | Housing for 1 pc. 192 x 192 mm, IP66 instrument |
| BCI-2-144 | Housing for 1 pc. 144 x 144 mm, IP66 instrument |
| BCI-3-144 | Housing for 1 pc. 144 x 144 mm, IP66 instrument |
| BCI-4-144 | Housing for 1 pc. 144 x 144 mm, IP66 instrument |
| | <i>Other housing models on request</i> |
| Remarks | |
| Material | Stainless steel |
| Finishing | Powder coated |
| Connections | 2 cable glands for cable entry |
| Dimmer | The housing is equipped with a dimmer on the front. |
| Indicator | Must be separately specified |
| General | |
| Protection class | IP66 |
| Mounting | The housing is equipped with a swivel-mounting bracket |

BCI... housing

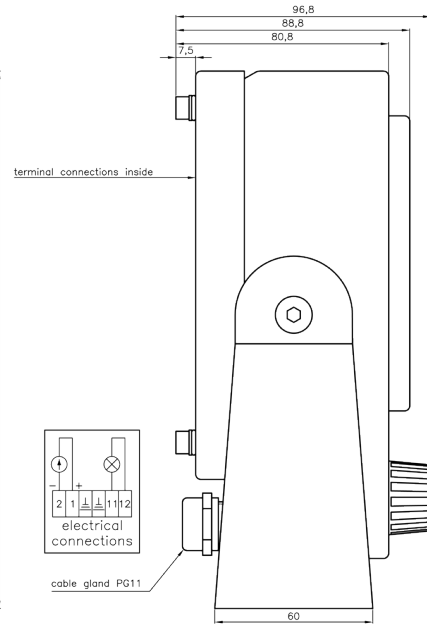
Dimensions



BCI-1-96

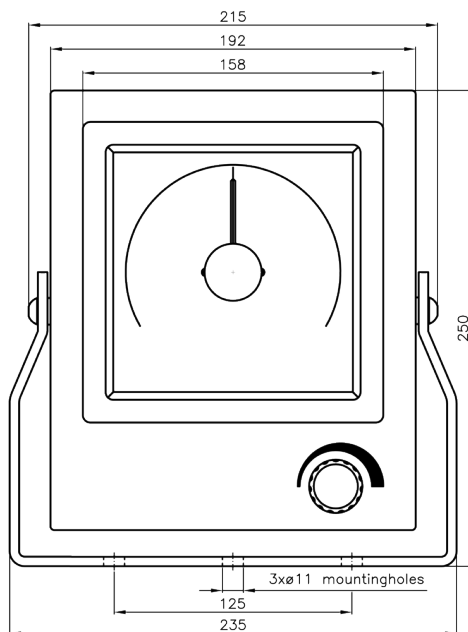


Front view

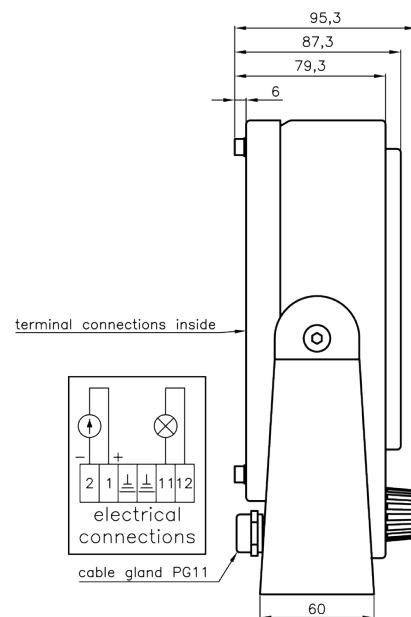


Side view

BCI-1-144



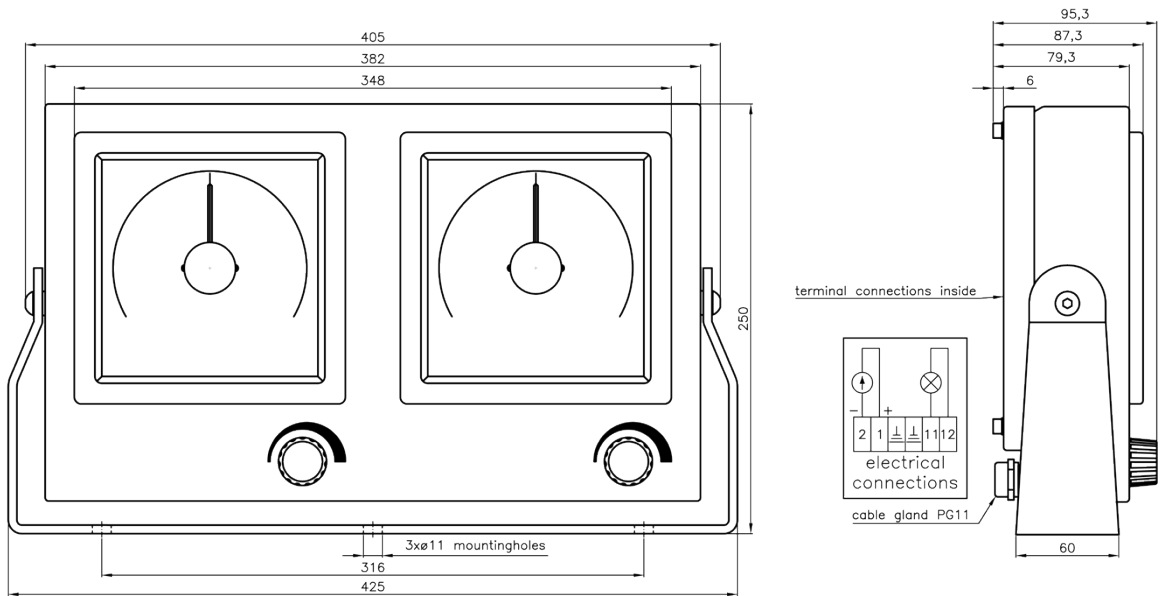
Front view



Side view

Dimensions

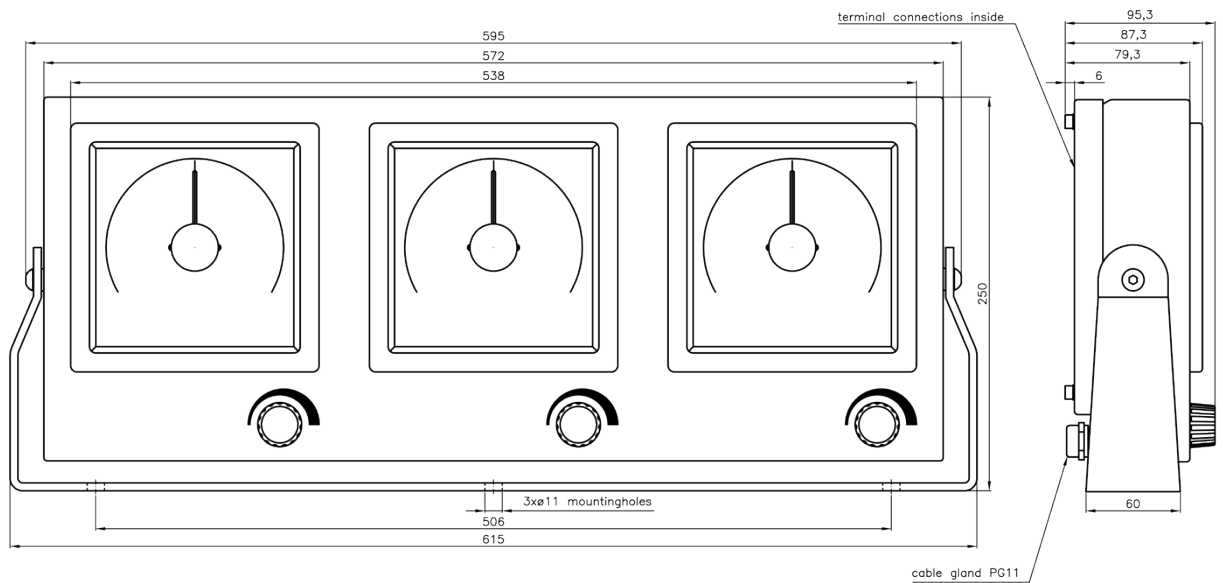
BCI-2-144



Front view

Side view

BCI-3-144

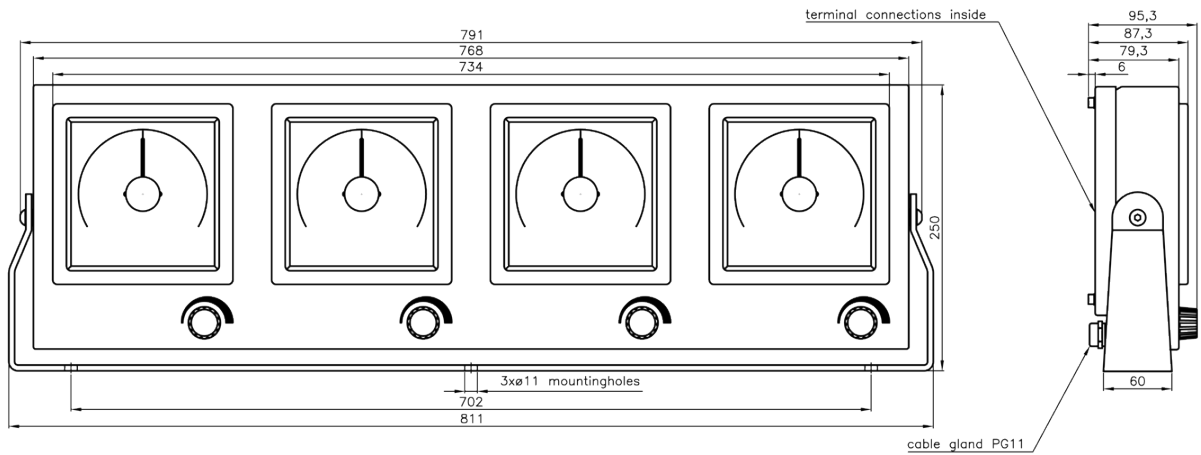


Front view

Side view

Dimensions

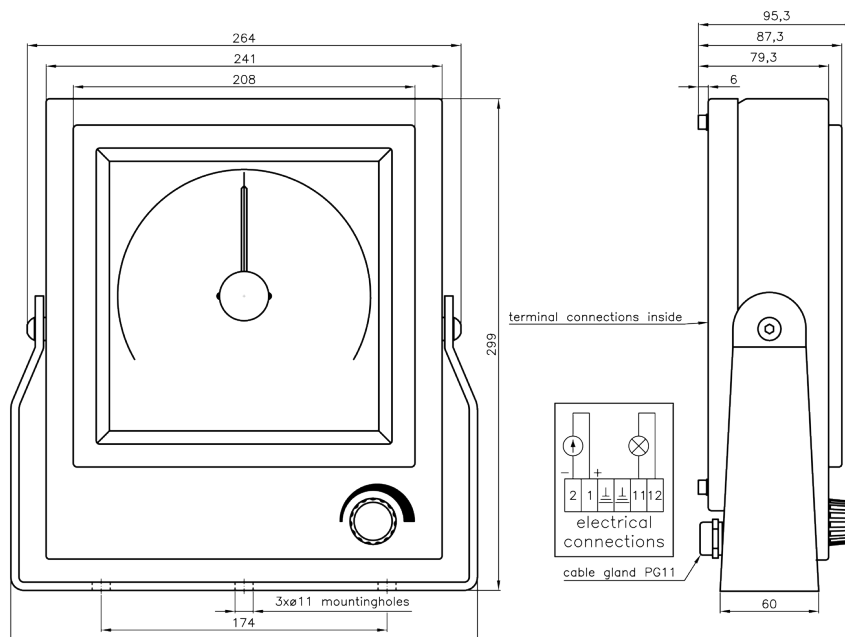
BCI-4-144



Front view

Side view

BCI-1-192



Front view

Side view

NOA... housing



Housing according Panama Canal recommendations, IP 66

The NOA-housing system is a 'Ready to mount' system for bridge wing instruments built according the Panama Canal recommendations. The IP66 waterproof NOA-housing is suitable for a single 192 x 192 mm panel indicator. (D3v192/66 models)

The user friendly dimmer knob, mounted on the front, provides an easy to adjust illumination intensity. This makes the instruments suitable for day/night operation.

