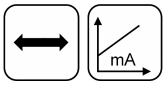
novotechnik
Siedle Group

# NOVOSTRICTIVE
# Transducer
# Touchless

## TM1
Screw flange
4 ... 20 mA
**Industrial**

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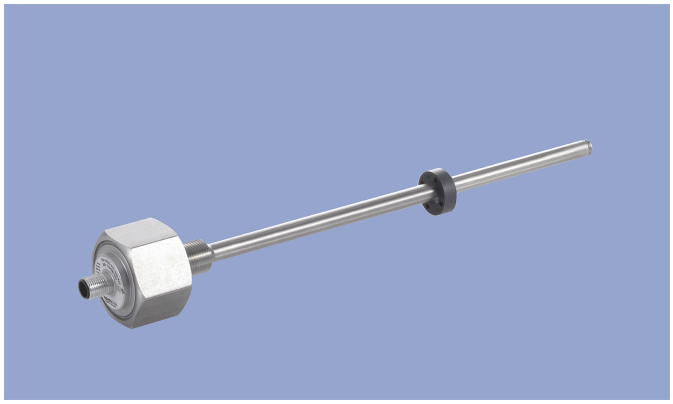


**Special Features**
- Compact design for tight spaces
- Touchless magnetostrictive measurement technology
- Operating pressure up to 350 bar, peaks up to 450 bar
- Non-contacting position detection with ring-shaped position marker
- Unlimited mechanical life
- No velocity limit for position marker
- Absolute output
- Outstanding accuracy performance up to 0.04 %
- Wide range of supply voltage
- Optimized for use in industrial applications
- Other configurations see separate data sheets

**Applications**
- Manufacturing Engineering
- Level measurement
- Actuators

The absolute linear transducer TM1 enables a compact and cost-effective position measurement. It consists of a stainless steel flange welded to a pressure-resistant rod and can therefore be used under harsh environmental conditions.
The magnetostrictive measuring technology offers excellent accuracy for measuring lengths up to 2000 mm.
The passive ring-shaped position marker allows a mechanically decoupled measurement.

| **Description** | |
|---|---|
| Material | Flange: SS 1.4307 / AISI 304L<br>Flange cover: AlSiMgBi<br>Rod: SS 1.4571 / AISI 316Ti<br>Sealing: O-ring NBR 90 SH A |
| Mounting | Screwed via thread M18x1.5 |
| Electrical connection | Connector M12x1, A-coded |

| **Mechanical Data** | |
|---|---|
| Dimensions | See dimension drawing |

# Ordering Specifications

## Ordering Specifications

Preferred types printed in bold

**Supply voltage Ub**
**8: Ub = 24 VDC**

**Output signal**
**B: 4 ... 20 mA**

**Output characteristic**
**1: Rising output characteristic, seen from flange**
2: Falling output characteristic, seen from flange

