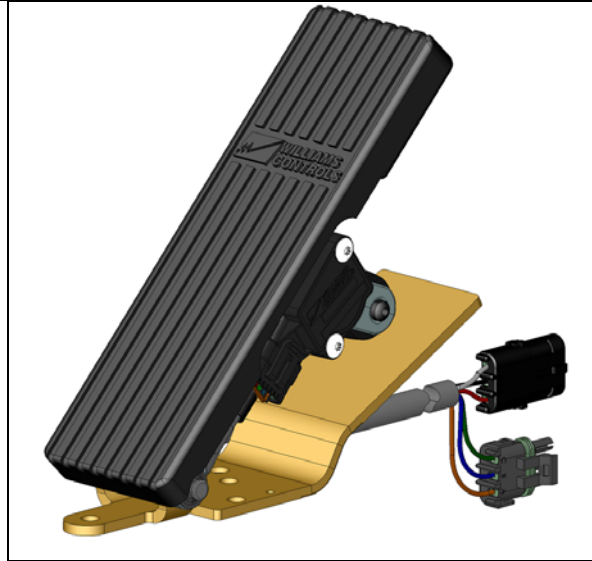


Original Release: 03/25/2009
Original Project: 1429

Williams Customer Specification

Features:

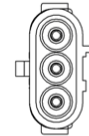
- 45° ± 2° Pedal Angle
- 17° ± 2° Angular Rotation
- FMVSS 124 and 302 compliant
- -40°C to + 85°C Operation
- +5V Operation
- Non-Contact Sensor
- Ratiometric APS output
- Integral Metripack 150 Series Connector
- Protected against Electrical Misconnection



Connector Pin Configuration

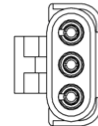
PACKARD ELECTRIC "WEATHER PACK: CONNECTOR
CONNECTOR, KEY INDEX P/N 12010717
TERMINAL PIN (MALE) P/N 12089040
WIRE SEAL P/N 12015323

PIN A---WHITE---APS GROUND 1
PIN B---BLACK---APS SIGNAL 1
PIN C---RED-----APS SUPPLY (5V) 1



PACKARD ELECTRIC "WEATHER PACK: CONNECTOR
CONNECTOR, KEY INDEX P/N 12015793
TERMINAL PIN (MALE) P/N 12089188
WIRE SEAL P/N 12015323

PIN C---GREEN-----APS SUPPLY (5V) 2
PIN B---BLUE-----APS GROUND 2
PIN A---ORANGE---APS SIGNAL 2




Applications:

- Truck Throttle with Position Sensor
- Used with 2007/2010 Cummins engine applications
- Meets Cummins Specification AEB 15.67

Description:

The Electronic Floor Pedal Assembly (EFPA) is designed to provide a signal to the engine fuel control system in response to the driver's request for engine power. A sensor is employed which provides a linear output voltage proportional to the angular displacement of the treadle.

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	Williams Customer Specification Form					
DOCUMENT NUMBER:	WQF-030-021	REVISION LEVEL:	A	DATE EFFECTIVE:	11/13/07	DAF# 00396
QEMS Representative	Mary Knight	Process Owner	Michael Cooper	Department Manager	Scott Thiel	

Absolute Maximum Electrical/Mechanical Ratings

Supply Voltage	+ 5.5 VDC
Output Current	± 10 mA
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Static Load Limit	1500N normal to treadle at 200mm from pivot

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

Vehicle System Safety Information


During FMEA analysis (Failure Modes and Effects Analysis, a.k.a. Hazard Analysis), Williams Controls (WMCO) has identified the following potential failure mode of its Non Contact Sensors that can not be mitigated within the sensor assembly:

- Sensor output APS1 or APS2 (applicable for Dual APS Sensor only) or APS or IVS output (applicable for APS/IVS Sensors only) could get “electrically stuck” at an arbitrary output signal level (for APS only – IVS could get stuck at High or Low signal level) within the operating range of the sensor

This potential failure mode can not be detected and/or resolved within the sensor assembly itself and diagnostic information about this issue can not be transmitted and/or generated by the sensor assembly, but must be detected by the vehicle powertrain control system(s). To mitigate this potential failure mode, 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.

