



MAGNETIC ENCODERS SERIES RM36



The RM36 is a high-speed magnetic rotary encoder designed for use in harsh industrial environments. The non-contact two-part design removes the need for seals or bearings ensuring long-term reliability and simple installation.

The encoder comprises a magnetic actuator and a separate encoder body. Rotation of the magnetic actuator is sensed by a custom encoder chip within the body, and processed to the required output.

The encoder chip processes the signals received to provide resolutions to 12 bit (4096 positions per revolution) with operational speeds to 30,000 rpm. Resolution options include binary and decimal. Output signals are provided in industry standard absolute, incremental or linear formats.

The compact encoder body is 36 mm in diameter and provides dirt immunity to IP68. The RM36 can be used in a wide range of applications including marine, medical, print, converting, industrial automation, metal working, motor control and instrumentation.

5 V power supply

RM36I - incremental with 80 to 1024 pulses per revolution (320 to 4096 counts per revolution with x 4 evaluation)

RM36S - synchro serial interface (SSI) with 320 to 4096 positions per revolution

24 V power supply

RM36P - absolute parallel interface with 512 positions per revolution

RM36I - incremental with 128 pulses per revolution (512 counts per revolution with x 4 evaluation)

RM36V - linear voltage output in a range of variants

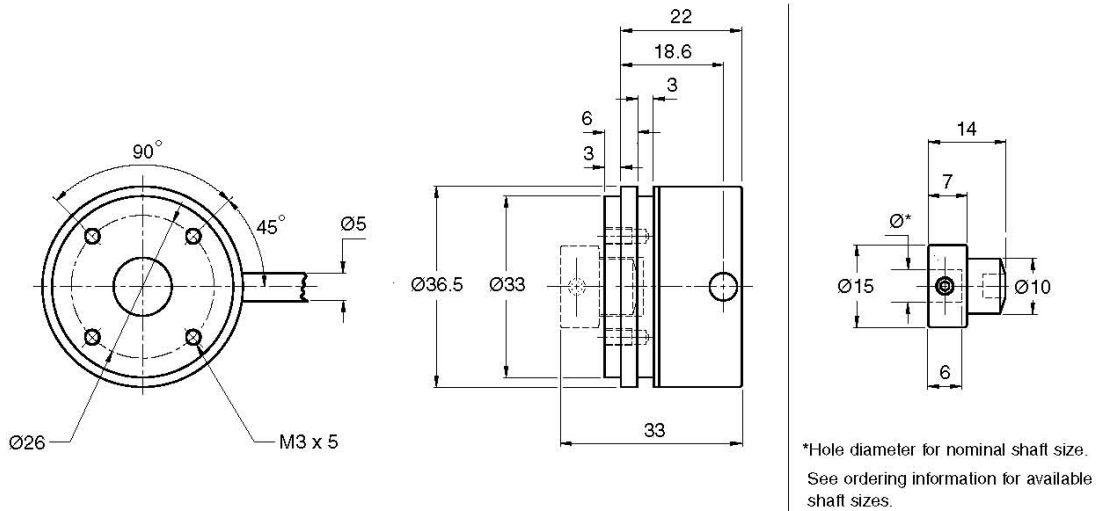
RM36C - linear current output in a range of variants

System features:

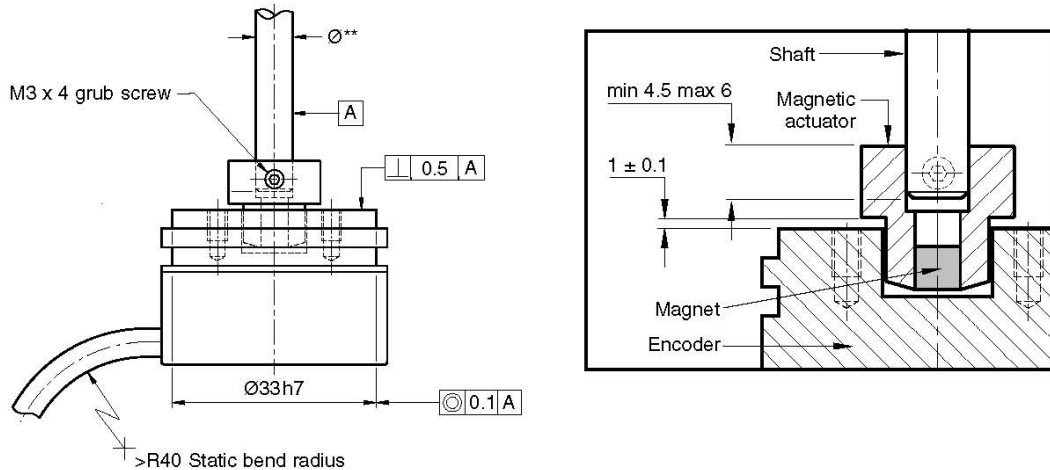
- + Excellent immunity to IP68
- + Non-contact, frictionless design
- + High speed operation to 30,000 rpm
- + 36 mm diameter body
- + Industry standard absolute, incremental and linear output formats
- + Binary and decimal resolution options
- + Accuracy $\pm 0.3^\circ$
- + Simple installation
- + Low inertia



