

# DIGITAL LENGTH GAUGES



## Series ST 12 / ST 30

### Key-Features:

- Measurement range up to 30 mm
- Linearity 1  $\mu\text{m}$
- TTL / 1 Vpp
- IP67/64
- Plunger actuation by measured object or pneumatic
- Working temperature: +10 °C to +40 °C

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## MECHANICAL DATA

Mechanical data		ST 1278	ST 1288	ST 3078	ST 3088	ST 1277	ST 1287	ST 3077	ST 3087
Measuring range	[mm]	12		30		12		30	
Plunger actuation		By measured object				Pneumatic			
Position of plunger at rest		Extended				Retracted			
Measuring standard		DIADUR grating on glass; grating period 20 µm							
System accuracy	[µm]	±1							
Position error per signal period	[µm]	≤ ±0.2							
Repeatability	[µm]	0.25		0.7		0.25		0.7	
Short-range accuracy typically	[µm]	0.3							
Reference mark	[mm]	approx. 5 below upper stop							
Working pressure	[bar]	-				0.7 to 2.5		0.8 to 2.5	
Radial force	[N]	≤ 0.8 (mechanically permissible)							
Fastening		Clamping shank Ø 8h6							
Operating orientation		Any							
Vibration 55 Hz to 2000 Hz	[m/s <sup>2</sup> ]	≤ 100 (EN 60 068-2-6)							
Shock 11 ms	[m/s <sup>2</sup> ]	≤ 1000 (EN 60 068-2-27)							
Working temperature	[°C]	+10 to +40; reference temperature +20							
Protection class EN 60 529		IP64							
Mass without cable	[g]	40		50		40		50	

## ELECTRICAL DATA

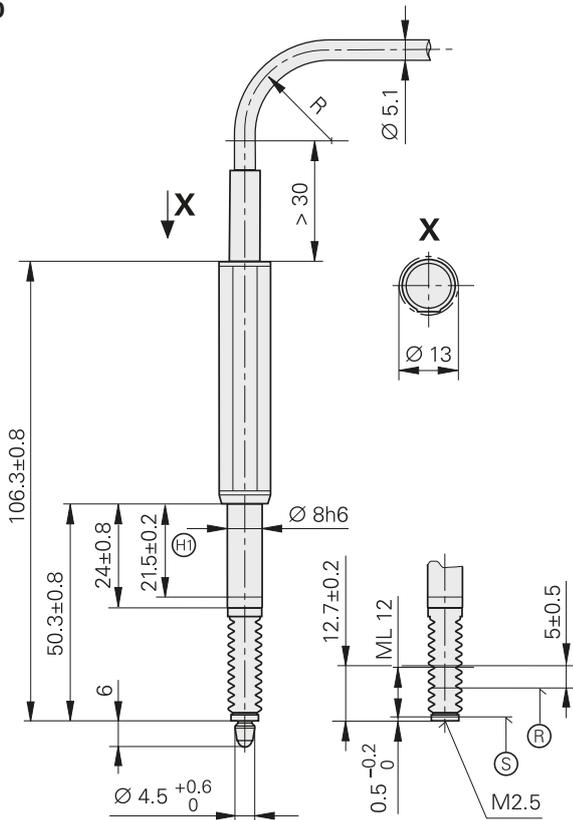
Electrical data		ST 127x ST 307x		ST 128x ST 308x	
Interface		TTL		1 Vpp	
Integrated interpolation		10 fach		-	
Signal period	[µm]	2		20	
Edge separation a at scanning frequency/traverse speed <sup>2)</sup> 100 kHz ≤ 72 m/min <sup>1)</sup> 25 kHz ≤ 30 m/min	[µs]	≥ 0.48 ≥ 1.98	≥ 0.23 ≥ 0.98	-	
Electrical connection		Cable 1.5 m with D-sub connector (male), 15-pin (integrated interface electronics)		Cable 1.5 m with D-sub connector (male), 15-pin	
Cable outlet		axial or radial			
Voltage supply	[VDC]	5 ±0.5			
Current consumption	[mA]	< 195 (without load)		< 55	

