PHOTOELECTRIC ROTARY ENCODER

AK20

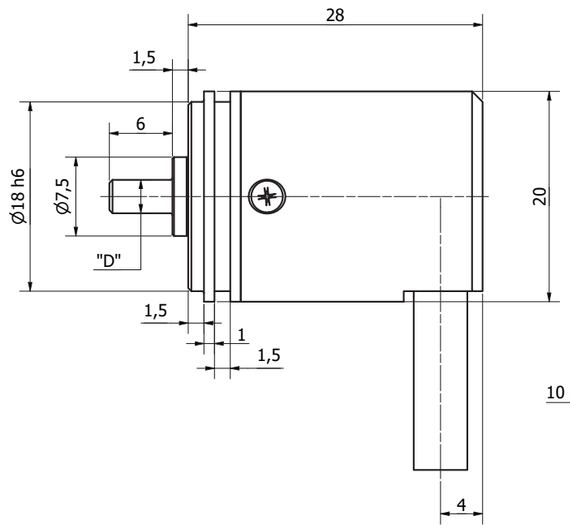
AK20 is a high-resolution device offering an absolute precision up to 20 bits, specifically designed for applications with limited space. Available in both solid shaft and blind hollow shaft versions, this compact encoder provides versatility for various installation requirements. With an optional shielded round cable with twisted pairs, it ensures optimal signal integrity even in electrically noisy environments. An upgraded version is also available, which supports an extended temperature range, making it suitable for more demanding industrial conditions. This encoder is the ideal choice for high-precision applications where space efficiency and robust performance are essential. The blind hollow shaft version includes a pair of flexible couplings that allow the customer to mount them at various angles, enabling optimal adaptation to specific application requirements.

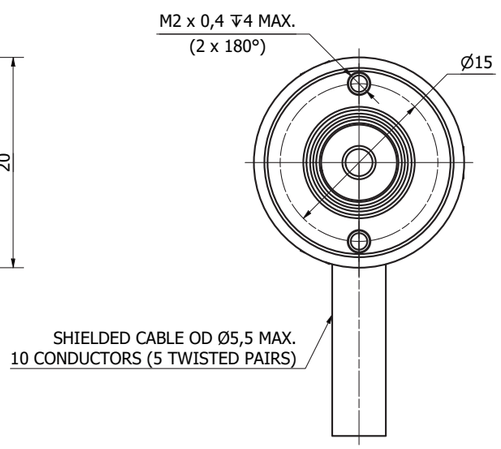
- Miniature size (∅ 20 mm)
- Various diameter options for solid and blind hollow shafts
- Several flexible couplings with different mounting options
- Special encoder design for extended temperature ranges (-40°C + 85°C)
- Round cable version

SYSTEM SPECIFICATIONS

Measuring type	Absolute singleturn
Measuring technology	Optical reflective
Measuring standard	Glass disc with absolute and incremental tracks
System accuracy	± 75 arc.sec
Resolution (positions per turn)[1)]	up to 20 bits (1 048 576 positions)

AK20S





D, mm	Ø 2 mm h6	Ø 3 mm h6	Ø 4 mm h6

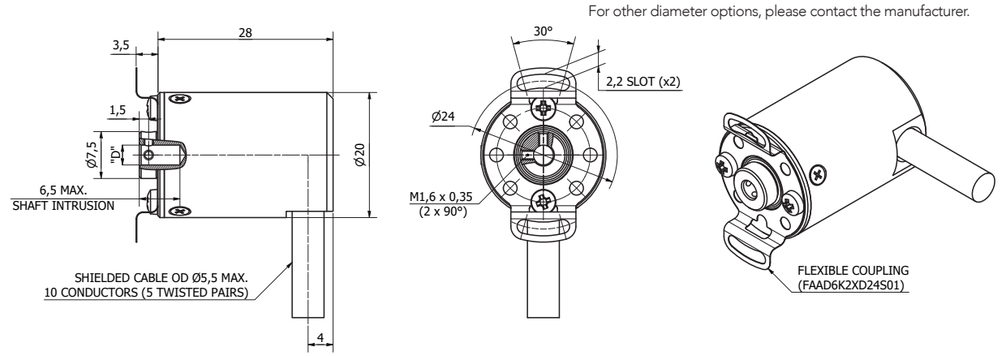
For other diameter options, please contact the manufacturer.

AK20H

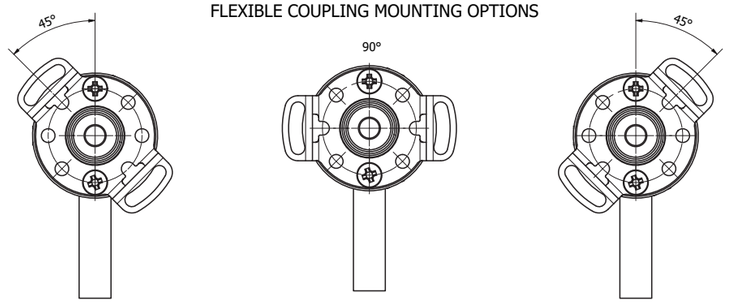
FLEXIBLE COUPLING VERSION 1

D, mm	Ø 2 mm H7	Ø 3 mm H7	Ø 4 mm H6

For other diameter options, please contact the manufacturer.



