



Absolute Encoder



Hollow Shaft



SSI protocol



BiSS protocol



enhanced by
OrbiSync™
technology

The ARH55 offers a flexible and precise position sensing solution for diverse applications. It features a housed stator that can be mounted and tightened in various ways for optimal integration. A range of interchangeable rotors with high-precision glass scales enables customers to choose the configuration that best fits their mechanical design needs. This modular concept ensures easy adaptation, high accuracy, and reliable performance in demanding environments.

- Housed stator
- Various mounting types and options
- Zero set and direction control
- Dual LED feedback
- Enhanced by OrbiSync™ dual sensor technology

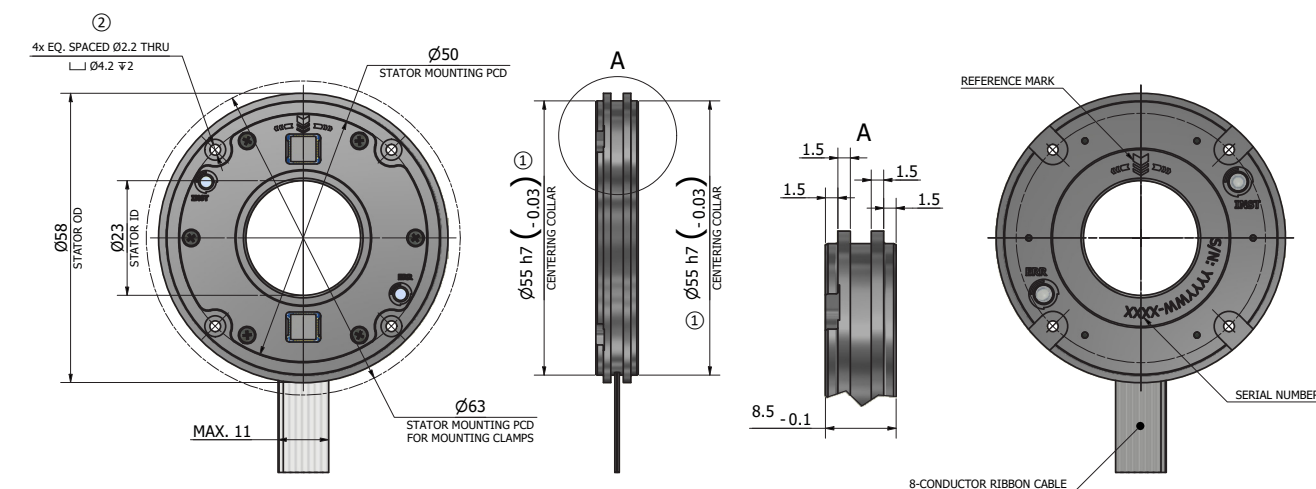
SYSTEM SPECIFICATIONS

Reading type	Single Turn absolute
Electrical interface	SSI / BiSS
Output code	Binary
Resolution	up to 23 bit
Accuracy*	±15"
Repeatability	2.5"

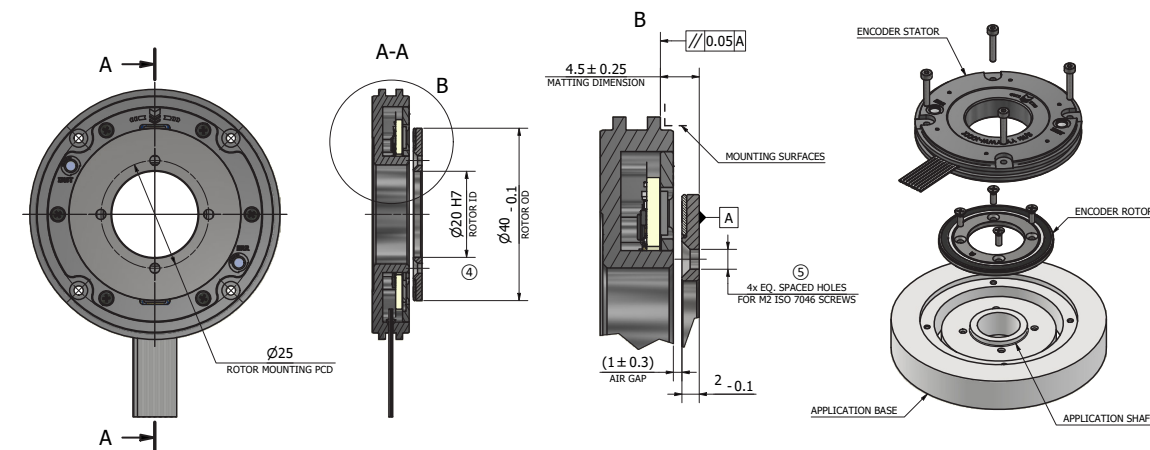
*the overall system accuracy depends on the mechanical mounting conditions, including stator-to-rotor alignment, axial and radial positioning, and rotor eccentricity. Under recommended installation practices, typical system accuracy can reach values up to the specified value.