<sup>1)</sup> Mechanically limited

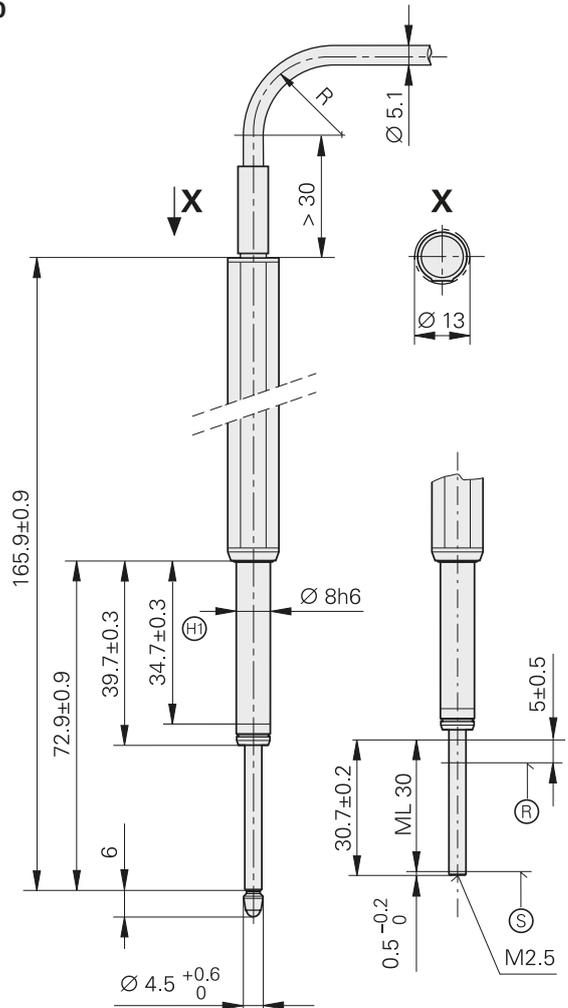
<sup>2)</sup> At a corresponding cutoff or scanning frequency

