



The M58 is a rugged industrial grade metric incremental encoder providing a unique combination of performance and flexibility. The M58 features a wide range of resolutions, up to 80,000 cycles per turn. The robust design of the M58 provides it with excellent resistance to shock and vibration. IP65 environmental protection level is standard (or IP67 is available with sealing flange). The M58 is an ideal replacement encoder for metric equipment used in many industries in the US. The M58 Incremental Encoder is available with the following certifications:

EN 55011 and EN 61000-6-2

## Mechanical Specifications

- Shaft Diameter:** 10mm, (0.39") Standard, 6mm (0.24") Option
- Bearings:** Series 6000
- Shaft Material:** Stainless Steel
- Bearing Housing:** Die cast aluminum with iridite finish
- Cover:** Zinc Alloy
- Shaft Loading:** up to 50 N (11 lbs.) axial and 100 N, (22 lbs.) radial
- Starting Torque at 25 C:** 0.004 Nm (0.6 in-oz) max
- Enclosure:** Aluminum
- Maximum RPM:** 9,000 RPM
- Moment of Inertia:**  $0.7 \times 10^{-6} \text{ kgm}^2$  ( $1.0 \times 10^{-4} \text{ oz-in-sec}^2$ )
- Weight:** Approximately .285 Kg (10 oz.)

## Electrical Specifications

- Code:** Incremental
- Supply Voltage:** 5-28 VDC (See Table 1)
- Voltage/Output:**  
28V/V: Line Driver, 5-28 VDC<sub>in</sub>, V<sub>out</sub>=V<sub>in</sub>  
28V/5: Line Driver, 5-28 VDC<sub>in</sub>, V<sub>out</sub>=5VDC
- Current Requirements:** 75mA typical + output load
- Protection Level:** Reverse, overvoltage and output short circuit
- Output Format:** 2 Incremental Channels in quadrature, with gated index and complements.
- Cycles per Shaft Turn:** see Table 2
- Frequency Response:** to 300kHz (See Table 1)
- Output Terminations:** (See Table 3 back page)

## Environmental Specifications

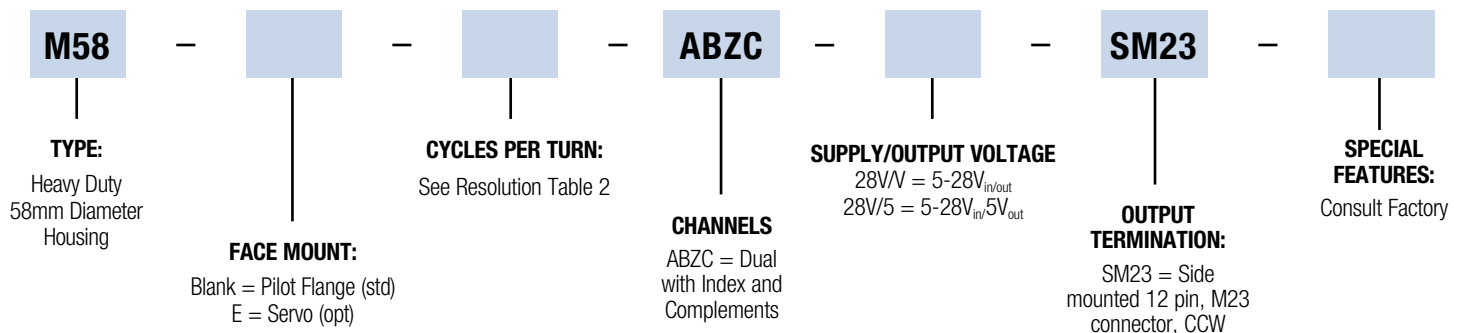
- Enclosure Rating:** IP65, NEMA 4X & 13 (IP67 with pilot flange)
- Temperature:** Operating, -0° to 70°C; storage (non-operating), -40° to 80°C. Consult factory for extended temperature ratings.
- Shock:** 50 g's for 6 msec duration
- Vibration:** 55 to 2000 Hz @ 10 g's
- Humidity:** 98% RH without condensation

