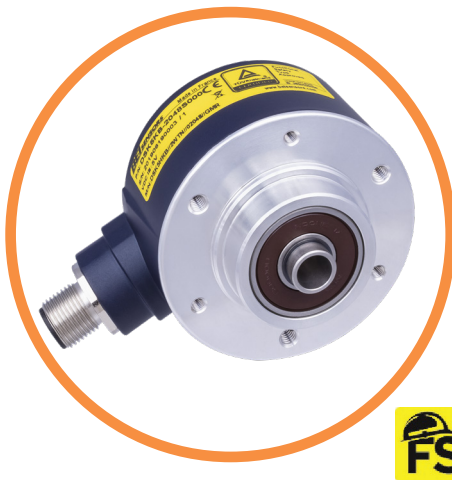


DSK5HKB MODELS

SIL3 PLe INCREMENTAL ENCODERS

Introduction

When an automation system requires a high degree of risk mitigation of failure modes, often times Functional Safety equipment can be a part of the solution. Sensata | BEI Sensors offers a wide range of Functional Safety encoders to fit most any application or electrical interface requirement. Rated at SIL3 (PLe), these encoders allow safe operation in set-up, production and maintenance modes, significantly reducing operational risks. All encoders have the option of a Digital HTL or TTL operation as an alternative to the Sine/Cosine outputs found on most Functional Safety encoders. This makes them a compatible replacement for existing encoders when migrating to a higher safety level of operation. This encoder series employs a tapered hollow shaft style of mounting. It will accept a nominal 7.3 mm tapered shaft as the mounting shaft and has several a variety of flexible tethering options. The encoder body is a nominal 58mm diameter.



Features

- Usable up to SIL3 and Cat.4 / PLe according to IEC 61508 / EN ISO 13849
- Suitable for safe motor feedback according to IEC 61800-5-2
- Robust and excellent resistance to shock and vibration
- High protection level: IP65
- High temperature performance –20°C to +85°C
- 58mm standard size encoder
- Shaft configurations: Blind 7.3mm - Tapered 10%
- Wide choice of connection configurations
- Power supply 5Vdc or 11 - 30Vdc
- Digital TTL/RS422, HTL or sine/cosine 1Vpp output
- Resolutions up to 2500ppr

Applications

- Industrial automation
- Automated guided vehicles
- Mills for lumber, steel and other metals
- Printing and packaging equipment
- Food processing equipment
- Forming and die presses

SPECIFICATIONS

Mechanical

	DSM5HKB
Material	Cover: cast zinc alloy or aluminum Body: aluminum Shaft: AISI 303 stainless steel
Bearings	6000 series - sealed
Maximum Loads	Axial: 40 N Radial: 80 N
Shaft Inertia	< 2,800 g.mm ²
Static/Dynamic torque	5 / 35 mN.m
Permissible max. speed	9,000 RPM

Continuous max. speed	6,000 RPM
Theoretical mechanical lifetime L_{10h} ^(A)	> 29.7 X 10 ⁹ turns / 82,365 hours
Encoder weight (approx.)	0.30 kg

^(A) **Continuous max. speed – ½ max. load – according to ISO 281:** 1990, L₁₀

Electrical Characteristics / Functional Safety Parameters ^(B)

Electronic Version	Output signals	Operating Voltage +V	Supply current	Current per channel pair	Short circuit protected	Reverse polarity protected	PFD	PFH	MTTFd	DC
2G2	Digital TTL	5V +/-5% ^(C) --- 250mA	100mA with no load	40mA	Yes	Yes	7.51E-05	8.58E-10	1331	HIGH
5G2	RS422	11-30V ^(C) --- 250mA			Not to +V		9.52E-05	1.09E-09	1050	
5G5	Digital HTL				Yes		9.52E-05	1.09E-09	1050	
2WT	Sine Cosine 1Vpp	5V +/-5% ^(C) --- 250mA	70mA with no load	10mA	Yes		4.29E-05	4.90E-10	2328	
5WT		11-30V ^(C) --- 250mA			Not to +V		6.60E-05	7.53E-10	1515	

^(B) Safety mission time: 20 years

^(C) Device must be supplied by a Class 2 LPS or SELV/PELV limited energy source ≤60V.