RM36 dimensions Dimensions and tolerances in mm



RM36 installation drawing



**Nominal shaft size with tolerance h7.

Operating and electrical specifications

Humidity (for IP64 version)	Storage 95% maximum relative humidity (non-condensing) (IEC 61010-1) Operating 80% maximum relative humidity (non-condensing) (IEC 61010-1)
Acceleration	Operating 500 m/s ² BS EN 60068-2-7:1993 (IEC 68-2-7:1983)
Shock non-operating	1000 m/s ² max @ 6 ms, 1/2 sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)
Vibration operating	100 m/s ² max @ 55 to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)
EMC compliance	BS EN 61326
Cable	Outside diameter 5 mm
Mass	Encoder unit 1 m cable (no connector) 85 g. Magnetic actuator 12 g
Environmental sealing	IP64 (IP68 optional) BS EN 60529:1992

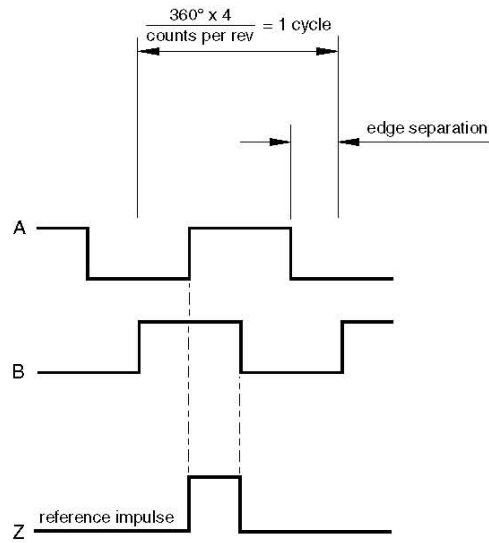
Output specifications - 5 V supply

RM36 I - Incremental outputs

Square wave output

Power supply	5 V \pm 5%
Power consumption	35 mA
Output signals	A, B, Z, A-, B-, Z-
Resolution options	320, 400, 500, 512, 800, 1000, 1024, 1600, 2000, 2048, 4096 counts per revolution
Hysteresis	0.2°
Accuracy	\pm 0.3°
Max. cable length	20 m
Connector options	9 pin D-type plug (standard) flying lead
Temperature	Operating -25 °C to +85 °C Storage -40 °C to +125 °C
Maximum speed	20,000 rpm (10,000 rpm - 4096 counts per rev)
Edge separation	1 μ s minimum

Timing diagram



B leads A for clockwise rotation of magnetic actuator

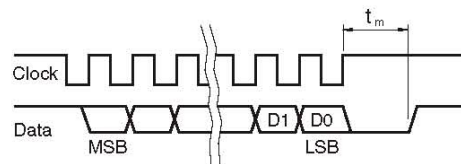


RM36 S - Binary synchro-serial interface (SSI)

Serial encoded absolute position measurement

Output code	Natural binary
Power supply	5 V \pm 5%
Power consumption	35 mA
Resolution options	320, 400, 500, 512, 800, 1000, 1024, 1600, 2000, 2048, 4096 positions per revolution
Hysteresis	0.2°
Accuracy	\pm 0.3°
Repeatability	\leq 0.1 bit
Data outputs	Serial data (RS422A)
Data inputs	Clock (RS422A)
Max. cable length	100 m (at 1 MHz)
Connector options	9 pin D-type plug (standard) flying lead
Temperature	operating -25 °C to +85 °C storage -40 °C to +125 °C
Maximum speed	20,000 rpm (18,000 rpm - 4096 counts per rev)

Timing diagram

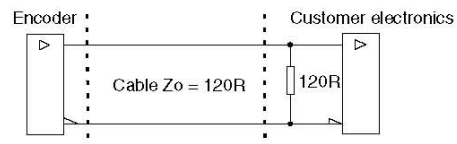


Clock = 50 kHz to 1 MHz

$t_m = 13 \mu\text{s}$ to $20 \mu\text{s}$

Recommended signal termination

(For data output lines only)



Position increases for clockwise rotation of shaft



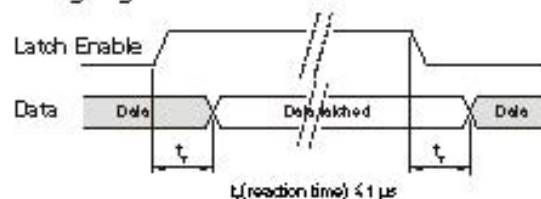
Output specifications - 24V supply

RM36 P - Binary parallel interface

Parallel absolute position measurement

Output code	Natural binary	
Power supply	24 V ± 10%	
Power consumption	See table	
Output voltage	$V_H \geq 23 \text{ V}$ at $I_H \leq 10 \text{ mA}$	
Variant A	$V_L \leq 1 \text{ V}$ at $I_L \leq 10 \text{ mA}$	
Resolution	9 bit (512 positions per revolution.)	
Hysteresis	0.5 bit	
Accuracy	± 1 bit	
Repeatability	≤ 0.1 bit	
Output signals	D0 (LSB) - D8 (MSB)	
Data inputs	LE - latch enable input signal, active high Maximum sampling rate 500 kHz	
Max. cable length	10 m	
Connector options	15 pin D-type plug (standard) flying lead	
Temperature	operating	-25 °C to +125 °C (+70 °C variant B)
	storage	-25 °C to +125 °C