TECHNICAL DRAWING

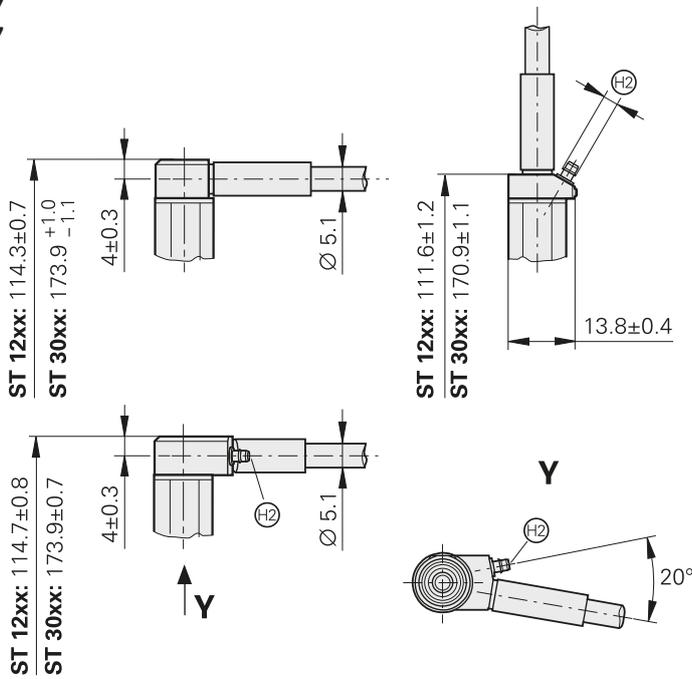
ST1200



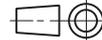
ST3000



ST12x7  
ST30x7



mm



Tolerancing ISO 8015

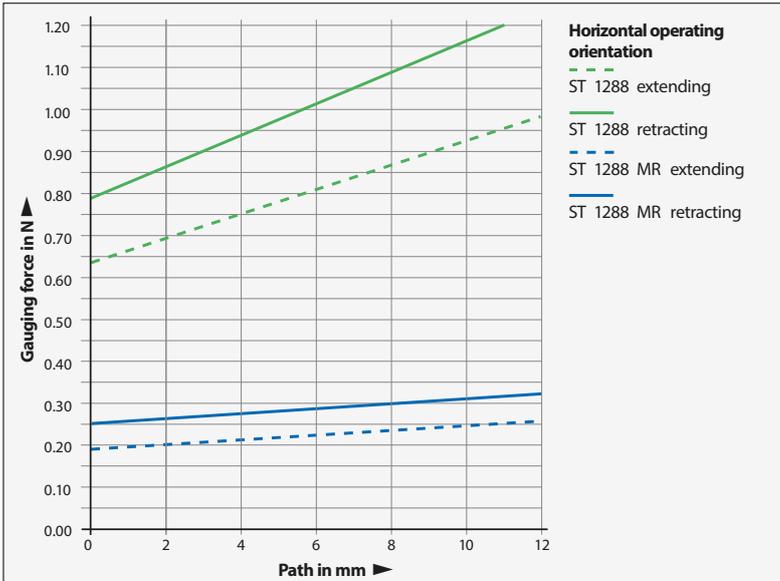
ISO 2768 - m H

< 6 mm: ±0.2 mm

- Ⓜ = Reference mark position
- Ⓢ = Beginning of measuring length
- Ⓢ = Clamping area
- Ⓢ = Air connection for 2 mm tube

## GAUGING FORCE / PATH DIAGRAM

### ST1288

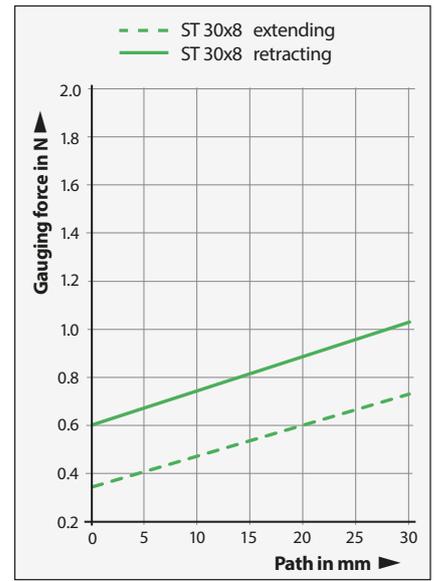


Version	Gauging force	Operating orientation
Default	0.65 N <sup>1)</sup>	Any
MR	0.4 N <sup>1)</sup>	Any
MG	0.2 N <sup>2)</sup>	Vertically downward

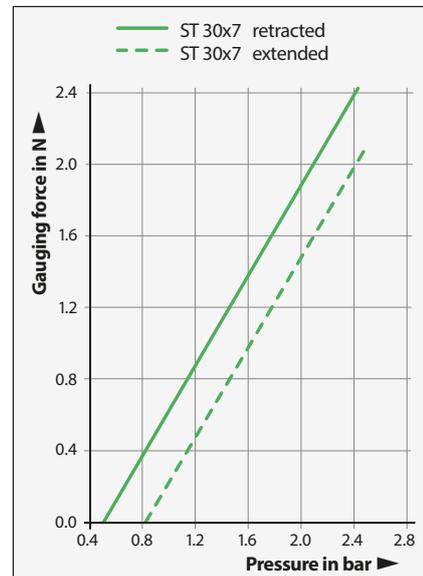
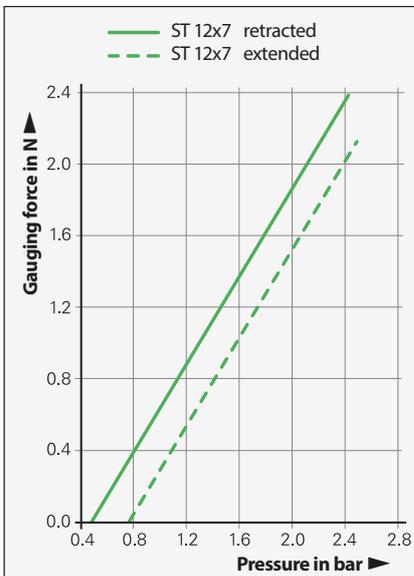
<sup>1)</sup> With nearly completed plunger extension

