

GURLEY SERIES M122 MAGNETIC ROTARY ENCODERS

MOTION TYPE:

ROTARY

USAGE GRADE:

LIGHT INDUSTRIAL

OUTPUT:

FOUR CHOICES

MAX RESOLUTION:

8192 COUNTS

OR

13 BITS



SMALL PACKAGE - BIG PERFORMANCE

The series **M122** magnetic rotary encoders are designed for light industrial applications that require up to thirteen bits of resolution (8192 words or counts/turn) in a very small package. The four models share these features:

- Non-contact; frictionless; bi-directional
- Maximum rotating speed: 30,000 RPM
- Protection: IP64 standard (IP 68 optional)
- Shock: 1000 m/s²; 6 ms
- Vibration: 100 m/s²; 55 to 2,000 Hz
- 22-mm body; blind hollow-shaft

Models Available:

M122-P	Parallel binary at 9 bits
M122-S	Synchro-serial interface (SSI) to 13 bits
M122-I	Incremental 8192 counts/rev (after quadrature decode)
M122-A	Analog (one SIN and COS wave over 360°)

ingenuity[®]@work

ISO
9001
CERTIFIED

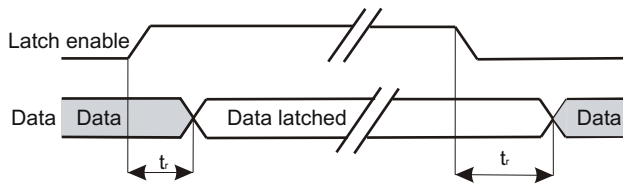
Gurley Precision Instruments
514 Fulton Street
Troy, NY 12180 U.S.A.
(800) 759-1844, (518) 272-6300, fax (518) 274-0336,
Online at www.gurley.com, e-mail: info@gurley.com



SPECIFICATIONS

M122 P Binary Parallel Interface

Timing diagram:



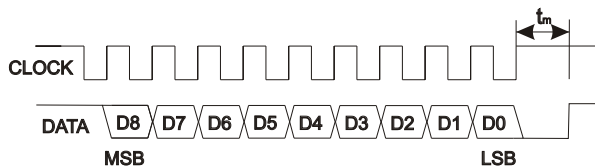
t_r = reaction time $\leq 1 \mu s$

Output increases with CW rotation
Maximum sampling rate is 500 kHz

Power Supply: 5V
 Power Consumption: 20 mA
 Output Voltage: $V_H \geq 4V$ at $-I_H \leq 3 \text{ mA}$
 $V_L \leq 1V$ at $I_L \leq 3 \text{ mA}$
 max. 12 bits (4096 words/turn)
 Resolution: 0.5 bit
 Hysteresis: ± 1 bit
 Accuracy: ≤ 0.1 bit
 Repeatability: ≤ 0.1 bit
 Output signals: D0 (LSB) - D8 (MSB) - natural binary
 Data inputs: LE - latch enable input signal, active high
 Max. Cable length: 30m
 Connection: DA-15P
 Temp. Range: -25 C to 125 C
 Weight: 83 g (with 1 m cable and D-type connector)

M122 S Binary Synchro-Serial Interface (SSI)

Timing diagram:



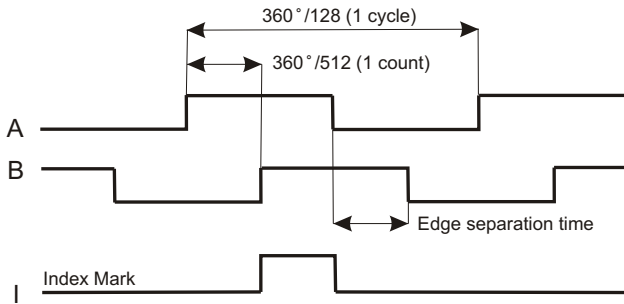
Clock $\leq 1 \text{ MHz}$
 $T_m = 20 \mu s$ to $40 \mu s$
 Output increases with CW rotation

Power Supply: 5V DC
 Power Consumption: 23 mA
 Resolution: max. 13 bits (8192 words/turn)
 Hysteresis: 0.5 bit
 Accuracy: see table below
 Repeatability: ≤ 0.1 bit
 Output signals: Serial data (RS 422) - natural binary
 Data inputs: Clock (RS422)
 Max. Cable length: 100m (at 1 mHz)
 Connection: DE-9P
 Temp. Range: -25 C to 85 C
 Weight: 75 g (with 1 m cable and D-type connector)