**NOTES & TABLES:** All notes and tables referred to in the text can be found on the back of this page.

## M58 Metric Incremental Encoder Ordering Options FOR ASSISTANCE CALL 800-350-2727

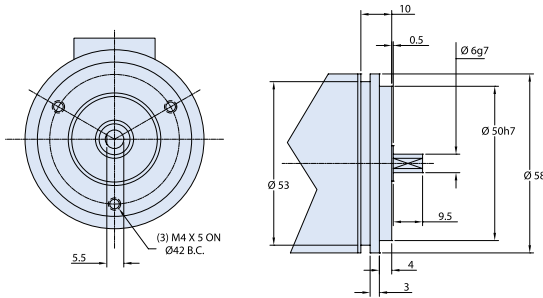
Use this diagram, working from left to right, to construct your model number.

Example: M58-1024-ABZC-28V/V-SM23 (-S: special shaft, diameter/ length, output level or termination)

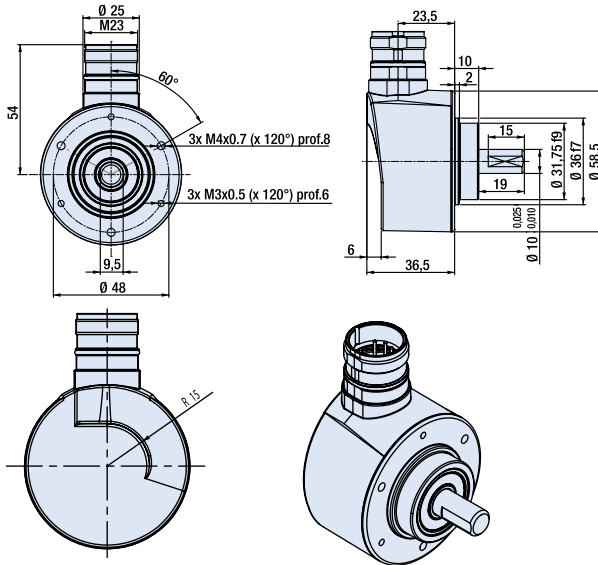


## Dimensions

Servo,  
6mm Shaft  
Diameter

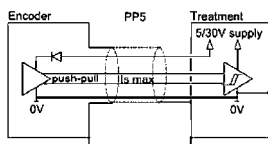


Pilot Flange,  
10mm Shaft  
Diameter



## Tables

**Table 1—Electrical**



Supply: 5 to 28±5%  
Cons. without load: 75mA max  
Current per channel: 40mA max  
0 max (I<sub>s</sub>=20mA): V<sub>o</sub>=0,5Vdc  
1 min (I<sub>s</sub>=20mA): V<sub>cc</sub>-2, 5Vdc

**Note:** TTL and RS422 compatible if the voltage power supply at the level of the encoder is 5 VDC. See notes for information on output devices.

**Table 2—M58 Disc Resolutions**

Resolutions in **RED** are interpolated and will be noted by (example T2 or other value). Additional resolutions are available, please consult factory.

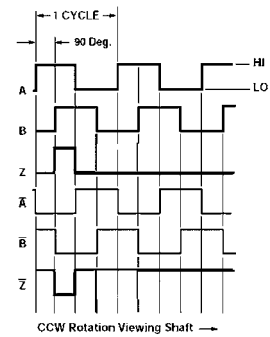
256 360 500 512 720 768 1000 1024 1080 1280 1440 1500 1800 2000 2048  
2500 2560 2880 3072 3600 4000 4096 4320 5000 5120 5760 6000 8000  
8192 10000 10240 12288 15000 16384 20000 25000 40000 50000 60000 80000

**Table 3—Output Terminations**

**SM23 12 PIN CONNECTOR, CCW**

PIN	10 + 11	2 + 12	8	5	3	1	6	4	Connector Body	9
CHANNELS	0V (CIRCUIT COMMON)	+V (SUPPLY)	A	B	Z	$\overline{A}$	$\overline{B}$	$\overline{Z}$	Case Ground	N/C

