



DESCRIPTION

The MTS-360 provides a true breakthrough in contactless sensor technology by combining a through-shaft design with 360° absolute position feedback in an ultra miniature size. The result is the smallest fully featured rotary sensor on the market with reliability up to 50 million cycles.

With its tiny size of only 6mm x 17mm x 18mm (HxWxL), engineers can now integrate a fully featured rotary sensor directly on their PCB without the packaging issues that typically accompany encoders or other absolute position devices. The exceptionally low profile fits easily in places that were previously too small for pre-packaged rotary sensors.

The MTS-360 relies on patented Hall effect technology to enable for the first time true non-contacting through-hole shaft sensing using standard SMD features. The offset through-hole accommodates the vacuum pick up tool, allowing use in automated SMD assembly systems. The standard model features a 4mm double D-flat shaft and an (8) pad SMD footprint that is compatible in most reflow soldering systems.

The new device offers electrical angles up to 360° with no dead band and linearity as low as $\pm 0.5\%$. Rated for use at -40°C to $+125^{\circ}\text{C}$, the sensor can be programmed with full scale output with angles shorter than 360 degrees. Output is selectable between Analog, PWM up to 12 bits or Serial Protocol (SPI) up to 14 bits and includes a second output channel to provide a programmable switch signal. A redundant version with a dual core sensor in the same package is also available.

This ultra-miniature MTS-360 Rotary Position Sensor is ideal in optical imaging stabilization and precision biomedical devices, optical zoom devices, consumer electronics, instrumentation, HVAC systems, automotive control systems, marine controls, fork lift trucks, farm equipment, cranes, low speed motor feedback, valve position sensors and robotic and automation feedback system.

ESD PRECAUTIONS

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD).

Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

STANDARD SPECIFICATIONS

- Linearity: $\pm 1\%$ absolute (0.5% upon request)
- Simple & Robust Magnetic Design
- Programmable Angular Range from 15 to 360 Degrees (without dead band)
- Programmable Linear Transfer Characteristic
(some positive slopes & one negative slope can be programmed in the same transfer characteristic; up to 4 programmable points; see last page)
- Selectable Analog (Ratiometric), PWM, Serial Protocol
- Programmable switch output
- Angular Resolution
(depends on electrical angle and rotational speed)
Analog & PWM: up to 12 bits
Serial Protocol (SPI): up to 14 bits
- Self-Diagnostic features
- Rotational life: up to 50.000.000 cycles
(depending on application and mounting)
- Operating temperature: up to -40°C to $+125^{\circ}\text{C}$
(others upon request)
- +20V over voltage protection and -10V reverse voltage protection
- Supply voltage: $5\text{V} \pm 10\%$
- Supply current
Typ 8.5mA for single version.
Typ 17mA for redundant version.
- IP50 (others upon request)

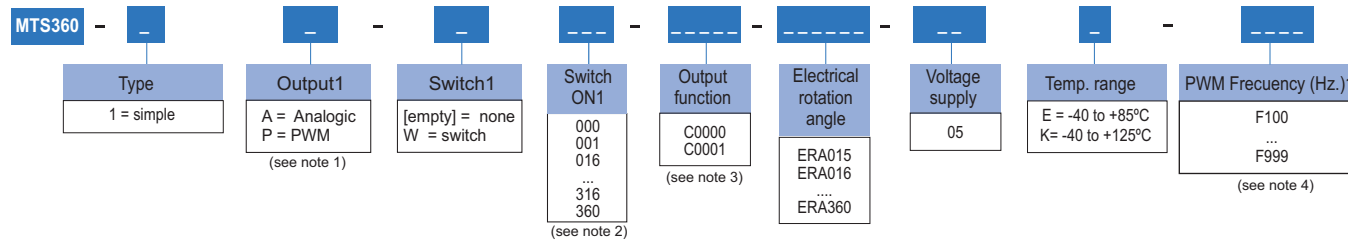
APPLICATION EXAMPLES

- Non-Contacting long life angle/position sensor
- Absolute Rotary Position Sensor
- Turn counter
- Pedal Position Sensor
- Throttle/EGR Valve and Gear Position Sensor
- Float-Level Sensor
- Motor-shaft Position Sensor
- Robotics
- Material handling, industrial equipment and HVAC monitoring & control...