**Electrical connection**
**104: Connector M12x1, 4-pole**

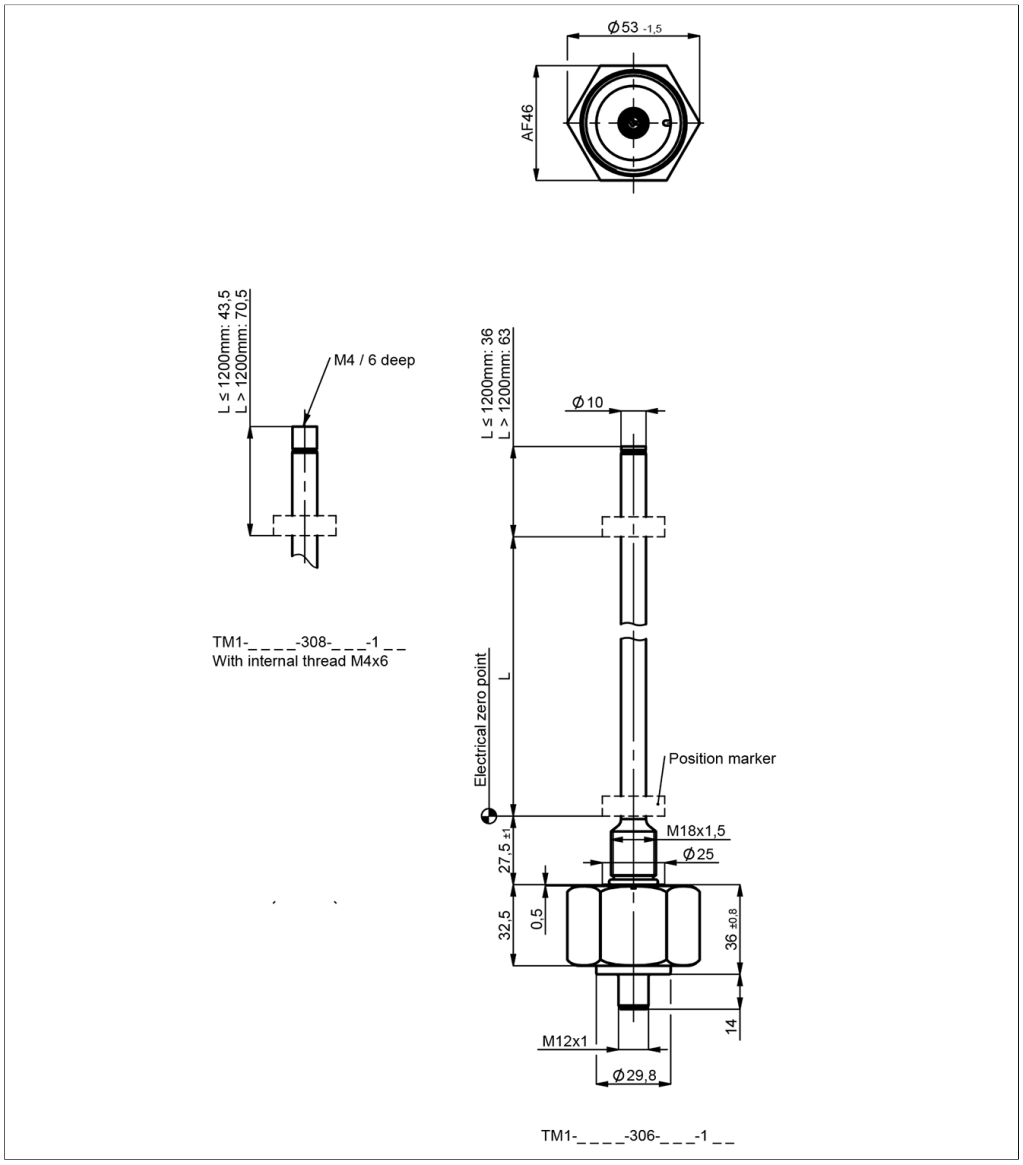
T M 1 – 0 5 0 0 – 3 0 6 – 8 B 1 – 1 0 4

**Mechanical version**
**306: Screw flange M18x1.5**
308: Screw flange M18x1.5 with internal thread M4x6 at rod end, additional length 7.5 mm

**Series**

Electrical measuring range
**Standard lengths 0050 up to 2000 mm in 25 mm-steps**
Other lengths on request