Environmental & Standards Conformity

	DSK5HKB
Protection (EN 60529)	IP65
Salt Spray (EN 60068-2-11 part 2)	96h
Humidity (EN 60068-2-38)	93% @ 65°C
Shock (EN 60068-2-27)	≤ 500m.s ⁻² (6 ms, half sine)
Vibration (EN 60068-2-6)	≤ 100m.s ⁻² (55... 2 000 Hz)
Operating temperature	-20 to 85°C (encoder T°)
Storage temperature	-20 to 85°C
EMC Immunity Test	EN 61000-6-2, increased levels
EMC Emission Test	EN 61000-6-4, increased levels
Isolation	1000 Veff
Functional safety	IEC 61508
	IEC 62061
	ISO 13849-1
	IEC 61800-5-2
Encoders usable up to SIL3 / PLe with specific requirements, see safety user manual for details.	
Z and Z/ are not safety signals.	



STANDARD CONNECTIONS

DSK5HKB connections

		0V	+V	A or S	B or C	Z	A/ or S/	B/ or C/	Z/	Ground
G6	M23 - 12 pins CW	1	2	3	4	5	6	7	8	Connector body
G8	M23 - 12 pins CCW	10 + 11	2 + 12	8	5	3	1	6	4	Connector body
G3	PVC cable 8 wires 8230/020	WH white	BN brown	GN green	YE yellow	GY grey	PK pink	BU blue	RD red	General shielding
GP	PUR cable 12 wires 8230/050	WH white + WH/GN white /green	BU blue + BN/GN brown / green	GY grey	BN brown	RD red	PK pink	GN green	BK black	General shielding
U3	PVC cable 8 wires	WH	BN	GN	YE	GY	PK	BU	RD	General shield
GC	PUR cable	BK	RD	GN	BN	VT	YE	OG	BU	General shield
GM	M12 8 pins	1	2	3	4	5	6	7	8	Connector body

Note: All connections are UL certified, except G3 and GP



RESOLUTIONS

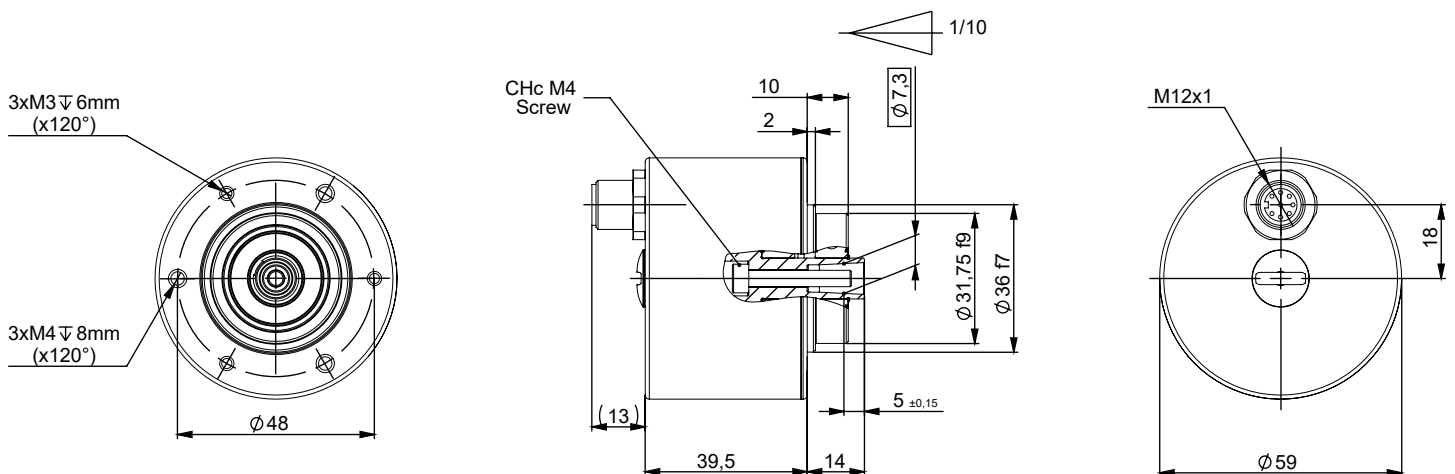
250 256 360 500 512 1000 1024 1500 2000 2048 2500