As a result of the specific scale and pointer design of this instrument, combined with the 'state of the art' illumination system, it provides the largest and easiest to read scale printing in the market.



| Model | Description |
|------------------|---|
| NOA-1-192 | Housing for 1 pc. 192 x 192 mm / IP 66 indicator Designed according the Panama Canal recommendations |

| Remarks | |
|-------------|--|
| Material | Stainless steel |
| Finishing | Powder coated |
| Connections | 2 cable glands for cable entry |
| Dimmer | The housing is equipped with a dimmer on the front |
| Indicator | Must be separately specified |

| General | |
|------------------|---|
| Protection class | IP66 |
| Mounting | The housing is equipped with 4 mounting holes, for fixed mounting on panel/wall |

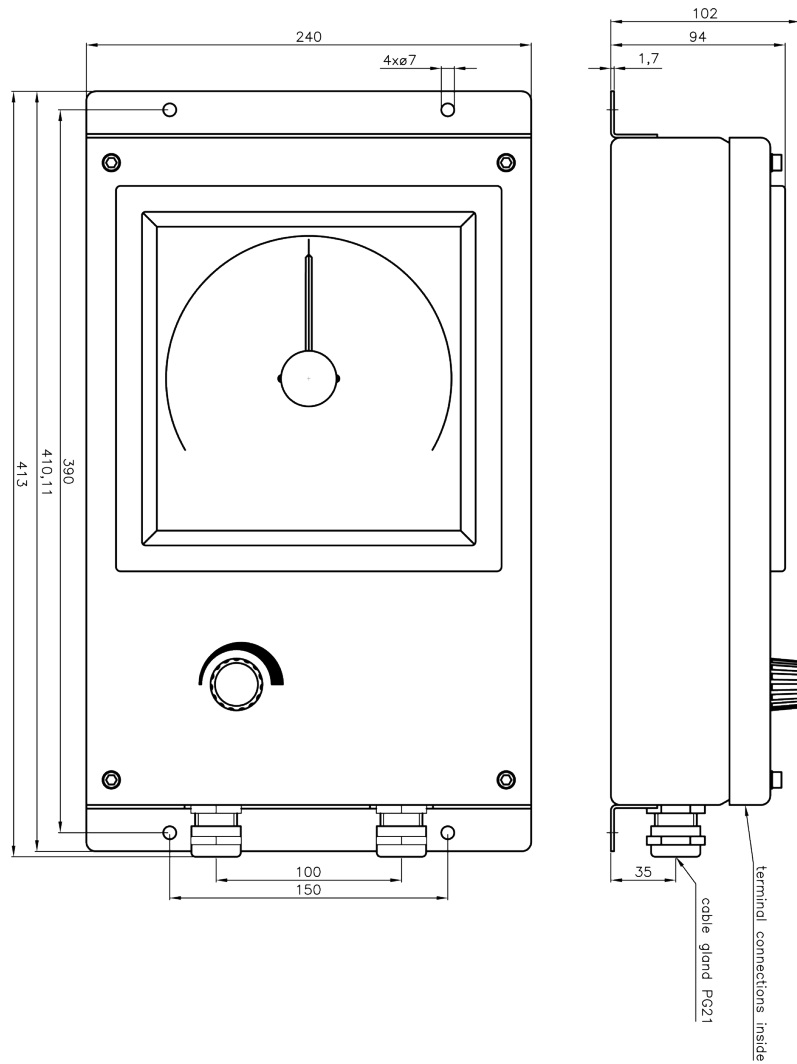


NOA... housing

Dimensions



NOA-1-192



Front view


Side view



Panorama rudder indicator

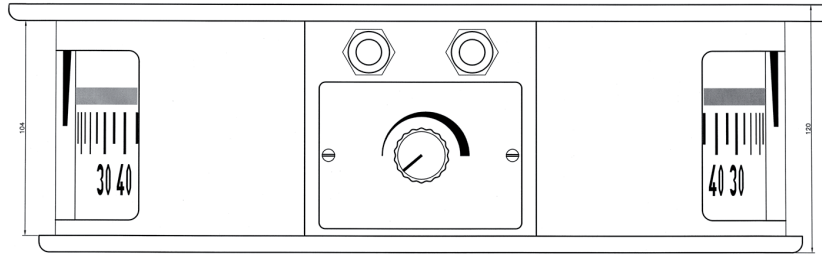
Servo-drive operated deckhead rudder indicator with 3 scales and pointers. Suitable for ceiling mounting. Integrated illumination dimmer and 2 cable glands.