# Drawing




CAD data see
www.novotechnik.de/en/download/cad-data/

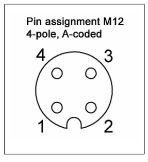
# Technical Data

| **Type** | **TM1-_ _ _ _-306-8B_-104** |
|---|---|
| Output signal | 4 ... 20 mA |
| Burden | @Ub 24 V: ≤ 500 Ω, @Ub 12 V: ≤ 250 Ω |
| Sampling rate / Update rate | 0.5 kHz |
| Electrical measuring range (dim. L) | 0 ... 50 mm up to 0 ... 2000 mm |
| Absolute linearity | ≤ ±0.04 %FS (min. 300 µm) |
| Tolerance of electr. zero point | ±1 mm |
| Resolution | ≤ 0.1 mm |
| Repeatability | ≤ ±0.1 mm |
| Hysteresis | ≤ ±0.1 mm |
| Temperature error | typ. 50 ppm/K (min. 0.01 mm/K) |
| Supply voltage Ub | 12/24 VDC (8 ... 32 VDC) |
| Supply voltage ripple | ≤ 10% Ub |
| Power drain w/o load | < 1 W |
| Overvoltage protection | 36 VDC (permanent) |
| Polarity protection | yes (-36 VDC) |
| Short circuit protection | yes (output vs GND and supply voltage up to 36 VDC) |
| Insulation resistance (500 VDC) | ≥ 10 MΩ |
| **Environmental Data** | |
| Max. operational speed | Mechanically unlimited |
| Vibration IEC 60068-2-6 | 20 g, 10 ... 2000 Hz, Amax = 0.75 mm |
| Shock IEC 60068-2-27 | 100 g, 11 ms (single hit) |
| Protection class DIN EN 60529 | IP67 |
| Operating temperature | -40 ... +105°C |
| Operating humidity | 0 ... 95 % R.H. (no condensation) |
| Working pressure | ≤ 350 bar |
| Pressure peaks | ≤ 450 bar |
| Burst pressure | > 700 bar |
| Life | Mechanically unlimited |
| Functional safety | If you need assistance in using our products in safety-related systems, please contact us |
| MTTF (IEC 60050) | 355 years |
| **EMC Compatibility** | |
| EN 61000-4-2 ESD (contact/air discharge) | 4 kV, 8 kV |
| EN 61000-4-3 Electromagnetic fields (RFI) | 10 V/m |
| EN 61000-4-4 Fast transients (burst) | 1 kV |
| EN 61000-4-6 Cond. disturbances (HF fields) | 10 V eff. |
| EN 55016-2-3 Radiated disturbances | Industrial and residential area |

FS = Full scale: Signal span according to electrical measuring range

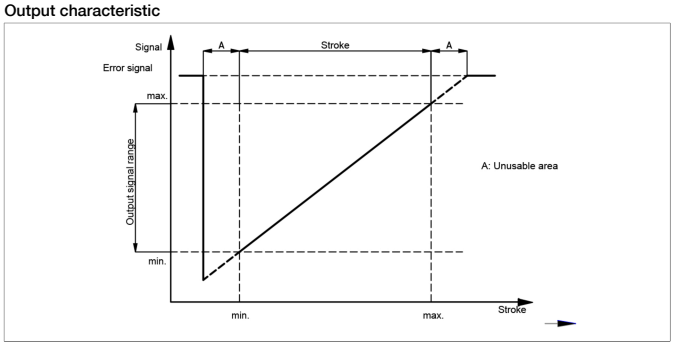
**Connection Assignment**

| Signal | Connector<br>code 1_ _ |
|---|---|
| Supply voltage Ub | Pin 1 |
| GND | Pin 3 |
| Signal output | Pin 2 |
| Do not connect | Pin 4 |
| | Connect cable shielding to protection earth |