**Figure 1** Output Waveform



## Notes

- Mounting is usually done either using the D-style square flange mount, E- or G-style servo mounts, or one of the standard face mounts, F1 for example. Consult factory for additional face mount options.
- The shaft seal is recommended in virtually all installations. The most common exceptions are applications requiring a very low starting torque or those requiring operation at both high temperature and high speed.
- Non-standard index widths and multiple indices are available by special order. Consult factory.
- Complementary outputs are recommended for use with line driver type (source/sink) outputs. When used with differential receivers, this combination provides a high degree of noise immunity.
- Output IC's:** Output IC's are available as either Line Driver (LD) or NPN Open Collector (OC) types. Open Collectors require pull-up resistors, resulting in higher output source impedance (sink impedance is similar to that of line drivers). In general, use of a Line Driver style output is recommended. Line Drivers source or sink current and their lower impedance mean better noise immunity and faster switching times. **Warning:** Do not connect any line driver outputs directly to circuit common/0V, which may damage the driver. Unused outputs should be isolated and left floating. Our applications specialists would be pleased to discuss your system requirements and the compatibility of your receiving electronics with Line Driver type outputs.
- 28V/V:** Multi-voltage Line Driver (7272\*): 100 mA source/sink. Input voltage 5 to 28 VDC +/- 5% standard (Note: V<sub>out</sub> = V<sub>in</sub>). This driver is TTL compatible when used with 5 volt supply. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 120 mA typical (plus load current). This is the recommended replacement for 3904R and 7406R open collector outputs with internal pullup resistors. It is also a direct replacement for any 4469, 88C30, 8830 or 26LS31 line driver. **28V/5:** Multi-voltage Line Driver (7272\*): 100 mA source/sink. Input voltage 5 to 28 VDC +/- 5% standard, internally regulated with 5V (TTL compatible) logic out. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 90 mA typical (plus load current). **Note:** Limit encoder load to 2.5W max at ambient. Example at 12 VDC: 2.5W/(+12VDC minus +5VDC) = 357 mA total allowed current. Consult factory for your specific requirements. **15V/V:** Multi-voltage Line Driver (4469\*): 100 mA source/sink. Input voltage 5 to 15 VDC +/- 5% standard (Note: V<sub>out</sub> = V<sub>in</sub>). TTL compatible when used with 5 volt supply. Supply lines are protected against overvoltage to 60 volts and reverse voltage. Outputs are short circuit protected for one minute. Supply current is 90 mA typical (plus load current). This is a direct replacement for the 4469 Line Driver. **28V/OC:** NPN Open Collector (3904\*, 7273\*). Current sink of 80 mA max. Current sourced by external pull-up resistor. Output can be pulled up to voltage other than supply voltage (30 V max). Input voltage 5 to 28 VDC +/- 5% standard. Supply current is 120 mA typical. This replaces prior IC's with designations of 3904, 7406, 3302, 681 and 689. **5V/OCR, 15V/OCR, 24V/OCR:** Open Collector (3904R\*, 7406R\*, 7273R\*): Current sink of 70 mA max. Includes internal pull-ups sized at approximately 100 ohms/volt. Max current source is 10 mA. Supply current is 100 mA typical, 120 mA with internal pull-ups. The 5V/OCR, 15V/OCR and 24V/OCR are often replaced by the 28V/V in system upgrades.
- Special -S at the end of the model number is used to define a variety of non-standard features such as special shaft lengths, voltage options, or special testing. Please consult the factory to discuss your special requirements.
- Higher frequency response may be available. Please consult with the factory.
- Extended temperature ratings are available in the following ranges: -40 to 70°C, -40 to 85°C, -20 to 105°C and -40 to 105°C depending on the particular model. Some models can operate down to -55°C. Extended temperature ranges can affect other performance factors. Consult with factory for more specific information.
- Mating straight plug receptacles may be ordered from the factory: For mating connector, order part number 924-81201-024 For 2 meter cable, order part number 924-31186-2302 For 10 meter cable, order part number 924-31186-2310