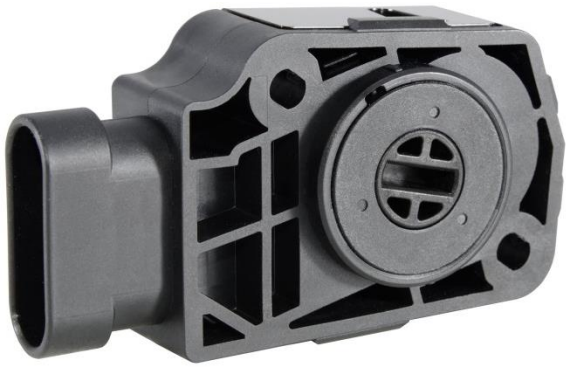
Williams Controls

Rotary Position Sensor

WM-830

- **No-contact, Hall-effect technology**
- **Internal shaft**
- **Measurement angle 48.5°**
- **5V supply**
- **Dual-redundant outputs**
- **Fail-safe outputs**
- **Voltage or PWM output options**
- **Environmentally robust**
- **Packard Electric 'Metri-Pack' 150 series connector**



The WM-830 is a cost-effective rotary sensor utilising proven Hall-effect technology to ensure accurate and reliable measurement of angular position.

Mechanical engagement with the rotating portion of the sensor is via a slotted cavity, while the electrical output span corresponds to a rotation of 48.5°.

Operation is from a 5V supply, typically derived from the electronic control unit to which the sensor is connected. Dual on-board circuits are electrically isolated from each other, so providing truly independent voltage outputs – one at 50% the level of the other – thereby allowing the host electronics to detect output errors. Further integrity is provided as the outputs enter pre-defined states in the event of connection errors to the sensor. PWM output options are also available on request.

A robust mechanical design offers exception levels of performance with respect to water and dust, shock, vibration and temperature, meaning the sensor is ideal for use in hostile, on- and off-highway vehicle environments.

Connection to the WM-830 is via the industry-standard, Packard Electric 'Metri-Pack' 150 series of connectors, which offer high-reliability performance across all operating conditions.

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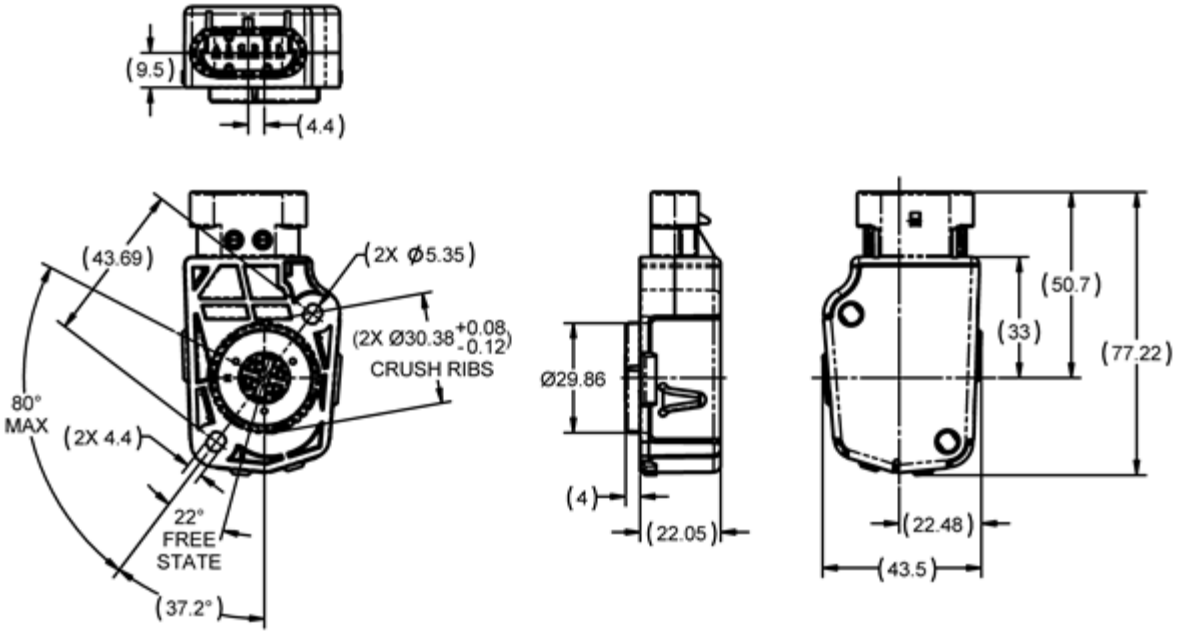
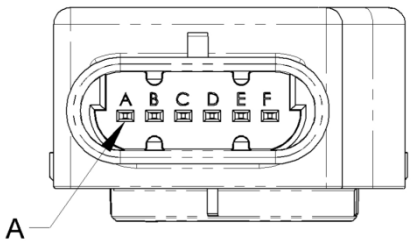
INSTALLATION

