



MWS120-2AN1IF18X00

MWS120

MEASURING WHEEL ENCODERS

SICK
Sensor Intelligence.

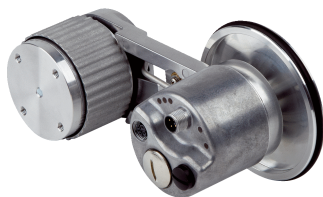


Illustration may differ

Ordering information

Type	part no.
MWS120-2AN1IF18X00	1121564

Included in delivery: AFS60A-S4IB262144 (1), BEF-MWS120-ARM (1), BEF-MR10300AK (1)

Other models and accessories → www.sick.com/MWS120



Detailed technical data

Safety-related parameters

MTTF_D (mean time to dangerous failure)	80 years (EN ISO 13849-1) ^{1) 2)}
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¹⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

²⁾ Value refers to the mounted encoder.

Performance

Number of steps per revolution (max. resolution)	262,144 (18 bit)
Measuring increment (resolution in mm/pulse)	0.0008 ¹⁾ ²⁾
Repeatability	< 0.1 mm ³⁾

¹⁾ Calculation example: Circumference of wheel / pulses per revolution = 200 mm / 16384 pulses per revolution = 0,012mm/pulse.

²⁾ Value based on measuring wheel circumference. The measuring wheel circumference depends on manufacturing tolerances, wear and tear, the selected spring tensioning force, and the behavior of the measurement wheel surface at different temperatures and on different measurement surfaces. To obtain the most accurate measurement results, we recommend performing a reference run for positioning tasks so that application-specific measuring wheel characteristics can be taken into account.

³⁾ Value is based on the mechanics. Backlash of the measuring wheel mechanics, is at a minimum. This enables a precise and repeatable measurement results.

Interfaces

Communication interface	EtherNet/IP™
Programmable/configurable	✓

Electronics

Connection type	Male connector, 1x, M12, 4-pin, axial Female connector, 2x, M12, 4-pin, axial
Power consumption	≤ 3 W
Supply voltage	10 V DC ... 30 V DC
Reverse polarity protection	✓

Mechanics

Measuring wheel circumference	300 mm ¹⁾
Measuring wheel surface	Cross knurled aluminium
Mounting	Measuring wheel mounted at the rear
Spring arm mechanism material	
Spring element	Stainless steel
	Aluminum
Start up torque	0.5 Ncm
Operating torque	0.3 Ncm
Bearing lifetime	3.0 x 10 ⁹ revolutions
Minimum spring tension force	4 N ²⁾ ³⁾
Max. permissible working area for the spring (continuous operation)	± 10 mm
Service life of spring element	> 1.5 million cycles
Mounting position relative to the measuring object	Preferably from above, from below possible ⁴⁾
Mounted encoder	AFS60 EtherNet/IP, AFS60A-S4IB262144, 1055364
Mounted mechanic	BEF-MWS120-ARM, 2118239
Attached measuring wheel	BEF-MR10300AK, 2115703

¹⁾ The surface of a measuring wheel is subject to wear. This depends on contact pressure, acceleration behavior in the application, traversing speed, measurement surface, mechanical alignment of the measuring wheel, temperature, and ambient conditions. We recommend you regularly check the condition of the measuring wheel and replace as required.

²⁾ The correct spring tensioning force for the application prevents slippage in the application without damaging the measuring surface.

³⁾ The clamping force can be set in 6 fixed increments of 4 N. 4 N corresponds to one increment.

⁴⁾ When mounted from below, the encoder weight during spring pretensioning must be taken into account.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 ¹⁾
Enclosure rating	IP67 (IEC 60529)
Operating temperature range	-30 °C ... +80 °C ²⁾
Storage temperature range	-40 °C ... +100 °C ²⁾

¹⁾ EMC according to the standards quoted is achieved if shielded cables are used.

²⁾ This value reflects the smallest temperature value of the installed products. For more information, please look at the individual data sheets.

