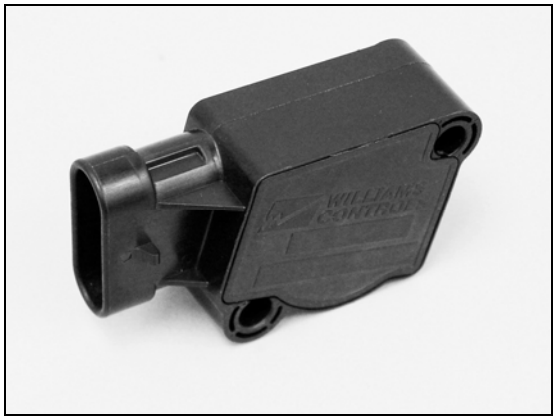
WCS-134143

Rev C - April 8, 2008

Non-contact Rotary Position Sensor



Features

- Dual Ratiometric APS output
- Independent, Isolated APS circuits
- IP66 Sealed
- Highly EMI resistant (SAE J1113)
- +5V Operation
- -40°C to + 85°C Operation
- Integral Preload Spring
- Integral Metripack 150 Series Connector
- Protected against Electrical Misconnection

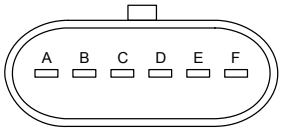
Applications

- Truck Throttle Position Sensor

Description:

This device is a solid-state rotary position sensor that provides a dual linear output voltage proportional to absolute shaft rotation in either direction from a reference angle. It operates from +5V power typically supplied by a vehicle engine control unit (ECU). This device's two outputs are independent and electrically isolated, supporting the implementation of highly fault tolerant and reliable systems.

Connector Pin Configuration



View Facing Connector End

Pin	Function	Pin	Function
A	APS1	D	VCC2 (+5V)
B	GND1	E	GND2
C	VCC1 (+5V)	F	APS2

Mating Connector

Packard Electric "Metri-Pack" Series 150
Housing p/n: 12066317
Terminal p/n: 12103881

Williams Controls
14100 S.W. 72nd Avenue
Portland, OR. 97224

Confidential and Proprietary

Phone (503) 684-8600
Fax (503) 624-3812
Email info@wmco.com

Absolute Maximum Ratings

APS Circuits

Supply Voltage (VCC1, VCC2)	5V +/- 0.5V
Output Current (APS1, APS2 output)	+/-10 mA
APS1,2 short circuit duration to ground	20 Minutes max.
APS1,2 short circuit duration to VCC	20 Minutes max.

Whole Sensor

Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +125°C

Operation of this device beyond absolute maximum ratings may result in permanent damage.

Electrical Specifications

Over -40°C to +85°C temperature range, V_{CCx}=5.0V unless noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{CC1,2}$	APS Supply Voltage		4.5	5	5.5	V
$I_{CC1,2}$	APS Supply Current	Per APS circuit		7	10	mA
V_{DIAG}	APS diagnostic output voltage, selected fault conditions	Broken VCC lead Pull-down load >= 20kΩ	0		2	%VCC
		Broken VCC lead Pull-up load >= 20kΩ	93		100	%VCC
		Broken GND lead Pull-down load >= 20kΩ	0		5	%VCC
		Broken GND lead Pull-up load >= 20kΩ	98		0	%VCC
		Output short-circuited to GND	0		5	%VCC
		Output short-circuited to VCC	95		100	%VCC
T_{RECOV}	Recovery time to normal operation from release of selected fault condition	From all fault conditions specified for V_{DIAG}			0.1	Sec
I_{OUT}	APS Output Current	For rated operation	-1		1	mA

