



Runner Clearance Probe

RCP

The RCP is an eddy current displacement probe that provides non-contact measurement of runner clearance on large Francis and Kaplan turbines, delivering a voltage output directly proportional to the distance between the turbine blade tip and the sensor face.

KEY FEATURES

- Non-contact eddy current measuring principle
- Standard linear ranges: 0–4, 0–8 or 0–10 mm
- Standard frequency range: up to 500 Hz (–3 dB)
- Integrated signal processing, 2–10 V output
- Excellent rigidity and wear resistance
- Sensor delivered with stainless steel mounting flange
- Integral cable, optional protection tube, custom length

MONITORING SOLUTIONS

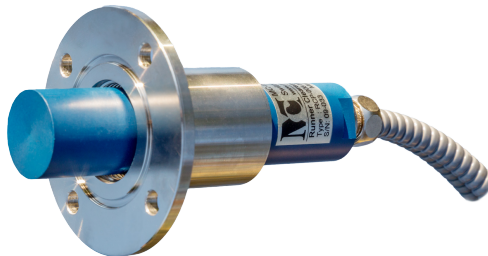


Runner clearance

TYPICAL APPLICATIONS



Hydropower units



DESCRIPTION

The RCP displacement probes are used for non-contact measurement of the turbine runner clearance of large Francis or Kaplan turbines. The high-performance casing material allows sealed, flush mounting of the eddy current probe into the turbine throat ring or turbine labyrinths and offers excellent wear resistance in harsh hydraulic environments. A sapphire tip protection is available for strongly erosive environments where the water carries a high load of abrasive material. The entire signal processing is

built into the sensor body. The voltage output is directly proportional to the measured distance between the metallic target and the sensor face.

Important: Each probe of the RCP family is engineered around the customer's machine. Based on the application data provided (see Ordering Information), MC-monitoring confirms the feasibility of a standard configuration or issues an engineering offer for a customized design.

GLOBAL SPECIFICATIONS

Values below refer to the standard configurations. Customized designs are confirmed after feasibility review.

Standard linear range	0 to 4 mm	0 to 8 mm	0 to 10 mm
Sensitivity	2 V/mm	1 V/mm	0.8 V/mm
Linearity (full scale)	±2.5%	±2.5%	±2.5% from 0 to 8 mm ±5% from 8 to 10 mm
Minimum target size	Ø15 mm	Ø28 mm	Ø28 mm

Other measuring ranges	Available on request — the measuring range determines the sensor diameter and the available bandwidth
Reference target material	According to customer specification, e.g.: ST37-2K (1.0037), VCL 140 (1.7223), X3CrNiMo13-4 (1.4313), C35E (1.1181), 15NiCr13 (1.5752), CA 6NM (1.4317)
Signal output	2 to 10 V
Resolution	Less than 10 µm (less than 1 µm for the 0 to 4 mm range)
Temperature stability	Less than 0.05%/°C FSO
Linearization module	Built-in electronic module with microcontroller
Power supply	+15 V _{DC} to +26 V _{DC}
Current consumption	30 mA typical

