NORIMETER analogue indicator using stepping-motor technology

NQ...

Square variant, optionally available with one or two integrated LEDs (e.g. limit-value monitoring) and LC-display (e.g. elapsed-hour meter or odometer)

Features

- **Exact measurements due to high accuracy class (± 0.5 % f.s.d)**
- **12-bit resolution of measuring range**
- **Long service life due to practically vibration-proof stepping motor (withstands up to 10g vibration, up to 10g shock)**
- **Safe and reliable function due to watchdog-supervised microprocessor control**
- **Immunity to EMI up to 20V/m**
- **Dimming of pointer and dial illumination optional**
- **Check function „auxiliary power failed": pointer moves back against mechanical stop**
- **Check function „sensor failure": pointer moves to position outside scale range**
- **High torque of stepping motor prevents friction errors**
- **No problems with transverse acceleration on curves, no overshooting as in the case of moving-coil indicators**
- **Direct connection for all usual input signals**
- **Operation possible in any installed position**
- **Optional non-linear scale portions or centre-zero scale**
- **Options available with integrated LEDs or LC-display**
- **LED-illumination for minimum self-heating**

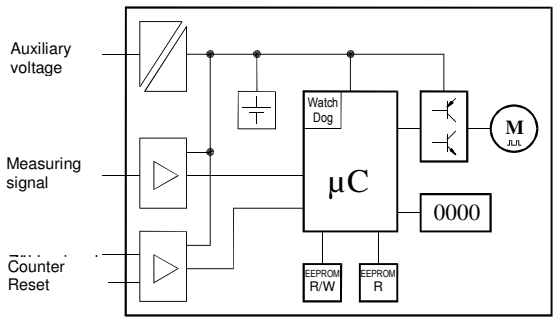
Details

Range of application

The NORIMETER is an analogue indicator based on stepping-motor technology. Its only moving element is a high-resolution stepping motor. The suspension of the shaft used here is very robust and makes the indicator immune to vibrations, permitting it to be used under severe conditions, including continuous duty and heavy mechanical stressing. NORIMETER provides reliable indication and, in contrast to all-mechanical movements, life-long consistency.
With a view to providing suitable solutions for many applications, these instruments have been developed in many forms and variants. Where required, NORIS can supply integrated add-on devices so that no additional devices need be purchased. These add-ons are directly integrated in the instrument in a space-saving manner. Available combinations include indicators with integrated LEDs (e.g. to indicate critical limits), or an integrated LC-display (e.g. elapsed-hour meters, event counters).

Input signal

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



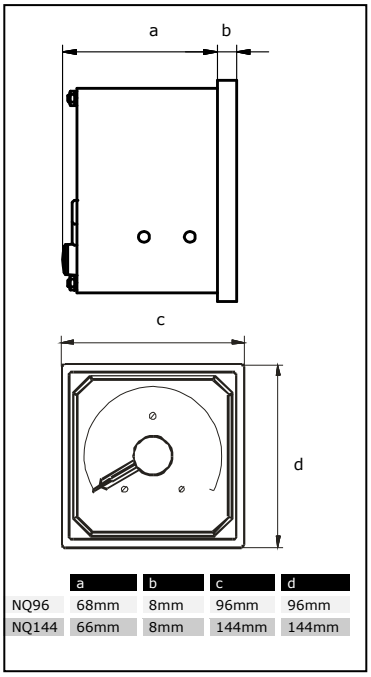
Basic calibration

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

Function description

After applying the auxiliary power, 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 digital 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 combination of high-grade electronic components with an excellent software system provides a maximum degree of accuracy.



	a	b	c	d
NQ96	68mm	8mm	96mm	96mm
NQ144	66mm	8mm	144mm	144mm

Basic specifications

	NQ96	NQ144
Pointer deflection	240° - 720 steps	
Resolution of measurement	12 bit	
Resistance (Ri, Rt)	Ri >20kΩ at V-input, Ri <150Ω at mA-input Rt<1kΩ at frequency input	
Degree of protection	Front: IP54, terminals IP00 to DIN EN 60529	
Accuracy class	0.5 to DIN IEC 51-1	
Vibration level	up to 10g to IEC 60068-2-6 of 10...100Hz (depending on design) to EN 61373 Category 1B	
Shock level	EN 61373 Category 1B: 5 g at 30 ms; 10 g at 18 ms	
Auxiliary voltage	10...32V/DC nominal 24V +/-20 % ripple, polarity-reversal protection (enquiries invited for other voltages)	
Overvoltage	up to 80V for 2 ms	
Power consumption at 24V/DC	< 40mA in continuous operation; <160mA (5s) on switching on, additional LED-illumination, incl. display 50mA, luminous pointer 20mA	
Interior illumination, dimmer	LED-illumination with potentiometer for brightness adjustment optional: 3 filament-bulb lamps W2x4,6d (24V/1,2W) variable via auxiliary voltage	
ESD	IEC61000-4-2 +/-6kV/CD +/-8kV/AD	
Electromagnetic field	IEC61000-4-3 20V/m 80%AM/1kHz 10kHz...2000MHz	
Burst	IEC61000-4-4 +/-2kV/PL; +/-2kV/DL	
Surge	IEC61000-4-5 +/-1kV/DM Ri=2Ω; +/-2kV/CM Ri=12Ω	
HF-interference	IEC61000-4-6 3Vpp 80%AM/1kHz 10kHz...100MHz	
LF-interference	IEC60553 3Vpp 50Hz...10kHz	
Initialising time	approx. 6s from application of auxiliary power	
Case material	Anodised aluminium; base plate: polycarb. GF30 UL0	
Weight	approx. 445 g	approx. 690 g
Installed position	To suit application	
Mounting	Clamp	
Connection	Plug with locking screws	
Operating temperature	-20℃...+70℃	
Shelf temperature	-40℃...+85℃	
Humidity	RH max. 96%	
Applied standards	CE requirements complied with, DIN EN 50121-3-1, DIN EN 50121-3-2, DIN EN 50155, DIN EN 61373, DIN EN 61010-1	

