

Analogue indicator Type SIR3 (round) and Type SIQ3 (square) with moving-coil element



Display principle	Moving-coil element
Design	Round Type SIR3 or square Type SIQ3
Casing sizes	Square: 72 x 72 mm, 96 x 96 mm, 144 x 144 mm Round: Ø 60 mm, Ø 80 mm, Ø 100 mm, Ø 130 mm
Measured variables	Analogue input signals (current, voltage)
Scale angle	240°
Casing material	Fibreglass-reinforced, UV-stabilised and salt spray resistant plastic; upper part: PC GF10; base plate: PC GF30; faceplate made of non-reflective float glass
Installation position	Any



Analogue Indicator SIR3/SIQ3

Scope of application

Type SIR3...,SIQ3... analogue indicators are mainly used in the following industries: Shipbuilding industry, machinery and plant engineering. Thanks to its mechanical design, the casing is extremely resistant to salt spray, enabling use in outdoor applications. The DIN-standardised casing sizes are suitable for installation in control cabinets and control panels with pre-stamped standardised installation openings.

Display principle

The display on the SIR3...,SIQ3... is based on a 1 mA moving-coil element. The moving-coil element contains a coil that rotates in the magnetic field of a permanent magnet. When a direct current flows through the coil, a second magnetic field is produced in the opposite direction of the magnetic field of the permanent magnet. The two magnetic fields repel, thus rotating the coil with an attached pointer. A coil spring acts against the magnetic force in the coil.

Special features

- Robust glass-fibre-reinforced plastic housing, also suitable for outdoor areas; round or square design
- Individual dial design and corporate logos possible
- Also available with a centred zero moving-coil element (± 1 mA)
- Bright LED dial lighting for optimum reading from all angles
- Direct connection of the current, voltage measuring signals
- Complies with DNV-GL certification (certification being prepared; other certifications available on request)

Indicator versions

The following figures show the types and sizes of the indicators:

Indicator sizes, Type NIR3 round



From left to right: Type SIR3 Ø 60 mm, Ø 80 mm, Ø 100 mm, Ø 130 mm

Indicator sizes, Type NIQ3 square



From left to right: Type SIQ3 72x72 mm, 96x96 mm, 144x144 mm

Features

Dial and pointer

The labelling and the scale graduation comply with DIN43802 and DIN43780 but can also be customised on request.

Dial and pointer – standard versions (to DIN 43802 and DIN 43780)

	White scale dial	Black scale dial
Graduation and labelling	Black	White
Type of graduation	Coarse-fine graduation	Coarse-fine graduation
Dial lighting	Scale dial lighting, white	Graduation and labelling lighting, white
Pointer versions	Black pointer, unlit	White pointer, unlit

