

**TECHNICAL DATASHEET**

**Absolute Motor Feedback Encoder Series AD58  
for Single Cable Solution - Functional Safety**



- Singleturn and Multiturn Encoder for High Performance Motion Control
- Encoder for Functional Safety applications (SIL2, PLd or SIL3, PLe, category 3)
- Single Cable Solution with ACURO® link interface for 4 wire applications
- Input for motor winding temperature sensor
- Resolution: up to 24 Bit ST + 12 Bit MT
- Wide operating temperature range
- Speed up to 7,000 rpm
- Encoder data stored in "Electronic Data Sheet (EDS)" inside encoder
- Motor and drive data can be stored inside encoder

**ACURO®**  
drive



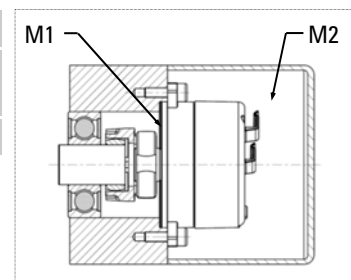
**TECHNICAL DATA  
mechanical**

Housing diameter	58 mm
Shaft	Shaft with integrated Double-Cardanic coupling hub
Mounting depth	37 mm
Mounting flange	Direct flange mount (fixing screws M3)
Protection class shaft input	IP40
Protection class housing	IP40 (with mating connector)
Shaft load incl. coupling: axial radial	27 N max. 8.4 N max.
Speed	≤ 7,000 rpm max. (see ambient temperature)
Starting torque typ.	≤ 3 Ncm
Moment of inertia	5.15 x 10 <sup>-6</sup> kgm <sup>2</sup>
Angular acceleration	1.0 x 10 <sup>5</sup> rad/sec <sup>2</sup> max.
Vibration resistance (DIN EN 60068-2-6)	300 m/s <sup>2</sup> (10 ... 2000 Hz)
Shock resistance (DIN EN 60068-2-27)	≤ 1,000 m/s <sup>2</sup> (6 ms)
Material shaft	Stainless Steel
Material housing / cover	Aluminum / Plastic
Weight	approx. 230 g (ST or MT)
Connection (with cable guidance)	ECU Interface (axial) Temperature Sensor Interface (axial)

**TECHNICAL DATA  
temperature characteristics**

Operating temperature <sup>1</sup>	-20°C ... +115°C
Ambient temperature <sup>2</sup>	-20°C...+105°C @6,000 rpm -20°C...+100°C @7,000 rpm
Storage temperature <sup>3</sup>	-30°C ... +80°C

<sup>1</sup> see measuring point M1  
<sup>2</sup> see measuring point M2  
<sup>3</sup> due to packaging



Specifications subject to change without notice.

## TECHNICAL DATASHEET

### Absolute Motor Feedback Encoder Series AD58 for Single Cable Solution - Functional Safety

#### TECHNICAL DATA electrical

General design	as per EN IEC 61010-1, protection class III, contamination level 2, overvoltage class II
Supply voltage	7 - 12 V DC
Current w/o load (typ.)	12 V DC: <130 mA 7 V DC: <190 mA
Resolution single-turn	24 Bit standard (others available on request)
Resolution multi-turn	12 Bit
Electrical Interface	4Wire: RS485
Data Protocol	ACURO® link for Single Cable Solution
Electronic Data Sheet (EDS)	512 bytes of storage for encoder data
OEM Memory	7.5 kbytes of storage for motor and drive data
Absolute accuracy (max.)	±20" (at room temperature 23 °C)
Repeatability (max.)	±10" (at room temperature 23 °C)

#### TECHNICAL DATA safety

Design Functional Safety AD58S	SIL2 according to EN IEC 61508, 62061, 61800-5-2, PLd according to EN ISO 13849-1
Design Functional Safety AD58E	SIL3 according to EN IEC 61508, 62061, 61800-5-2, PLe according to EN ISO 13849-1
Resolution for save position	9 Bit Singleturn
PFH-value	1,05 x 10 <sup>-9</sup> per hour
MTTFd	846 years
DCavg	94,70%
Realizable safety function according to EN 61800-5-2	SS1 (Safe Stop 1) <sup>1</sup> SS2 (Safe Stop 2) <sup>1</sup> SOS (Safe Operating Stop) SDI (Safe direction) SLS (Safe limited speed) SLI (Safe limited increment) SLA (Safe limited acceleration) SSR (Safe speed range) SAR (Safe acceleration range)