FLEXIBLE COUPLING MOUNTING OPTIONS

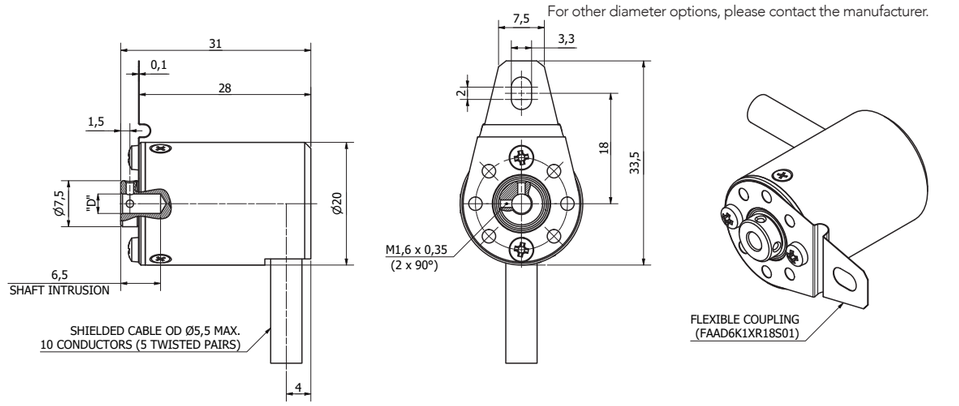


AK20H

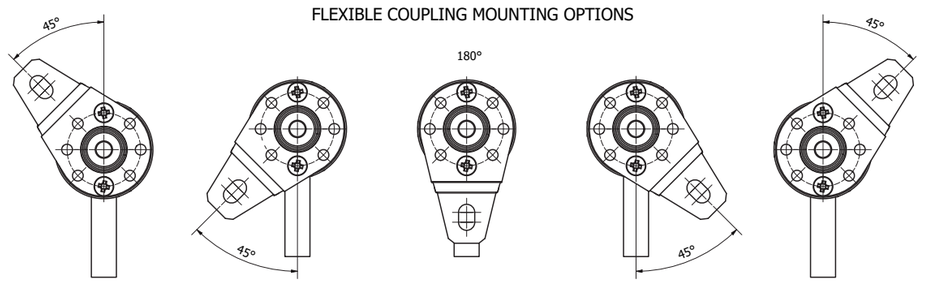
FLEXIBLE COUPLING VERSION 2

D, mm	Ø 2 mm H7	Ø 3 mm H7	Ø 4 mm H7

For other diameter options, please contact the manufacturer.



FLEXIBLE COUPLING MOUNTING OPTIONS



ELECTRICAL DATA

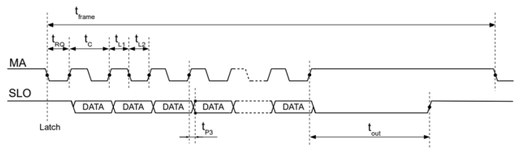
Electrical Interface[1)]	SSI	BISS-C
Output code	Binary / Gray	Binary
Supply voltage	+ 5V ± 5%	
Current consumption (without load)	Max 120 mA	

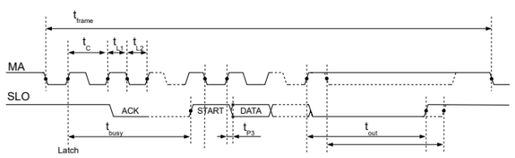
1) Select when ordering.

ABSOLUTE DIGITAL INTERFACE

DESCRIPTION	DATA
$T_{timeout}$	typical 20 µs
Clock frequency	0.5 - 10 MHz

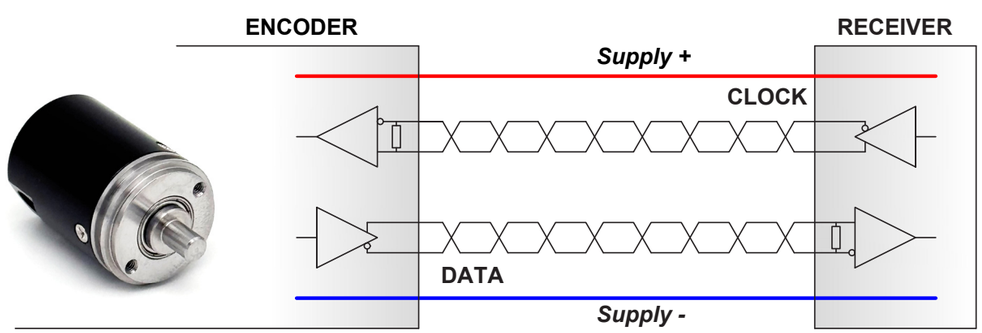
DESCRIPTION	DATA
$T_{timeout}$	0.075 us - 24 us
Clock frequency	62.4 kHz - 20 MHz





