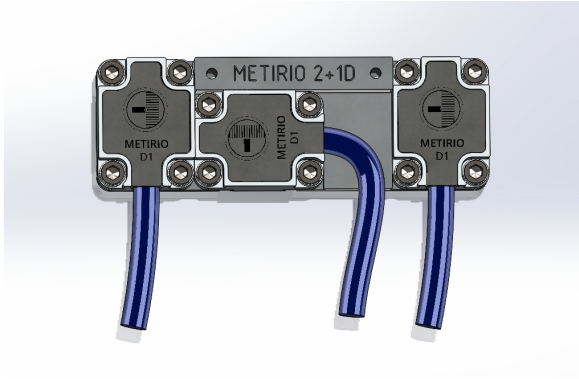


METIRIO 2D+1 Specifications

DESCRIPTION



The **METIRIO 2D+1** is a powerful tool based on the **METIRIO** optical encoder to fully characterize a linear movement.

By combining three individual encoder units and a special 2D scale, it is possible to track deviations in y-direction as well as angular changes of the stage on its guide-rail.

Mounting adapters and screws allow for easy attachment and fit into a tiny package. It outputs analogue sine and cosine signals and is offered with standard D-Sub connector and various cable lengths up to 3 m.

Features

- Compact size: 45.4 x 15.0 x 6.18 mm
- Lightweight: 7.67 g
- High resolution: <1nm
- High bandwidth: 500 kHz

Applications

- Characterization of Motion systems
- Determination of angular movement

Smaract has devised a system that allows to control every aspect of a linear motion with a tiny footprint. The **METIRIO 2D+1** takes the innovative approach of **METIRIO 2D**, that allows tracking of two dimensions simultaneously on a special 2D patterned scale and expands it by allowing the measurement of angular changes during motion.

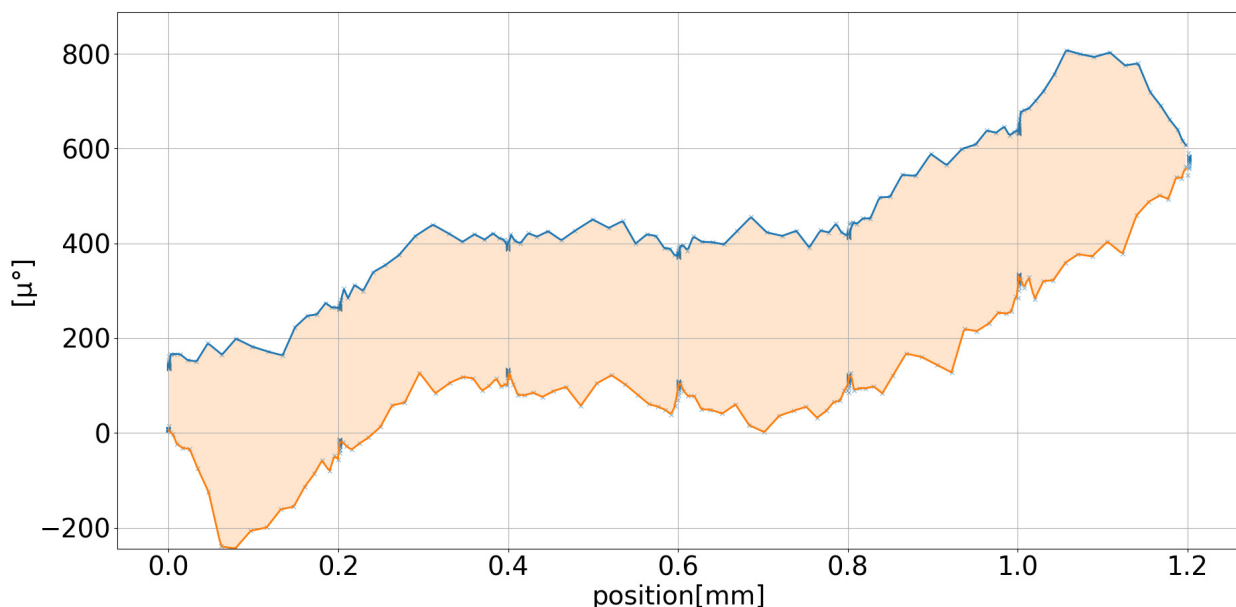


Figure 1. Characterization of angular hysteresis of a linear motion stage traveling 1.2 mm forward and backward.

General specifications

Parameter	Symbol	Condition	Value	Unit
Max. Resolution	$r_{\max}$	1 kHz low-pass filter	1	nm
Bandwidth	f_{3db}		500	kHz
Max. Speed	$v_{\max}$		10	m/s
Angular range			± 1	$^{\circ}$
Angular resolution			2	μ°
Typical Resolution	r		5.7	nm
Supply voltage	V_{DD}	to GND	3.3 to 5.0	V
Typical Current	I_{DD}	per Encoder	20	mA
Typical Power Consumption		per Encoder	100	mW
Central Emission Wavelength	λ_{pk}	—	850	nm
Radiant Power	ϕ_e		≤ 45	mW
Analog Output	V_{pp}	differential Sine, Cosine	1	V
Integrated noise			50	μV_{RMS}
Reference Signal	U_{ref}		RS485	square signal
Dimensions			45.4 x 15.0 x 6.18	mm ³
Weight			7.67	g