<sup>1</sup> deceleration controlled (-d) or ramp monitored (-r)

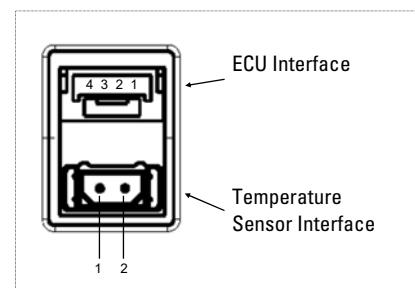
#### ELECTRICAL CONNECTIONS

##### ECU Interface, 4 pole, with mechanical lock

PIN	Signal 4Wire
1	UB+
2	DATA+
3	DATA-
4	UB-

##### Temperature Sensor Interface <sup>2</sup>, 2 pole with mechanical lock

PIN	Signal
1	Sensor+ (KTY, PT1000)
2	Sensor- (KTY, PT1000)



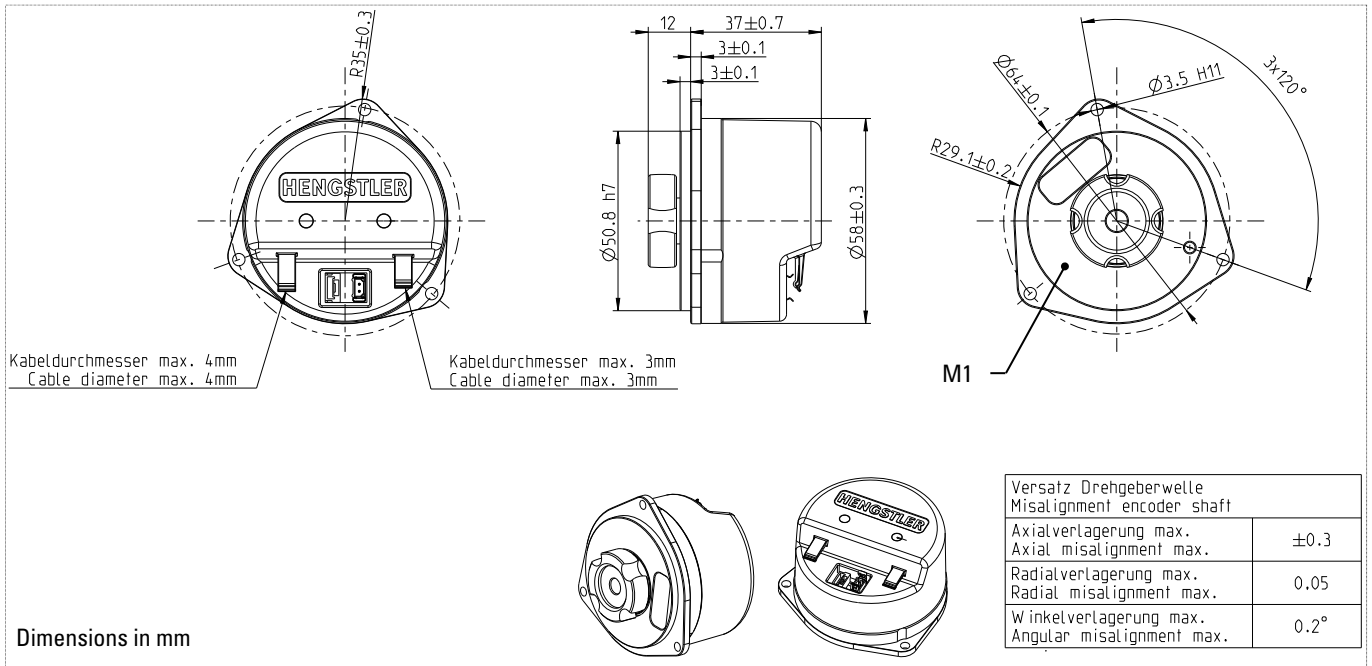
<sup>2</sup> Insulation resistance according to EN IEC 60204-1 PELV/SELV

Specifications subject to change without notice.