Certificates

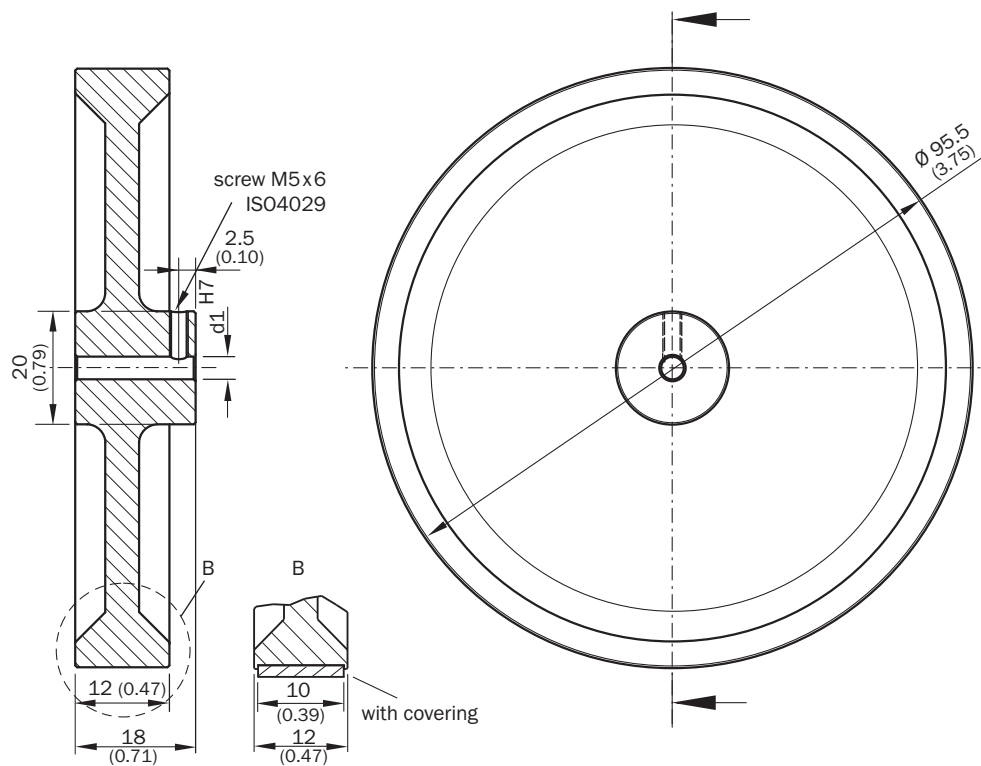
EU declaration of conformity	✓
UK declaration of conformity	✓
ACMA declaration of conformity	✓
Moroccan declaration of conformity	✓
China RoHS	✓

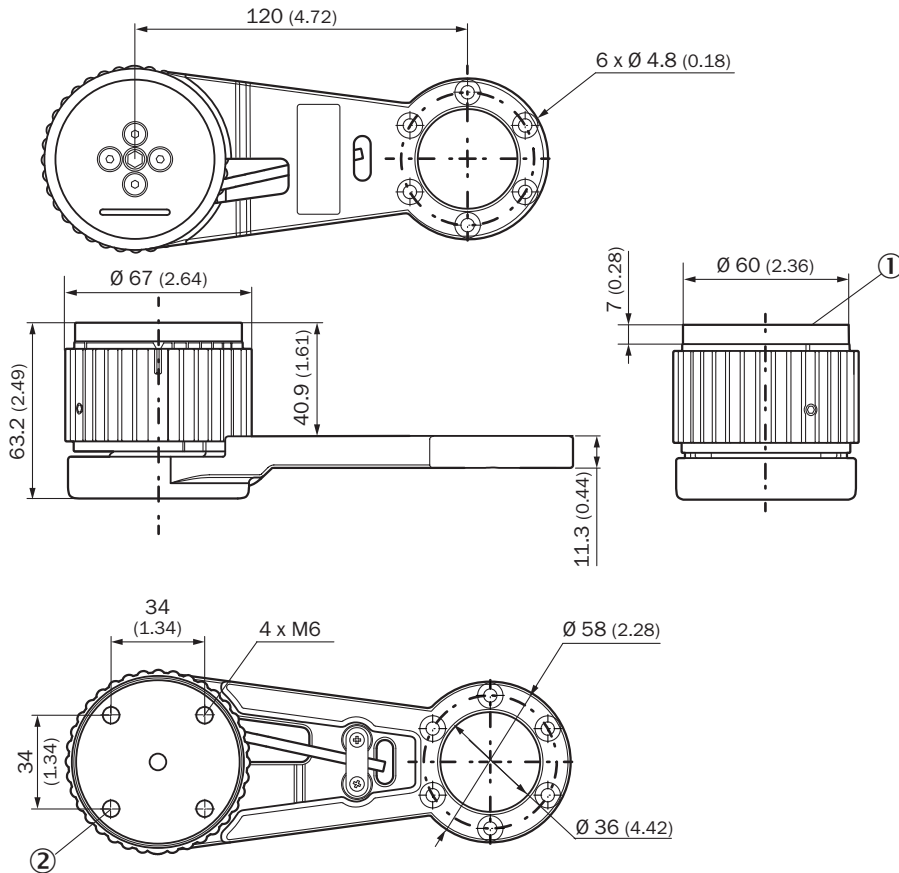
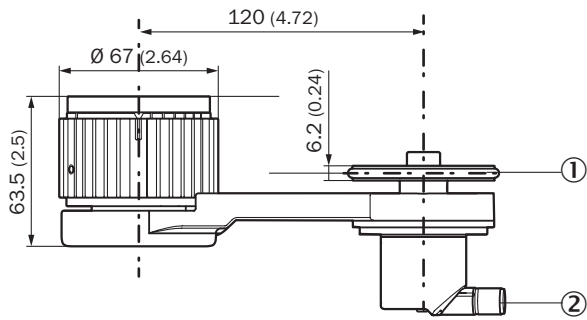
Classifications