MECHANICAL



ELECTRICAL CONNECTIONS



Mating connector type: Packard Electric 'Metri-Pack' 150 series or equivalent

Mating Part Nos: 12066317 (housing) & 402418 (terminal, female)

Pin	Function
A	V_{OUT1}
B	GND1
C	V_{CC1}
D	V_{CC2}
E	GND2
F	V_{OUT2}

SPECIFICATIONS

ANALOG VOLTAGE CIRCUIT

OPERATIONAL SUPPLY VOLTAGE (V_{CC1}, V_{CC2})	4.5-5.5V
NON-OPERATIONAL SUPPLY VOLTAGE (V_{CC1}, V_{CC2})	24V to -12V
SUPPLY CURRENT	15mA
OUTPUT CURRENT	15mA
OUTPUT SHORT-CIRCUIT DURATION TO GND	Indefinite
OUTPUT SHORT-CIRCUIT DURATION TO SUPPLY	Indefinite
OUTPUT SHORT-CIRCUIT DURATION TO BATTERY	20 minutes maximum
VCC SHORT-CIRCUIT DURATION TO BATTERY	20 minutes maximum

TEMPERATURE

OPERATING TEMPERATURE	-40°C to 85°C
STORAGE TEMPERATURE	-40°C to 105°C

ELECTRICAL SPECIFICATIONS

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Units
V_{CC1}, V_{CC2}	Supply Voltage		4.5	5	5.5	V
I_{CC1}, I_{CC2}	Supply Current	Per circuit	4	7	10	mA
V_{OUT1}	Analog Voltage, Θ_1	$\Theta < \Theta_1$	20	22	24	%V_{CC}
	Analog Voltage, Θ_2	$\Theta > \Theta_2$	82	84	86	%V_{CC}
V_{OUT1}	Analog Voltage, Θ_1	$\Theta < \Theta_1$	9	11	13	%V_{CC}
	Analog Voltage, Θ_2	$\Theta > \Theta_2$	40	42	44	%V_{CC}

MECHANICAL

MEASUREMENT ANGLE	48.5°

ENVIRONMENTAL VALIDATION

THERMAL CYCLE / STRESS	SAE J1455 -40°C to 85°C
THERMAL SHOCK	-40°C to 85°C
HUMIDITY	120 hour exposure at 95% humidity from 27°C to 75°C
VIBRATION	Random broadband 5-500Hz, 4G
SALT FOG	ASTM B-117 96 hour exposure
DUST EXPOSURE	24 hour exposure cycled
CHEMICAL EXPOSURE	Diesel fuel, brake fluid, anti-freeze and plastic protectant exposure
MECHANICAL SHOCK	SAE J1455 one meter drop to concrete
EMI RESISTANCE	SAE J1113-1 and E-mark compliant