## TECHNICAL DATASHEET

### Absolute Motor Feedback Encoder Series AD58 for Single Cable Solution - Functional Safety

#### DIMENSIONAL DRAWINGS



#### ORDERING INFORMATION

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Interface	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AD58/</b> non safety <b>AD58S</b> SIL2, PLd <b>AD58E</b> SIL3, PLe	<b>0024</b> 24 Bit ST <b>1224</b> 24 Bit ST + 12 Bit MT	<b>G</b> 7 - 12 VDC	<b>Y.0V</b> Three-eared flange, IP40, Shaft with integrated coupling hub	<b>4W</b> ACURO® link 4 Wire	<b>9</b> ECU Interface, axial, 4 pole + Temperature Sensor Interface, axial, 2 pole

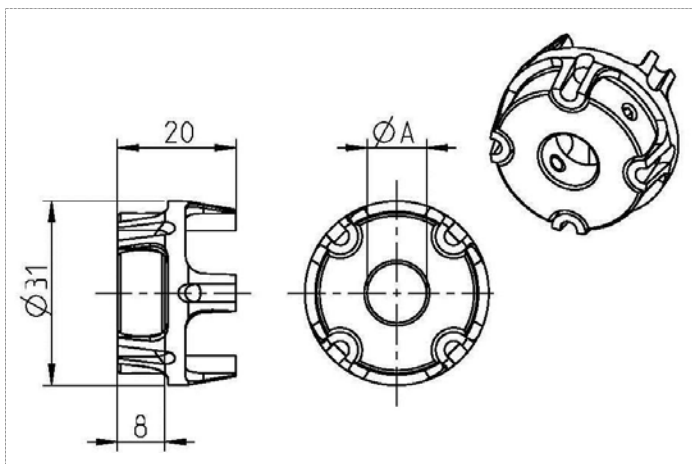
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**TECHNICAL DATASHEET**

**Absolute Motor Feedback Encoder Series AD58  
for Single Cable Solution - Functional Safety**

**ACCESSORIES**  
Shaft Coupling



Coupling to mate with AD58 encoder series	Part Nr.
For shaft size 6 mm	on request
For shaft size 12 mm	on request
For shaft size 14 mm	on request

\*Other sizes available upon request

**ACCESSORIES**  
Motor Connection Cables

Motor Connection Cable with Connector	Part Nr.
Encoder power/interface harness assembly, 30 cm, 4-pin AD58-Series connector on one end with cut wires on the opposite end	1 572 019
Temperature sensor harness assembly, 30 cm, 2-pin AD58-Series connector on one end and cut wires on the opposite end (for connection of motor winding temperature sensors (KTY, PT1000))	1 572 020

**TECHNICAL MANUALS**

	Ordering code
Implementation Guide and User Manual, English	0 581 914
Protocol description ACURO link, English	2 572 040

**SOFTWARE**

	Ordering code
IP Core VHDL - ACURO link (for incorporation into drive)	on request

Specifications subject to change without notice.

**TECHNICAL DATASHEET**

**Motor Feedback Absolute Encoder AD58 DRIVE-CLiQ**



AD58 DRIVE-CLiQ

- Singleturn and Multiturn Encoder for high performance motion control
- Encoder for Functional Safety applications (SIL2 PLd, category 3)
- Resolution: up to 24 Bit ST + 12 Bit MT
- DRIVE-CLiQ interface
- Wide operating temperature range
- Up to 10,000 rpm continuous operation
- Motor Temperature Logging and Temperature Monitoring of Encoder
- Optical encoder with a true geared multiturn



**TECHNICAL DATA**  
**mechanical**

Housing Diameter	58 mm		
Shaft Diameter	9.25 mm tapered Solid Shaft; Taper 1:10		
Flange (Mounting of Housing)	Spring Tether		
Protection Class Shaft Input (EN 60529)	IP50		
Protection Class Housing (EN 60529)	IP50		
Axial End Play of Mating Shaft (static)	± 0.5 mm		
Radial Runout of Mating Shaft (static)	± 0.05 mm		
Speed max.	10,000 rpm		
Starting Torque typ.	≤ 1.5 Ncm		
Moment of Inertia	3.1 x 10 <sup>-6</sup> kgm <sup>2</sup>		
Vibration Resistance (EN 60068-2-6)	100 m/s <sup>2</sup> (50 ... 2000 Hz)		
Shock Resistance (EN 60068-2-27)	1000 m/s <sup>2</sup> (6 ms)		
Operating Temperature <sup>1</sup>	-25 °C ... +110 °C		
Storage Temperature <sup>2</sup>	-20 °C ... +80 °C		
Relative Humidity (EN 60068-2-78)	≤ 90 % ; without condensation		
Measurement Point External Temperature Sensor	Type	KTY84-130	PT1000
	Temp. Measurement Range <sup>3</sup>	-40 °C ... +200 °C	
	Resolution	0,2 K	0,2 K
Material Shaft	Stainless Steel		
Material Housing	Aluminum		
Weight	approx. 260 g (Singleturn) / 310 g (Multiturn)		
Connection	Data Connector Encoder axial 8-pole Motor winding temperature sensor input axial 2-pole		