<sup>2)</sup> Over the entire measuring range

### ST30x8



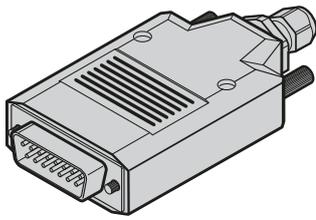
## GAUGING FORCE / PRESSURE DIAGRAM



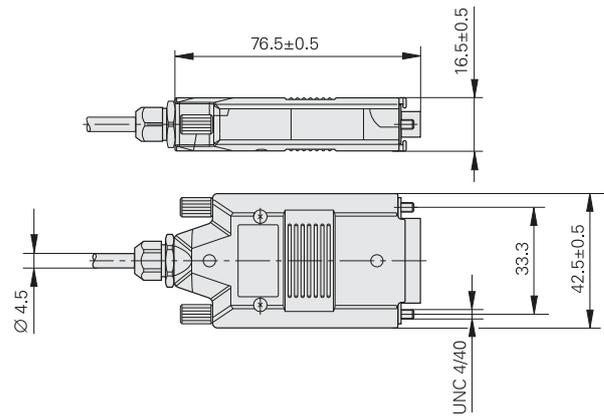
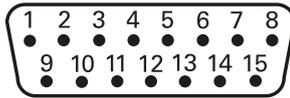
The diagrams apply for the horizontal operating orientation, except for special variants. The following compensation values are to be taken into account for other operating orientations.

Model	Operating orientation vertical Upward	Operating orientation vertical Downward
ST 12x7	-0.07 N	+0.07 N
ST 12x8	-0.08 N	+0.08 N
ST 30xx	-0.11 N	+0.11 N

## ELECTRICAL CONNECTION INCREMENTAL TTL



interface electronics integrated



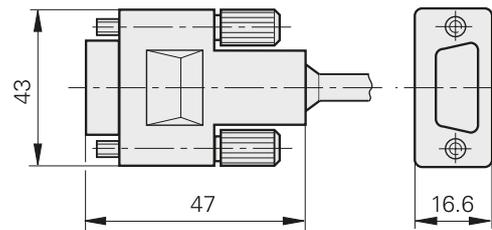
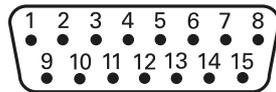
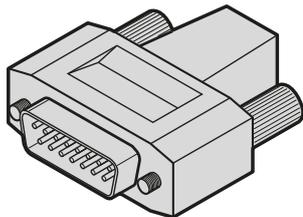
	Voltage supply				Incremental signals						Other signals			
<b>Sub-D-Connector (male), 15-pin</b>	4	12	2	10	1	9	3	11	14	7	13	5/6/8	15	
<b>Signal</b>	Up	Sensor Up	0V	Sensor 0V	Ua1	$\overline{Ua1}$	Ua2	$\overline{Ua2}$	Ua0	$\overline{Ua0}$	$\overline{UaS}$	n.c.	n.c.	

Shield on housing; Up = Power supply

Sensor: The sensor line is connected in the encoder with the corresponding power line.

Vacant pins or wires must not be used.

## ELECTRICAL CONNECTION INCREMENTAL 1Vpp



	Spannungsversorgung				Inkrementalsignale						sonstige Signale			
<b>Sub-D-Connector (male), 15-pin</b>	4	12	2	10	1	9	3	11	14	7	5/6/8/15	13	/	
<b>Signal</b>	Up	Sensor Up	0V	Sensor 0V	A+	A-	B+	B-	R+	R-	n.c.	n.c.	n.c.	

Shield on housing; UP = Power supply

Sensor: The sensor line is connected in the encoder with the corresponding power line.

Vacant pins or wires must not be used.

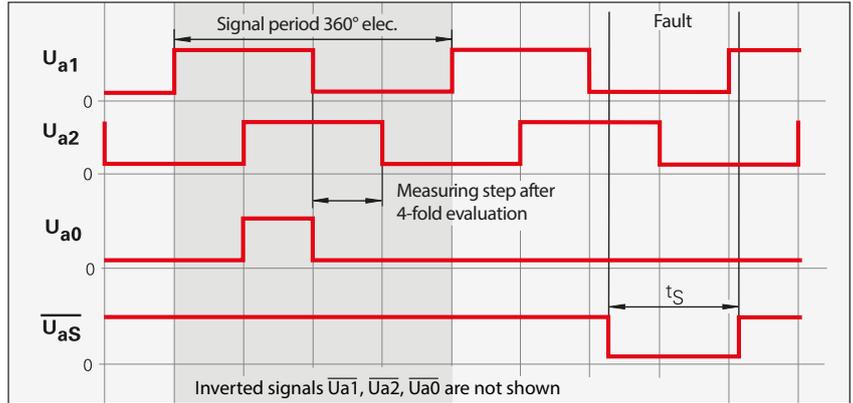
## INCREMENTAL SIGNAL TTL

WayCon encoders with TTL interface incorporate electronics that digitize sinusoidal scanning signals with or without interpolation.