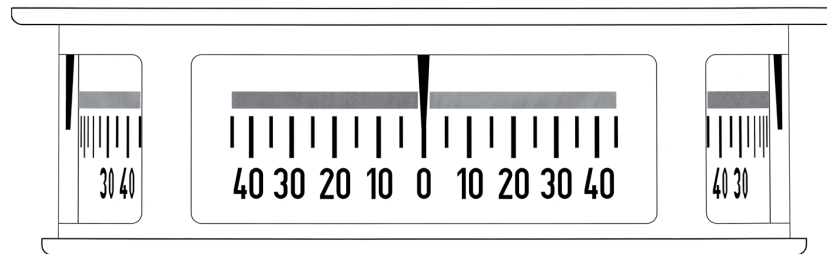
| | | | |
|---|---|---|---|
| <p>Model RCI-400</p> | <p>Dimensions 400 x 122 mm (diameter x height)</p> | <p>Weight 3960 g</p> | <p>Standards EN 60945:2002</p> |
| <p>Illumination options Dimmable pointer illumination Dimmable scale illumination</p> | <p>Input options 0...10 V 0...12 V 10...0...10 V 12...0...12 V 0...20 mA 4...20 mA 1...0...1 mA 10...0...10 mA 20...0...20 mA</p> | <p>Load 80 kΩ 80 kΩ 80 kΩ 80 kΩ 100 Ω 100 Ω 1000 Ω 100 Ω 50 Ω</p> | <p>Compliance ISO 20673:2007</p> <p>MED directives - Rudder A.1/4.20</p> |
| <p>Scale options Background Inscription Coloured marks and bands Company logo</p> | <p>Pointer options Deflection Colour</p> | <p>black / white black / white / yellow On customer request On customer request</p> |  |
| <p>Temperature ranges Operation Storage Influence on accuracy</p> | <p>Vibration test 3...13.2 Hz 13.2...100 Hz</p> | <p>3x 70° black / white / yellow <i>Other pointer colours on request</i></p> <p>0...55 °C -40...0...80 °C 0.5 % / 10 °C</p> <p>2 mm 0.7 g</p> | |
| <p>General Glass Protection class Accuracy Mounting</p> | | <p>low-reflecting glass IP40 Class 1.5 On the ceiling of the bridge</p> | |



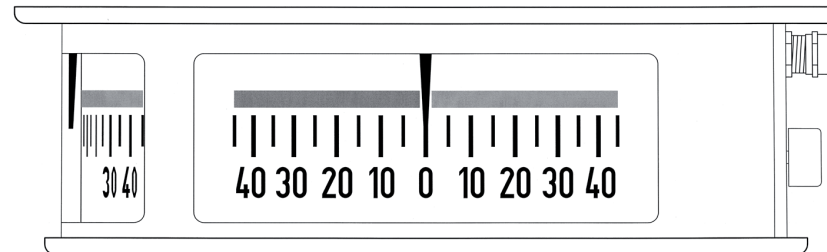
Rear view



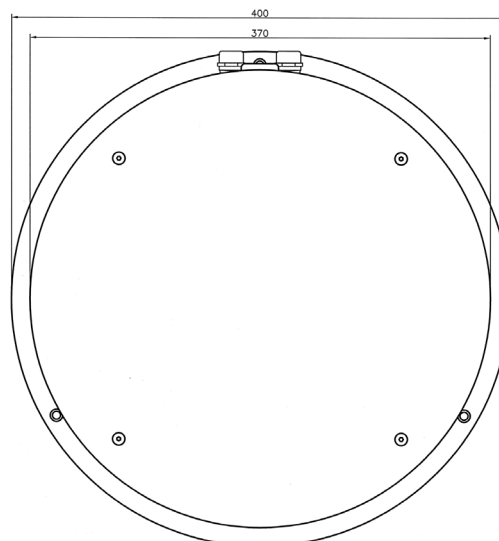
Front view



Side view



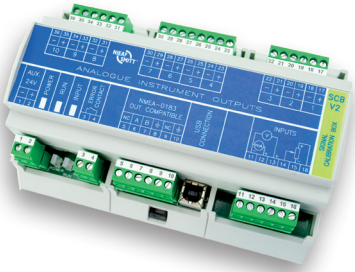
Bottom view





Signal calibration box

The signal calibration box (SCB) is designed to convert signals from a sensor and display these corrected signals on one or more panel indicators.



