

# Stepping-motor Analogue Indicator NORIMETER 2 Square Variant



- WATCH-DOG monitors the micro-processor controller
- High accuracy class rating of 0.5
- Direct connection for all usual input signals
- LED illumination generates less internal heating
- Robust steel-plate enclosure with reduced mounting depth
- Operation possible in any installed position
- IP52 or IP66 protection class at front
- Vibration resistant up to 4 g, shock resistant up to 25 g
- Light and uniformly distributed LED illumination due to innovative lighting design
- Illumination can be linearly dimmed internally or externally
- Options available with integrated signal LED
- Check function auxiliary power failed:  
pointer moves back against mechanical stop
- Check function sensor failure:  
pointer moves to position outside scale range
- Pointer and dial are illuminated separately
- No transverse acceleration on curves, no overshooting as in the case of moving-coil indicators
- High torque of stepping motor prevents friction errors
- Optional non-linear scale portions or centre-zero scale



Analogue Indicator NIQ(D)2...



## Stepping-motor Analogue Indicator NIQ(D)2...

### Range of Application

The NORIMETER 2 is a reliable analogue indicator that uses stepping motor technology and has a long service life as opposed to purely mechanical indicators. The only moving component is the high resolution stepping motor, which is fitted with robust shaft bearings. The steel-plate enclosure, with its IP52 or IP66 protection class front, holds the electronics firmly in place. This ensures that it always remains unaffected by vibrations during continuous operation as well as making it extremely suitable for handling increased mechanical stress and this capability enables it to be mounted directly on a motor.

Different designs have been developed for this unit (square or round) as well as many different application versions. Function upgrades, such as the input signal transducer, which have been integrated in the unit result in cost and space savings.

The combination of high-grade electronic components with an excellent software system provides a maximum degree of accuracy.

### Function Description

Every indicator is calibrated individually. The calibration points are stored in an EEPROM. Unintentional changes during operation are prevented by write-protect hardware.

After applying the operating voltage, the pointer is first run back against the gear stop and then initialised for scale zero. This initialising function provides recalibration of the instrument every time the voltage has been interrupted and, as a result, ensures an accurate measuring process. After amplification and A/D-conversion or frequency measurement, the input signal is available in digital form. The signal is then standardised for the scale range to drive the stepping motor. Sliding indication is provided by a routine whereby the stepping motor is slightly braked on approaching the end position in order to prevent overshooting. The measuring process is controlled and evaluated by a microprocessor so that an optimum

combination is obtained of sliding measured-value matching and a high degree of accuracy, but without any pointer flutter. In appearance, the presentation is comparable to that of a well-damped moving-coil indicator; but then the device is constructed to withstand much more rigorous conditions.

The improved and innovative illumination design used in our range of NORIMETER 2 units consists of differently coloured LEDs that are used to illuminate the light-pointer and the surface fibre-optic beneath the dial. Uniformly distributed illumination over the complete dial is guaranteed by the use of a special surface fibre-optic and its diffuser dial. This ensures optimum illumination regardless of size, even with white dials. Shadowing of parts of the dial that is frequently seen in units with transparent dials illuminated from underneath does not occur.

### Input Signal

NORIMETER accepts all usual measuring signals without it being necessary for users to purchase an additional signal transducer.

### Non-linear Measuring Range, Centre-zero Point

The NORIMETER 2 features calibration points that can be located on the scale to suit users' requirements. Each of these points has a certain value of the input signal assigned to it. The software is responsible for the measuring. This ensures that ranges that are proportional to one another can be displayed on a single dial or the zero-point can also be set in the center of the dial.