<sup>1</sup> measured at TM, see dimensional drawing

<sup>2</sup> due to packaging

<sup>3</sup> calibration temperature 100 °C

Specifications subject to change without notice.

## TECHNICAL DATASHEET

### Motor Feedback Absolute Encoder AD58 DRIVE-CLiQ

#### TECHNICAL DATA electrical

General design	as per EN IEC 61010-1, protection class III, contamination level 2, overvoltage class II
Supply Voltage	10-36 VDC
Power Consumption max.	2.5 W (at 24 V)
Current Consumption typ.	40 mA (at 24 V Singleturn) 60 mA (at 24 V Multiturn)
Interface / Protocol	DRIVE-CLiQ
Siemens-Software (Version: 12.2.2014)	Sinamics Simotion: ≥ V4.4 HF4 Sinumerik with safety: : ≥ V4.4 SP2
Resolution Singleturn	20 Bit 24 Bit
Resolution Multiturn	12 Bit
Absolute Accuracy	± 35'' (at 20 Bit) ± 25'' (at 24 Bit)
Cable Length	≤ 95 m

#### TECHNICAL DATA safety

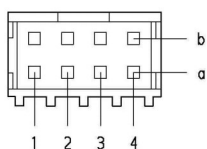
Design Functional Safety	SIL2 according to EN IEC 61508, 62061, 61800-5-2, PLd according to EN ISO 13849-1
Resolution for save position	9 Bit Singleturn
PFH-value	$5.26 \times 10^{-8}$ per hour (85°C)
MTTFd	169 years
DCavg	90%
Safe Position <sup>1</sup>	Encoder: 2° (Safety relevant measuring step: SM = 0,7°)
Realizable safety function according to EN 61800-5-2	SS1 (Safe Stop 1) <sup>2</sup> SS2 (Safe Stop 2) <sup>2</sup> SOS (Safe Operating Stop) SDI (Safe direction) SLS (Safe limited speed) SLI (Safe limited increment) SLA (Safe limited acceleration) SSR (Safe speed range) SAR (Safe acceleration range) SLP (Safe limited position) <sup>3</sup> SCA (Safe cam) <sup>3</sup>

<sup>1</sup> Further tolerances may occur in subsequent electronics after position value comparison (contact manufacturer of subsequent electronics)

<sup>2</sup> deceleration controlled (-d) or ramp monitored (-r)

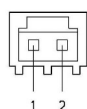
<sup>3</sup> For SLP and SCA functions a safe reference run must be performed after „Power ON“ (see integration manual 0 580 935, chapter 8.1.2, S. 22)