Standard variants:

Non-illuminated white dial:
White metal dial, non-illuminated
Black bar pointer, non-illuminated
Black legend, pilot scale divisions
(DIN43802, DIN43780)
Clear glass window
Black bezel

Illuminated white dial:
White plastic dial, light passing through dial, when lit
Black bar pointer, non-illuminated
Black legend, pilot scale divisions
(DIN43802, DIN43780)
Clear glass window
Black bezel

Non-illuminated black dial:
Black metal dial, non-illuminated
White bar pointer, non-illuminated
White legend, pilot scale divisions
(DIN43802, DIN43780)
Anti-reflection glass window
Black bezel

Illuminated black dial:
Black plastic dial with
white illumination, light passing through dial, when lit
White luminous pointer, red when lit
White legend, pilot scale divisions
(DIN43802, DIN43780)
Anti-reflection glass window
Black bezel

Basic variants

Legends on dials are to DIN 43802, scale ranges based on DIN 43780. Customised versions available with respect to scale range, legend, and scale marking.

NORIMETERs are flexible and a great variety of extensions are available.
Special connections, input measuring ranges, or or other special problem solutions can be provided by special request

Dial: Illuminated through-lighted dial, black or white, when lit red, green, yellow light passing through dial
Non-illuminated metal dial, black or white
Legend: white, black, yellow, red
Divisions: Pilot scale divisions, coarse/fine divisions on request.
Marking: Divisions or range in colour, scale arc in colour
Pointer: Luminous pointer, white when unlit, when lit red, green and yellow on request
Bar pointer non-illuminated, black or white
Window: Clear glass or anti-reflection glass
Bezel: black

Extention variants

Our customer is king! In order to keep your first cost as low as possible, you can order these indicators with integrated optional equipment. The combination of one or several of the options specified below integrates multiple devices in one case.

Integrated illuminated LC-display

The Norimeter can be provided with an integrated liguid-crystal display by special request. This type of display permits data to be indicated which our electronics evaluate during operation (typically, as an elapsed-hour meter to indicate when a preset limit has been exceeded) or which are input from an external source (odometer).

The data are stored in an EEPROM to prevent data loss in a blackout.

	NQ96	NQ144
Built-in display	optionally available	optionally available
Display illuminated	green	green
Type of signal	Internal, software-controlled pulse External pulse, 8...34V- with pulse period of 30...400ms	
Height of digits	5.5mm	5.5mm
Number of places	8 digits	8 digits

Integrated LED

Furthermore, the devices can be fitted with one or two integrated LEDs which are controlled via external contacts to alarm conditions (e.g. limit value exceeded).

	NQ96	NQ144
Built-in LED	optionally available	optionally available
Maximum number	2	2
Colour	Single-colour LED, red, green or yellow Multi-colour LED depending on signal: red/green/yellow	
Type of signal	external signal	

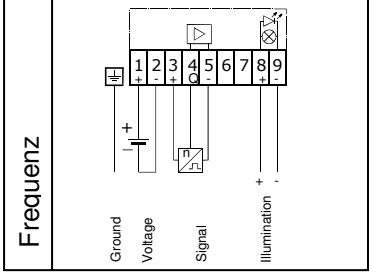
Non-linear measuring range, centre-zero point

The NORIMETER 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. From these, the software generates measuring curves the calibration point serving as the starting point. This system permits portions of the scale to be expanded or crowded or the zero point can be placed at the center of the NORIMETER scale.