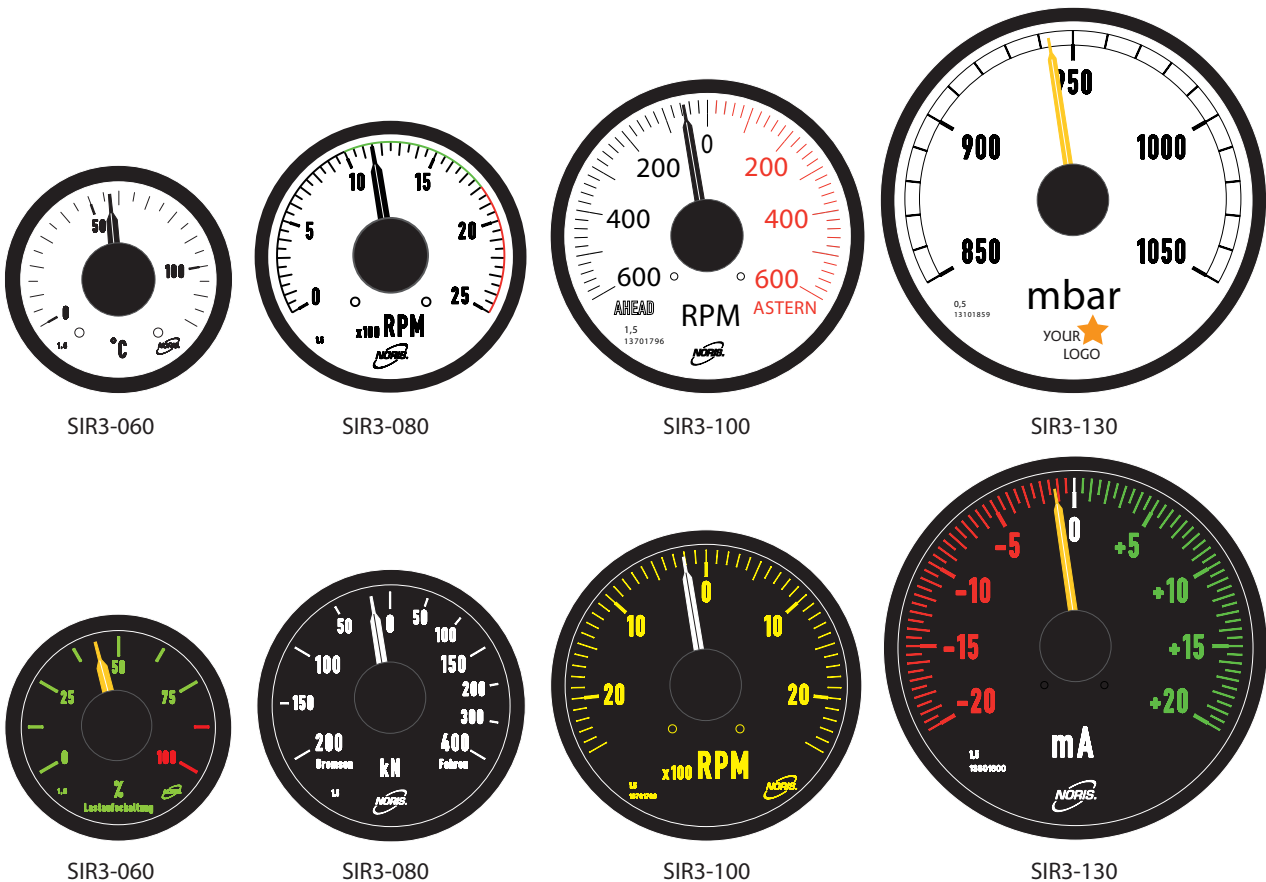
Dial and pointer – individual versions

Graduation and labelling	Available in all colours in accordance with customer requirements, own logos possible
Type of graduation	Orientation graduation or any other scale graduation available according to customer requirements
Black dial lighting	Dial lighting and labelling red, green or in another translucent colour
Pointer versions	Unlit: black, white, yellow

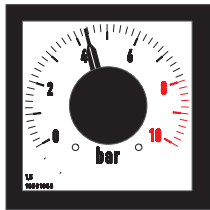
Standard and customised dial versions

Examples of standard and customised versions of dials are illustrated below.