The incremental signals are transmitted as the square-wave pulse trains  $U_{a1}$  and  $U_{a2}$ , phase-shifted by  $90^\circ$  elec. The reference mark signal consists of one or more reference pulses  $U_{a0}$ , which are gated with the incremental signals. In addition, the integrated electronics produce their inverted signals  $\overline{U_{a1}}$ ,  $\overline{U_{a2}}$  and  $\overline{U_{a0}}$  for noise-proof transmission. The illustrated sequence of output signals - with  $U_{a2}$  lagging  $U_{a1}$  - applies to the direction of motion shown in the dimension drawing.

The fault detection signal  $\overline{U_{aS}}$  indicates fault conditions such as an interruption in the supply lines, failure of the light source, etc.

The distance between two successive edges of the incremental signals  $U_{a1}$  and  $U_{a2}$  through 1-fold, 2-fold or 4-fold evaluation is one measuring step.

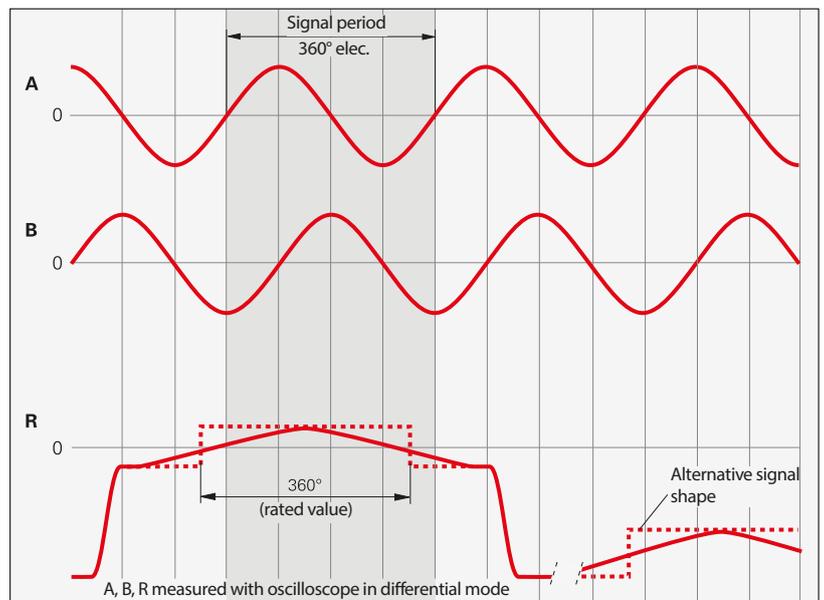


## INCREMENTAL SIGNAL 1 Vpp

WayCon encoders with 1 Vpp interface provide voltage signals that can be highly interpolated.

The sinusoidal incremental signals A and B are phase-shifted by  $90^\circ$  elec. and have amplitudes of typically 1 Vpp. The illustrated sequence of output signals - with B lagging A - applies for the direction of motion shown in the dimension drawing.

The reference mark signal R has an unambiguous assignment to the incremental signals. The output signal might be somewhat lower next to the reference mark.



## MODELS

ST 1277 / 383973-02	100 kHz, axial, pneumatic, TTL
ST 1278 / 383963-01	25 kHz, radial, spring, TTL
ST 1278 / 383965-01	25 kHz, axial, spring, TTL
ST 1288 / 383987-01	axial, spring, 1 Vss

ST 3077 / 375137-02	100 kHz, axial, pneumatic, TTL
ST 3078 / 375133-02	100 kHz, axial, spring, TTL
ST 3078 / 375134-02	100 kHz, radial, spring, TTL

Output Signal EnDat, 1 Vpp on request

Subject to change without prior notice.

**WayCon Positionsmesstechnik GmbH**  
 email: [info@waycon.de](mailto:info@waycon.de)  
 internet: [www.waycon.biz](http://www.waycon.biz)



Positionsmesstechnik

**Head Office**  
 Mehlsbeerstr. 4  
 82024 Taufkirchen  
 Tel. +49 (0)89 67 97 13-0  
 Fax +49 (0)89 67 97 13-250

**Office Köln**  
 Auf der Pehle 1  
 50321 Brühl  
 Tel. +49 (0)2232 56 79 44  
 Fax +49 (0)2232 56 79 45