Types of input and connecting diagram

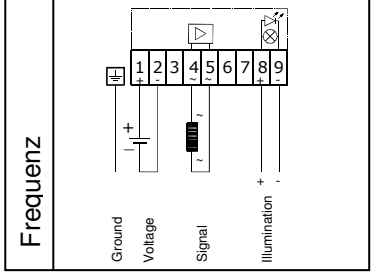
Typ: frequency

-F	square wave 24V NPN (- switching)
-FP	square wave 24V PNP (+ switching) (possible input range approx. 2 … 30,000 Hz, lowest upper-range frequency 50 Hz)



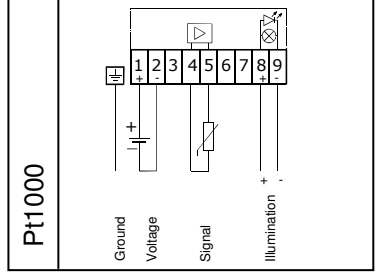
Typ: frequency

-FG	tachogenerator >6Vpp
-FS	coil >1Vpp
-FJ	coil >100mVpp



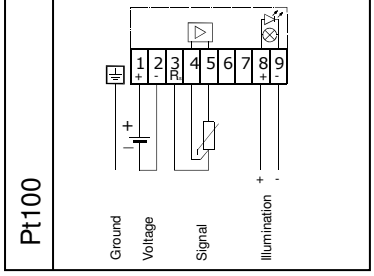
Typ: Pt1000

-PT1	0…120 °C	-PT5	0…300 °C	-PT11	-30…120 °C
-PT2	0…150 °C	-PT6	0…400 °C	-PT12	0…100 °C
-PT3	0…200 °C	-PT7	0…500 °C		
-PT4	0…250 °C	-PT8	0…600 °C		



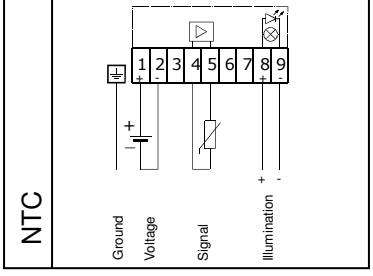
Typ: Pt100

-P1	0-120 °C	-P5	0-300 °C	-P11	-30-120 °C
-P2	0-150 °C	-P6	0-400 °C	-P12	0-100 °C
-P3	0-200 °C	-P7	0-500 °C		
-P4	0-250 °C	-P8	0-600 °C		



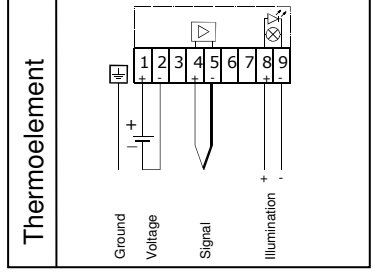
Typ: NTC

-H1	42 °C..-.120 °C
-H2	5 °C - 70 °C



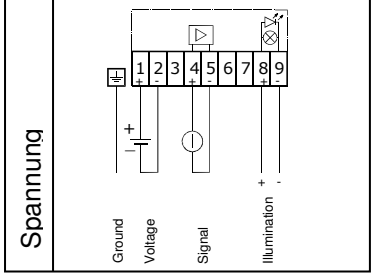
Typ: thermocouple

-TK6	NiCr-Ni 0...400 °C	-TJ8	Fe-CuNi 0…600 °C
-TK8	NiCr-Ni 0…600 °C	-TJ9	Fe-CuNi 0…800 °C
-TK9	NiCr-Ni 0…800 °C	-TR10	Pt13Rh-Pt 0…1600 °C



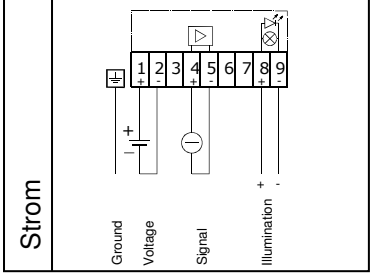
Typ: voltage

-G1	0...10V DC
-G2	2...10V DC
-G3	0... 6V DC
-G4	-10...10V DC



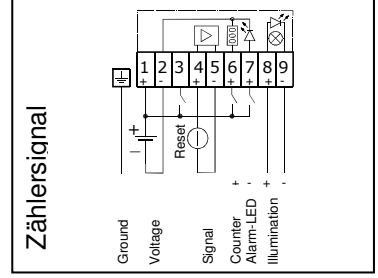
Typ: current

-I1	0…20mA
-I2	4…20mA
-I3	1… 5mA
-I4	-20...20mA



Connection diagram of counter

To reset the counterl: disconnect auxiliary voltage (terminal 1), press reset and hold while you connect the auxillary voltage. After initialisation stop pressing reset.



Product coding

Indicator coding

N Stepping-motor type

Bezel

Q square

Size

xx 96 x 96, 144 x 144

Variant

V... denotes special features of the indicator. This number is issued on receipt of order.

Input

\- ... Voltage, amperage, frequency, Pt100, Pt1000, NiCr-Ni, Fe-CuNi, NTC-thermistor

Scale number

\- ... denotes scale. Code issued on receipt of order.

N Q 80 V1 -G1 -456 (NQ80V1-G1-456)

There are more NORIMETER variants available in this instrument family for which separate data sheets are available.

Available variants:

- Circular bezel:
  Ø 80 mm, 100 mm, 130 mm, 160 mm
- Dual indicators permitting two independent measured values to be displayed in a single instrument

Under development:

- Indicator with a built-in limit-value contact

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