

# GURLEY MODEL A23S

## ABSOLUTE ENCODER WITH SSI OUTPUT

**MOTION TYPE:**

**ROTARY**

**USAGE GRADE:**

**INDUSTRIAL**

**OUTPUT:**

**ABSOLUTE**

**MAX RESOLUTION:**

**SINGLE-TURN:  $2^{16}$**   
**(65,536 MEAS.**  
**STEPS/REV)**

**MULTI-TURN:  $2^{30}$**   
**(1,073,741,824**  
**TOTAL STEPS)**



**New Hollow-Shaft Version Available**  
**Call Factory for Details**

### INDUSTRIAL RUGGEDNESS, SINGLE OR MULTI-TURN

The Model A23S with SSI output is a heavy-duty absolute rotary encoder with opto-electronic technology and standard SSI (RS422/RS485) interface. It is available as a single-turn encoder with up to 16 bits of resolution (65,536 steps per revolution), or as a multi-turn with a range of  $2^{14}$  (16,384) turns. These encoders are used in a wide variety of position sensing applications for the measuring of angles and distances. Mechanical features include a 58 mm aluminum housing, a 6 mm or 10 mm dia-stainless steel shaft, and precision ball bearings. Electrical features include a temperature insensitive IR opto-receiver array and over-voltage peak protection.

**ingenuity@work<sup>®</sup>**

**ISO**  
**9001**  
**CERTIFIED**

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# SPECIFICATIONS

ELECTRICAL	
Clock input	Via opto-coupler
Clock frequency	100 kHz to 2 MHz
Data output	Line-driver according to RS 485 / RS 422
LSB step frequency	Max. 800 kHz
Transition accuracy @20°C	½ LSB (12-bit); 2 LSB (16-bit)
EMC	Certified according to EN 61000-6-2, and -2
Supply voltage	+5 VDC ±0.25 V or 10-30 VDC
Current consumption (5 VDC)	~200 mA
Electrical lifetime	> 10 <sup>5</sup> h
Output code format	Gray code or Natural Binary
MECHANICAL	
Housing	Aluminum
Bearing life	6 x 10 <sup>9</sup> revolutions (with 26 N radial or 13 N axial load)
Moment of inertia	50 g·cm <sup>2</sup> (7 x 10 <sup>-4</sup> in·oz·s <sup>2</sup> )
RPM	Max. 6,000 (continuous)
Shock (EN-60068-2-27)	100 G (6 ms)
Vibration (EN-60068-2-6)	10 G (10 Hz to 1,000 Hz)
Weight	Single-turn: ~400 g Multi-turn: ~600 g
Max shaft loading	Axial 20 N (4 lb), radial 110 N (25 lb)
Friction torque	3 Ncm (7 in·oz) without shaft seals 10 Ncm (14 in·oz) with shaft seals
ENVIRONMENTAL	
Operating temperature	- 40°C to + 70°C (-40°F to 158°F)
Storage temperature	- 40°C to + 85°C (-40°F to 185°F)
Humidity	98 % (non-condensing)
Casing side	IP 65 Protection class (EN 60529)
Shaft side	IP 64 Protection class (EN 60529) (1 ± 0.5 bar)

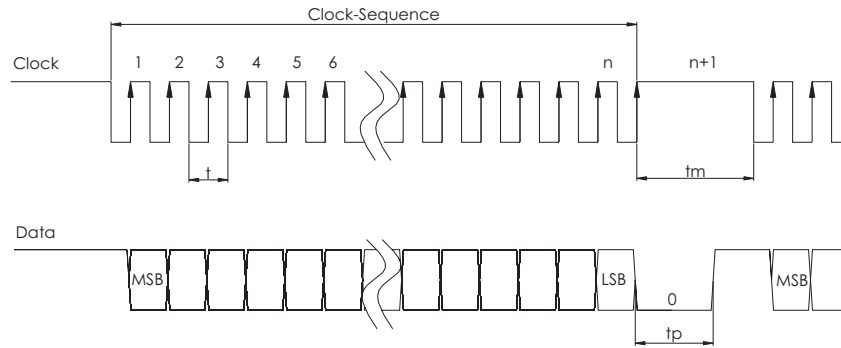
*As part of our continuous product improvement program these specifications are subject to change without notice.*