# Technical Data

Series NIQ(D)2...		
Electrical connections	Supply voltage	$U_o = 18 \dots 36 V_{DC}; U_R = 24 V_{DC}$
	Power consumption at 24 V <sub>DC</sub> incl. illumination	Approx. 60 mA in continuous operation, < 160 mA (5 ms) on switching on
	Reverse voltage protection	Integrated
	Overvoltage	80 V <sub>DC</sub> (2 ms)
	Ripple	< 20 % U <sub>o</sub>
Accuracy	Resistance	$R_i > 20 \text{ k}\Omega$ at V-input; $R_i < 150 \text{ k}\Omega$ at mA-input; $R_i < 1 \text{ k}\Omega$ at frequency input
	Accuracy class	EN60051 and IEC51-1: 0.5 % with respect to measurement span
	Resolution of measuring signal	12 Bit
Mechanical influences	Resolution stepping-motor	Twelve motor steps per angle degree
	Gear backlash	Typically 0.3 angle degrees
	Operating temperature	-20 °C ... +70 °C
Environmental influences	Climatic test	IEC60068-2-30
	Storage temperature	-40 °C ... +85 °C
	Vibration resistance	IEC60068-T2-6: 4 g increased strain, characteristic 2 (10 ... 100 Hz)
	Shock resistance (impact)	IEC60068-T2-27: 25 g with 11 ms dwell time
	Degree of protection	DIN EN 60529: terminals IP30 (all); front IP52 (NIQ2...), IP66 (NIQD2...)
	ESD	IEC61000-4-2: +/-8 kV for Air Discharge; +/-6 kV for Contact Discharge
	HF-interference immunity	IEC61000-4-3: f=80 MHz ... 2 GHz at 80 % AM @ 1 kHz, E=10 V <sub>eff</sub> /m
	Burst	IEC61000-4-4: +/-2 kV/Power Line; +/-1 kV/Data Line
	Surge	IEC61000-4-5: sym. +/-1 kV (R <sub>i</sub> =2 Ω); asym. +/-2 kV (R <sub>i</sub> =12 Ω)
	Conducted HF-interference	IEC61000-4-6: f=10 kHz ... 100 MHz at 80 % AM @ 1 kHz, U=10 V <sub>eff</sub>
Conducted LF-interference	IEC60553: f=0.05 ... 10 kHz, U=3 V <sub>eff</sub>	
Mech. quantities	Interference emission	CISPR 16-1, 16-2, EMC1; conducted emission 10 kHz ... 30 MHz; interference field emission of housing 30 MHz ... 1 GHz
	Case material	Zinc-plated steel, rustproof
	Mounting	Two mounting elements according to DIN 43835 form B
Other	Installation position	Any
	Weight	72 x 72 mm: 260 g; 96 x 96 mm: 370 g; 144 x 144 mm: 710 g
	Illumination	LED illumination; internal basic brightness adjustment via intergr. potentiometer, external brightness adjustment via supply voltage
	Initialising time	Approx. 6 seconds from application of supply voltage
	Scale angle	240°
Approv.	Connection	Connecting plug 9-pin with screwable locking
	Approvals	CE; GL, MED (if requested, please explicitly specify when placing the order)
Applied standards	DIN EN 50121-3-2:2000, DIN EN 50155, DIN EN 55011:1998, DIN EN 61010-1	

## Type Code for Standard Variants

NIQ(D)2 - 072 - G1 - 123 (-) (e. g. NIQ(D)2-072-G1-123-MED)

1	Device and series (Standard variants, other available on customer request)
NIQ2	NORIMETER 2 standard stepping-motor indicator, 240° indicator, square variant, steel-plate enclosure, connecting plug 9-pin with screwable locking, Standard version degree of protection IP52
NIQD2	NORIMETER 2 standard stepping-motor indicator, 240° indicator, square variant, steel-plate enclosure, connecting plug 9-pin with screwable locking, Special version degree of protection IP66

2	Size	3	Input signal
072	72 x 72 mm	...	Voltage, current, frequency, Pt100, Pt1000 (see area types)
096	96 x 96 mm		
144	144 x 144 mm		

4	Scale number	5	MED approval
...	Describes the scale; issued on receipt of order	without	without code means: no MED approval
		MED	MED approval with device marking