ECLASS 5.0	27270501
ECLASS 5.1.4	27270501
ECLASS 6.0	27270590

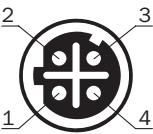
ECLASS 6.2	27270590
ECLASS 7.0	27270501
ECLASS 8.0	27270501
ECLASS 8.1	27270501
ECLASS 9.0	27270501
ECLASS 10.0	27270790
ECLASS 11.0	27270707
ECLASS 12.0	27270504
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing





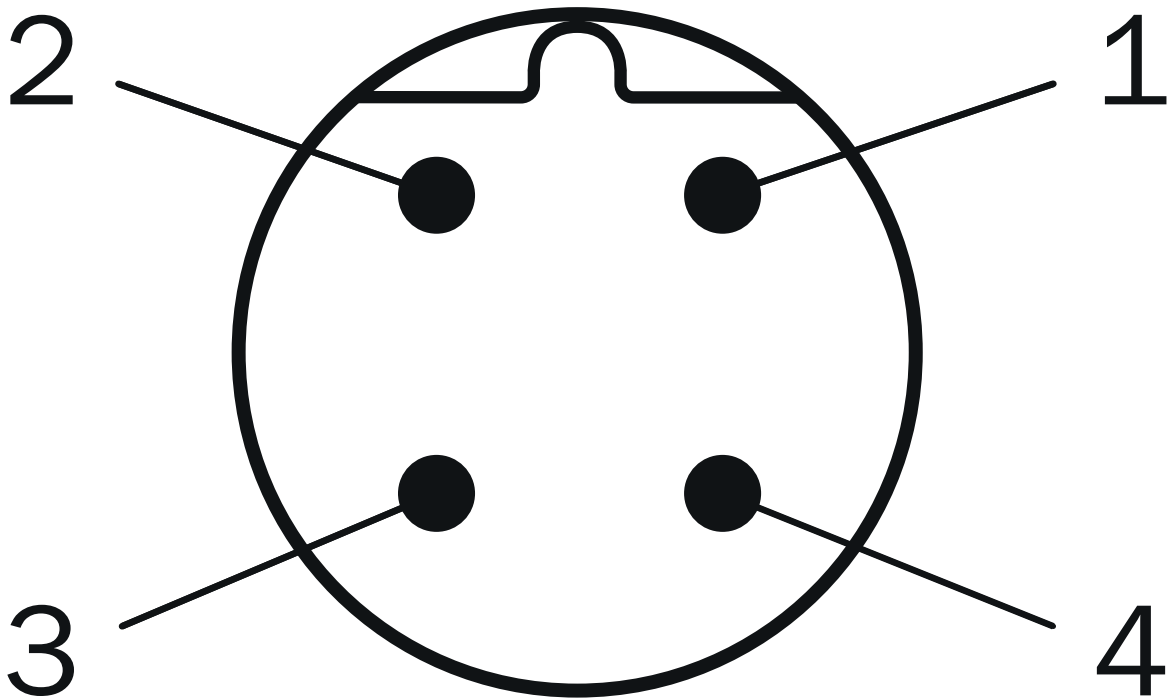
Anschlussbelegung Female connector



Port 1, Port 2

PIN	Signal
1	T x D+
2	R x D+
3	T x D-
4	R x D-

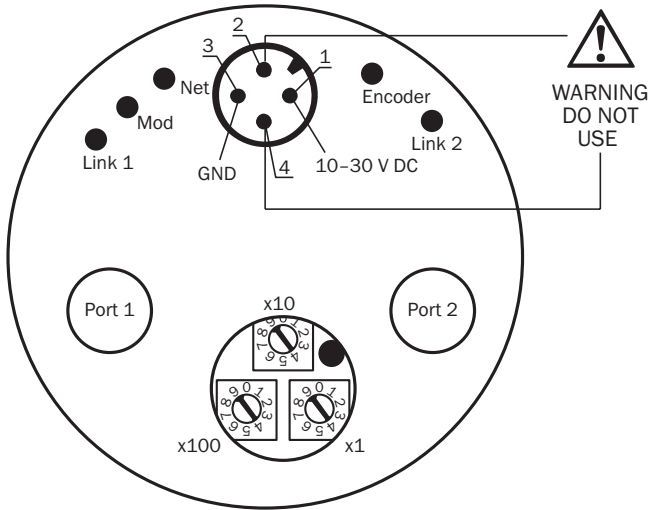
Anschlussbelegung Male connector



Supply voltage

PIN	Signal
1	10 V ... 30 V
2	Not assigned
3	GND
4	Not assigned

Connection diagram

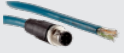
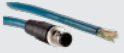
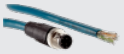


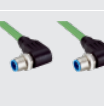
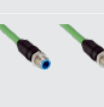
Recommended accessories

Other models and accessories → www.sick.com/MWS120

	Brief description	Type	part no.
measuring wheels and measuring wheel mechanics			
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm	BEF-MR010020R	2055224
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm	BEF-MR010030R	2049278
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm	BEF-MR010050R	2055227
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm	BEF-MR10500AK	4084733
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200AK	4084737
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200AP	4084738
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200APG	4084740