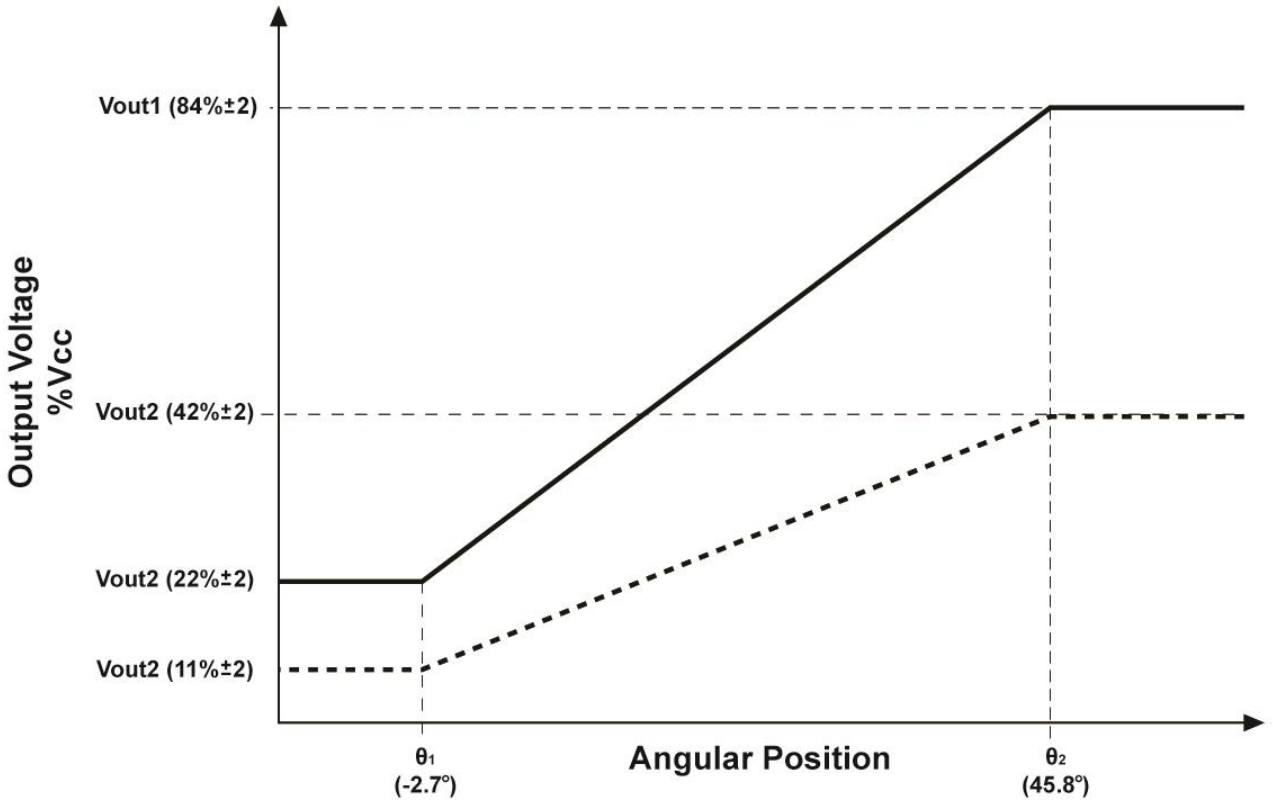
REGULATORY VALIDATION

FMVSS-302 FLAMMABILITY	Per US federal regulations

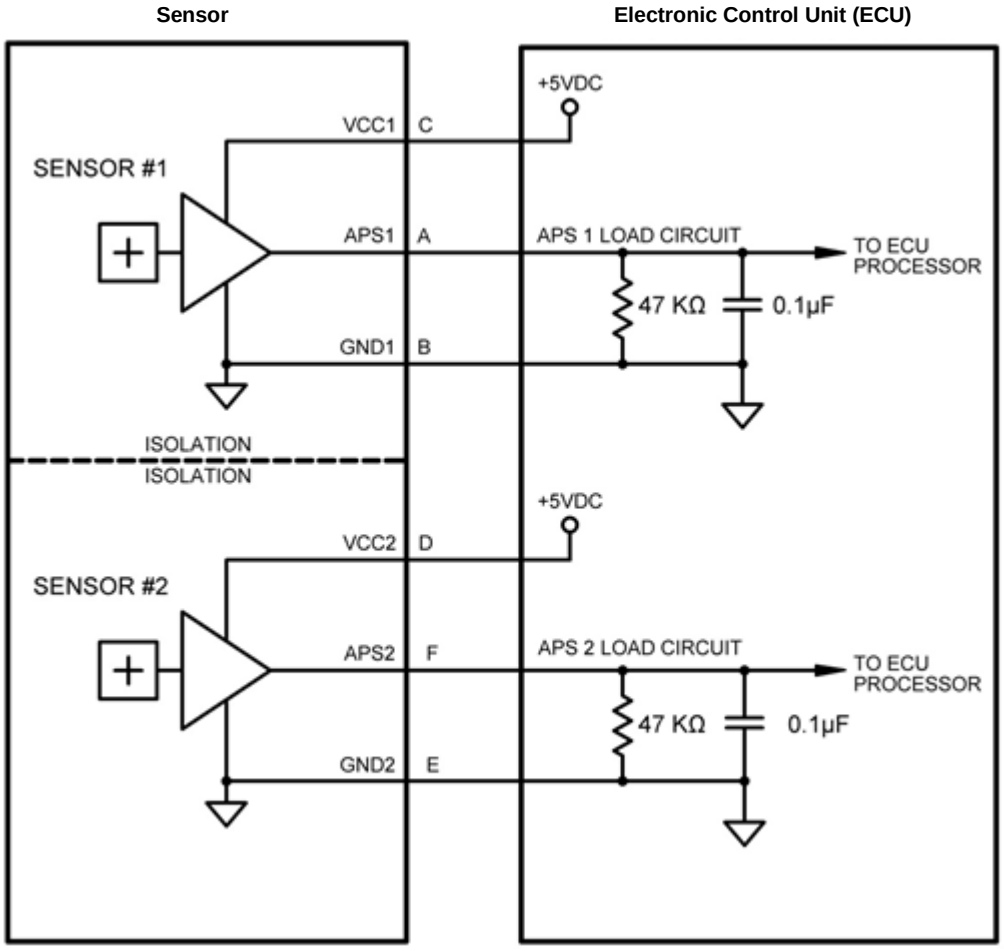
MECHANICAL VALIDATION

FULL STROKE CYCLES	10 million
CYCLE RATE	2Hz

TYPICAL OUTPUT CHARACTERISTICS



APPLICATIONS INFORMATION



SYSTEM SAFETY INFORMATION

System Safety Information

During FMEA analysis (Failure Modes and Effects Analysis, otherwise known as Hazard Analysis), Curtiss-Wright Industrial Group - Williams Controls (CWIG-WMCO) has identified the following potential failure mode of the WM-830 that cannot be mitigated within the sensor assembly:

> Sensor output APS1 or APS2 could get “electrically stuck” at an arbitrary output signal level within the operating range of the sensor.

This potential failure mode cannot be detected and/or resolved within the sensor assembly itself and diagnostic information about this issue cannot be transmitted and/or generated by the sensor assembly, but must be detected by the electronic control unit(s) to which the sensor is connected. To mitigate this potential failure mode, CWIG-WMCO designed and released sensors feature a “Dual-Redundant Output” concept. This sensor will produce two electrically independent output signals that are in direct correlation with each other.

It is the responsibility of the customer to satisfy themself that the sensor is fit for its intended purpose and used in a way that complies with all applicable laws and safety regulations. To mitigate the risk named above, CWIG-WMCO strongly recommends using the sensors built-in redundancy feature. The first APS signal would be used as the source of accelerator position signal information, and the second APS signal would be used for diagnostic purposes only. The comparison of the second (diagnostic) signal with the first (sensor position) signal enables the electronic control unit to fully detect the described “electrically stuck” output failure mode. Software algorithms specifically designed for this purpose are commonly used in the industry and known to mitigate this risk.

IMPORTANT INFORMATION
Whilst Curtiss-Wright Industrial Group – Williams Controls has designed this sensor to meet a range of applications it is the responsibility of the customer to ensure it meets their specific requirement.

Curtiss-Wright Industrial Group – Williams Controls makes no warranty or representation in respect of product fitness or suitability for any particular design application, environment, or otherwise, except as may subsequently be agreed in contract for the sale and purchase of products. Customers should therefore satisfy themselves of the actual performance requirements and subsequently the product’s suitability for any particular design application and the environment in which the product is to be used.

Continual research and development may require change to products and specification without prior notification.

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