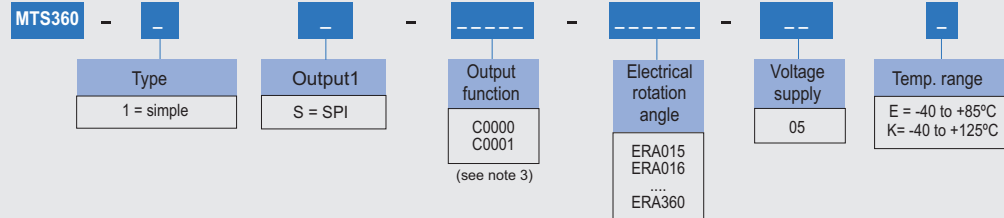


MTS360: HOW TO ORDER

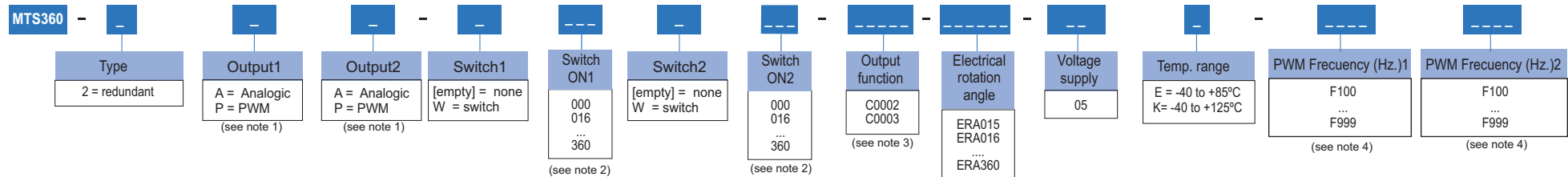
Simple output (analogic / PWM)



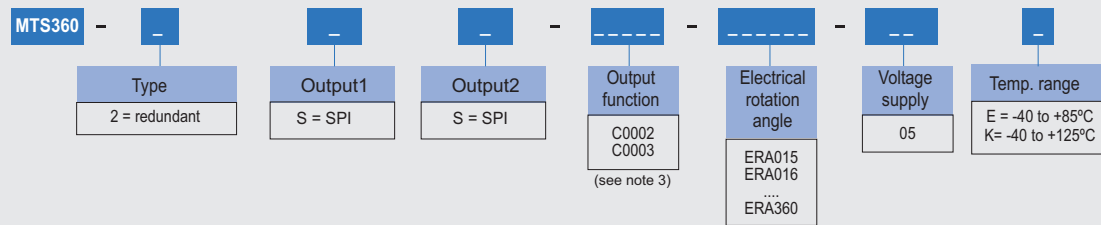
Simple output (serial protocol)



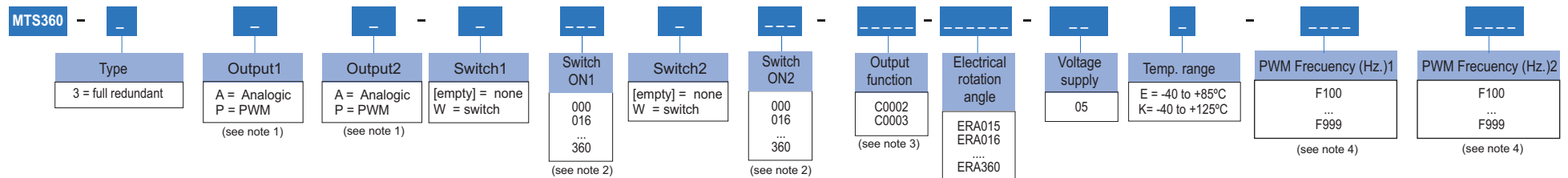
Redundant output (analogic / PWM)