#### ELECTRICAL CONNECTIONS PCB Connector, 8-pole



PIN	Signals
1a	RX-N
2a	RX-P
3a	TX-P
4a	TX-N
1b	Screen
2b	N.C.
3b	UB -
4b	UB +

#### ELECTRICAL CONNECTIONS PCB Connector, 2-pole Temperature Sensor



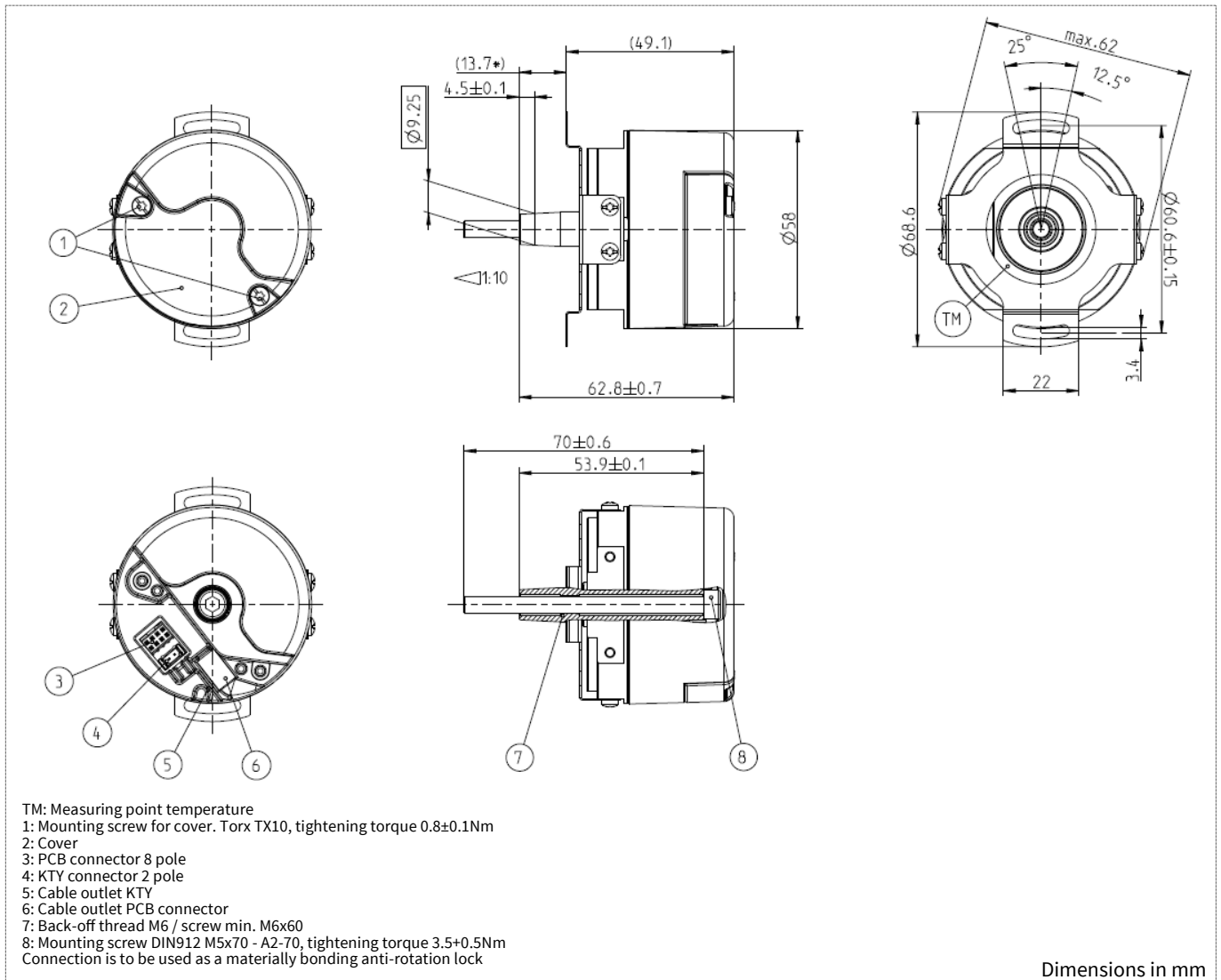
PIN	Signals
1	T +
2	T -

Specifications subject to change without notice.