Note: Deviation from recommended mounting tolerances may lead to increased measurement error.

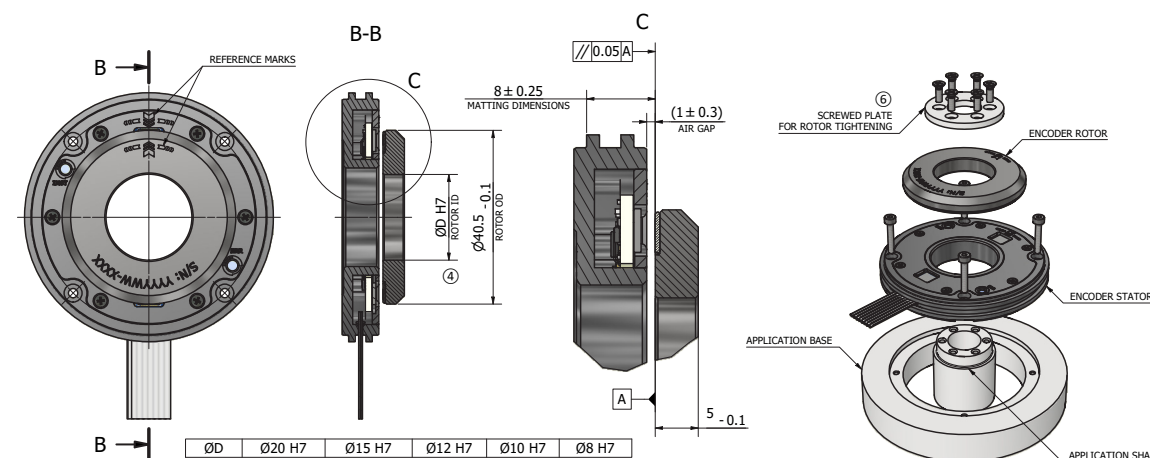
ENCODER STATOR



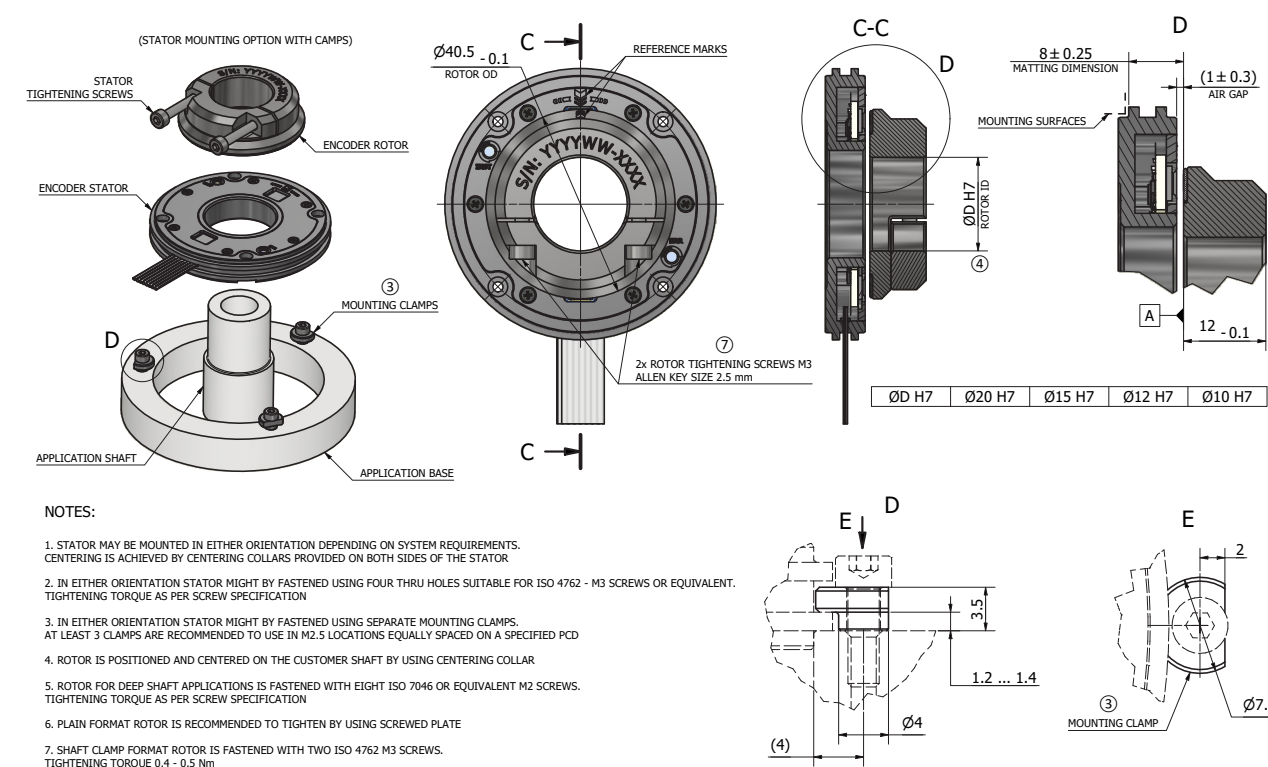
DEEP SHAFT MOUNTING FORMAT



PLAIN ROTOR FORMAT



SHAFT CLAMP COLLAR FORMAT



MECHANICAL SPECIFICATIONS

STATOR	
Material	FR4 (PCB) and alluminum housing
Outside diameter (OD)	58 mm
Inside diameter (ID)	23 mm
Centering collars diameter	55 h7 mm
Height	8.5 mm
Weight (without cable)	35 g
PCB fabrication	per IPC-A-600 Class 3
PCB assembly	per IPC-A-610 Class 3
Soldering process	per J-STD-001 Class 3
Conformal coating (top side el. components)	per IPC-CC-830

ROTOR	
Material	Stainless-steel hub + chromium circular scale on glass disc
Mechanical speed	5000 RPM
ROTOR FOR DEEP SHAFT MOUNTING FORMAT	

Outside diameter (OD)	40 mm				
Inside diameter (ID)	20 H7 mm				
Mass moment of inertia	< 3.5 x 10 ⁻⁶ kg.m ²				
Weight	15 g				

PLAIN ROTOR FORMAT					
Outside diameter (OD)	40.5 mm				
Inside diameter (ID)	20 H7 mm	15 H7 mm	12 H7 mm	10 H7 mm	8 H7 mm
Mass moment of inertia	< 8.5 x 10 ⁻⁶ kg.m ²	< 9 x 10 ⁻⁶ kg.m ²	< 9.5 x 10 ⁻⁶ kg.m ²	< 9.5 x 10 ⁻⁶ kg.m ²	< 9.5 x 10 ⁻⁶ kg.m ²
Weight	35 g	40 g	43 g	45 g	46 g

