



Product Specifications



The Rotation Monitoring and Triggering (RMAT) system has been developed by k-Space to provide an accurate, programmable triggering solution for synchronizing metrology equipment to sample rotation during thin-film deposition. The package seamlessly integrates a 12-bit absolute encoder and programmable logic controller (PLC) with user-friendly Windows-based software to provide four programmable trigger outputs that can be used to initiate measurements at specific rotation positions.





STANDARD HARDWARE

Encoder Specifications

Encoder Type:	12-bit absolute, SSI interface
Steps per revolution:	4096 (0.088°)
Repeat Accuracy:	0.002°
Communication:	RS-232 to USB
Mechanical Interface:	Solid Shaft, 10mm
Flange Dimensions:	2.5-inch (63.5mm) square flange (see drawing)
Maximum Speed:	9000 RPM
Lifetime:	3x10 ⁹ revolutions

PLC Specifications

Processor:	32-bit RISC processor
Encoder Input:	SSI with 2MHz clock
Polling Period:	125us
Trigger Outputs:	4 programmable opto-isolated channels, 5V, 25mA sourcing on each
Pulse Width:	Programmable, 1ms – 254ms (0ms yields 125us pulse width)
Trigger Accuracy:	≤42 RPM, trigger output will occur at programmed encoder position >42RPM, <84RPM output will occur at encoder position with +/- 1 encoder position tolerance.

Note: Maximum polling rate of encoder position is 125us + PLC runtime comparison to programmed trigger positions. Above 42RPM the PLC cannot guarantee an output at the required position. Maximum acceptable position error for trigger output is selectable by user, up to maximum of 25 position error.

System Power Requirements

Voltage Input:	100-240VAC, 0.45A
Computer Interface:	USB 2.0

Supplied Cables

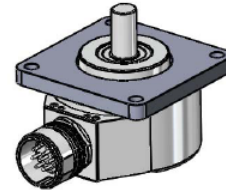
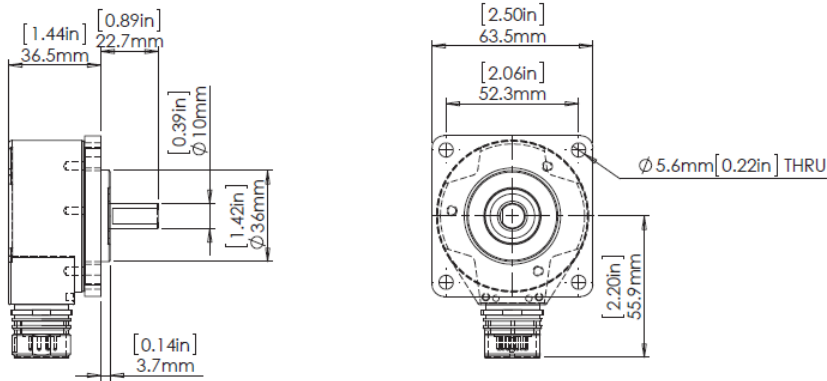
USB	5m (PLC to Computer)
Encoder Interface	6m (PLC to Encoder)
AC Power	2m (PLC)



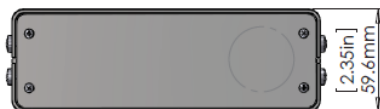
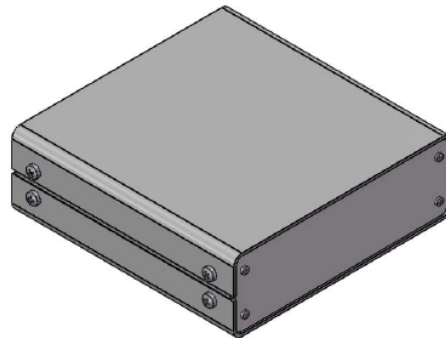
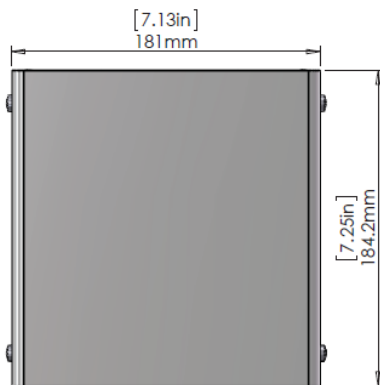


ENCODER AND PLC DIMENSIONS

The standard kSA Encoder dimensions are shown below. k-Space can provide custom coupling collars upon request.



Connector Type: M23
 Cable Attachment: Radial
 Shaft (\varnothing L), with Flat: 10x19mm



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SOFTWARE DESCRIPTION

Software Requirements

The k4RMT interface software runs on Windows XP, Windows 7 32-bit, and Windows 7 64-bit platforms.

Additional Notes

Trigger positions cannot overlap. The PLC cannot read the encoder while it is outputting a trigger pulse. It is up to the user to ensure that the output trigger pulse width does not prohibit reading the encoder before the next trigger position. This is rotation speed dependent. It is recommended that output trigger pulses are programmed to be as narrow as possible.

The screenshot shows the kSA RMT software interface. The window title is "kSA RMT". The interface is divided into several sections:

- Encoder Selection:** Available Encoders: COM5 (dropdown), a refresh button, and a Select button. Current Connection: COM5, DMC30010 Rev 1.1a2-SER, 458.
- Encoder Settings:** Contains a table of trigger settings and a "Write To Encoder" button.

	Enable	Initialize	Position (counts)	Tolerance (counts)	Pulse Width (msec)
Trigger 1	<input checked="" type="checkbox"/>	Set to Current	309	0	10
Trigger 2	<input checked="" type="checkbox"/>	Set to Current	1392	0	20
Trigger 3	<input checked="" type="checkbox"/>	Set to Current	2318	0	30
Trigger 4	<input checked="" type="checkbox"/>	Set to Current	4084	0	4
- Encoder Control:** A red icon of an encoder.
- Units:** Encoder Counts (dropdown).
- Edge:** Square wave icon, a gear icon with a checkmark, and a square wave icon with a checkmark.
- File Operations:** Load Settings and Save Settings buttons.
- Encoder Position:** Read button, Raw 0, Zero Adjusted 0.
- Zero Encoder:** Set Manually 0, Use Current (selected) Zero Encoder button.

