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

Construction type	Round type SIR3; square type SIQ3
Display principle	Moving-coil element
Housing 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
Protection class	IEC 60529: Front of housing IP66, IP67 and IP68 (1m, 24h); rear of housing IP30 (standard, higher on request)
Measured variables	Analogue input signals (current, voltage)
Scale angular	240°
Housing material	Glas fibre reinforced, salt spray resistant and uv stabilised plastic; upper part: PC GF10; base plate: PC GF30; face made of lumenized float glass

Analogue Indicator SIR3/SIQ3

Scope of application

Type SIR3, SIQ3 analogue indicators are commonly used in the fields of the shipbuilding industry, transport technology, machinery and equipment. They are suitable for use in harsh ambient conditions and comply with the requirements of DIN EN 50155 for railway applications and the ship classification society DNV-GL. 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.

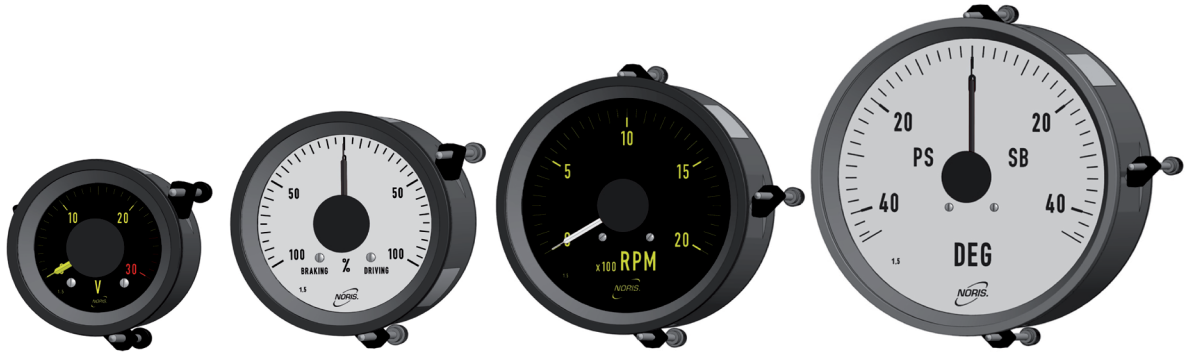
Special features

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

Indicator versions

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

Indicator sizes, Type SIR3 round



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

Indicator sizes, Type SIQ3 square

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

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Features

Scale and pointer

The markings 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**
Scale graduations and dial markings	Black	White
Type of graduation	Coarse-fine graduation	
Scale dial illumination	Dial illumination, white	Graduation and markings illumination, white
Pointer versions	Black pointer, unlit	White pointer, unlit

Dial and pointer – individual versions	
Scale and scale markings	Available in all RAL 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 scale dial illumination	Dial illumination and markings red, green or in another translucent colour
Pointer versions	Non-illuminated: yellow

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Standard and customised dial versions