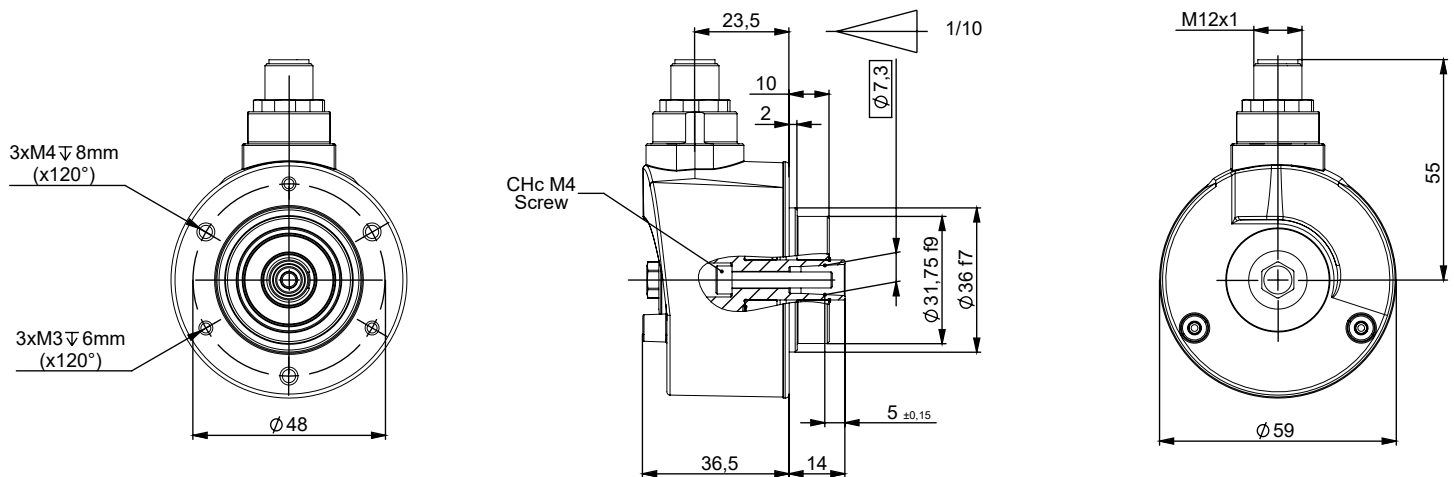
DIMENSIONS

All dimensions are in mm

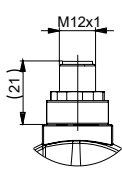
DSK5HKB - Blind shaft 7.3mm tapered 10% - M12 connector - Axial



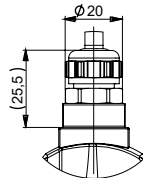
DSK5HKB - Blind shaft 7.3mm tapered 10% - M12 connector - Radial