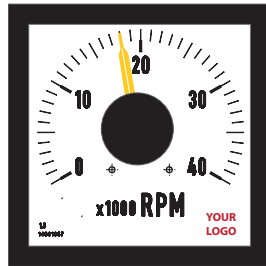
Type SIR3, round



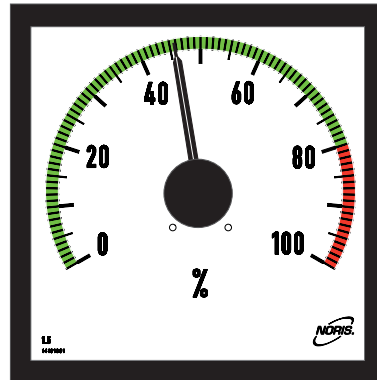
Type SIQ3, square



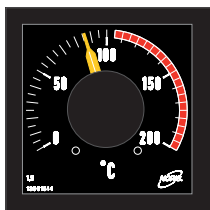
SIQ3-072



SIQ3-096



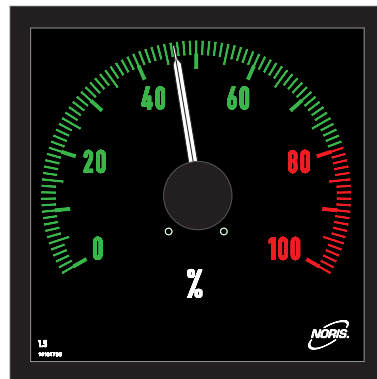
SIQ3-144



SIQ3-072



SIQ3-096



SIQ3-144

Zero point, pointer return point and measuring range

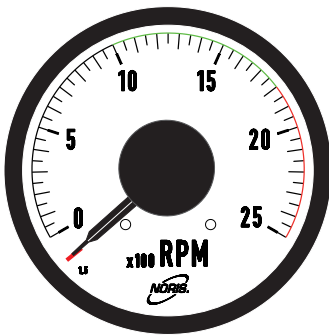
Zero point	Zero point on the right	Zero point in the middle
Pointer return point	<ul style="list-style-type: none"> The pointer moves to the pointer return point when the power is turned off. This position is the mechanical zero point (bottom left, 7 o'clock position) 	
Measuring range	<ul style="list-style-type: none"> The measuring range shown on the dial (can be individually defined) and the signal measuring range (see type code) differ. Processing of industrial current/voltage signals (customised current/voltage measuring ranges also possible), see type code 	

Lighting

The indicator is lit by six integrates white LEDs which illuminate the dial from behind. The lighting can be realised protected against polarity reversal via a 24 VDC input or a 12 VDC control input.

The brightness depends on the applied voltage. For both control inputs, the control range starts at approx. 6 VDC and ends at maximum brightness at the respective final voltage of 12 VDC or 24 VDC. The brightness can be regulated with a commercially available PWM dimmer. The pointer is unlit.

Monitoring measuring signal – Live Zero function



Live Zero

Type -I2: 4...20 mA
Type -U2: 2...10 VDC

Functional description

The Live Zero function monitors the accuracy of the measuring signal thus increasing operational reliability. The measured value zero is not sent as a standard signal of the zero variable but rather it is offset (example: with 4...20 mA inputs the scale value is 0 at 4 mA). This makes it possible to detect possible sensor failure, wire break or short-circuit of the sensor line.

Function indicator

The pointer will drop below the zero point to indicate failure of the measuring signal (see illustration).

Dimensioned drawing, connection and wiring diagrams

Dimensions of square Type SIQ3...

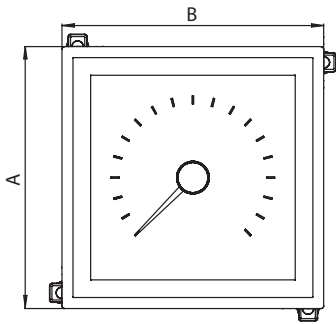


Fig.: SIQ3... Front view

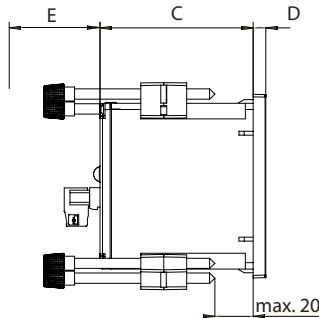


Fig.: SIQ3... Side view

Indicator type	A	B	C	D	E	Control panel cut-out	Permissible deviation
SIQ3-072...	72 mm	72 mm	60 mm	5 mm	40 mm	67.5 x 67.5 mm	+0.5 mm
SIQ3-096...	96 mm	96 mm	60 mm	5 mm	for wiring	91.5 x 91.5 mm	+0.8 mm
SIQ3-144...	144 mm	144 mm	61 mm	8 mm		137.5 x 137.5 mm	+1.0 mm

Dimensions of round Type SIR3...