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

Round design, Type SIR3

Fig. 1

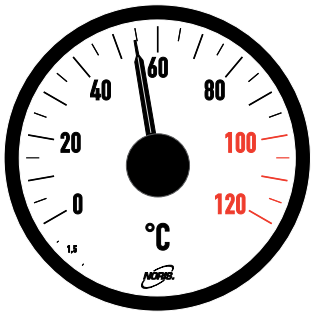


Fig. 2

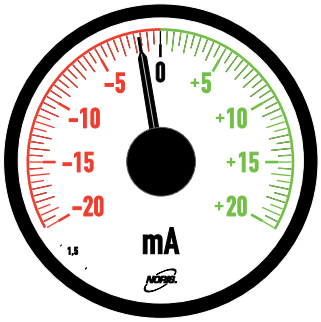


Fig. 3

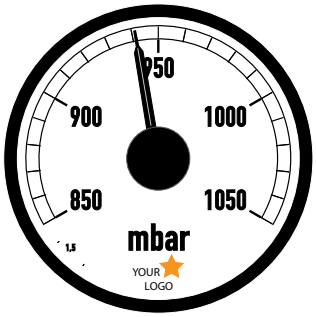


Fig. 4

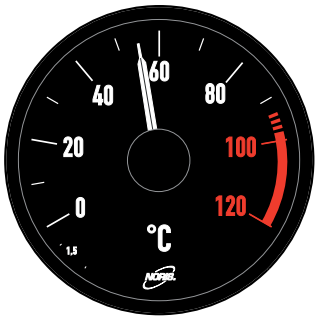


Fig. 5

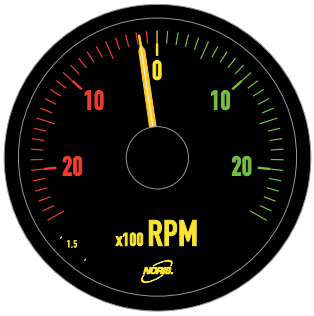
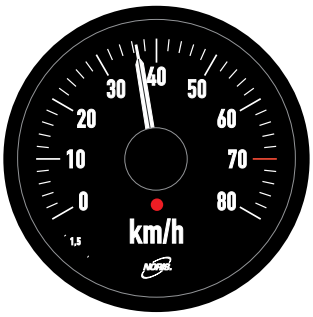


Fig. 6



Square design, Type SIQ3

Fig. 7

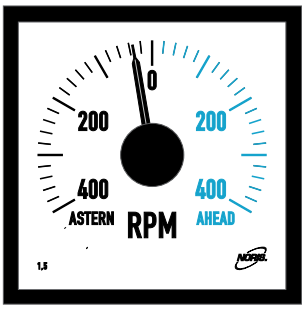


Fig. 8

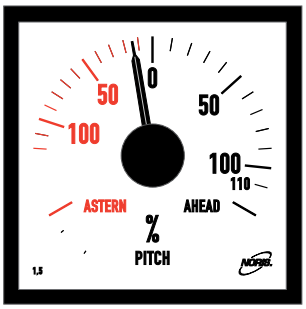


Fig. 9

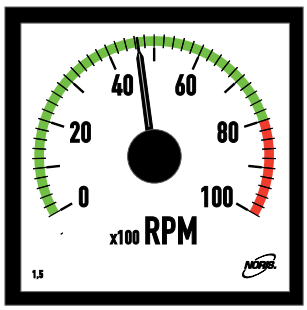


Fig. 10

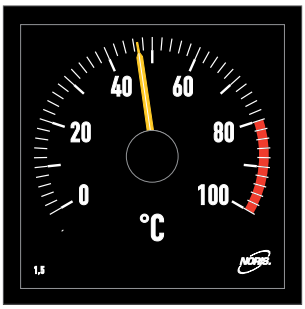


Fig. 11

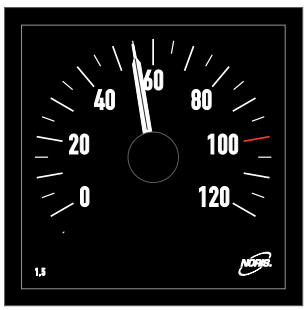
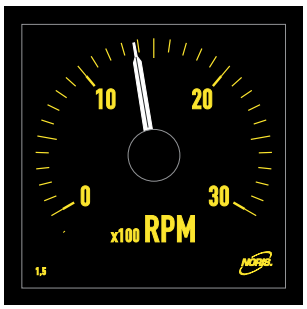


Fig. 12



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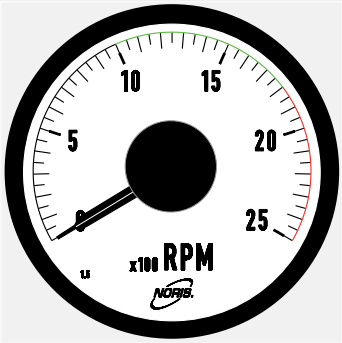
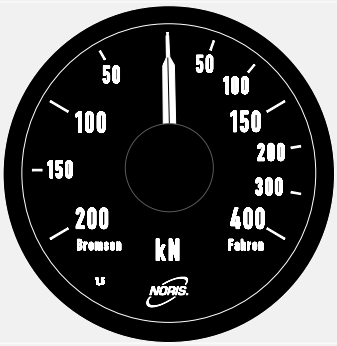
Zero point and measuring range