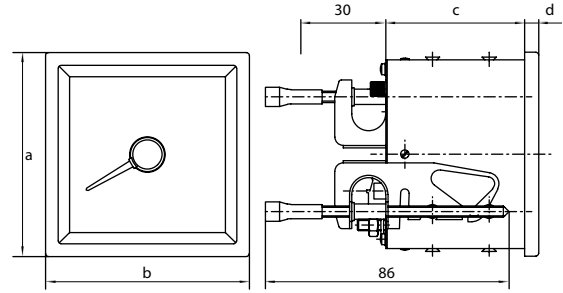
## Type Code for Special Variants

NIQ(D)2 - 072 V101 (e. g. NIQ(D)2-072V101)

3	Special variants
Vxxx	sequential number (customized)

**MED:** If a MED approval, together with the marking of device, is requested, please explicitly specify when placing the order. The type designation is then marked with "-MED".

# Dimensions



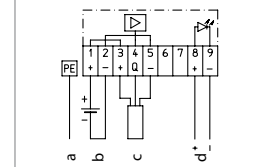
e = console cutout to DIN 43700

Type	a	b	c	d	e
NIQ2-072	72	72	49	5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>
NIQD2-072	72	72	48	6	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>
NIQ2-096	96	96	43	6	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>
NIQD2-096	96	96	42	7	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>
NIQ2-144	144	144	48	7	138 <sup>+1.0</sup> x 138 <sup>+1.0</sup>
NIQD2-144	144	144	47	8	138 <sup>+1.0</sup> x 138 <sup>+1.0</sup>

## Types and Connection Diagrams

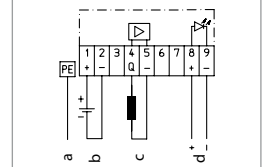
### Type Selection, Frequency

-F	Square wave 24V NPN (-switching)
-FP	Square wave 24V PNP (+switching)
-FZ	Square wave 12V NPN (-switching)
-FZP	Square wave 12V PNP (+switching)



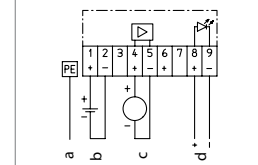
### Type Selection, Frequency

-FG	Tachogenerator > 6 V <sub>pp</sub>
-FS	Coil > 1 V <sub>pp</sub>
-FJ	Coil > 100 mV <sub>pp</sub>



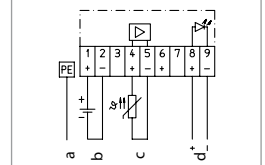
### Type S. Current/Voltage

-G1	0 ... 10 V	-I1	0...20mA
-G2	2 ... 10 V	-I2	4...20mA
-G3	0 ... 6 V	-I4	-20.0...+20mA
-G4	-10.0...+10V		



### Type S. Pt100/Pt1000

-X1	0...120°C	-X5	0...300°C	-X11	-30...120°C
-X2	0...150°C	-X6	0...400°C	-X12	0...100°C
-X3	0...200°C	-X7	0...500°C	force P=Pt100 PT=Pt1000	
-X4	0...250°C	-X8	0...600°C		



## Variants

### Scale and pointer: Standard variants

Scale lettering to DIN 43802, coarse-fine division, bezel black, anti-reflection glass

<b>Non-illuminated white scale</b>	Bar pointer black non-illuminated, scale lettering black
<b>Illuminated white scale</b>	White illuminated through-lighted scale, bar pointer black non-illuminated, scale lettering black
<b>Non-illuminated black scale</b>	Bar pointer white non-illuminated, scale lettering white
<b>Illuminated black scale</b>	White scale lettering through-lighted, luminous pointer white - when lighted red, scale lettering white

### Scale and pointer: Individual variations

<b>Illuminated scale</b>	Through-lighted scale black or white, when lighted red, green, yellow
<b>Non-illuminated scale</b>	Scale in black or white
<b>Lettering</b>	in white, black, yellow, red, green
<b>Markings</b>	Divisions, range or scale arc in colour
<b>Scale division</b>	Pilot scale division, coarse-fine division
<b>Luminous pointer</b>	Non-illuminated white, when lighted red, green or yellow
<b>Bar pointer</b>	Non-illuminated white or black