Operating conditions

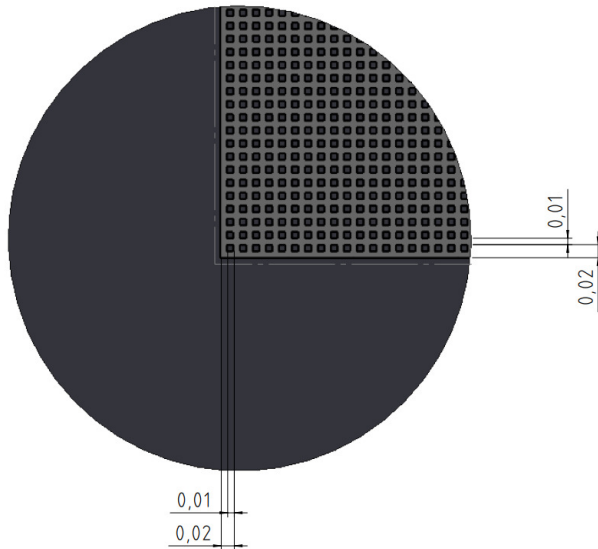
Parameter	Symbol	Condition	Value	Unit
Operating temperature	T_O	no dew condensation	0 to +80	$^{\circ}C$
Storage temperature	T_S	no dew condensation	-20 to +80	$^{\circ}C$
Humidity	$\varphi_{\max}$	EN 60068-2-78	80	%

Absolute Maximum Ratings

Parameter	Symbol	Condition	Value	Unit
Max. power consumption	P_{el}	all outputs terminated	310	mW
Max. radiant output power	$\Phi_{\max}$	short circuit current $I_F = 1000$ mA	<360	mW
ESD susceptibility	V_{ESD}	contact discharge (IEC 61000-4-2)	4000	V

REFLECTIVE SCALES

Encoders of the **METIRIO** family are suitable to read a broad variety of reflective linear, convex and rotary scales. However, the **METIRIO 2D+1** only works in conjunction with a special 2D scale. This scale is manufactured with a special grid pattern that allows motion tracking in x and y dimension simultaneously. For further information about available scales, please refer to OE-UG00003 - METIRIO Scale Catalogue.



Characteristic	Info
Grating Type	Reflective amplitude Grating
Scale Pitch	20 μm
Scale Types	glass with 2D-grid pattern

OUTPUT SIGNALS

METIRIO is an analogue encoder that outputs 1V peak-to-peak sine and cosine signals as well as a TTL-shaped signal for the reference mark.

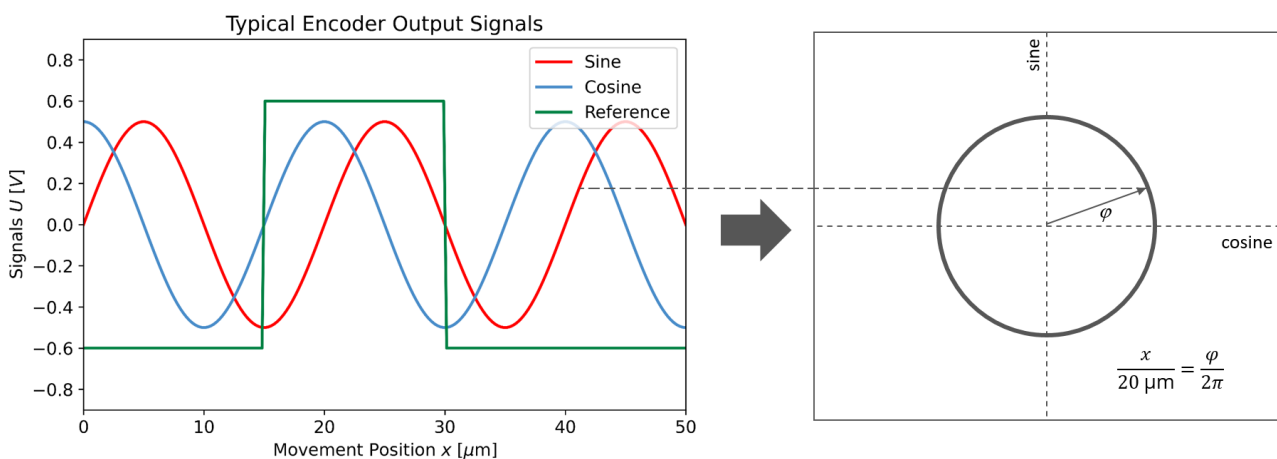


Figure 2. Typical output signals

From the analog sine and cosine signals the position can be calculated, since one period of the signal equals one 20 μm period of the scale grating.

For **digital communication** an interface module that translates the analogue signals either to ABZ- or BissC-protocol, is available.

CONNECTION

The **METIRIO 2D+1** is equipped with three standard D-Sub 15 male connectors with shielded AWG 36 cable with Polyurethane (PUR) sheath. Standard cable length is 1.5 m but can be customized up to 3 m. This variant is

compatible with most Motion controllers. The cable fulfills the requirements of "UL AWM Style 20963" which allows the cable to be used in drag chain applications. Also, it is flame retardant.

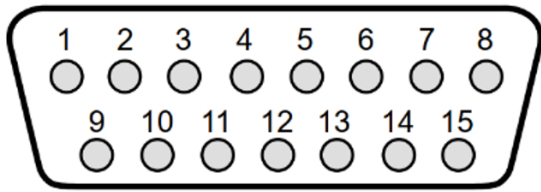


Figure 3. Pin assignment of the D-Sub 15 male connector of the **METIRIO 2D+1**

Pin	Description	Pin	Description
1	n.c.	9	n.c.
2	n.c.	10	SCL
3	n.c.	11	SDA
4	GND	12	U_{sin-}
5	U_{sin+}	13	U_{cos-}
6	U_{cos+}	14	U_{Ref-}
7	U_{Ref+}	15	V_{DD}
8	n.c.	Housing	Shield

Alternatively, the **METIRIO 2D+1** is available with the same cable but with different connectors or without connector. The available cable lengths are the same as for the D-sub variant.

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