Zero point	Zero point on the left	Zero point in the middle
		
Scale measuring range	• The measuring range shown on the dial (can be individually defined) and the signal measuring range (see type code) differ. • Processing of current/voltage signals (customised current/voltage measuring ranges also possible), see type code	

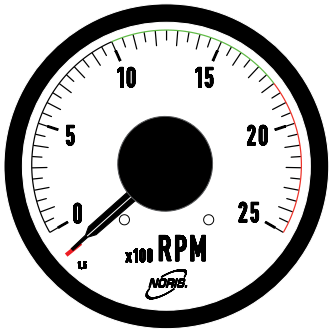
Illumination

NOTICE! For technical reasons, the moving coil system casts shadows in the centre of the indicator's scale dial for indicators with white scale dial. For indicators with black scale dial in dark rooms with sufficient ambient light, the pointer is visible in the dark. This becomes possible due to reflexion of the ambient light and the scale illumination on the pointer.

The indicator is lit by six integrates white LEDs which illuminate the dial from behind. The illumination 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).

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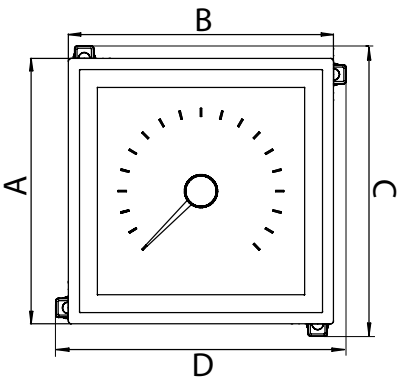
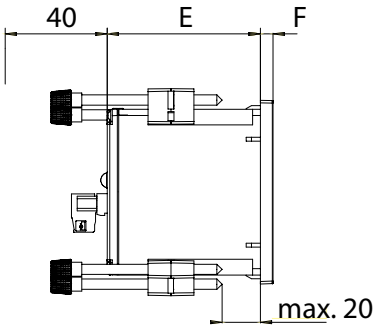
Dimensioned drawing, connection and wiring diagrams

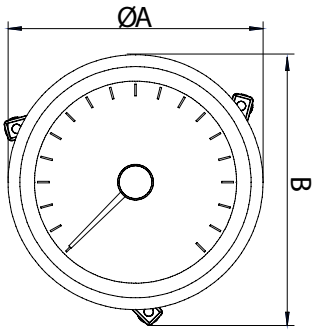
Dimensions of square type SIQ3...



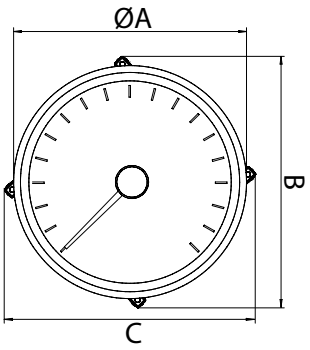


Indicator type	A	B	C	D	E	F	Panel cut-out	Permissible deviation
SIQ3-072…	72	72	81	81	60	5	67.5 x 67.5	+0.5
SIQ3-096…	96	96	105	105	60	5	91.5 x 91.5	+0.8
SIQ3-144…	144	144	153	153	61	8	137.5 x 137.5	+1.0
All values in this table in mm								

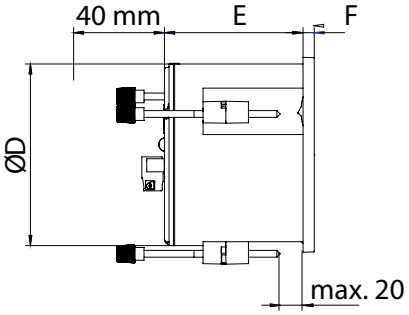
Dimensions of round type SIR3...