Mechanical Specifications

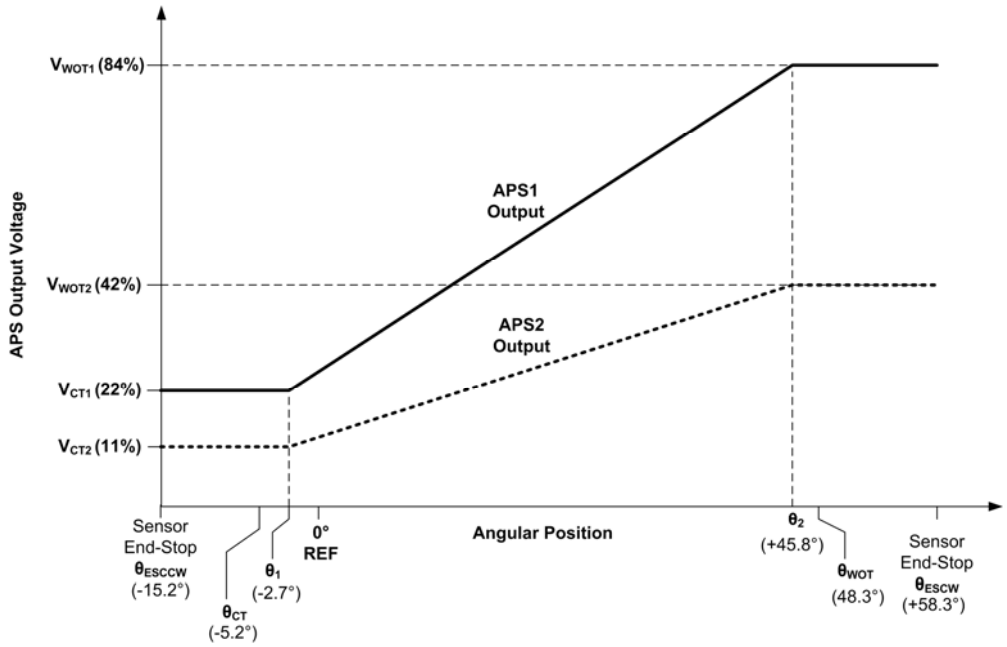
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
θ_{ESCCW}	CCW end-stop angle (CT)	From mechanical reference [1]	-17.2	-15.2	-13.2	°
θ_{ESCW}	CW end-stop angle (WOT)	" "	56.3	58.3	60.3	°
	Direction of Rotation	" "		CW		
θ_{CT}	CT reference point	" "		-5.2		°
θ_{WOT}	WOT reference point	" "		48.3		°
Θ_1	Lower clamp corner	" "		-2.7		°
Θ_2	Upper clamp corner	" "		45.8		°
T_{MNT}	Screw Mounting Torque				25	In-lb
N_{ROT}	Life expectancy rotations	Zero axial, radial load	10^7			
N_{DITH}	Life expectancy dither cycles		$8x10^7$			
	Seal Rating			IP66		

Notes: 1 – Mechanical reference is defined as line through center of mounting bolt holes, refer to Mechanical Dimensions and Characteristics drawing

Environmental Validation

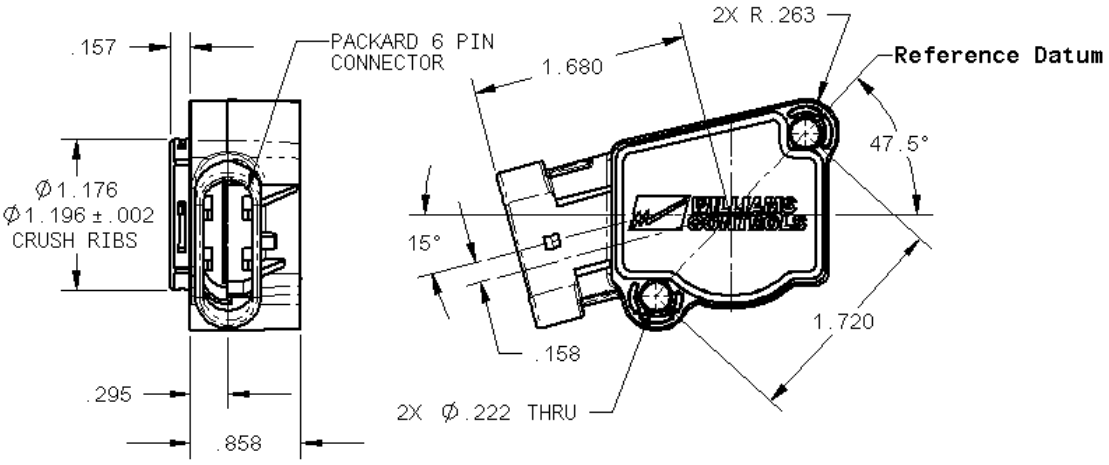
Salt Spray:	**Refer to Williams Spec WDS-010B**
Humidity:	
Chemical Resistance:	
Vibration:	
Thermal Shock:	
EMI Resistance:	**Refer to SAE J1113-1**