SYMBOL	PARAMETER	CONDITIONS	MIN	MAX	UNIT
SSI Protocol					
t_{frame}	Permissible Frame Repetition		(*)	indefinite	
t_C	Permissible Clock Period		100		ns
t_{L1}	Clock Signal hi Level Duration		25	t_{out}	ns
t_{L2}	Clock Signal lo Level Duration		25	t_{out}	ns
t_{RQ}	REQ Signal lo Level Duration		50		ns
t_{P3}	Propagation Delay: SLO stable after MA lo → hi	CL = 20 pF, rise to 70% VDDIO or fall to 30% VDDIO		60	ns
BISS C Protocol					
t_{frame}	Permissible Frame Repetition		(*)	indefinite	
t_C	Permissible Clock Period		50		ns
t_{L1}	Clock Signal hi Level Duration		20	t_{out}	ns
t_{L2}	Clock Signal lo Level Duration		20	t_{out}	ns
t_{busy}	Processing Time with Start Bit Delay			$5t_C$	
t_{P3}	Propagation Delay: SLO stable after MA lo → hi	CL = 20 pF, rise to 70% VDDIO or fall to 30% VDDIO		60	ns
t_{S1}	Setup Time: SLI stable before MA hi → lo		5		ns
t_{H1}	Hold Time: SLI stable after MA hi → lo		10		ns

ENCODER ELECTRICAL CONNECTION



MECHANICAL DATA

Maximum shaft speed	10 000 RPM
Moment of inertia	< 0.4 gcm^2
Starting torque	5 x 10^{-4} Nm
Shaft load: - axial - radial	 3 N 3 N
Vibrations (55 Hz to 2000 Hz)	≤ 100 m/s^2
Shock (6 ms)	≤ 300 m/s^2
Operating temperature: - standard - extended	 0°C - 70°C -40°C - 85°C
Storage temperature	-40°C - 105°C
Ingress Protection (EN 60529)	IP50
Mass (without cable): - standard - for extended temperature option with stainless steel	 < 20 g < 30 g

ACCESSORIES

FLEXIBLE COUPLINGS	FAAD6K2XD24S01 flexible coupling version 1	FAAD6K1XR18S01 flexible coupling version 2

FAAD6K2XD24S01 FLEXIBLE COUPLING VERSION 1

FAAD6K1XR18S01 FLEXIBLE COUPLING VERSION 2

CONNECTORS FOR CABLE	B12 12-pin round connector	C9 9-pin round connector	C12 12-pin round connector	D9 9-pin flat connector	D15 15-pin flat connector

12-PINS ROUND CONNECTOR B12, MALE

9-PINS ROUND CONNECTOR C9, MALE

12-PINS ROUND CONNECTOR C12, MALE

9-PINS FLAT CONNECTOR D9, MALE

15-PINS FLAT CONNECTOR D15, MALE

SPECIAL CAPABILITIES

We offer exceptional flexibility in our design and manufacturing processes, allowing us to create tailor-made encoders to meet specific customer needs. We can also modify our standard encoders to accommodate different shaft diameters or designs, special wiring configurations, different mechanical interfaces, etc. Additionally, we can incorporate other custom features, such as specialized connectors, couplings, and various accessories, to ensure seamless integration into your application. Furthermore, we can adapt the design and conduct testing for various environmental conditions, including higher ingress protection levels, extended temperature ranges, and resistance to intensive mechanical vibrations or shock.

ORDER FORM

AK20X1 - X2 - X3 - X4 - X5 - X6 - X7 - X8/X9

Type (X1):	Output signals interface (X2):	Singleturn bit number (X3):	Output code (X4):	Operating temperature (X5):	Shaft diameter (X6):	Cable length (X7):	Connector or flange Socket type (X8):	Flexible coupling (X9):
S - solid shaft **H** - blind hollow shaft	**S** - SSI **B** - BiSS-C	**B1** - 1 bit **B9** - 9 bits ... **B20** - 20 bits	**B** - Binary **G** - Gray* *only for SSI output signal.	**N** - 0°C - 70°C (standard) **T** - -40°C - 85°C (extended)	**02M** - Ø 2 mm **03M** - Ø 3 mm **04M** - Ø 4 mm	**R005** - 500 mm **R01** - 1 000 mm **R02** - 2 000 mm	**W** - without connector **B12** - round, 12 pins **D9** - flat, 9 pins **D15** - flat, 15 pins **C9** - round, 9 pins **C12** - round, 12 pins	**W** - without coupling **1** - flexible coupling version 1* **2** - flexible coupling version 2* *only for blind hollow shaft encoder type.

ORDER EXAMPLES: 1) AK20S-S-B20-B-N-04M-R01-W-W
2) AK20H-B-B20-G-T-04M-R005-D15-1