# SYNCHRONOUS SERIAL INTERFACE (SSI)

**DRIVER:** Driver meets EIA standard RS 485/RS 422: transmission rates up to 10 MBit/s  
**TRANSFER:** Transfer distance up to 1,200m  
**TRANSMISSION:** Balanced transmission provides high noise immunity  
**PAIR LINES:** Shielded and twisted pair lines are essential to attain extremely high noise immunity  
**INTERFACE:** For a detailed description of the Synchronous-Serial Interface (SSI), refer to *Introduction to SSI*

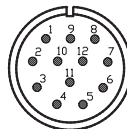
## SINGLE SHIFT



$tp < 20 \mu s$ ;  $tm > 20 \mu s$ ;  $t < tm$

## ELECTRICAL INTERFACE

Function		Pin # (CONN = E)	Wire color (CONN = P)
Clock -	INP	1	Yellow
Clock +	INP	2	Green
Data +	OUT	3	Grey
Data -	OUT	4	Pink
Direction	INP	8	Red
V = +5 V or 10-30 V	PWR	11	Brown
GND	PWR	12	White
Shield		-	Shielding

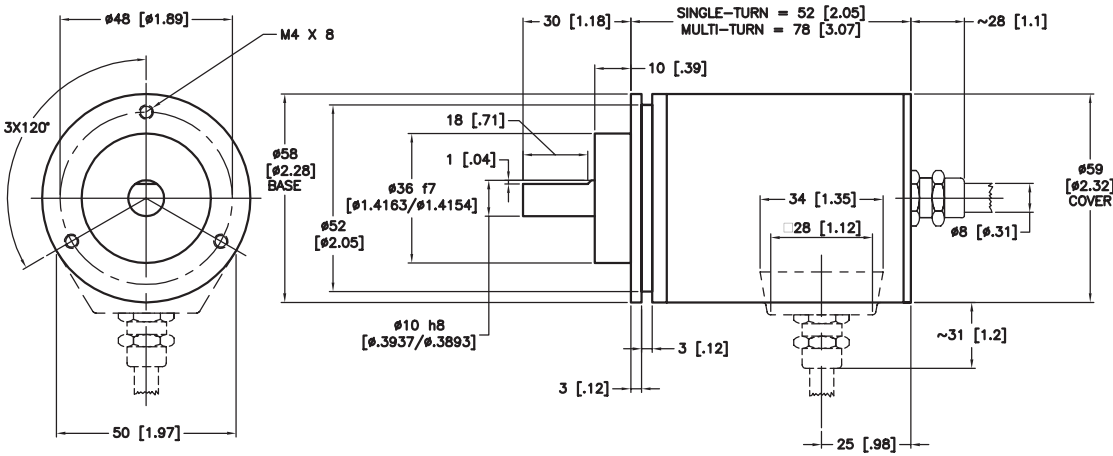


**MATING CONNECTOR  
(Male)**

DIRECTION - Input	
Level	For clockwise shaft rotation when viewed from the mounting face, eccoder counts:
0 (Input to GND)	Up
1 (Input to +V)	Down

