

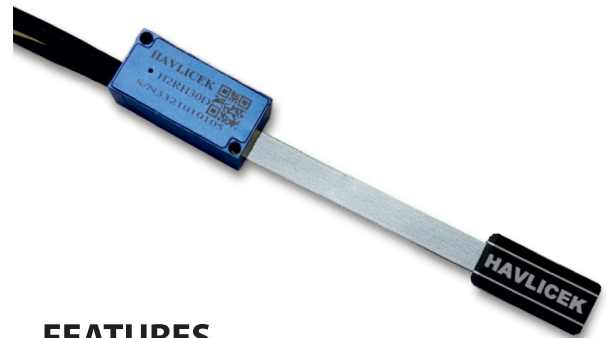
EXPOSED LINEAR ENCODER

HC-2 SERIES

Introducing the Havlicek HC-2 Exposed Linear Encoder – a cutting-edge solution at the forefront of precision measurement technology. Featuring a fine-tuned 20-nanometer resolution and reliability in high-velocity applications, the Havlicek HC-2 stands out as a leader in precision engineering, delivering exceptional performance in applications demanding meticulous measurements. Experience the future of measurement technology with Havlicek – where motion meets precision. Elevate your processes with the HC-2 Exposed Linear Encoder, setting a new standard in performance and accuracy. Your success begins with the precision you can trust.

GENERAL SPECIFICATIONS

Technical parameter	H2RE	H2RF	H2RH	H2RY	H2RZ
Linear scales	Self-adhesive mounted stainless steel tape scale, scale period 20 µm				
Coefficient of thermal expansion	α _{therm} : ≈ 10.1 ± 0.2 ppm/K				
Resolution	1 µm	0.5 µm	0.1 µm	0.05 µm	0.02 µm
Output signals	□ TTL	□ TTL	□ TTL	□ TTL	□ TTL
Signal period	4 µm	2 µm	0.4 µm	0.2 µm	0.08 µm
Maximum frequency	10MHz				
Maximum Traversing speed	<600 m/min	<600 m/min	<240 m/min	<120 m/min	<42 m/min
sub-divisional error	<40nm				
Optical reference mark	H2RE, H2RF, H2RH, H2RY, H2RZ Selectable with magnets every 50 mm				
Limits	Magnetic limit switch sensor				
Cable length	<50 m	<50 m	<50 m	<50 m	<50 m
Supply voltage	5V ±5%, <150 mA	5V ±5%, <150 mA	5V ±5%, <150 mA	5V ±5%, <150 mA	5V ±5%, <150 mA
Electrical connection	Cable standart: 1 m or 3 m with 15-pin D-sub connector (male)				
Degree of protection	±5 µm/mm				
Accuracy grade	100 m/s ² (55Hz to 2000 Hz) IEC 60068-2-6				
Vibration	100 m/s ² (55Hz to 2000 Hz) IEC 60068-2-6				
Shock	500 m/s ² (11 ms) IEC 60068-2-27				
Operation temperature	-5°C...70°C				
Storage temperature	-20°C...70°C				
Weight	0.17 kg + 0.025 kg/m				
Humidity	<95% (non-condensing)				



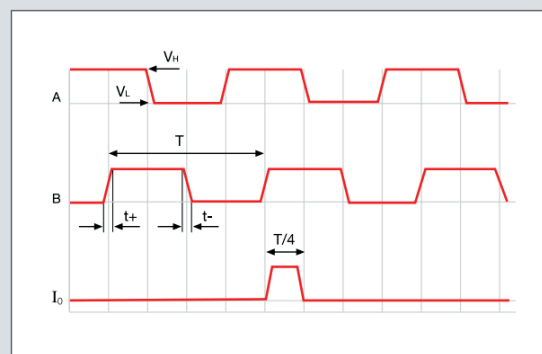
FEATURES

- 20 nanometer resolution
- ±3µm accuracy
- Compact size
- Maximum speed up to 10m/s
- Incremental

OUTPUT SPECIFICATIONS | Differential TTL

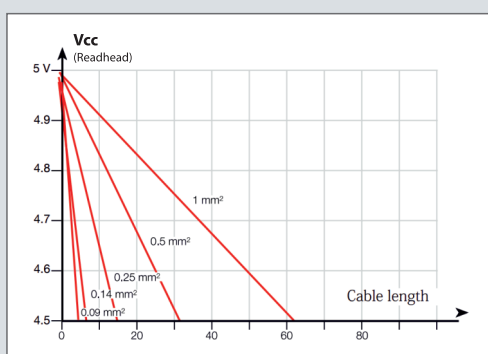
Square wave differential line driver to EIA RS422A (except limits). This characteristic together with a line termination of 120 Ω, twisted pair, and an overall shield provide greater immunity to electromagnetic noise caused by their environment.