SHAFT CLAMP COLLAR FORMAT				
Outside diameter (OD)	40.5 mm			
Inside diameter (ID)	20 H7 mm	15 H7 mm	12 H7 mm	10 H7 mm
Mass moment of inertia	< 16 x 10 ⁻⁶ kg.m ²	< 17 x 10 ⁻⁶ kg.m ²	< 17 x 10 ⁻⁶ kg.m ²	< 17 x 10 ⁻⁶ kg.m ²
Weight	71 g	84 g	88 g	91 g

INSTALLATION TOLERANCES (between stator and rotor)	
Axial displacement (Air gap)	1.75 ± 0.5 mm
Tangential displacement of the stator	± 0.3 mm
Radial displacement of the stator	± 0.3 mm
Permissible radial runout of customer shaft	15 µm

ENVIRONMENTAL DATA	
Operating temperature	-40 °C to 105 °C
Storage temperature	-40 °C to 105 °C
Relative humidity	98% (non-condensing)
Permissible vibration (10 to 2000 Hz)	20G sweep (EN 60068-2-6:2008)
Permissible shock (6 ms)	100G saw-tooth (EN 60068-2-27:2009)
Protection	IP00
Environmental compliance	RoHs

DEEP SHAFT MOUNTING FORMAT



PLAIN ROTOR FORMAT



SHAFT CLAMP COLLAR FORMAT

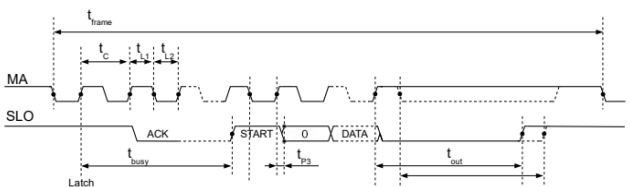
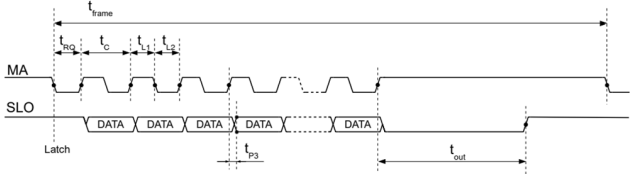


ELECTRICAL DATA

Supply voltage	+ 5V ± 10%
Current consumption (without load)	< 220 mA

ABSOLUTE DIGITAL INTERFACE

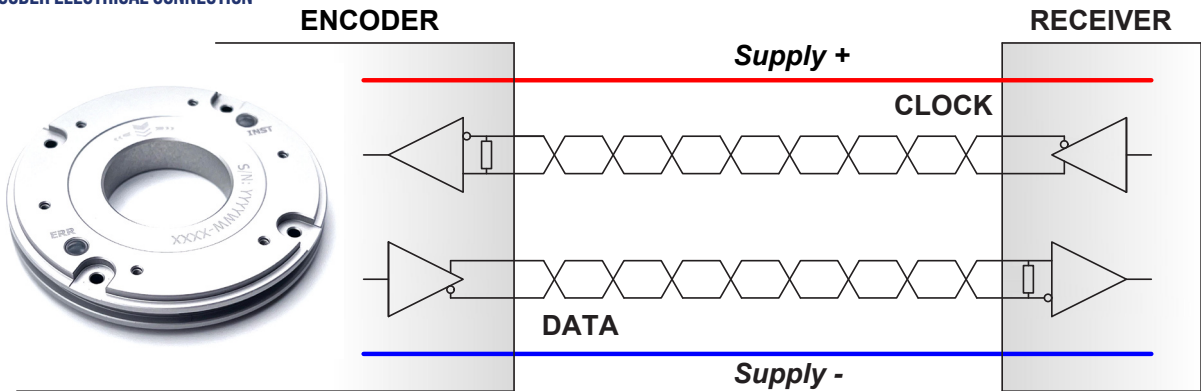
DESCRIPTION	DATA	DESCRIPTION	DATA
 SSI SYNCHRONOUS SERIAL INTERFACE	T_{timeout} typical 20 µs Clock frequency 50 kHz - 5 MHz	 BiSS INTERFACE	T_{timeout} 0.8 us - 20 us Clock frequency 50 kHz - 10 MHz