SIR3-060, SIR3-080



SIR3-100, SIR3-130



Indicator type	A	B	C	D	E	F	Panel cut-out	Permissible deviation
SIR3-060…	66	71.5	-	60	61	5	Ø 60.5	+0.5
SIR3-080…	86	91.5	-	80	61	5	Ø 80.5	+0.5
SIR3-100…	106	116.5	116.5	100	61	5	Ø 100.5	+0.5
SIR3-130…	136	146.5	146.5	130	63	6	Ø 130.5	+0.5
All values in this table in mm								

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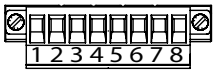
Connector and pin assignment

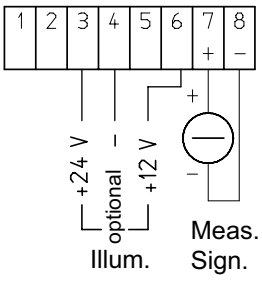


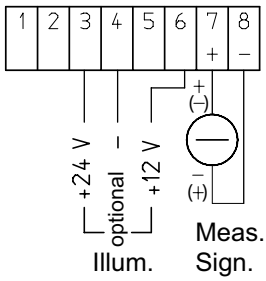
1: Slx3 connector, 8-pin

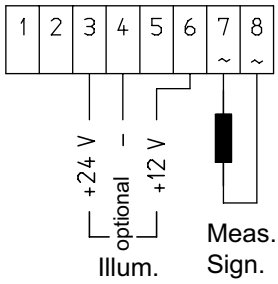
Pin	Indicator labeling	Description
1	N.C.	Not connected
2	N.C.	Not connected
3	Illum. + (≤24V)	Illumination control input, positive (24 VDC)
4	Illum. -	Illumination control input, negative
5	N.C.	Not connected
6	Illum. + (≤12V)	Illumination control input, positive (12 VDC)
7	Meas. Sign. + (type-specific)	Measuring signal input, positive
8	Meas. Sign. - (type-specific)	Measuring signal input, negative

Connection diagrams

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







Type -I1:	0…20 mA
Type -I2:	4…20 mA
Type -I0:	Customised
Type -U1:	0…10 VDC
Type -U2:	2…10 VDC
Type -U0:	Customised

Type -I4:	-20…0…+20 mA
Type -U4:	-10…0…+10 VDC
Type -UG0:	Tachogenerator GE1214, DC voltage signal

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

Reference information for application of type series-I2 in conjunction with DIN EN 50155:

For indicators type series -I2 in conjunction with DIN EN 50155 for railway application, a split ferrite must be mounted on the connection cable directly at the connector (see connection instructions in the instruction manual NAN-KD-0022).

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Technical data

Electrical connection	
Reverse voltage protection	Yes
Connection	8-pin connector

Input signal	
Analogue measurement signals	0 ... 20 mA (Ri ~ 70 Ω); 4 ... 20 mA (Ri ~265 Ω); -20 ... +20 mA (Ri ~65 Ω); 0 ... 10 VDC (Ri ~10 kΩ); 2 ... 10 VDC (Ri ~8 kΩ); -10 VAC ... +10 VDC (Ri ~10 kΩ); customer-specific measuring ranges on request
Alternating voltage	Max. 250 VAC (Ri voltage-dependent: for 50 VAC = RI ~50 kΩ; for 100 VAC = Ri ~100 kΩ)
Input for illumination control	For direct voltage or commercially available PWM dimmer in 12 V or 24 V range (see connector and connection assignments)
Class of accuracy	IEC 60051: 1.5