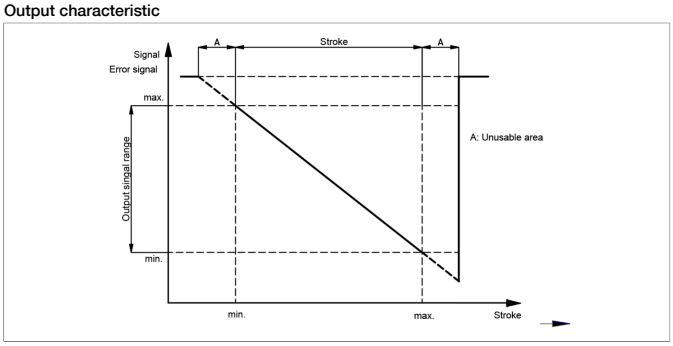


# Technical Data
# Output Characteristics

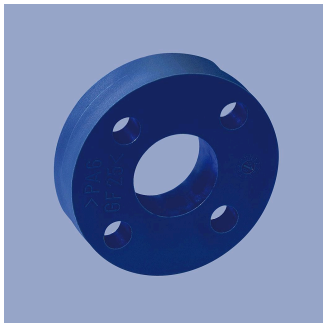
**Output characteristic**

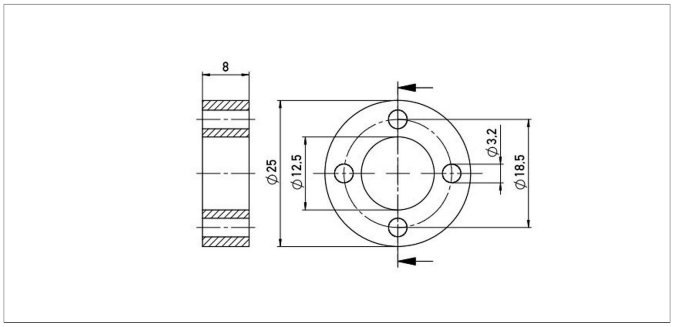



**Output characteristic**



# Position Markers



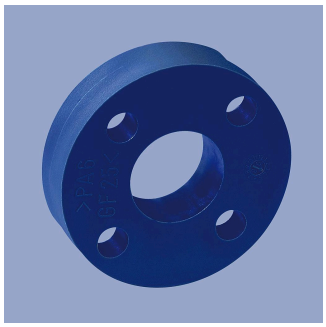


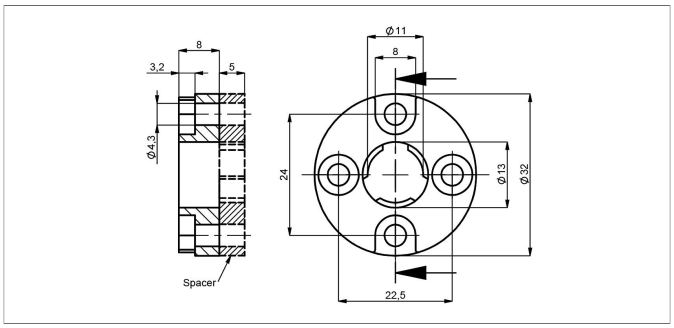

**Z-TH1-P18**

Ring position marker for fixation with screws M3

| | |
|---|---|
| Material | PA6-GF |
| Weight | approx. 12 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque of mounting | max. 100 Ncm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400005697 | 1 |





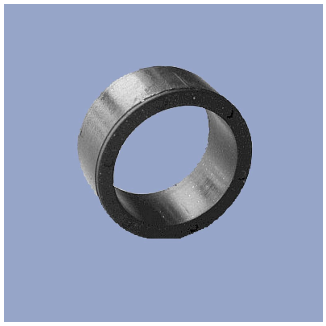

**Z-TH1-P19**

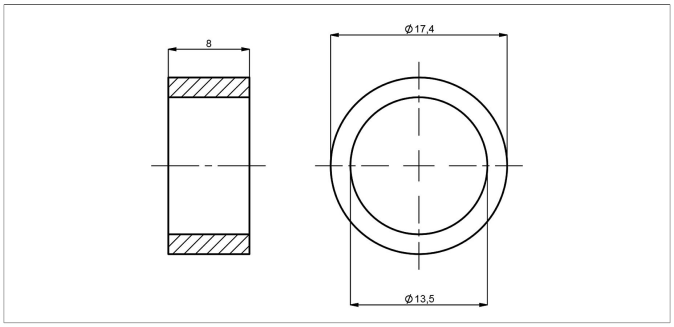
**Z-TH1-PD19 With spacer**

Ring position marker for fixation with screws M4, optionally with or without spacer

| | |
|---|---|
| Material | PA6-GF, Spacer: POM-GF |
| Weight | approx. 14 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque | max. 100 Ncm |

| P/N | Spacer | Pack. unit [pcs] |
|---|---|---|
| 400005698 | - | 1 |
| 400107117 | incl. | 1 |



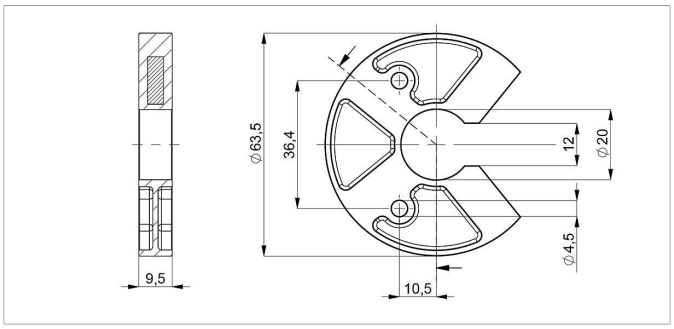



**Z-TH1-P30**

Ring position marker for mounting via lock washer and retaining ring

| | |
|---|---|
| Material | NdFeB bonded (EP) |
| Weight | approx. 5 g |
| Operating temp. | -40 ... +100°C |
| Surface pressure | max. 10 N/mm² |