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		50	t_{out}	ns
t_{L2}	Clock Signal lo Level Duration		50	t_{out}	ns
t_{REQ}	REQ Signal lo Level Duration		50		ns
t_{P3}	Propagation Delay: SLO stable after MA lo → hi			60	ns
BiSS C Protocol					
t_{frame}	Permissible Frame Repetition		(*)	indefinite	
t_{C}	Permissible Clock Period		200		ns
t_{L1}	Clock Signal hi Level Duration		100	t_{out}	ns
t_{L2}	Clock Signal lo Level Duration		100	t_{out}	ns
t_{busy}	Processing Time with Start Bit Delay			$9t_{\text{C}}$	
t_{P3}	Propagation Delay: SLO stable after MA lo → hi			60	ns

ELECTRICAL CONNECTION

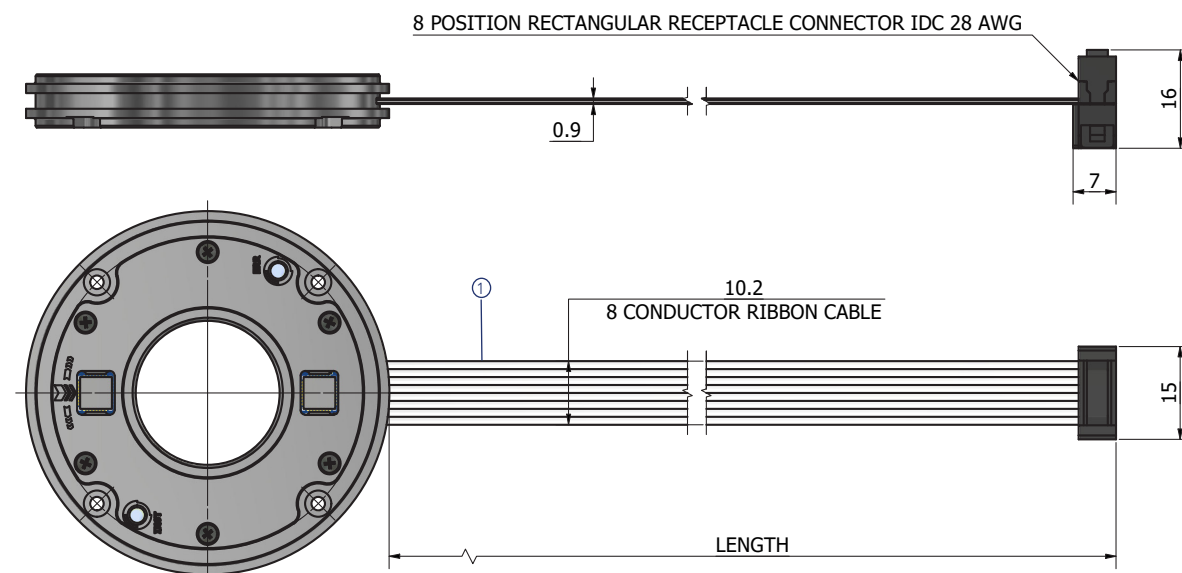
ENCODER ELECTRICAL CONNECTION



ENCODER PIN-OUT

Cable conductor	Connector	SSI / BiSS-C
①	1	5 V supply
2	2	0 V (GND)
3	3	Zero position set ¹⁾
4	4	Counting direction set ²⁾
5	5	Clock+
6	6	Clock-
7	7	Data+
8	8	Data-

ENCODER HARNESS



ZERO POSITION SETTING FUNCTION¹⁾

To enhance flexibility in system integration, the encoder includes a dedicated Zero Set input wire, allowing users to define the absolute zero position according to the specific requirements of their application. By activating this input at any desired mechanical position, the encoder reassigns that position as the new absolute zero, ensuring seamless alignment with the machine's coordinate system. This feature eliminates the need for mechanical repositioning or external software tools, streamlining both installation and commissioning processes. This functionality is especially useful in applications where mechanical reference points vary between builds, or where field recalibration is needed after maintenance or replacement.