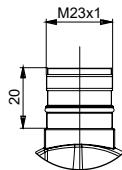
**M12
GMR**



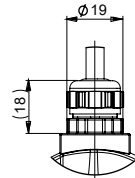
**Cable
U3R, GCR**



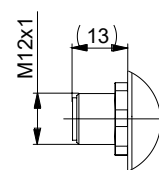
**M23
G6R, G8R**



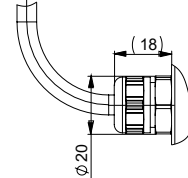
**Cable
G3R, GPR**



**M12
GMA**

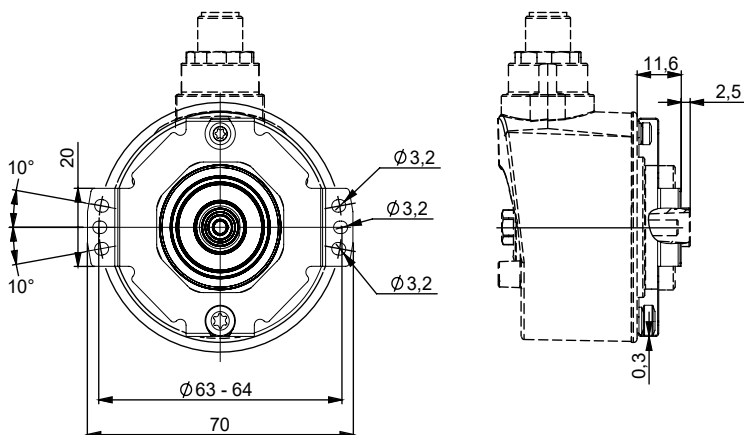


**Cable
G3A, U3A,
GPA, GCA**

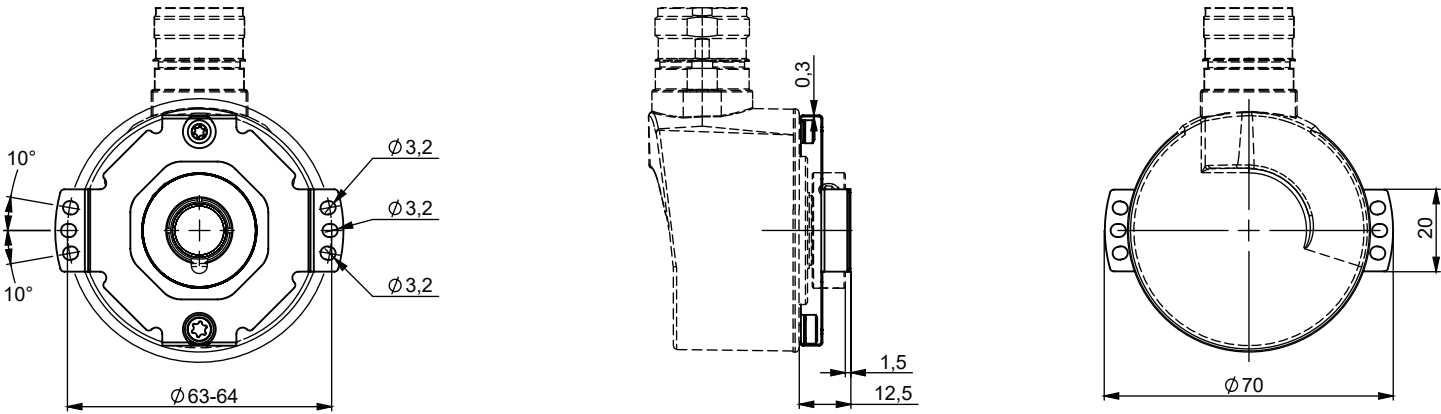


COUPLING INTERFACES

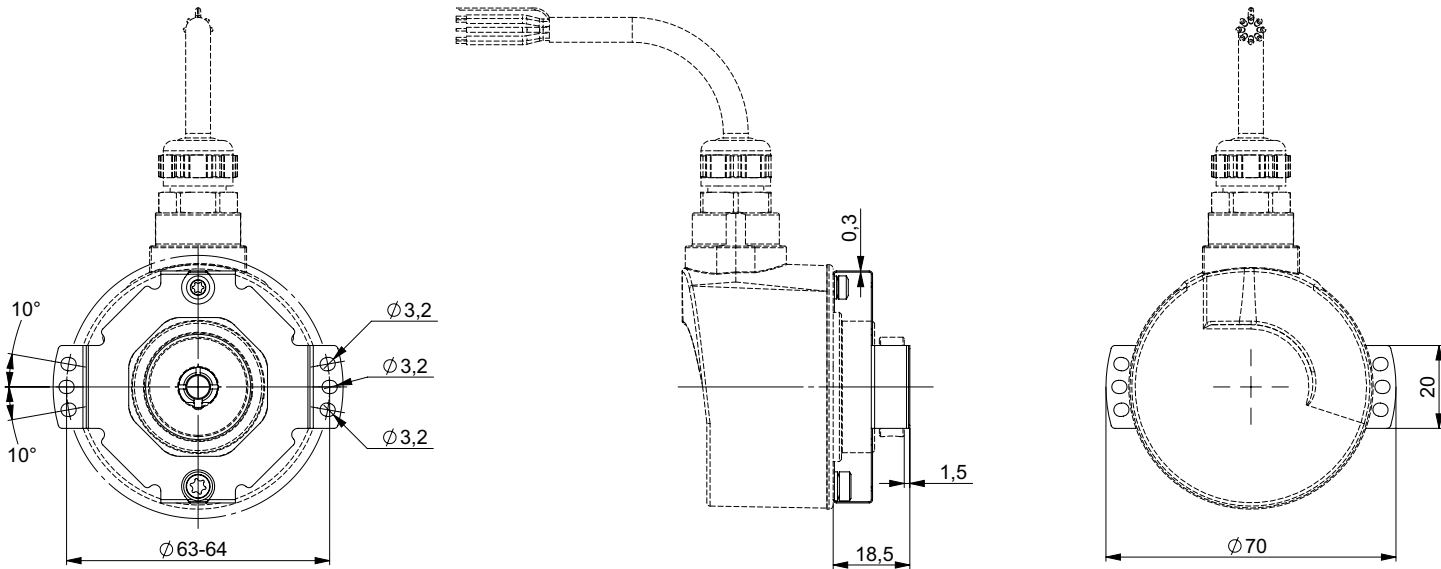
Stator coupling kit M9445/044



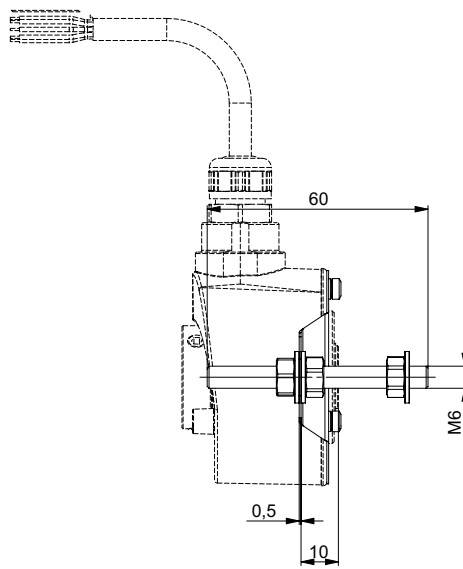
Stator coupling kit M9445/063 for DSK5H 9.52 to 14mm shaft



Stator coupling kit M9445/064



Tether arm kit M9445/047



		9445/044	9445/047	9445/063	
Permissible misalignments	Axial	+/- 1mm	+/- 1mm	+/- 1mm	+/- 1mm
	Radial	+/- 0.2mm	+/- 0.2mm	+/- 0.2mm	+/- 0.2mm
	Perpend	+/- 2°	+/- 5°	+/- 2°	+/- 2°
	Runout	0.1mm	0.1mm	0.1mm	0.1mm
Angular rigidity		>600 N.m/rad	>100 N.m/rad	>600 N.m/rad	>600 N.m/rad

GENERAL NOTES

For a safe installation according to the required safety level needed in the application, refer to the user safety User Manual. The safety User Manual provides the technical information (drawings, electrical data, etc...) for a safe integration. A quick installation guide is provided with each encoder for use by the technician who installs the device on the equipment.



