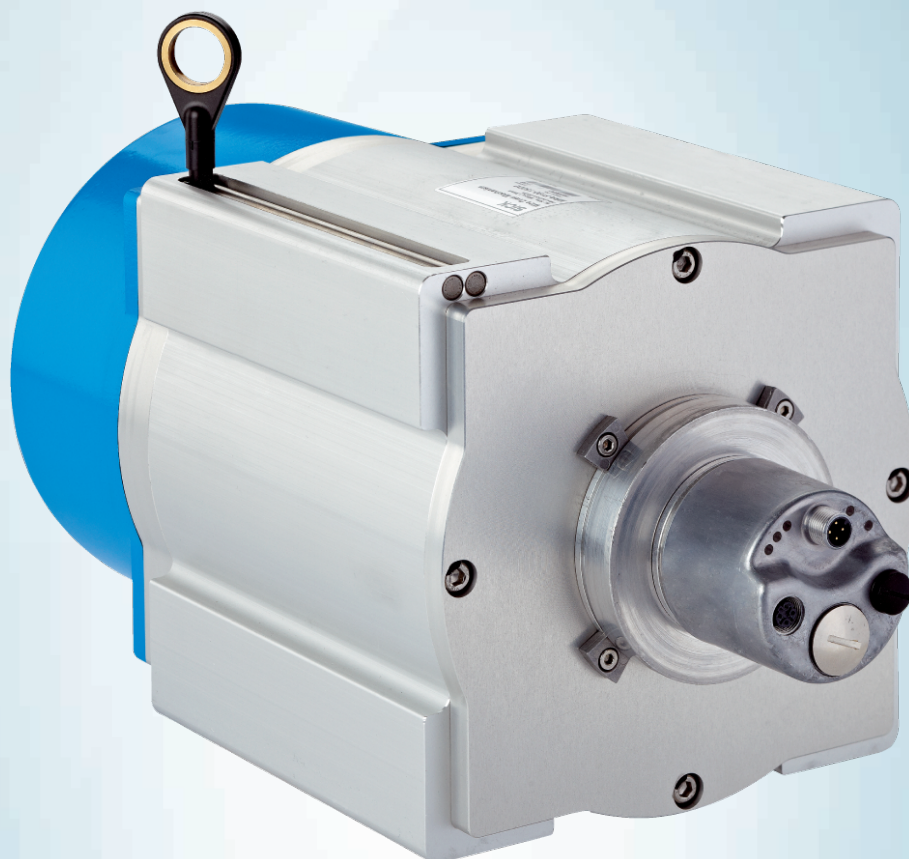


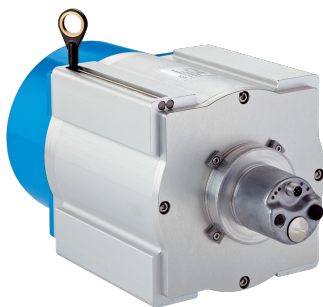


BTF19-E1BM5099

HighLine

WIRE DRAW ENCODERS

SICK
Sensor Intelligence.



Ordering information

Type	part no.
BTF19-E1BM5099	1061012

Included in delivery: AFM60A-S1EB018x12 (1), MRA-F190-150D2 (1)

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



Detailed technical data

Safety-related parameters

MTTF_D (mean time to dangerous failure)	80 years (EN ISO 13849-1) ¹⁾
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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.

Performance

Measurement range	0 m ... 50 m
Encoder	Absolute encoders
Resolution (wire draw + encoder)	0.002 mm ^{1) 2)}
Repeatability	≤ 5 mm ³⁾
Linearity	≤ ± 2 mm ³⁾
Hysteresis	≤ 10 mm ³⁾

¹⁾ The values shown have been rounded.

²⁾ Example calculation based on the BTF08 with PROFINET: 200 mm (wire draw length per revolution - see Mechanical data): 262,144 (number of steps per revolution) = 0.001 mm (resolution of wire draw + encoder combination).

³⁾ Value applies to wire draw mechanism.

Interfaces

Communication interface	EtherCAT®
Programmable/configurable	✓

Electronics

Connection type	Male connector, 1x, M12, 4-pin, axial Female connector, 2x, M12, 4-pin, axial
Supply voltage	10 V DC ... 30 V DC
Power consumption	≤ 3 W (without load)

Mechanics

Weight	16.7 kg
Measuring wire material	Highly flexible stranded steel 1,4401 stainless steel V4A
Measuring wire diameter	1.35 mm
Weight (measuring wire)	7.1 g/m
Housing material, wire draw mechanism	Aluminum (anodized), aluminum die cast (nickel-plated)
Spring return force	18 N ... 37 N ¹⁾
Length of wire pulled out per revolution	491.5 mm
Life of wire draw mechanism	Typ. 1,000,000 cycles ²⁾ ³⁾
Actual wire draw length	50.2 m
Wire acceleration	18 m/s ²
Operating speed	4 m/s
Mounted encoder	AFM60 EtherCAT®, AFM60A-S1EB018X12, 1059061
Mounted mechanic	MRA-F190-150D2, 6028630

¹⁾ These values were measured at an ambient temperature of 25 °C. There may be variations at other temperatures.