Incremental	A, /A, B, /B, I ₀ / I ₀
	V _H ≥ 2.5V I _H = 20 mA V _L ≤ 0.5V I _L = 20 mA
Referencemark (I ₀)	Gated with incremental signals
Switching time	t ₊ /t ₋ < 30 ns (1 meter cable)
Power	5V ±5%, 150 mA
Incremental Signal period T	20, 4, 2, 0.4, 0.2 µm
Maximum cable length	50 m
Load impedance	Z ₀ = 120 Ω between differential



Voltage drop across cable

The voltage required for a TTL encoder must be 5V ± 5%. A simple formula may be used to calculate the maximum cable length depending on the section of the supply cables.



$$L_{max} = (V_{cc} - 4.75) * 500 / (Z_{CABLE/Km} * I_{MAX})$$

example

$$V_{cc} = 5V, I_{MAX} = 0.1 \text{ Amp}$$

Z (1 mm ²)	= 16.6 Ω/Km	(L _{max} = 75 m)
Z (0.5 mm ²)	= 32 Ω/Km	(L _{max} = 39 m)
Z (0.25 mm ²)	= 66 Ω/Km	(L _{max} = 19 m)
Z (0.14 mm ²)	= 132 Ω/Km	(L _{max} = 9 m)
Z (0.09 mm ²)	= 232 Ω/Km	(L _{max} = 5 m)

HC-2 SERIES

STEEL SCALE TAPE CEMENTED ON MOUNTING SURFACE

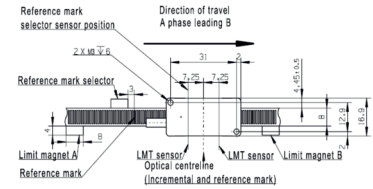
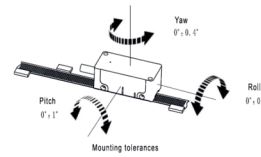
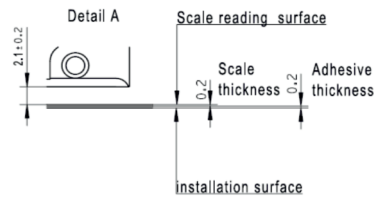
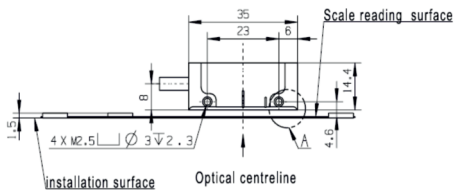
Adhesive model with the smallest cross section for constraint spaces, it consists of an engraved steel tape glued directly onto the machine surface, recommended if the tape is under thermally stable conditions.

CHARACTERS

- Available from 70 nm to 10000 nm with reference per 50 min.
- Small cross-sectional area.
- Steel tape scale with adhesive tape.



Dimensions | Mounting tolerances



PIN ASSIGNMENT | SHIELDING

Pin	Signal	Color
14	A	red
6	/A	blue
13	B	yellow
5	/B	green
12	Z	purple
4	/Z	grey
10	LTM-R	orange
11	LMT-L	black
7	+5 V	brown
8	+5 V	brown
2	0 V	white
9	0 V	white
Housing	Ground	Shield

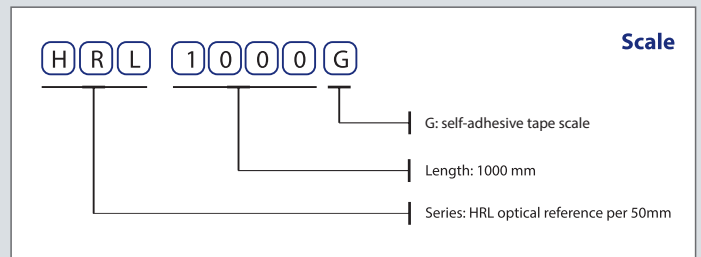
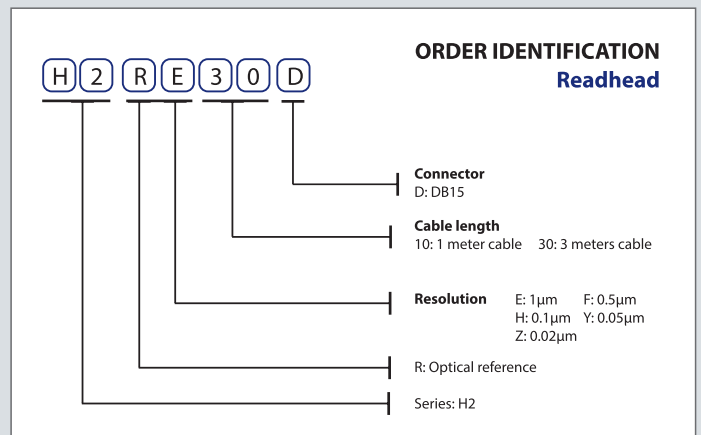
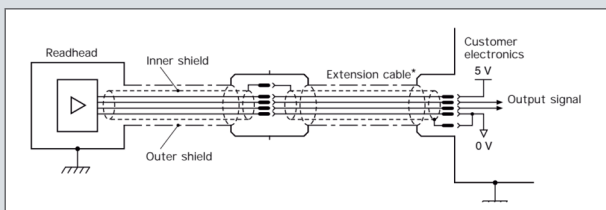
H2...-D

Length:
1 or 3 metres

Cable included
SUB D 15 connector
(male pin)



Grounding and shielding



IMPORTANT: The outer shield should be connected to the machine earth (Field Ground). The inner shield should be connected to 0 V at receiving electronics only. Care should be taken to ensure that the inner and outer shields are insulated from each other. If the inner and outer shields are connected together, this will cause a short between 0 V and earth, which could cause electrical noise issues.