Typical Output Characteristics



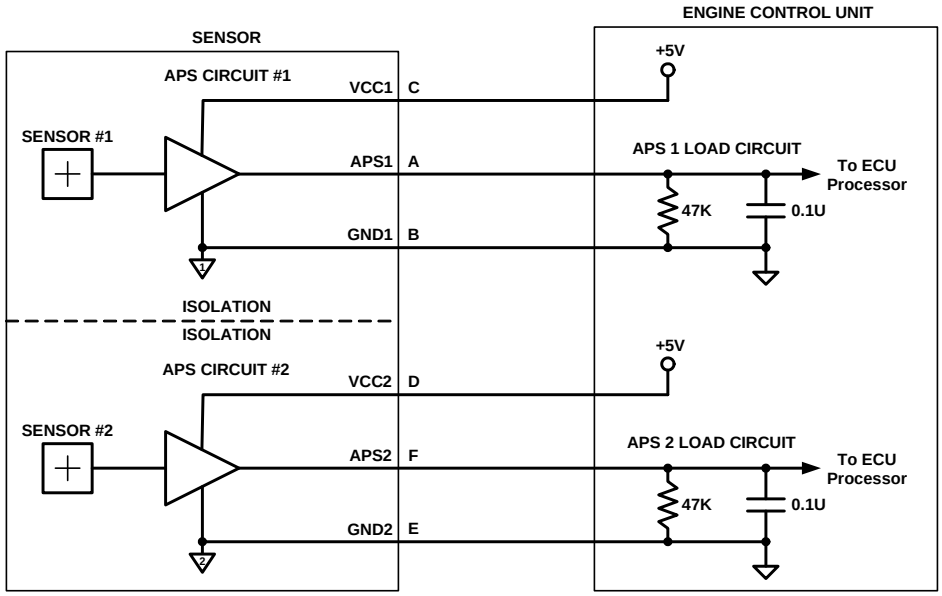
NOTE: All APS voltages are ± 2% V_{ref}.

Mechanical Dimensions and Characteristics (for reference only, refer to DWG# 133915)



Applications Information

The following figure shows suggested interconnection and typical compatible ECU internal load circuits. Note that to maintain maximally redundant operation, separate power and ground signals need to be provided to each sensor.



To aid with ECU diagnostic functions, this sensor is specified to output predetermined voltages in the event that power supply lines or the ground lines are broken. The ranges for these voltages is specified in the 'Electrical Specifications' table under the parameter V_{DIAG}. This voltage is specified for a number of fault and loading conditions.

Referenced Documents:

- **Williams Controls DWG # 133382**
- **Williams Controls Specification # WDS-010B**
- **SAE J1113-1 – Electromagnetic Compatibility Measurement Procedures and Limits for Components of Vehicles, Boats, and Machines**

Revision History

Rev	Date	By	Changes/Comments
A	7/26/06		First release
B	1/07/08	KH	Corrected terminal part number
C	4/8/08	KevinW	Corrected wording in Electrical Spec section (VCC PU – GND PD)