Environmental influences	
Operating temperature	Reference range of operation: 5 ... 35 °C, nominal range of operation: -25 ... +70 °C
Storage temperature	-40 ... +70 °C (max. peak values within 30 days/year at relative humidity of 5…95%)
Protection class	IEC 60529: Front of housing IP66, IP67 and IP68 (1m, 24h); rear of housing IP30 (standard, higher on request)
Salt spray resistance	IEC 60068-2-52: Test severity class 1 (open deck) and test severity class 4 (de-icing salt)
Vibration resistance	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	EN 61373 cat. 2: 5 g at 30 ms; 10 g at 18 ms
Climatic test	IEC 60068-2-1 dry cold: -25 °C, test duration 16 h IEC 60068-2-2 dry heat: +70 °C, test duration 16 h IEC 60068-2-30 moist heat: ≤95% relative at 55 °C, test duration 2 x 12h
ESD	IEC 61000-4-2 and EN50121-3-2, Tab. 9.3, evaluation criterion "A": 8 kV for air discharge; 6 kV for contact discharge
Burst	IEC 61000-4-4 and EN50121-3-2, Tab. 7.2 and 8.2, power supply connections: 2 kV, signal, data and control lines 2 kV
Surge	IEC 61000-4-5 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	IEC 61000-4-3: 80 MHz…2 GHz, 80% AM at 1 kHz, E = 10 Vrms/m EN 50121-3-2, Tab. 9.1 and 9.2: 80 MHz ... 1 GHz at 80% AM @1 kHz, E = 20 Vrms/m; 1.0 GHz ... 2.1 GHz at 80% AM @1 kHz, E = 10 Vrms/m; 2.1 GHz ... 2.5 GHz at 80% AM @1 kHz, E = 5 Vrms/m;
Conducted RF interference	IEC 61000-4-6 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	GL 2012: 50 Hz…10 kHz, U = 3 Vrms
Emitted interference	CISPR 16-1, 16-2: Battery-related connections, 10 kHz … 30 MHz EN 50121-3-2, Tab. 4: Battery-related connections, 150 kHz … 30 MHz EN 50121-3-2, Tab. 6: Casing, 30 MHz … 1 GHz
Dielectric strength	1000 VDC between all electrical inputs and outputs

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Mechanical properties	
Housing material	Glas fibre reinforced, salt spray resistant and uv stabilised plastic; upper part: PC GF10; base plate: PC GF30; face made of lumenized float glass
Mounting	Fastening screws with dovetail key and hand knob (tool-less)
Installation position	Any
Weight	SIQ3-072: 280 g SIQ3-096: 340 g SIQ3-144: 570 g SIR3-060: 240 g SIR3-080: 280 g SIR3-100: 325 g, SIR3-130: 450 g
Housing 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

Other	
Illumination	Externally dimmableLED illumination
Scale angular	240°
Fire protection class	UL94: V0 (all housing parts)
Approvals	CE, DNV-GL (other certifications available on request)
Other standards	DIN EN 50155 (railway applications)

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Type code

Structure of type code SIR3…, SIQ3…						
SI	**R**	**3**	**-060**	**-I2**	**-123**	**Example: SIR3-060-I2-1234**
	Housing type					
		Series				
			Housing size			
				Input signal		
					Scale version	

Type code SIR3…, SIQ3…						
Housing type	**R**	Round				
	Q	Square				
Series		**3**	Fixed digit (indicator generation)			
Housing size			**-072**	Square, front frame size 72 x 72 mm		
			-096	Square, front frame size 96 x 96 mm		
			-144	Square, front frame size 144 x 144 mm		
			-060	Round, housing diameter Ø 60 mm		
			-080	Round, housing diameter Ø 80 mm		
			-100	Round, housing diameter Ø 100 mm		
			-130	Round, housing diameter Ø 130 mm		
Input signal				**-I1**	Direct current 0…20 mA	
				-I2	Direct current 4…20 mA	
				-I4	Direct current -20…0...+20 mA	
				-I0	Direct current, customer-specific compensation	
				-U1	DC voltage, 0 ... 10 VDC	
				-U2	DC voltage, 2 ... 10 VDC	
				-U4	DC voltage, -10…0…+10 VDC	
				-U0	DC voltage, customer-specific compensation	
				-UG0	DC voltage, compensation for GE1214 tachometer	
				-W0	Customised alternating voltage measuring range	
Scale version					**-1234**	Measuring range, scale graduations etc.
Customised indicator					**-V567**	Customised indicator
SI	_	**3**	-_ _ _	-_ _	**Example: SIQ3-096-U2-1234**	

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 the dial markings are not specified when ordering, coarse/fine scale graduations will be supplied as standard. An orientation graduation or other deviating dial markings must be specified in the order.
- The dial version number and the V### number are assigned by NORIS.

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