| P/N | Pack. unit [pcs] |
|---|---|
| 400106139 | 1 |




**Z-TH1-P25**

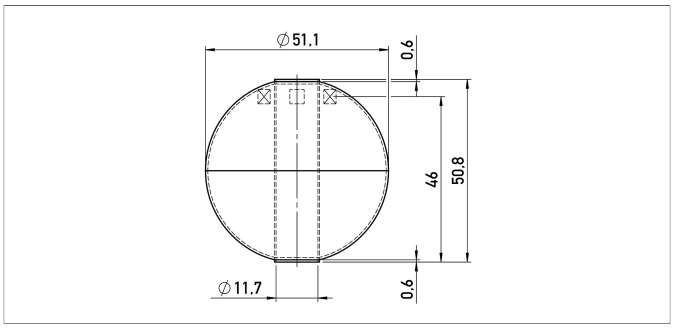
U-shaped position marker for fixation with M4 screws

Caution: for dimension of electrical zero point please follow the user manual!

| | |
|---|---|
| Material | PA6-GF |
| Operating temp. | -40 ... +105°C |
| Surface pressure | max. 40 N/mm² |
| Fastening torque of mounting | max. 100 Ncm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400105076 | 1 |

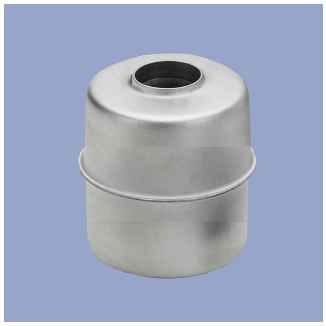
# Position Markers

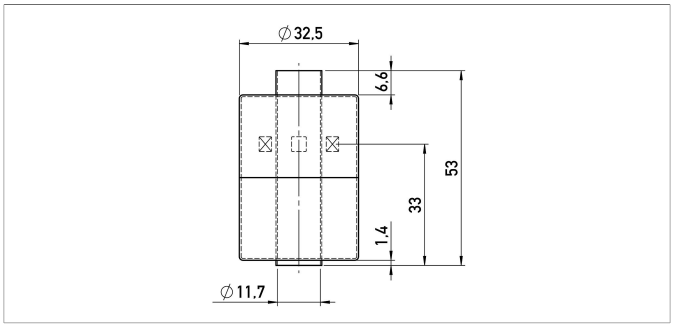



**Z-TH1-P32**
Ball-type floating position marker

| | |
|---|---|
| Material | SS 1.4571 / AISI 316Ti |
| Weight | approx. 42 g |
| Operating temp. | -40 ... +100°C |
| Compression strength | ≤ 40 bar |
| Density | 720 kg/m³ |
| Immersion depth in water | 36.7 mm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400105703 | 1 |

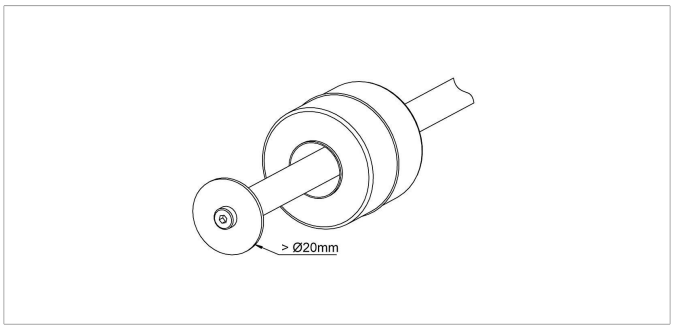




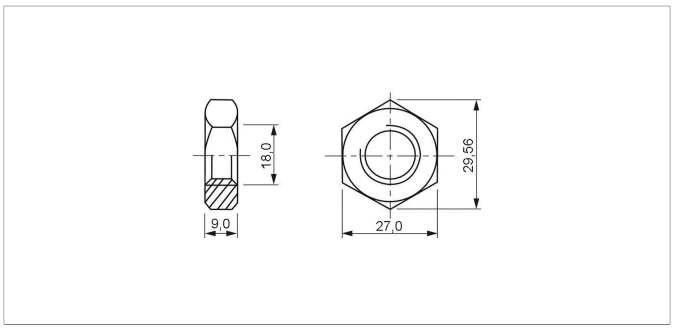

**Z-TH1-P31**
Cylinder floating position marker

| | |
|---|---|
| Material | SS 1.4404 / AISI 316L |
| Weight | approx. 20 g |
| Operating temp. | -40 ... +100°C |
| Compression strength | ≤ 24 bar |
| Density | 740 kg/m³ |
| Immersion depth in water | approx. 26.6 mm |