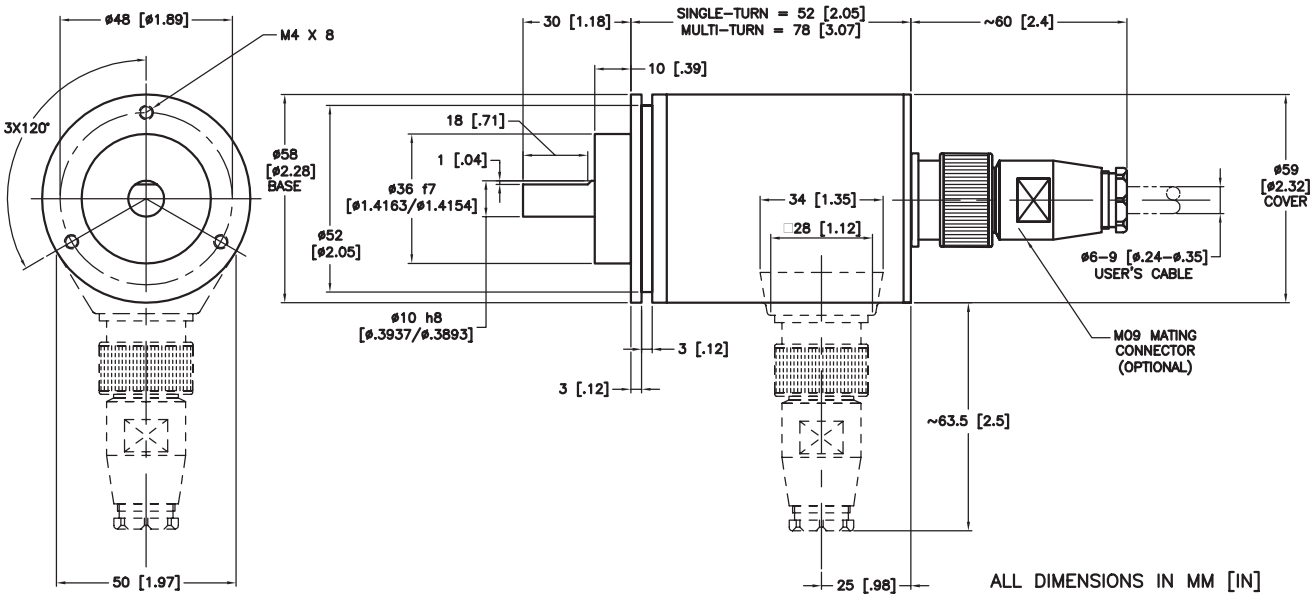
New Hollow-Shaft Version Available  
Call Factory for Details

BASE = A, B OR C CONN = P



BASE	DESCRIPTION
A	AS SHOWN
B	A + SHAFT SEALS
C	B + STAINLESS STEEL BASE AND COVER

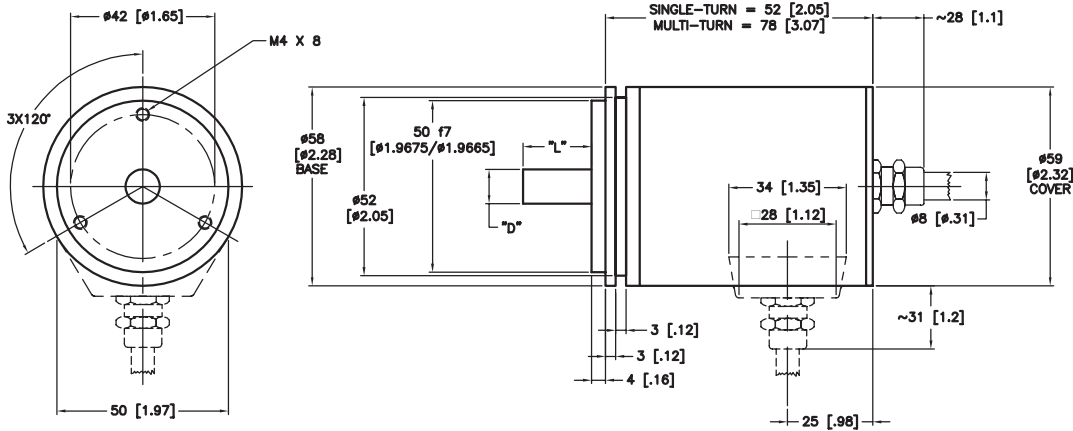
BASE = A, B OR C CONN = E



ALL DIMENSIONS IN MM [IN]