Redundant output (SPI)



Full redundant output (analogic / PWM)

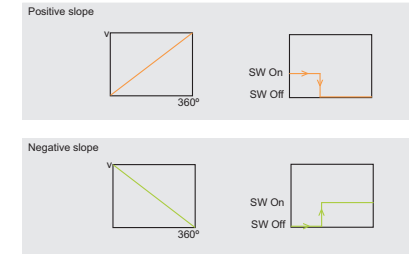


Other configurations will be studied case by case.

(1) The analog output is a ratiometric output, proportional to input supply voltage.

(2) Leave empty if no applicable.

Switch function diagram:

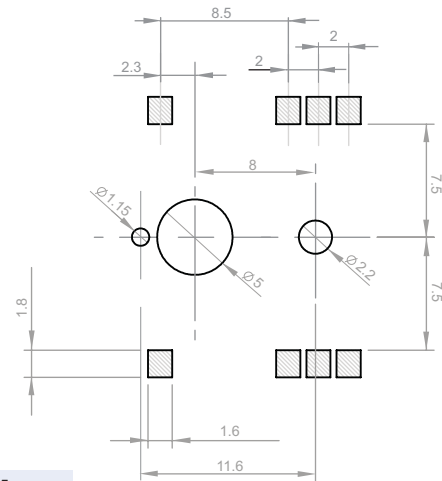
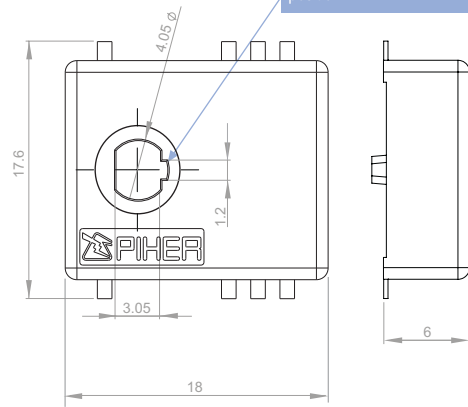


(3) Other output functions available upon request. In the How To Order reference, enter **CXXXX** meanwhile the new output function reference is not defined.

(4) Leave empty if no applicable. Default frequency is 200 Hz

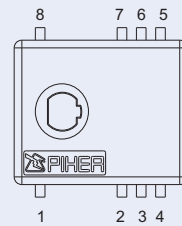
DIMENSIONS

Rotor is shown at zero position.
Sensor is delivered at random position.