## TECHNICAL DATASHEET

### Motor Feedback Absolute Encoder AD58 DRIVE-CLiQ

#### DIMENSIONAL DRAWING



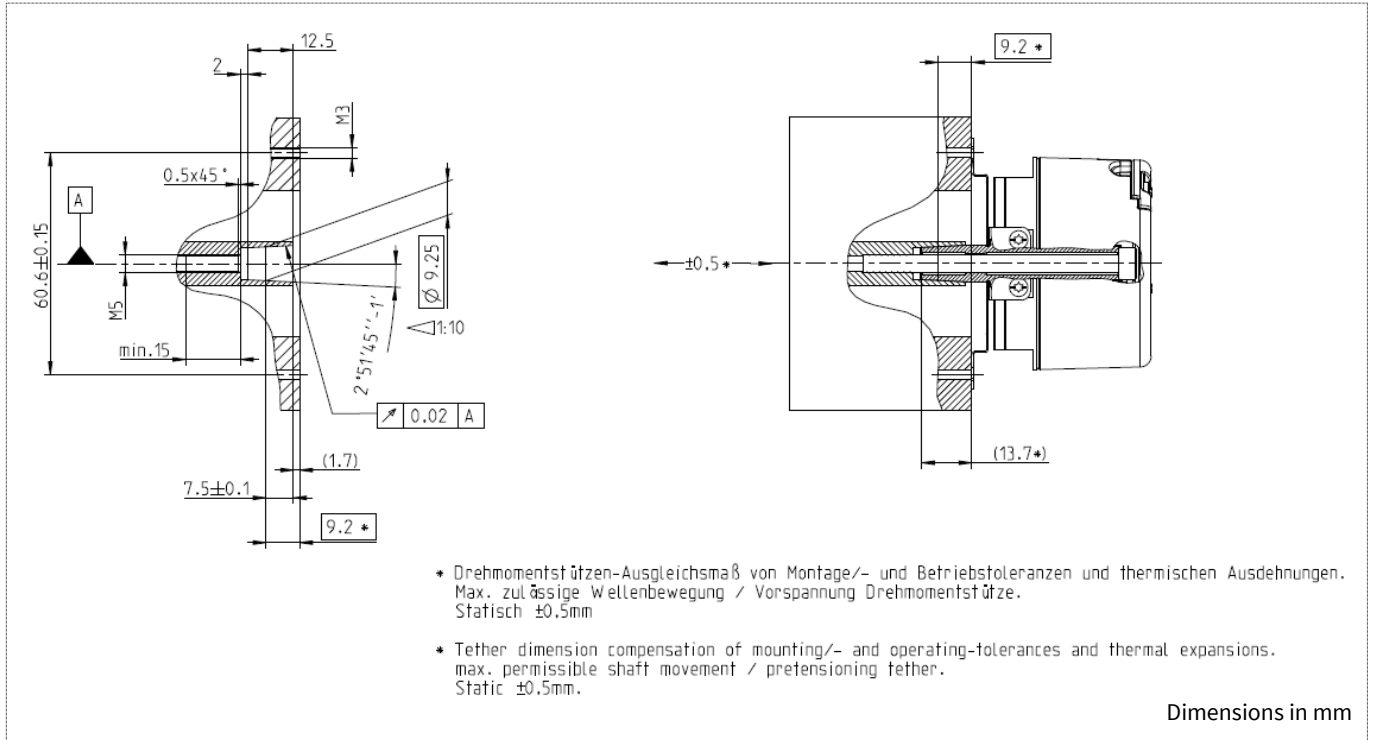
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## TECHNICAL DATASHEET

### Motor Feedback Absolute Encoder AD58 DRIVE-CLiQ

#### EXAMPLE OF INSTALLATION



#### ORDERING INFORMATION AD58 DRIVE-CLiQ

Type	Resolution	Supply voltage	Flange, Protection, Shaft	Interface	Connection
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>AD58S</b>	<b>0020</b> 20 Bit ST <b>0024</b> 24 Bit ST  <b>1220</b> 12 Bit MT + 20 Bit ST <b>1224</b> 12 Bit MT + 24 Bit ST	<b>E</b> DC 10 - 30 V	<b>2.1K</b> Spring Tether, IP50, Taper 1:10	<b>DQ</b> DRIVE-CLiQ	<b>3</b> PCB Connector, axial

Specifications subject to change without notice.



## TECHNICAL DATASHEET

### Motor Feedback Absolute Encoder AD58 DRIVE-CLiQ

#### Accessories

#### CONNECTING CABLES

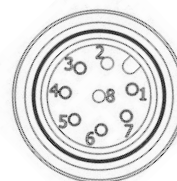


Connecting cable with plug (socket) on both end matching to supply voltage / communication	Ordering Code
M12 Connector, 8-pole, Flange Socket, FEP-Cable, 0,15 m	1 580 022
M12 Connector, 8-pole, Flange Socket, FEP-Cable, 0,20 m	1 580 023
M12 Connector, 8-pole, Flange Socket, FEP-Cable, 0,30 m	1 580 024

#### ELECTRICAL CONNECTIONS

M12 Connector, 8-pole, Flange Socket

PIN	Signale
1	UB +
2	N.C.
3	RX-P
4	RX-N
5	UB -
6	TX-N
7	TX-P
8	N.C.



Connecting cable with plug (socket) on one end matching to temperature sensor	Ordering Code
2-pole, Cable 0,23 m	1 580 021

#### ELECTRICAL CONNECTIONS

Temperature Sensor

Colour	Signals
Green	T +
Brown	T -

Specifications subject to change without notice.