Resolution Options (Counts per rev)	Maximum Speed (rpm)	Accuracy	Hysteresis
320, 400, 500	30,000	$\pm 0.7^\circ$	0.18°
512	30,000	$\pm 0.7^\circ$	0.45°
800, 1000, 1024	20,000	$\pm 0.5^\circ$	0.18°
1600, 2000, 2048	10,000	$\pm 0.5^\circ$	0.18°
4096	5,000	$\pm 0.5^\circ$	0.18°
8192	2,500	$\pm 0.5^\circ$	0.18°

M122 I Incremental Output

Output diagram:

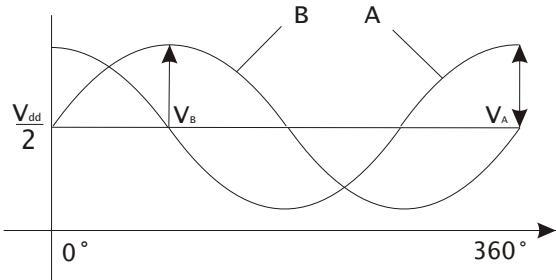


B leads A for CW rotation

Power Supply: 5V DC
 Power Consumption: 23 mA
 Output TTL signals: A, B, I, /A, /B, /I, (RS 422)
 Resolution: 8192 counts/rev. (after quadrature decode)
 Accuracy: see table below
 Max. cable length: 50m
 Connection: DE-9P
 Temp. Range: -25 C to 85 C
 Weight: 75 g (with 1 m cable and D-type connector)
 Edge separation time (max output frequency 64 kHz):

Resolution Options (Counts per rev)	Maximum Speed (rpm)	Accuracy	Hysteresis
320, 400, 500	30,000	±0.7°	0.18°
512	30,000	±0.7°	0.45°
800, 1000, 1024	20,000	±0.5°	0.18°
1600, 2000, 2048	10,000	±0.5°	0.18°
4096	5,000	±0.5°	0.18°
8192	2,500	±0.5°	0.18°

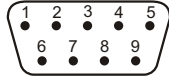
M122 A Analog Sinusoidal Outputs



Power Supply: $V_{dd} = 5V DC / 20 mA$
 Output, single ended
 Signal amplitude: $2 V_{pp} \pm 0.1 V$
 Signal offset: $V_{dd}/2 \pm 5 mV$
 Signal Characteristic:
 $|V_A - V_B| \leq 5 mV$
 $|V_{OA} - V_{OB}| \leq 5 mV$
 $|\phi_A - \phi_B| = 90^\circ \pm 1^\circ$
 $V_A = \text{sine amplitude}$
 $V_B = \text{cosine amplitude}$
 $V_{OA} = \text{sine offset}$
 $V_{OB} = \text{cosine offset}$
 Max. Output frequency: 500Hz
 Max. Cable length: 3 m
 Connection: DE-9P
 Temp. Range: -25 C to 125 C
 Weight: 75 g (with 1 m cable & D type connector)

Pin Assignment / Wire Color

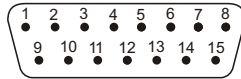
DA9P



M122 S/I/A

Nr. Pin	M122 S		M122 I		M122 A	
	Function	Wire Color	Function	Wire Color	Function	Wire Color
1	Shield		Shield		Shield	
2	Clock	White	I	White	V _A	White
3	Clock	Brown	B	Green	V _B	Brown
4	NC	-	A	Gray	NC	-
5	V _{dd}	Red	V _{dd}	Red	V _{dd}	Red
6	Data	Green	T	Brown	NC	-
7	Data	Yellow	B	Yellow	NC	-
8	NC	-	A	Pink	NC	-
9	GND	Blue	GND	Blue	GND	Blue