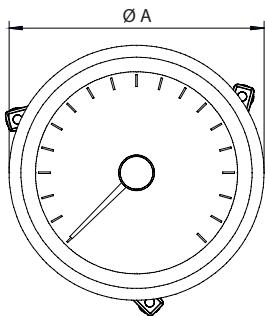


Fig.: SIR3... Front view

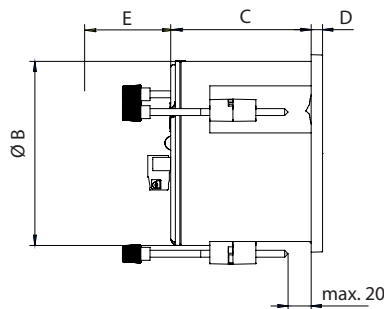


Fig.: SIR3... Side view

Indicator type	A	B	C	D	E	Control panel cut-out	Permissible deviation
SIR3-060	66 mm	60 mm	61 mm	5 mm	40 mm	Ø 60.5 mm	+0.5 mm
SIR3-080	86 mm	80 mm	61 mm	5 mm	for wiring	Ø 80.5 mm	+0.5 mm
SIR3-100	106 mm	100 mm	61 mm	5 mm		Ø 100.5 mm	+0.5 mm
SIR3-130	136 mm	130 mm	63 mm	6 mm		Ø 130.5 mm	+0.5 mm

Connector and pin assignments



1: 1x3 connector, 8-pin

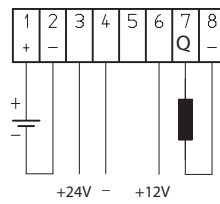
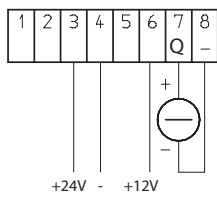
Pin	Description
1	Not used
2	Not used
3	Lighting control input, positive (24 VDC)

Pin	Description
4	Lighting control input, negative
5	Not used
6	Lighting control input, positive (12 VDC)
7	Measuring signal input, positive
8	Measuring signal input, negative

Terminal diagram

Free pins in the diagrams below are not used for the respective signal type.

Indicator types for direct current/direct voltage, alternating voltage



- Type -I1: 0...20 mA
- Type -I2: 4...20 mA
- Type -I4: -20...0...+20 mA
- Type -I0: Customised
- Type -U1: 0...10 VDC
- Type -U2: 2...10 VDC
- Type -U4: -10...0...+10 VDC
- Type -U0: Customised

- Type -W0: Alternating voltage for tachogenerator; sinusoidal signal, 250 VAC max.

Technical data

Electrical connection	
Reverse voltage protection	Yes
Connection	8-pin connector

Input signal	
Direct current	0 ... 20 mA (Ri ~ 70 Ω); 4 ... 20 mA (Ri ~265 Ω); -20 ... +20 mA (Ri ~60 Ω)
Direct voltage	0 ... 10 VDC (Ri ~10 kΩ); 2 ... 10 VDC (Ri ~8.33 kΩ); -10 VAC ... +10 VDC (Ri ~10 kΩ)
Alternating voltage	Max. 250 VAC (Ri voltage-dependent: for 50 VAC = Ri ~50 kΩ; for 100 VAC = Ri ~100 kΩ)
Input for lighting control	For direct voltage or commercially available PWM dimmer in 12 V or 24 V range (see connector and connection assignments)
Accuracy class	EN60051 and IEC51-1: 1.5% referred to measuring range