Timing diagram



Electrical variants

Variant	Type	Power consumption	Max. load
A	Push-Pull	40 mA	30 mA
B	Open Collector NPN	25 mA	20 mA



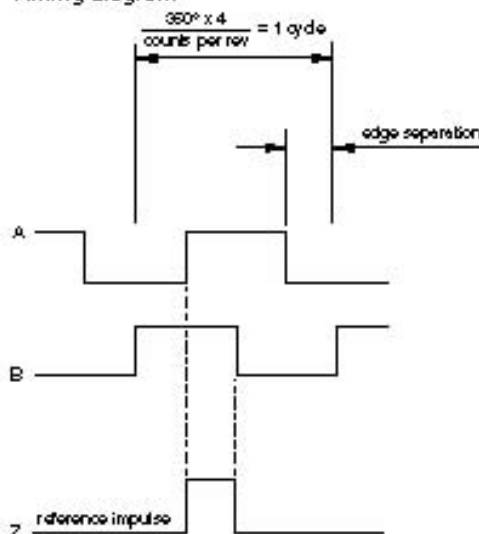
Position increases for clockwise rotation of magnetic actuator

RM36 I - Incremental outputs

Square wave output

Power supply	24 V ± 10%	
Power consumption	See table	
Output signals	A, B, Z, A-, B-, Z- (Variant A) A, B, Z (Variant B)	
Resolution	128 pulses per revolution (512 counts per revolution with x 4 evaluation)	
Hysteresis	0.5 count (± 0.7°)	
Accuracy	± 1 count (± 0.7°)	
Max. cable length	20 m	
Connector options	9 pin D-type plug (standard) flying lead	
Temperature	Operating	-25 °C to +70 °C
	Storage	-25 °C to +125 °C

Timing diagram



Electrical variants

Variant	Type	Power consumption	Max. load
A	Push-Pull	30 mA	30 mA
B	Open Collector NPN	25 mA	20 mA

Edge separation

	Ideal	Typical	Min.
6,000 rpm	19.5 μs	10.5 μs	5 μs
30,000 rpm	3.9 μs	2 μs	0.5 μs



B leads A for clockwise rotation of magnetic actuator

Output specifications - 24V supply

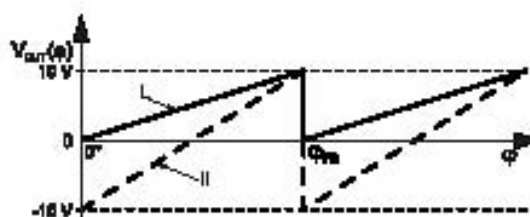
RM36V - Linear voltage output

Power supply	Type I: +20 V to +30 V DC Type II: ± 12 V to ± 16 V DC
Power consumption	40 mA typical
Output voltage	Type I: 0 V to 10 V DC Type II: -10 V to +10 V DC
Output loading	Max 10 mA
Linearity	1%
Max. cable length	20 m
Connector options	9 pin D-type plug (standard) tying lead
Temperature	Operating -25 °C to +70 °C Storage -25 °C to +125 °C

Electrical variants

Φ Fs	Type I				Type II			
	360°	180°	90°	45°	360°	180°	90°	45°
CW	A	B	C	D	M	N	P	Q
CCW	E	F	G	H	R	S	T	V

Electrical output/shaft position



Voltage increases for clockwise rotation of magnetic actuator

Operating and electrical specifications

Humidity (for IP64 version)	Storage 95% maximum relative humidity (non-condensing) (IEC 61010-1) Operating 80% maximum relative humidity (non-condensing) (IEC 61010-1)
Acceleration	Operating 500 m/s ² BS EN 60068-2-7:1993 (IEC 68-2-7:1983)
Shock non-operating	1000 m/s ² , 6 ms, 1/2 sine BS EN 60068-2-27:1993 (IEC 68-2-27:1987)
Vibration operating	100 m/s ² max @ 55 to 2000 Hz BS EN 60068-2-6:1996 (IEC 68-2-6:1995)
EMC compliance	BS EN 61326
Cable	Outside diameter 5 mm
Mass	Encoder unit 1 m cable (no connector) 85 g. Magnetic actuator 12 g
Environmental sealing	IP64 (IP68 optional) BS EN 60529:1992

elap

ELAP S.P.A. VIA VITTORIO VENETO, 4 - I-20094 CORSICO (MI) - TEL. ++39.02.4519561
FAX ++39.02.45103406 E-MAIL: INFO@ELAP.IT URL: WWW.ELAP.IT