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm	BEF-MR10200APN	4084739
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels	BEF-MR10500AP	4084734

	Brief description	Type	part no.
	Description: Spring arm for linear measurement with contact, spring contact pressure manually adjustable without tools in 6 increments of 4 N from 0 ... 24 N, can be combined with separately available encoders and measuring wheels. Items supplied: MWS120 spring arm (part number: 2118239), 3 pcs. M4 x 16 cylinder head screws for adapter or encoder mounting Suitable for: MWS120, direct mounting Ø 60 mm face mount flange encoder with mechanical shaft design "S4" = Ø 10 mm, DBS60, DFS60, AFS60 AFM60. Ø 36 mm encoders such as AHS/AHM36 can be mounted with an adapter flange (part no.: 2072298), MWS120 mounting bracket (part number: 2113284)		
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 300 mm	BEF-MR10300AK	2115703
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 300 mm	BEF-MR10300AP	2118512
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 300 mm	BEF-MR10300APG	2118496
	Product segment: Measuring wheels and measuring wheel mechanics Product: Measuring wheels Description: Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 300 mm	BEF-MR10300APN	2118494
Mounting systems			
	Description: Mounting bracket for MWS120 measuring wheel system and SPEETEC 1D laser surface motion sensors Suitable for: MWS120, NCV50 (in conjunction with BEF-WN-NCV50 mounting bracket part no.: 2117456)	BEF-WF-MWS-NCV	2113284