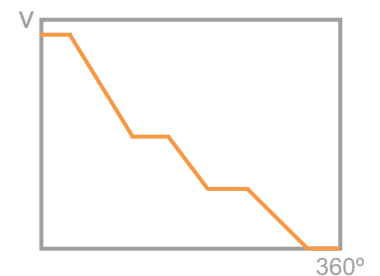
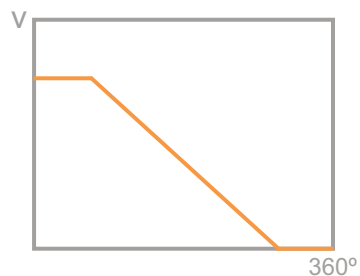
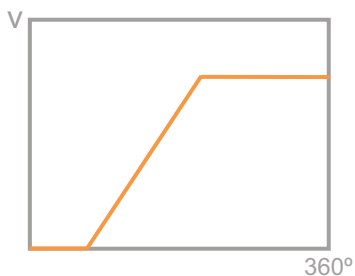
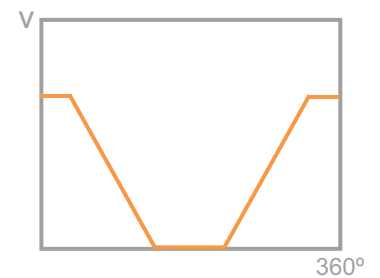
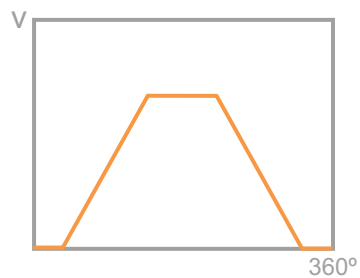
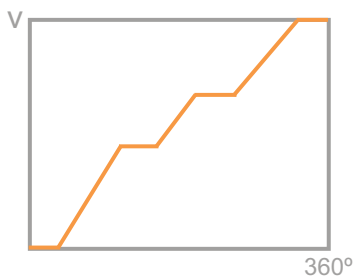
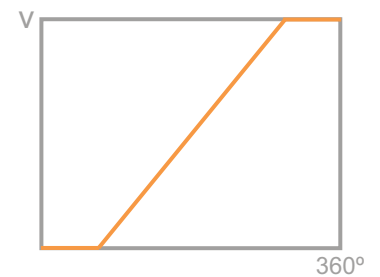
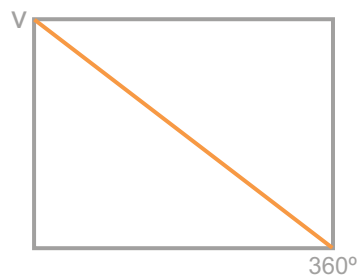
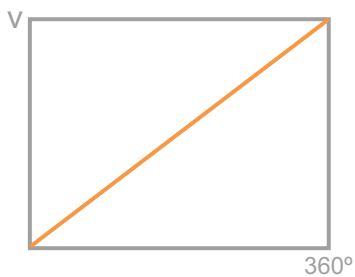
Simple analog output connection scheme

- 1.- Supply voltage
- 2.- Supply voltage
- 3.- Not used *
- 4.- Not used *
- 5.- Analog output
- 6.- Analog output
- 7.- Ground
- 8.- Ground

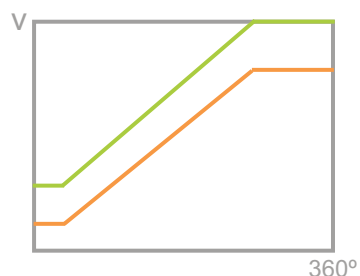
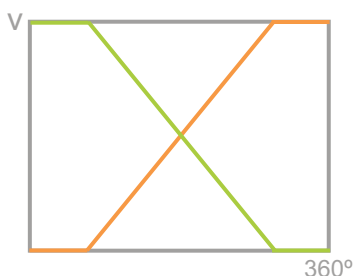


* The output pin needs to be connected to the ground

OUTPUT FUNCTION EXAMPLES

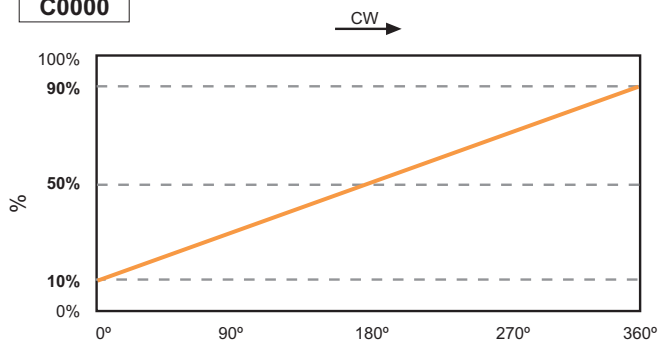


Redundant examples:

