

Circular-bezel type for rail traction applications
Features two separately controlled pointers,
e.g. for desired speed/actual speed. Integrated
LEDs or LC-display (e.g. odometer) are op-
tional.



Features

- ✓ Pointer-position feedback system independent of indicator
- ✓ Additional check function "auxiliary power failed": pointer moves back against mechanical stop
- ✓ Check function „sensor failure“: pointer moves to a position outside scale range
- ✓ Safety and reliability due to watchdog-supervised microprocessor control
- ✓ Exact measured value due to high accuracy class of 0.5 – 12-bit resolution of measuring range
- ✓ Withstands vibrations up to 10g, up to 60g shock, meets DIN EN 61373 Category 1B
- ✓ EMC up to 20V/m
- ✓ Dimmer permits adaptation to changes in visibility (when travelling in tunnel or bright sunlight)
- ✓ Excellent readability also in absolute darkness by back-panel illumination and luminous pointer
- ✓ Main pointer and additional pointer in luminous form for better viewing
- ✓ Minimal self-heating due to illumination by LEDs
- ✓ No problems due to transverse acceleration on curves, no overshooting as in the case of moving-coil indicators
- ✓ Direct connection for all usual input signals
- ✓ Can be installed in any position
- ✓ Optional non-linear scale or center-zero designs available
- ✓ Combination of up to 3 measured values and 2 digital signals in one instrument saves first cost
 - Main pointer for a measured value to be indicated analogously (actual value)
 - Additional pointer moving on scale margin for another measured value to be indicated analogously (desired value)
 - Integrated LC-display to provide digital readings of any parameter
 - Up to 2 LEDs to output a status condition

Details

Range of application

The dual indicator has been designed specifically to meet rail traction requirements. It excels in providing a long service life and high reliability due to its rugged construction and high degree of accuracy. The only moving elements in the stepping motor type analogue indicator are a high-resolution stepping motor for the main pointer and another for the additional pointer moving on the scale margin. Each pointer is controlled by a separate, independent measuring signal. The robust bearing system of the pointer shafts makes the indicator insensitive to vibration, a great asset in continuous operation. Installed in rail vehicles, the NORIMETER provides reliable indication which, compared to all-mechanical movements, is maintained over a long service life.

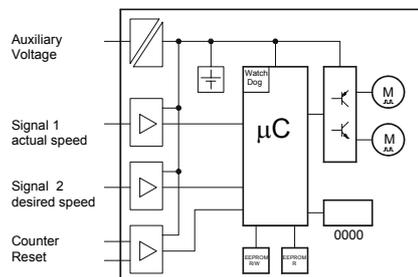
With two parameters indicated analogously in combination with LEDs or an LC-display, here is an instrument that provides a cost-effective alternative to the purchase of multiple indicators.

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.

Input signal

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



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

Supervision of indication

In order to be able to assure maximum reliability, a perforated disc that is solidly connected to the pointer shaft is integrated in the indicator. Every movement of this perforated disc is supervised by light sensors. An external system (TRAS) supervises the pointer position from the outside and, in the case of erroneous indication, issues an alarm. The complete separation of the supervising system and indicating system ensures a maximum of indication reliability.

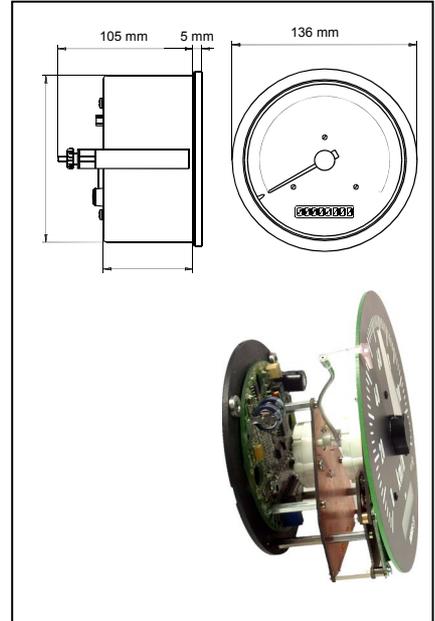
Basic specifications

	N2R130
Pointer deflection	240° - 720 steps
Resolution of measurement	12 bit
Resistance (R _i , R _t)	R _i >20kΩ at V-input, R _i <150Ω at mA-input R _t <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	up to 60g for 11ms (acc. to design) to EN 61373 Category 1B
Auxiliary voltage	10...32V/DC nominal 24V +/-20 % ripple, polarity-reversal protection (enquiries invited for other voltages)
Overtoltage	up to 80V for 2 ms
Power consumption	< 70mA 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
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 R _i =2Ω; +/-2kV/CM R _i =12Ω
HF-interference	IEC61000-4-6 3V _{pp} 80%AM/1kHz 10kHz...100MHz
LF-interference	IEC60553 3V _{pp} 50Hz...10kHz
Initialising time	approx. 6s from application of auxiliary power
Case material	Anodised aluminium; base plate: polycarb. GF30 UL0
Weight	approx. 580 g
Installed position	To suit application
Mounting	Clamp
Connection	Plug with locking screws Serial interface for supervision system
Operating temperature	-20°C...+70°C
Shelf temperature	-40°C...+85°C
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-

Standard variant:

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



Varianten

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 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:	Circular form: black or chrome

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.

Integrated illuminated LC-display

The Norimeter can be provided with an integrated liquid-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.

	N2R130
Built-in display	optionally available
Display illuminated	green
Type of signal	Internal, software-controlled pulse External pulse, 8...34V- with pulse period of 30...400ms
Height of digits	7.0mm
Number of places	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).

	N2R130
Built-in LED	optionally available
Maximum number	1, 2
Colour	Single-colour LED: red, green or yellow Multi-colour LED: red/green/yellow
Type of signal	external signal