²⁾ Average values, which depend on the application.

³⁾ The service life depends on the type of load. This is influenced by environmental conditions, the installation location, the measuring range in use, the traversing speed, and acceleration.

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3 ¹⁾
Enclosure rating	IP31, mounted mechanic IP67, Encoder (IEC 60529) ²⁾
Operating temperature range	-30 °C ... +70 °C

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

²⁾ With mating connector fitted.

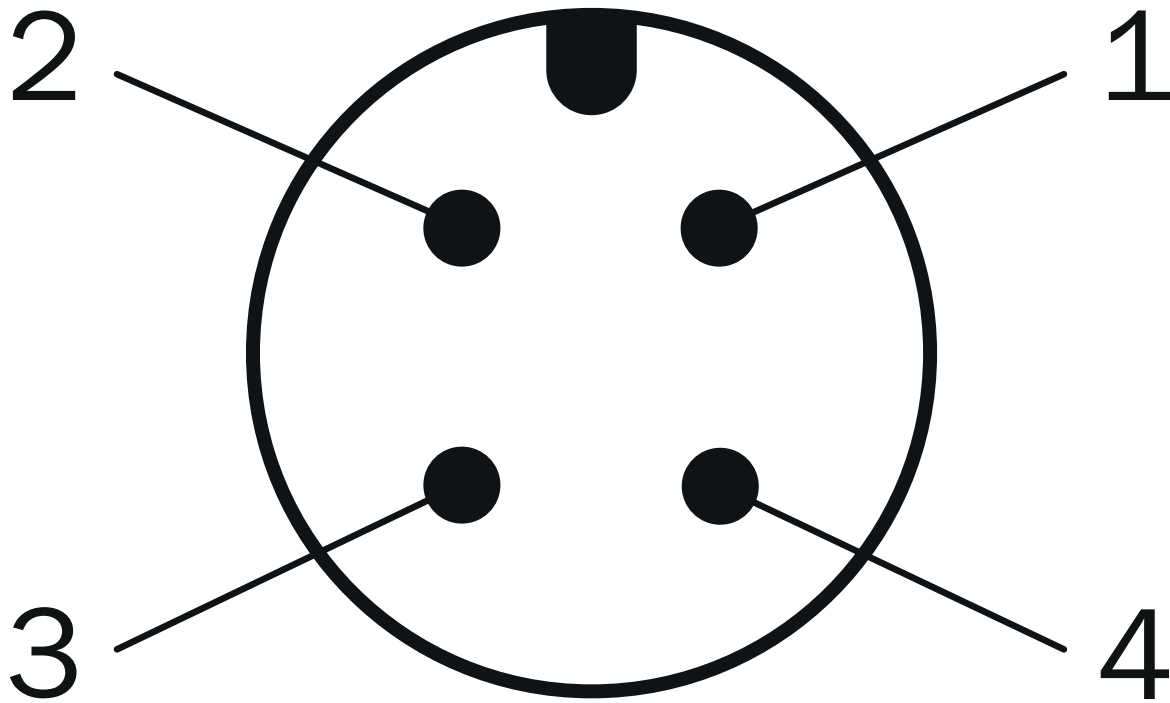
Certificates

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

Classifications

ECLASS 5.0	27270590
ECLASS 5.1.4	27270590
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270590
ECLASS 8.0	27270590
ECLASS 8.1	27270590
ECLASS 9.0	27270590
ECLASS 10.0	27270613