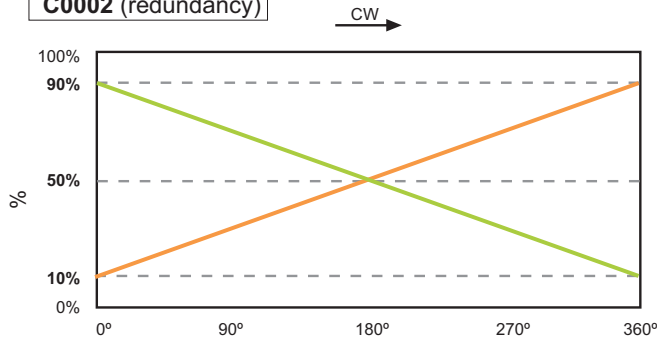


STANDARD OUTPUT FUNCTIONS

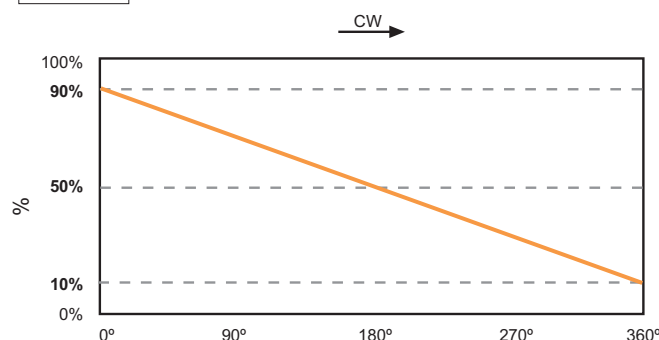
C0000



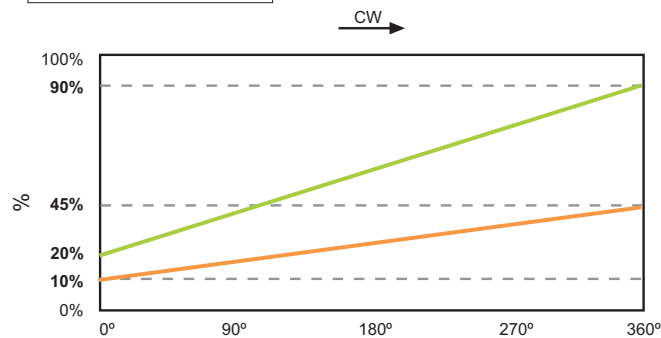
C0002 (redundancy)



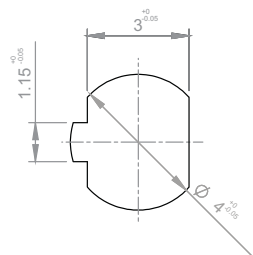
C0001



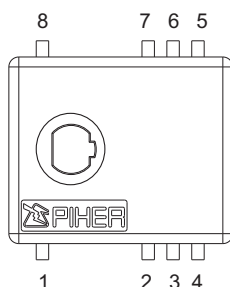
C0003 (redundancy)



RECOMMENDED SHAFT



PINOUT DIAGRAM (SIMPLE VERSIONS)



Pin	Analog	PWM	SPI
1	Supply voltage	Supply voltage	Supply voltage
2	Supply voltage	Supply voltage	Supply voltage
3	Switch output*	Switch output*	/SS
4	Switch output*	Switch output*	SCLK
5	Signal output**	Signal output **	MOSI
6	Signal output**	Signal output **	MOSI
7	Ground	Ground	Ground
8	Ground	Ground	Ground

* If the feature is not used in the application, please connect to ground

** Piher can supply the recommended wiring diagram

Disclaimer

Ferromagnetic parts close to the sensor environment, including the shaft, may modify the performance of the sensor. Therefore this must be communicated to PIHER for prior analysis.

No external magnetic perturbations are considered on the application where PIHER sensor is mounted. If so, amplitude and direction or flux density generator type and characteristics (magnet, cable, motor...) must be notified to PIHER for prior analysis.

The product information in this catalogue is for reference purposes. Please consult for the most up to date and accurate design information.

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