COUNTING DIRECTION CONFIGURATION²⁾

To support flexible integration with various mechanical systems, the encoder features an additional input wire that allows users to configure the absolute position counting direction. By toggling this input, the encoder can be set to count position values in either a clockwise (CW) or counterclockwise (CCW) direction — ensuring compatibility with the specific rotational logic of the application. This feature enables quick adaptation without requiring mechanical changes or firmware reconfiguration, simplifying installation and improving alignment with system control schemes.

DIRECTION / ZERO POSITION PROGRAMMING

PROGRAMMING

To program the rotation direction or set a new zero position, assert the corresponding input low prior to device power-up. The input state must remain stable for a minimum of 3 s after power is applied. The input may be released thereafter. The updated configuration becomes effective 10 s after power-up.

FACTORY RESET

If both configuration inputs are held low during power-up, the encoder performs a factory reset and restores all parameters to default values.

DUAL LED STATUS INDICATORS

To provide immediate visual feedback during setup and operation, the encoder stator is equipped with two integrated LED indicators: ERR and INST. These indicators assist in both installation accuracy and runtime diagnostics.

ERR (ERROR INDICATOR)

The ERR LED provides real-time error feedback from the encoder.

LED	STATUS
RED	An internal error has been detected
OFF*	No errors present; the encoder is functioning normally

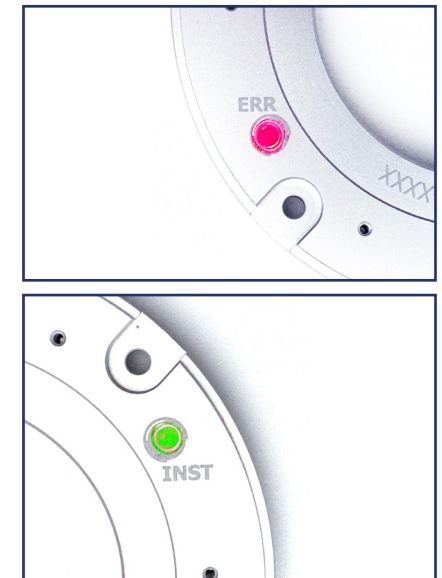
*Latched status, in order to reset power cycle should be applied.

INST (INSTALLATION ACCURACY INDICATOR)

The INST LED indicates the correctness of the rotor's mechanical alignment and signal quality.

LED	STATUS
GREEN	The rotor is correctly mounted, and the encoder signals are within acceptable limits.
RED	Misalignment or poor signal quality detected - adjustment of the rotor position is necessary.

These intuitive indicators simplify installation and maintenance, helping ensure optimal encoder performance without the need for external tools or diagnostics.



ORBISYNC™ TECHNOLOGY

Orbisync™ is a next-generation optical encoder platform developed by Precizika Metrology for high-precision absolute rotary sensing. Leveraging a dual-sensor architecture with built-in intelligence, it continuously calibrates itself to maintain accuracy over time and varying conditions. Advanced onboard processing ensures clean, reliable position data, even in dynamic environments. Its modular design supports both compact open-frame and fully housed configurations, making it a versatile solution for modern motion systems.



SPECIAL CAPABILITIES

Precizika Metrology offers 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 CODE

ARH55	X1	X2	X3	X4	X5	X6
Output signals interface (X1):	Bit number (X2):	Rotor type (X3):	Rotor inner diameter (X4):	Cable length (X5):	Connector or flange Socket type (X6):	
S - SSI B - BiSS-C	B01 - 1 bit B23 - 23 bits	D - Deep shaft mounting format P - Plain rotor format S - Shaft clamp collar format	08 - ø 8 H7 mm 10 - ø 10 H7 mm 12 - ø 12 H7 mm 15 - ø 15 H7 mm 20 - ø 20 H7 mm	RC005 - 500 mm RC01 - 1 000 mm RC02 - 2 000 mm	W - without connector IDC - IDC 8-pins connector	
ORDER EXAMPLES: 1) ARH55-S-B23-D-20-RC005-W 2) ARH55-B-B15-P-10-RC005-IDC						