ENVIRONMENTAL

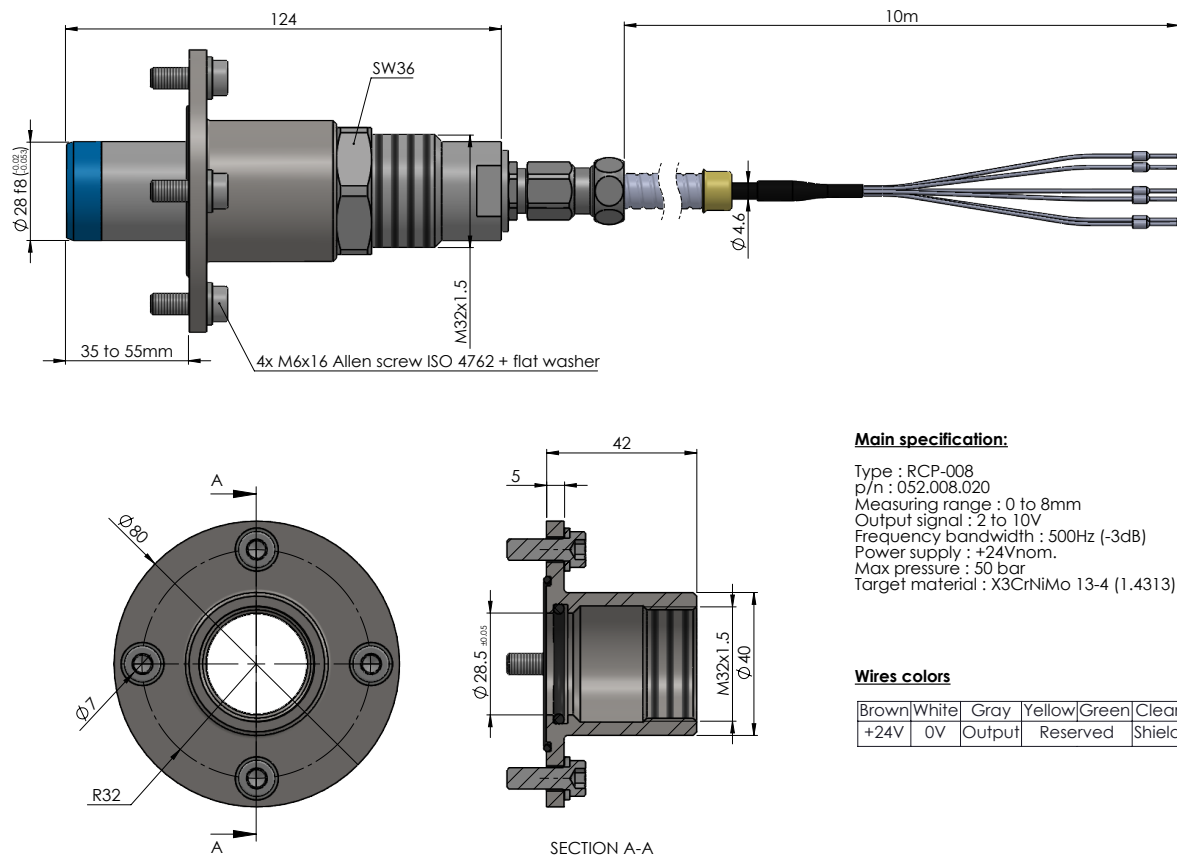
Temperature range — operation	0 °C to +55 °C (sensor & cable)
Temperature range — non-destructive	–20 °C to +70 °C (sensor & cable)
Max. pressure on measuring face	According to customer specification
Shock and vibration	IEC 60947-5-2 / 7.4
Ingress protection	IP67

PHYSICAL

Sensor body	Stainless steel; sensor diameter depending on the selected measuring range
Tip protection	High-performance material; sapphire tip protection for strongly erosive environments
Insertion depth	Adapted to the turbine throat material thickness, according to customer specification
Output cable	Integral cable, 10 m standard — other lengths according to customer specification
Cable protection	With or without metallic protection tube, according to customer specification
Mounting	Flush mounting in turbine throat ring or labyrinths; machine-specific mounting arrangement (e.g. stainless steel flange, fixing nuts)

MECHANICAL DRAWING

Standard design shown for illustration purposes only. The final mechanical design is defined for each application and documented in the project-specific drawing.



ORDERING INFORMATION

RCP probes are configured to order. To confirm the feasibility of your application, please provide the following information with your enquiry:

1. Installation depth (insertion depth)
2. Measuring range
3. Maximum pressure on the measuring face
4. Cable with or without protection tube
5. Output cable length
6. Target material

If the requested configuration corresponds to a standard design, MC-monitoring confirms feasibility and assigns the corresponding part number. If the configuration is outside the standard values, MC-monitoring issues an engineering offer for a customized design.

Part number: 052.0XX.XXX — a dedicated part number is incremented and assigned for each new design.

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Quality certification



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