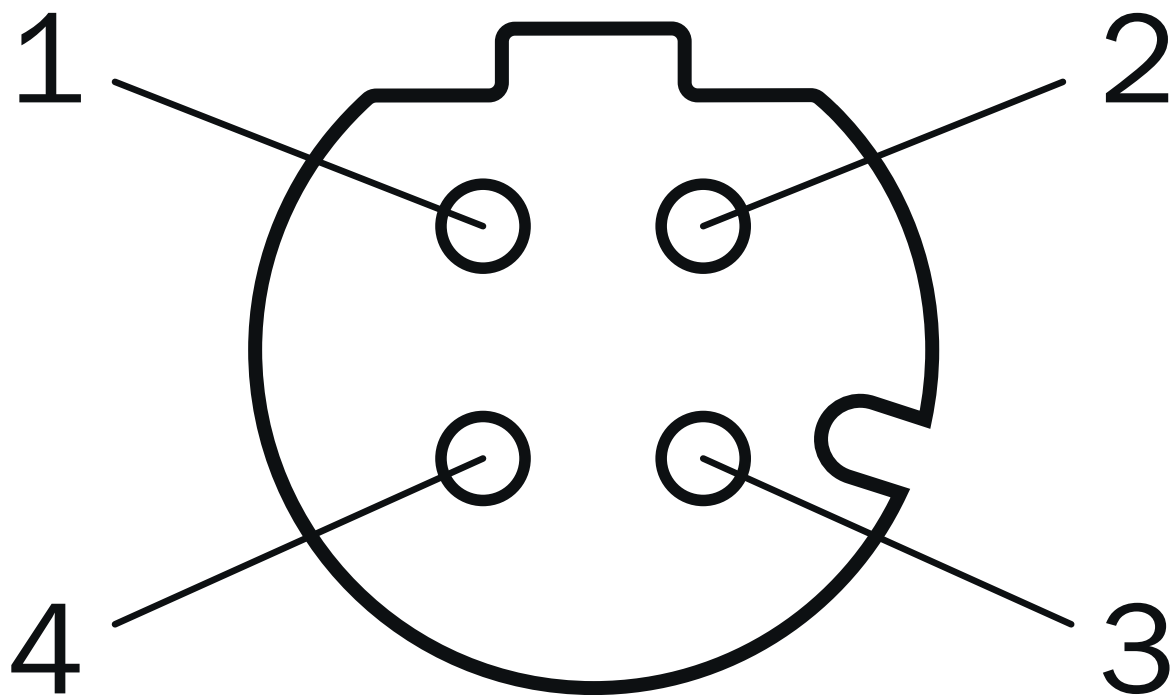
Anschlussbelegung Male connector



Supply voltage

PIN	Wire color	Signal
1	Brown	U _S 10 V ... 30 V
2	White	Not assigned
3	Blue	GND
4	Black	Not assigned

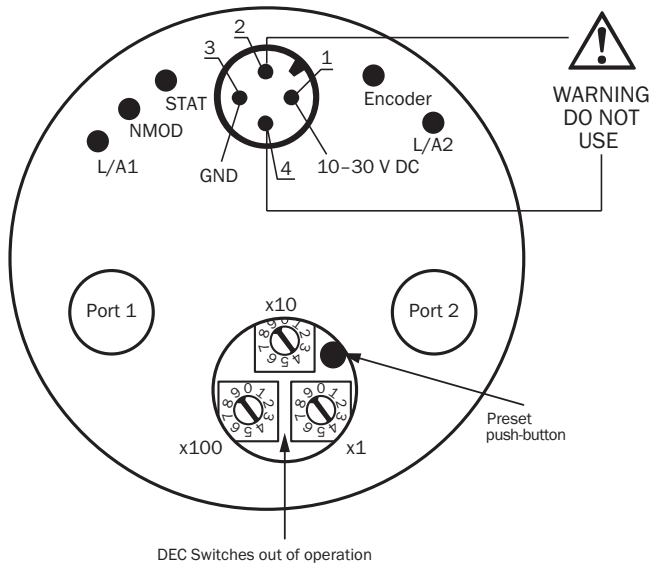
Anschlussbelegung Female connector



Port 1, Port 2

PIN	Wire color	Signal
1	Yellow	T x D+
2	White	R x D+
3	Orange	T x D-
4	Blue	R x D-

Connection diagram



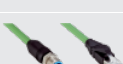
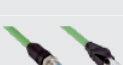
Recommended accessories

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

	Brief description	Type	part no.
Mounting systems			
	Description: Joint ball for later insertion in wire end ring with 20 mm diameter. The use of this joint ball enables movement in multiple levels of freedom.	Joint protection for wire rope BTf/PRF/MRA	5318683
	Description: Compressed air attachment for MRA-F080... and MRA-F130... HighLine wire draw mechanism	MRA-F-P	6073769
	Description: Flange adapter for HighLine wire draw mechanisms, adaption of face mount flange with centering hub 20 mm to 50 mm servo flange Material: Aluminum Details: Aluminum Items supplied: Including 3 countersunk screws M3 x 10	BEF-FA-020-050WDE	2073776