New Hollow-Shaft Version Available  
Call Factory for Details

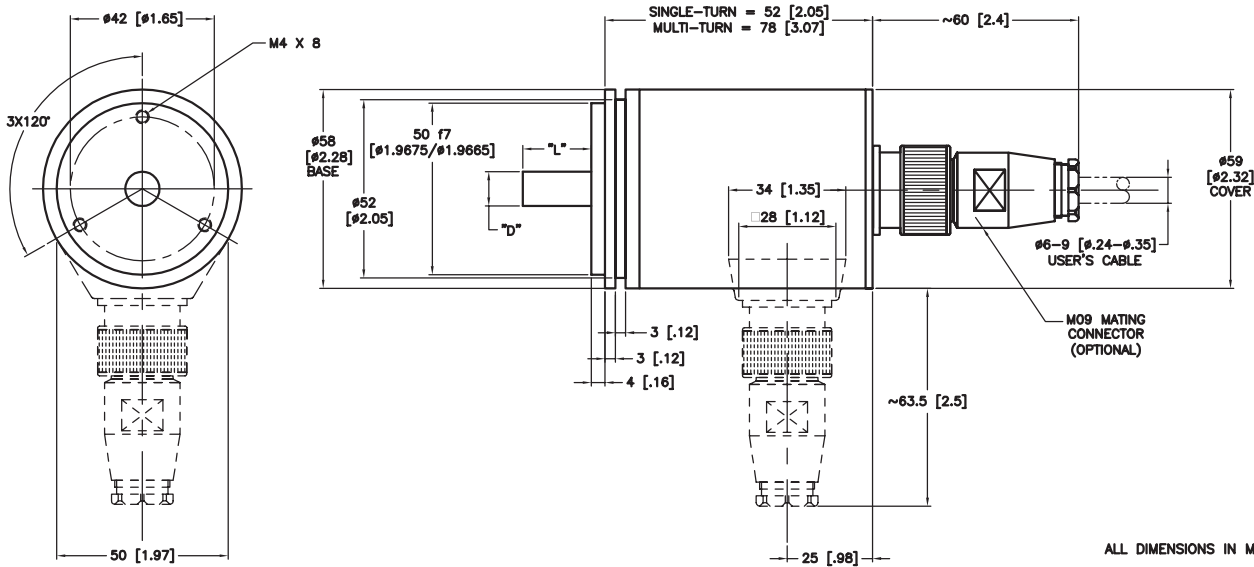
BASE = D, E OR F    CONN = P



BASE	DESCRIPTION
D	AS SHOWN
E	A + SHAFT SEALS*
F	B + STAINLESS STEEL BASE AND COVER

\* NOT AVAILABLE WITH #10 SHAFT

BASE = D, E OR F    CONN = E



ALL DIMENSIONS IN MM [IN]

# ORDERING INFORMATION

A23S

<b>IN</b>	<b>CODE</b>	<b>RES</b>	<b>FORMAT</b>	<b>#TURNS</b>	<b>BASE</b>	<b>CABLE</b>	<b>EXIT</b>	<b>CONN</b>	<b>DIA</b>	<b>SF</b>

**IN**

**5** +5VDC input voltage  
**R** 10-30 VDC

**CABLE**

**##** Cable length, inches  
**00** With **CONN = E**  
**40** 40" standard (**CONN = P**)

**CODE**

**B** Natural Binary  
**G** Gray code

**EXIT**

**S** Side exit  
**T** Top exit

**RES**

**10** 1024 words/turn  
**12** 4096 words/turn  
**13** 8192 words/turn  
**16** 65536 words/turn  
**AA** 360 words/turn  
 (only with **#TURNS = 00**)  
**AB** 3600 words/turn  
 (only with **#TURNS = 00**)

**CONN**

**P** Pigtails (no connector)  
**E** 12-pin circular

**DIA**

**06M** 6 mm shaft diameter  
 (only with **BASE = D, E or F**)  
**10M** 10 mm shaft diameter

**FORMAT**

**S** SSI

**SF**

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

**#TURNS**

**00** 1 (Single-turn)  
**04** 16  
**08** 256  
**12** 4096  
**14** 16384

**Accessories**

**M09 Ax06399** Mating connector for **CONN = E**  
 Synchro cleats

**BASE**

**A** Clamp flange (**DIA = 10M**)  
**B** A + shaft seals  
**C** B + stainless steel base and cover  
**D** Synchro flange (**DIA = 06M or 10M**)  
**E** D + shaft seals (**DIA = 06M**)  
**F** E + stainless steel base and cover (no shaft seal if **DIA = 10M**)

**SCA06Mxxx**  
**SCA10Mxxx** Shaft coupling for Ø6mm or Ø10mm encoder shaft; xxx = user's shaft diameter, to be specified

**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 parameters. 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.