	Brief description	Type	part no.
connectors and cables			
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Description: Unshielded Connection systems: Screw-type terminals Permitted cross-section: $\leq 0.75 \text{ mm}^2$	DOS-1204-W	6007303
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, M12, 4-pin, straight, D-coded Signal type: Ethernet Cable: 5 m, 4-wire, CAT5, CAT5e, PUR, halogen-free Description: Ethernet, shielded	SSL-1204-G05ME90	6045277
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, M12, 4-pin, straight, D-coded Signal type: Ethernet Cable: 10 m, 4-wire, CAT5, CAT5e, PUR, halogen-free Description: Ethernet, shielded	SSL-1204-G10ME90	6045279
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Flying leads Signal type: Ethernet Cable: 2 m, 4-wire, CAT5, CAT5e, PUR, halogen-free Description: Ethernet, shielded	STL-1204-G02ME90	6045284
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Flying leads Signal type: Ethernet Cable: 5 m, 4-wire, CAT5, CAT5e, PUR, halogen-free Description: Ethernet, shielded	STL-1204-G05ME90	6045285
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Flying leads Signal type: Ethernet Cable: 10 m, 4-wire, CAT5, CAT5e, PUR, halogen-free Description: Ethernet, shielded	STL-1204-G10ME90	6045286
	Connection type head A: Female connector, M12, 4-pin, straight, D-coded Signal type: Ethernet Cable: CAT5, CAT5e Description: Ethernet, shielded Connection systems: IDC quick connection Permitted cross-section: $0.14 \text{ mm}^2 \dots 0.34 \text{ mm}^2$	DOS-1204-GE	6048153
	Connection type head A: Female connector, M12, 4-pin, angled, D-coded Signal type: Ethernet Cable: CAT5, CAT5e Description: Ethernet, shielded Connection systems: IDC quick connection Permitted cross-section: $0.14 \text{ mm}^2 \dots 0.34 \text{ mm}^2$	DOS-1204-WE	6048154
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Signal type: Ethernet Cable: CAT5, CAT5e Description: Ethernet, shielded Connection systems: IDC quick connection Permitted cross-section: $0.14 \text{ mm}^2 \dots 0.34 \text{ mm}^2$	STE-1204-GE01	6048151
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Signal type: Ethernet Cable: CAT5, CAT5e Description: Ethernet, shielded Connection systems: IDC quick connection Permitted cross-section: $0.14 \text{ mm}^2 \dots 0.34 \text{ mm}^2$	STE-1204-WE	6048152
	Connection type head A: Male connector, RJ45, 8-pin, straight Signal type: Gigabit Ethernet Cable: CAT6A Description: Gigabit Ethernet, shielded Connection systems: IDC quick connection Permitted cross-section: $4.5 \text{ mm}^2 \dots 8 \text{ mm}^2$	STE-0J08-GE	6048150
	Connection type head A: Female connector, M12, 4-pin, D-coded Connection type head B: Female connector, RJ45, 8-pin Signal type: Ethernet Cable: CAT5, CAT5e Description: Ethernet, shielded	Feedthrough female connector Ethernet RJ45	6048180

	Brief description	Type	part no.
	Note: Cabinet through Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 2 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-020UB3XLEAX	2095607
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-050UB3XLEAX	2095608
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 10 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-100UB3XLEAX	2095609
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 25 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-250UB3XLEAX	2095615
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 2 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-020UB3XLEAX	2095766
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 5 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-050UB3XLEAX	2095767
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 10 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-100UB3XLEAX	2095768
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 25 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-250UB3XLEAX	2095771
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Male connector, M12, 4-pin, angled, D-coded Signal type: Ethernet, PROFINET Cable: 2 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-020P-N1N2D24	2106168
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, M12, 4-pin, straight, D-coded Signal type: Ethernet, PROFINET Cable: 2 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YM2D24-020P-N1M2D24	2106159
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 2 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET	YN2D24-020P-N1MRJA4	2106162

	Brief description	Type	part no.
	Application: Drag chain operation, Zones with oils and lubricants Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 10 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YM2D24-100P-N1MRJA4	2106185
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 5 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YM2D24-050P-N1MRJA4	2106184
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, RJ45, 8-pin, straight Signal type: Ethernet Cable: 5 m, 4-wire, AWG26, PUR, halogen-free Description: Ethernet, twisted pair, shielded	YM2D24-050EA1M-RJA4	6034415
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 2 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YM2D24-020P-N1MRJA4	2106182
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 10 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-100P-N1MRJA4	2106164
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 5 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-050P-N1MRJA4	2106163
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Flying leads Signal type: Ethernet, PROFINET Cable: 5 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-050P-N1XLEAX	2106175
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: 3 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-030P-N1MRJA4	2144265
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 0.6 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-C60UB3XLEAX	2145654
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 1 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-010UB3XLEAX	2145655
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 3 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded	YF2A14-030UB3XLEAX	2145656

	Brief description	Type	part no.
	Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 0.6 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-C60UB3XLEAX	2145657
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 1 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-010UB3XLEAX	2145658
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Flying leads Signal type: Ethernet, PROFINET Cable: 20 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-200P-N1XLEAX	2122743
	Connection type head A: Female connector, M12, 4-pin, angled, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 20 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YG2A14-200UB3XLEAX	2095770
	Connection type head A: Female connector, M12, 4-pin, straight, A-coded Connection type head B: Flying leads Signal type: Sensor/actuator cable Cable: 20 m, 4-wire, PUR, halogen-free Description: Sensor/actuator cable, unshielded Application: Drag chain operation, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-200UB3XLEAX	2095611
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Connection type head B: Flying leads Signal type: Ethernet, PROFINET Cable: 10 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-100P-N1XLEAX	2106176

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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