General specifications

| | |
|-----------------------|----------------------|
| Supply voltage | 24 VDC (-25 % +30 %) |
| Power consumption | ± 3.6 W |
| Operation temperature | -15 °C...+70 °C |

Compliance

| |
|-------------------------|
| LR TA System |
| Specification 1 of 2002 |
| EN 60945:2002 |
| ISO 20673:2007 |
| ISO 20672:2007 |
| EN 22554:2007 |
| EN 22555:2007 |

Input

| | |
|--------------------------|--|
| Three wire potentiometer | (1 KΩ - 10 KΩ) |
| Current signal | 4...20 mA RI (max) 150 Ω 0...20 mA RI (max) 150 Ω |
| Voltage signal | 0...10 V RI (min) 5 MΩ -10...0...10 V RI (min) 5MΩ -12...0...12 V RI (min) 5MΩ |

(the input type is selectable by software)

Output

| | |
|-----------------------------------|--|
| 10 x adjustable indicators output | |
| Voltage signal | 0...10 V -10...0...10 V -12...0...10 V |
| 1 x NMEA 0183 compatible output | |
| Talker device | Engine room monitoring systems (ER) |
| Sentence format | Rudder sensor angle |
| Baud rate | 4800 |
| Message frequency | ± 10 Hz |

Message format \$--RSA, x.x, A, x.x, A*hh<CR><LF>

Sensors*

| | |
|-------------------------------------|--|
| Port rudder sensor | Status A = data valid / V = data invalid |
| Starboard (or single) rudder sensor | Status A = data valid / V = data invalid |

* Relative measurement of rudder angle without units, "-" = bow turns to port. Sensor output is proportional to rudder angle but not necessarily 1:1

| | |
|---------------|---|
| Communication | 1x USB port for the adjustment Software built-in to denial converter |
|---------------|---|

| | |
|-------------------|---|
| Internal software | Corrects the input to a "perfect" signal Sends the "perfect" signal over the NMEA 0183 Compatible output converts the "perfect" signal per indicator output Possibility to adjust via the USB port |
|-------------------|---|

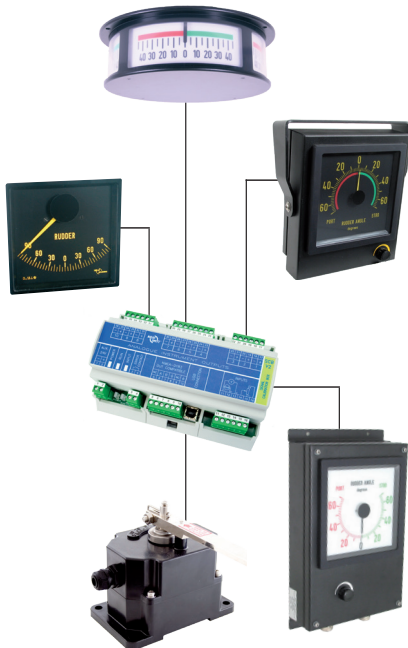
| | |
|---------------------|---|
| Adjustment software | Windows™ based adjustment software Possibility to adjust the input and output Curves option to generate a report file |
|---------------------|---|

| | |
|---------------|-------------|
| Response time | 200 ms max. |
|---------------|-------------|

| | |
|----------|--|
| Accuracy | The complete system (from rudder axis to indicator) can be calibrated to accuracy less than 0.5 % (in accordance with the standards). Initial factory accuracy 1.0 %. Accuracy over temperature range 0.2 %. |
|----------|--|

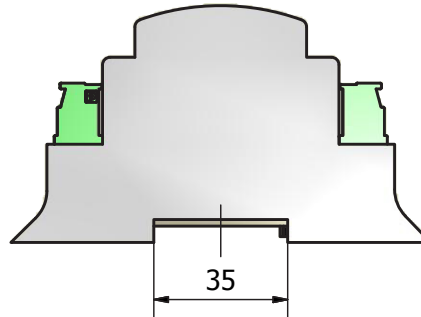
| | |
|-------------|--|
| Housing | |
| Dimensions | 155 x 110 x 62 mm (w x b x h), 35 mm rail mounting |
| Materials | Plastic, UL-9u V-o |
| Connections | Pluggable screw connectors |