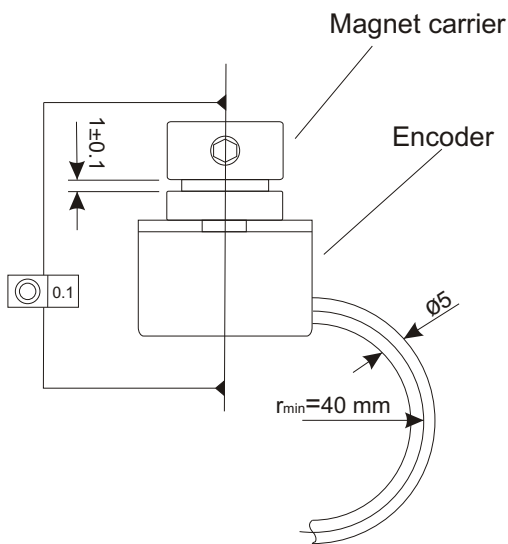
DA15P



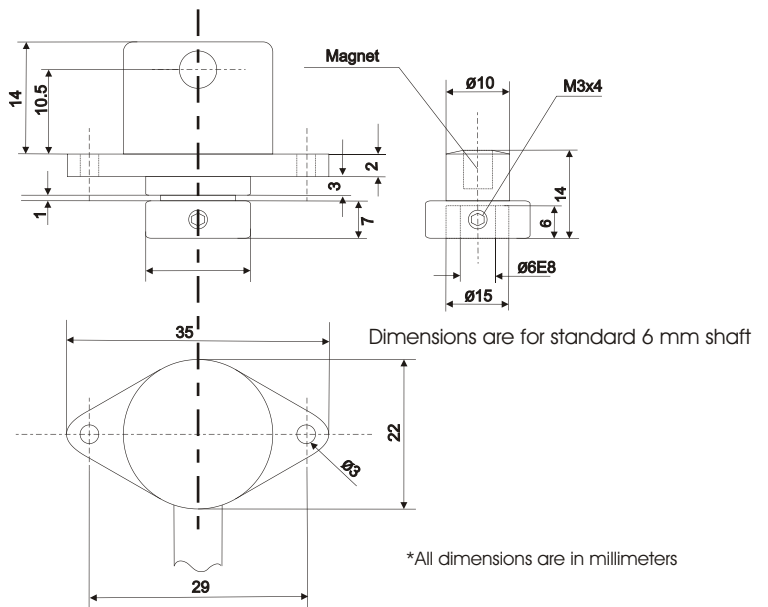
M122 P

Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Function	Shield	D8	D7	D6	D5	D4	D3	+5V	D2	D1	D0	NC	NC	LE	GND
Wire Color	-	White	Brown	Green	Yellow	Gray	Pink	Red	Black	Violet	Gray/Pink	-	-	Red/Blue	Blue

Mounting M122



Dimensions M122



M122

PAGE 4 OF 5

606

Gurley Precision Instruments
514 Fulton Street
Troy, NY 12180 U.S.A.

(800) 759-1844, (518) 272-6300, fax (518) 274-0336,
Online at www.gurley.com, e-mail: info@gurley.com



ORDERING INFORMATION

MODEL	SHAFT	RES	IND	V	OUT	TEMP	BASE	CAB	EXIT	CONN	DIA	SF

MODEL

M122 22-mm body

SHAFT

B Blind hollow shaft

LINES - Disc line count

00128, 00256 (OUT = I)
 00512, 01024 (BEFORE 4x)
 02048,
 00512 (OUT = P)
 00001 (OUT = A)
 00512, 01024 (OUT = S)
 02048, 04096
 08192

IND - Index format

Q Quarter-cycle gated index (OUT = I)
N None (OUT = P, S, or A)

V - Input voltage

5 +5 Vdc

OUT Output format

P Parallel natural binary
S SSI natural binary
I Incremental
A Analog

TEMP - Temperature

A -25°C to +125°C (OUT = P, A)
B -25°C to +85°C (OUT = I, S)

BASE

E IP64, standard EMC grade (standard)
F IP68, standard EMC grade
B IP64, high EMC grade
C IP68, high EMC grade

SPECIAL CAPABILITIES

For special situations, we can optimize catalog encoders to provide higher frequency response, greater accuracy, wider temperature range, reduced torque, non-standard line counts, or other modified characteristics. In addition, we regularly design and manufacture custom encoders for user-specific requirements. These range from high-volume, low-cost, limited-performance commercial applications to encoders for military, aerospace and similar high-performance, high-reliability conditions. We would welcome the opportunity to help you with your encoder needs.

WARRANTY

Gurley Precision Instruments offers a limited warranty against defects in material and workmanship for a period of one year from the date of shipment.

CAB - Cable length, meters

10 1.0 meters(Standard)
30 3.0 meters
XX X.X meters; 9.9 meters is maximum

EXIT

S Side-exit cable

CONN - Connector

P Pigtails (no connector)
Q DA-15P (OUT = P)(standard)
S DE-9P (OUT = S, I, A) (standard)

DIA - Shaft diameter

04M 4mm
05M 5 mm
06M 6 mm (standard)
08M 8 mm
10M 10 mm
03E 3/16"
04E 1/4"
06E 3/8"
000 supplied without a magnet carrier

SF - Special features

N No special features
Issued at time of order to cover special customer requirements
N No special features

ACCESSORIES (order separately)

M01 Mating connector for DA-15P
M06 Mating connector for DE-9P
 Magnet carrier: Call factory

M 1 2 2

PAGE 5 OF 5

606

Gurley Precision Instruments
 514 Fulton Street
 Troy, NY 12180 U.S.A.

(800) 759-1844, (518) 272-6300, fax (518) 274-0336,
 Online at www.gurley.com, e-mail: info@gurley.com