DSK5H ORDERING OPTIONS

Example : DSK5HKB//5G29//1024//GPR050//**DX**

Contact the factory for special versions, ex: resolution, connection, flange...

DSK5H	KB	//	5G2	9	//	01024	//	GP	R	050	//	**DX**
Family												
DSK5H												
Shaft												
KB: Blind shaft 7.3mm, tapered 10%												
Voltage Output												
2G2: 5Vdc, TTL RS422 5G2: 11- 30Vdc, TTL RS422 5G5: 11- 30Vdc, HTL 2WT: 5Vdc, Sine 1 Vpp (analog) 5WT: 11- 30Vdc, Sine 1 Vpp (analog)												
Channels												
9: Digital electronics AA/ BB/ ZZ/ B before A, CW viewed from flange side Z gated A&B N: Analog electronics SS/ CC/ ZZ/ C before S, CW viewed from flange side Z ungated Contact factory for other configurations												
Resolution												
250, 256, 360, 500, 512, 1000, 1024, 1500, 2000, 2048, 2500												
Output Termination												
G6: M23 12 pins CW G8: M23 12 pins CCW GM: M12 8 pins GP: PUR cable 12 wires G3: PVC cable 8 wires U3: PVC Cable 8 wires GC: PUR cable 8 wires												
Output Orientation												
R: Radial A: Axial												
Cable Length												
xxx: Cable Length (ex.: 020 = 2 Meters) Blank: No Cable												
Accessories*												
*****: No accessory **DX**: 9445/044 stator coupling **BA**: 9445/047 Tether arm CSS3*: Key + 9445/063 stator coupling ?????: Key + 9445/064 stator coupling												

* Parts mounted on encoder and fasteners included in the encoder box.

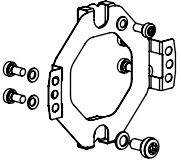
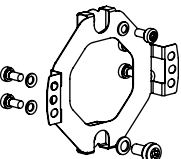
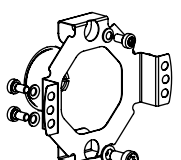
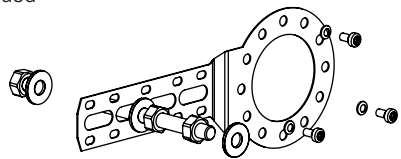
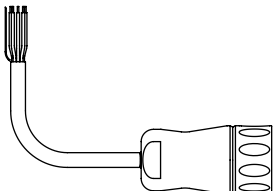


AGENCY APPROVALS & CERTIFICATIONS



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Web: www.sensata.com

Description	Part Number
Safety Rated Flexmount Kit Hardware included 	M9445/044
Safety Rated Flexmount Kit Hardware included 	M9445/063
Safety Rated Flexmount Kit Hardware included 	M 9445/064
Safety Encoder Tether Arm Kit Hardware included 	M9445/047
Standard Mating Connector 2m, 5m, 10m Mating Cable Assembly 	Extension cords compatible with G6 connection option: RAL-020-001 = M23, PVC cable, 2m RAL-050-001 = M23, PVC cable, 5m RAL-100-001 = M23, PVC cable, 10m Extension cords compatible with G8 connection option: RAL-020-012 = M23, PUR cable, 2m RAL-050-020 = M23, PUR cable, 5m RAL-100-028 = M23, PUR cable, 10m Extension cords compatible with GM connection option: RAL-020-039 = M12 overmolded, PUR cable, 2m RAL-050-052 = M12 overmolded, PUR cable, 5m RAL-100-050 = M12 overmolded, PUR cable, 10m

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