| P/N | Pack. unit [pcs] |
|---|---|
| 400105704 | 1 |



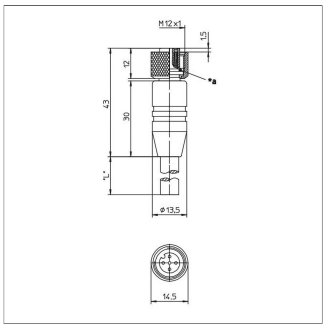

**Floating Position Marker - Installation Recommendation**
When using floating position markers, we recommend to secure the marker against loss with a washer at the rod end.
For this purpose, a sensor version with inner thread at the rod end is required (s. ordering code).

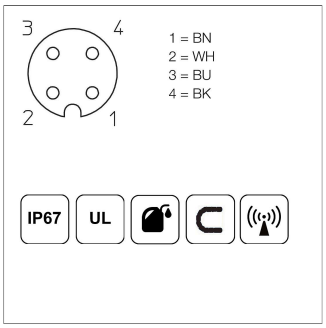



**Z-TH1-M01**
Lock nut ISO 8675, M18x1.5-A2

| P/N | Pack. unit [pcs] |
|---|---|
| 400056090 | 1 |

# Connector System M12



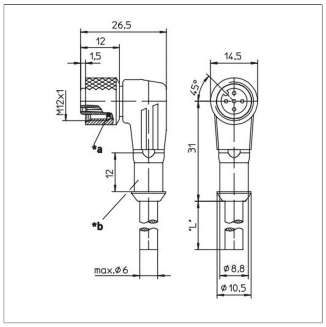



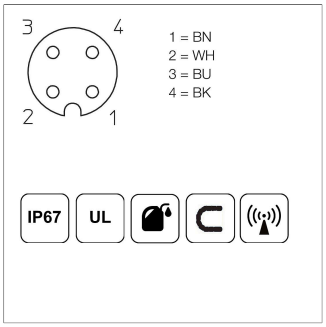

**EEM-33-32/62/97**

M12x1 Mating female connector, 4-pin, straight, A-coded, with molded cable, shielded, IP67, open ended

| | |
|---|---|
| Plug housing | PA |
| Cable sheath | PUR, Ø = max. 6 mm, -25 ... +80°C (moved) -50 ... +80°C (fixed) |
| Lead wires | PP, 0.34 mm² |

| P/N | Type | Length |
|---|---|---|
| 400005600 | EEM-33-32 | 2 m |
| 400005609 | EEM-33-62 | 5 m |
| 400005650 | EEM-33-97 | 10 m |




**EEM-33-33/63/99**

M12x1 Mating female connector, 4-pin, angled, A-coded, with molded cable, shielded, IP67, open ended

| | |
|---|---|
| Plug housing | PA |
| Cable sheath | PUR, Ø = max. 6 mm, -25 ... +80°C (moved) -50 ... +80°C (fixed) |
| Lead wires | PP, 0.34 mm² |

| P/N | Type | Length |
|---|---|---|
| 400005601 | EEM-33-33 | 2 m |
| 400005610 | EEM-33-63 | 5 m |
| 400005696 | EEM-33-99 | 10 m |

**IP67** Protection class IP67 DIN EN 60529

**IP68** Protection class IP68 DIN EN 60529

Very good Electromagnetic Compatibiliy (EMC) and shield systems

Very good resistance to oils, coolants and lubricants

Suited for applications in dragchains

**UL** UL - approved

CAN CAN-Bus

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© Aug 18, 2026

The specifications contained in our datasheets are intended solely for informational purposes. The documented specification values are based on ideal operational and environmental conditions and can vary significantly depending on the actual customer application. Using our products at or close to one or more of the specified performance ranges can lead to limitations regarding other performance parameters. It is therefore necessary that the end user verifies relevant performance parameters in the intended application. We reserve the right to change product specifications without notice.