Typical rudder indicator system

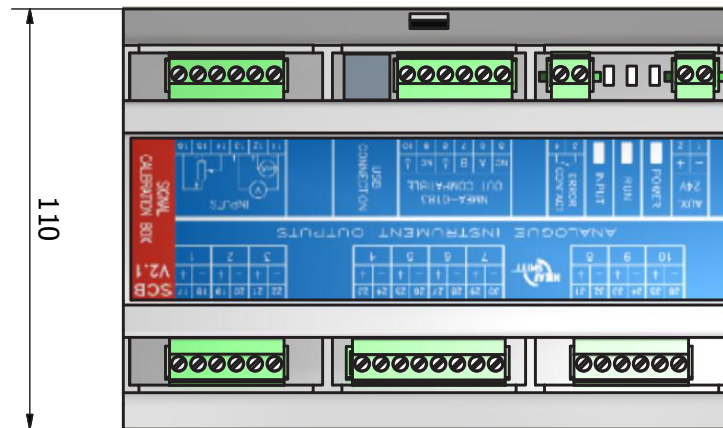




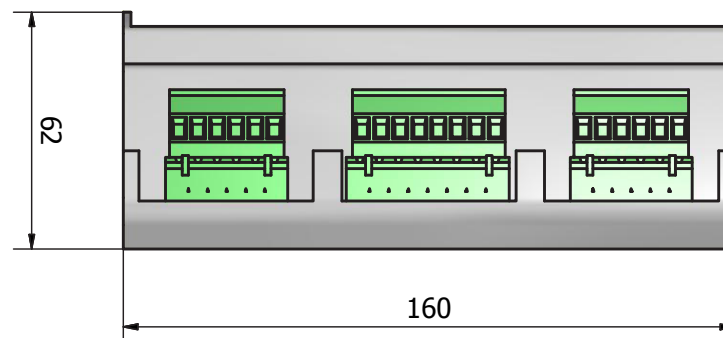
Rear view



Front view



Side view



D3v...S/LED

Moving coil indicator

Indicators for navy applications:



| Model | Dimensions | Weight | Standards |
|--------------------|---|--|-----------|
| D3v72S/LED | 72 x 72 mm / 50 mm | 400 g | DIN 43700 |
| D3v96S/LED | 96 x 96 mm / 90 mm | 750 g | DIN 43701 |
| D3v144S/LED | 144 x 144 mm / 90 mm | 900 g | DIN 43718 |
| | | | DIN 43802 |
| | | | EN 60051 |
| Shock proof | 30 G STANAG 1008 (NATO) | | |
| Input | DC current DC voltage AC current AC voltage | 1 mA...10 A 60 mV...500 V 1 mA...10 mA 10 V...500 V | |
| Scale options | Black scale with white printing Black scale with multi colour printing <i>Other scales on request</i> | | |
| Scale division | Linear pointer deflection 240° | | |
| Extra options | Coloured markings | | |
| General | | | |
| Protection class | IP54 | | |
| Accuracy | Class 1.5 | | |



Maritime
instruments

Dv2... models



Cross pointer indicator

The unique cross-pointer instrument is equipped with 2 measuring systems, each with its own pointer and scale. The cross-point of the 2 pointers is a third value with its own scale. ('3-values-in-1 indicator').

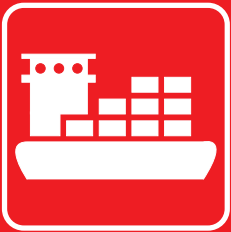
This instrument is for example used in the dredging industry. The cross point value gives the net dredging result.



| Model | Dimensions | Weight | Standards |
|------------------|--|--------|-----------|
| Dv2-96S | 96 x 96 mm / 60 mm | 350 g | DIN 43700 |
| Dv2-144S | 144 x 144 mm / 60 mm | 450 g | DIN 43701 |
| Dv2-192S | 192 x 192 mm / 90 mm | 1000 g | DIN 43718 |
| Dv2-240S | 240 x 240 mm / 100 mm | 2800 g | DIN 43802 |
| | | | EN 60051 |
| Input | 0..10 V 4..20mA | | |
| Scale options | White scale with black printing Black scale with one colour uv sensitive printing White scale with multi colour printing <i>Other scales on request</i> | | |
| Extra options | Scale illumination Coloured markings Company logo on the scale | | |
| General | | | |
| Protection class | IP54 | | |
| Accuracy | Class 1.5 | | |



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