Environmental influences	
Operating temperature	IEC60068-2-1/2: -25 °C ... +70°
Storage temperature	Recommended: -40 ... +70 °C (max. peak values within 30 days/year at relative humidity of 5...95%)
Protection class	DIN EN 60529 IP66, IP67 and IP68 (1 m immersion depth, 24 h), rear of casing IP30 (higher protection class on request)
Vibration resistance	DIN IEC 60068-T2-6, 0.7 g @ 5 ... 100 Hz (sine) IEC 60068-2-6: 0.5 g, test duration 3 x 90 minutes (at 100 Hz)
Shock resistance	EN61373 Cat. 2: 5 g at 30 ms, 18 shocks per test
Climatic test	IEC60068-2-1 dry cold: -25 °C, test duration 16h IEC60068-2-2 dry heat: +70°C, test duration 16h IEC60068-2-30 moist heat: ≤95% relative at 55 °C, test duration 2x 12h
ESD	IEC61000-4-2 and EN50121-3-2, Tab. 9.3, evaluation criterion "A": 8 kV for air discharge; 6 kV for contact discharge
Burst	IEC61000-4-4 and EN50121-3-2, Tab. 7.2 and 8.2, power supply connections: 2 kV, signal, data and control lines 2 kV
Surge	IEC61000-4-5 and EN50121-3-2, Tab. 7.3, assessment criterion A, operating voltage positive to operating voltage negative at 1 kV (Ri = 2Ω)
RF interference immunity	IEC61000-4-3: 80 MHz...2 GHz, 80% AM at 1 kHz, E = 10 Vrms/m f = 80 MHz ... 1 GHz at 80% AM @1 kHz, E = 20 Vrms/m; f = 1.0 GHz ... 2.1 GHz at 80% AM @1 kHz, E = 10 Vrms/m; f = 2.1GHz ... 2.5 GHz at 80% AM @1 kHz, E = 5 Vrms/m;
Conducted RF interference	IEC61000-4-6 and EN50121-3-2, Tab. 7.1 and 8.1: 150 kHz...80 MHz, 80% AM at 1 kHz, U = 10 Vrms
Conducted AF interference	GL2012: 50 Hz...10 kHz, U = 3 Vrms
Emitted interference	CISPR 16-1, 16-2: Battery-related connections, 10 kHz ... 30 MHz EN50121-3-2, Tab. 4: Battery-related connections, 150 kHz ... 30 MHz EN50121-3-2, Tab. 6: Casing, 30 MHz ... 1 GHz

Mechanical variables	
Casing material	Fibreglass-reinforced, UV-stabilised and salt spray resistant plastic; upper part: PC GF10; base plate: PC GF30; faceplate made of non-reflective float glass
Installation position	Any
Weight	Square: SIQ3-072: 280 g, SIQ3-096: 340 g, SIQ3-144: 570 g Round: SIR3-060: 240 g, SIR3-080: 280 g, SIR3-100: 325 g, SIR3-130: 450 g

Other

Lighting	Externally controlled LED lighting
Scale angle	240°
Fire protection class	V0
Approvals	CE, DNV-GL (certification being prepared, other certifications available on request)

Type code

Breakdown of type code SI... (coil instrument)				
	SI	R	3	-060 -I2 Example: SIR3-060-I2
				Design: round or square
				Fixed: series (indicator generation)
				Size
				Input signal
Type code SIR3..., SIQ3... (standard and preferred types)				
Design	R			Round
	Q			Square
Series		3		Fixed number for series (indicator generation)
Size			-060	Round, body Ø 60 mm
			-080	Round, body Ø 80 mm
			-100	Round, body Ø 100 mm
			-130	Round, body Ø 130 mm
			-072	Square, body 72 x 72 mm
			-096	Square, body 96 x 96 mm
			-144	Square, body 144 x 144 mm
Input signal			-I1	0 ... 20 mA
			-I2	4 ... 20 mA
			-I4	-20 ... 0 ... +20 mA
			-U1	0 ... 10 VDC
			-U2	2 ... 10 VDC
			-U4	-10 ... 0 ... +10 VDC
			-W0	Customised alternating voltage measuring range
	SI	3	---	--- Example: SIQ3-096-U2

Ordering information

- To ensure the dial design is implemented as accurately as possible, exact descriptions, drawings or photos of existing dials should accompany the order.
- If not otherwise specified in the order, please note that the coarse-fine scale graduation will be standard. An orientation graduation or other divergent dial labelling must be specified in the order.
- The dial number and the V-number are assigned by NORIS.