	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: ≤ 0.75 mm²	DOS-1204-W	6007303
	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 Note: Cabinet through	Feedthrough female connector Ethernet RJ45	6048180
	Connection type head A: Female connector, M12, 4-pin, straight, D-coded Signal type: PROFINET Cable: CAT5, CAT5e Description: PROFINET, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm²	DOS-1204-GZ	6048263
	Connection type head A: Female connector, M12, 4-pin, angled, D-coded Signal type: PROFINET Cable: CAT5, CAT5e Description: PROFINET, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm²	DOS-1204-WZ	6048264
	Connection type head A: Male connector, RJ45, 4-pin, straight Connection type head B: Male connector, M12, 4-pin, angled, D-coded Signal type: Ethernet, PROFINET Cable: 30 m, 4-wire, CAT5, CAT5e, PVC Description: Ethernet, shielded, PROFINET	SSL-2J04-F30MZ	6059450
	Connection type head A: Male connector, RJ45, 4-pin, straight Signal type: Ethernet, PROFINET Cable: CAT5, CAT5e Description: Ethernet, shielded PROFINET Connection systems: IDC quick connection Permitted cross-section: 4 mm² ... 8 mm²	STE-0J04-GZ	6048260
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Signal type: PROFINET Cable: CAT5, CAT5e Description: PROFINET, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm²	STE-1204-GZ	6048261
	Connection type head A: Male connector, M12, 4-pin, angled, D-coded Signal type: PROFINET Cable: CAT5, CAT5e Description: PROFINET, shielded Connection systems: IDC quick connection Permitted cross-section: 0.14 mm² ... 0.34 mm²	STE-1204-WZ	6048262
	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: Uncontaminated zones, 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: Uncontaminated zones, 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	YF2A14-100UB3XLEAX	2095609

	Brief description	Type	part no.
	Application: Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation 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: Uncontaminated zones, 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: Uncontaminated zones, 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: Uncontaminated zones, 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: Uncontaminated zones, 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: Uncontaminated zones, 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: Flying leads Signal type: Ethernet, PROFINET Cable: 25 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YN2D24-250P-N1XLEAX	2106180
	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
	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: Flying leads 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-N1XLEAX	2106174
	Connection type head A: Male connector, M12, 4-pin, straight, 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	YM2D24-100P-N1XLEAX	2106173
	Connection type head A: Male connector, M12, 4-pin, straight, D-coded Connection type head B: Flying leads Signal type: Ethernet, PROFINET Cable: 5 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET	YM2D24-050P-N1XLEAX	2106172

	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: Flying leads • 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-N1XLEAX	2106171
	• 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: 10 m, 4-wire, PUR, halogen-free • Description: Ethernet, shielded, PROFINET • Application: Drag chain operation, Zones with oils and lubricants	YN2D24-100P-N1N2D24	2106170
	• 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: 10 m, 4-wire, PUR, halogen-free • Description: Ethernet, shielded, PROFINET • Application: Drag chain operation, Zones with oils and lubricants	YM2D24-100P-N1M2D24	2106161
	• 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, straight, D-coded • Connection type head B: Male connector, M12, 4-pin, angled, D-coded • 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-N1N2D24	2106167
	• Connection type head A: Male connector, M12, 4-pin, straight, D-coded • Connection type head B: Male connector, M12, 4-pin, angled, D-coded • 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-N1N2D24	2106166
	• Connection type head A: Male connector, M12, 4-pin, straight, 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	YM2D24-020P-N1N2D24	2106165
	• 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, 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, 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	YN2D24-100P-N1MRJA4	2106164

	Brief description	Type	part no.
	Application: Drag chain operation, Zones with oils and lubricants 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: 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	YN2D24-020P-N1MRJA4	2106162
	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: 5 m, 4-wire, PUR, halogen-free Description: Ethernet, shielded, PROFINET Application: Drag chain operation, Zones with oils and lubricants	YM2D24-050P-N1M2D24	2106160
	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: Uncontaminated zones, 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: Uncontaminated zones, 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 Application: Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-030UB3XLEAX	2145656
	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: Uncontaminated zones, 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: Uncontaminated zones, 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: Male connector, M12, 4-pin, angled, D-coded 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-N1N2D24	2127662
	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	YM2D24-050P-N1MRJA4	2106184

	Brief description	Type	part no.
	Application: Drag chain operation, Zones with oils and lubricants 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: Uncontaminated zones, 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: Uncontaminated zones, Zones with oils and lubricants, Robot, Drag chain operation	YF2A14-200UB3XLEAX	2095611
Wire draw mechanism			
	Product segment: Wire draw mechanism Product family: Wire draw mechanism for wire draw encoders Description: HighLine wire draw mechanism for servo flange with 6 mm shaft, measuring range 0 m ... 50 m Items supplied: Without encoder	MRA-F190-150D2	6028630

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.

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