To mitigate the risk named above, Williams Controls strongly recommends using the sensor’s built-in redundancy feature. The first APS signal would be used as the source of accelerator position signal information, and the second APS signal (or IVS signal, depending on sensor type) would be used for diagnostic purposes only. The comparison of the second (diagnostic) signal with the first (accelerator position) signal enables the vehicle to fully detect the described “electrically stuck” output failure mode.

Software algorithms specifically designed for this purpose (e.g. “stuck throttle routine”, “stuck pedal routine”...) are commonly used in the industry and known to mitigate this risk.

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Design Verification Testing (Regulatory, Mechanical, Environmental)

Regulatory Validation

- **FMVSS-124 RTI Certification**
Per Federal regulations
- **FMVSS-302 Flammability**
Per Federal regulations
- **Engine Manufacturer Specification**
Per Cummins Standard AEB 15.67

Mechanical Validation

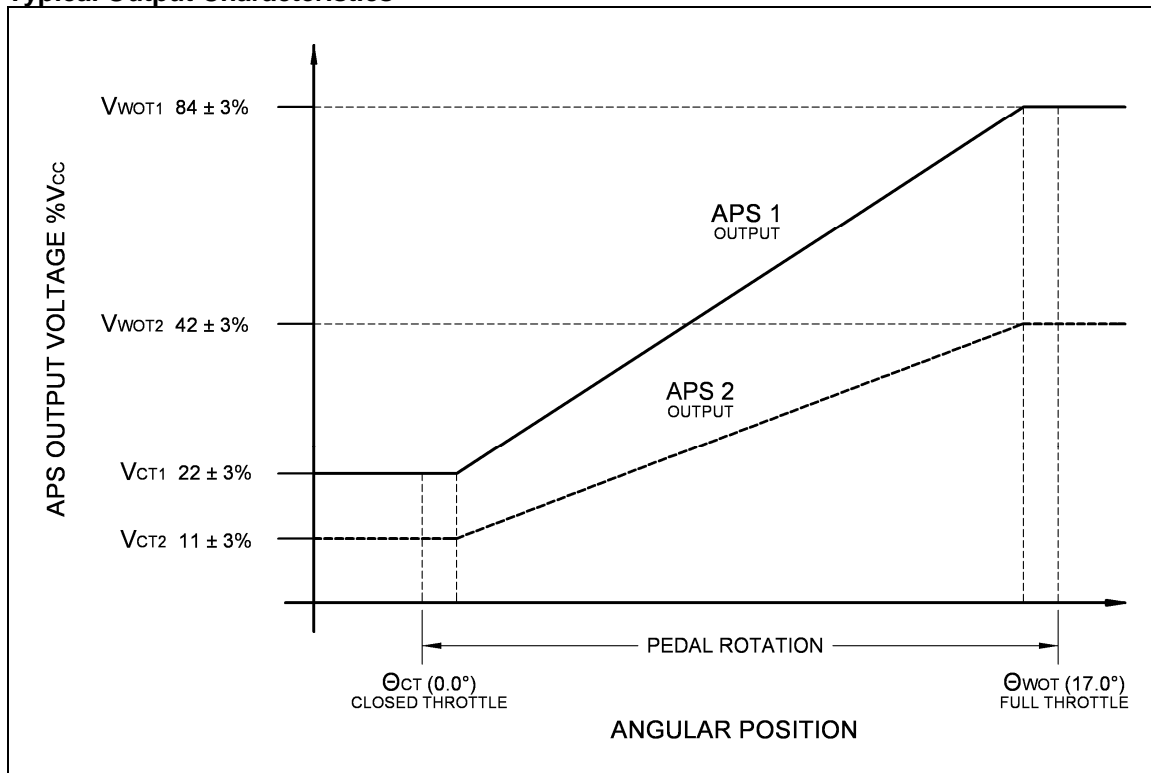
- **Full Stroke Endurance/Durability**
With periodically monitored electrical output
- **Ultimate Strength**
With force vs displacement plots
- **Side Load Deflection**
With Force vs Displacement Plots


Full Stroke Cycles:	3 x 10 ⁶ Cycles
Cycle Rate:	1 Hz

Pedal Environmental Validation:

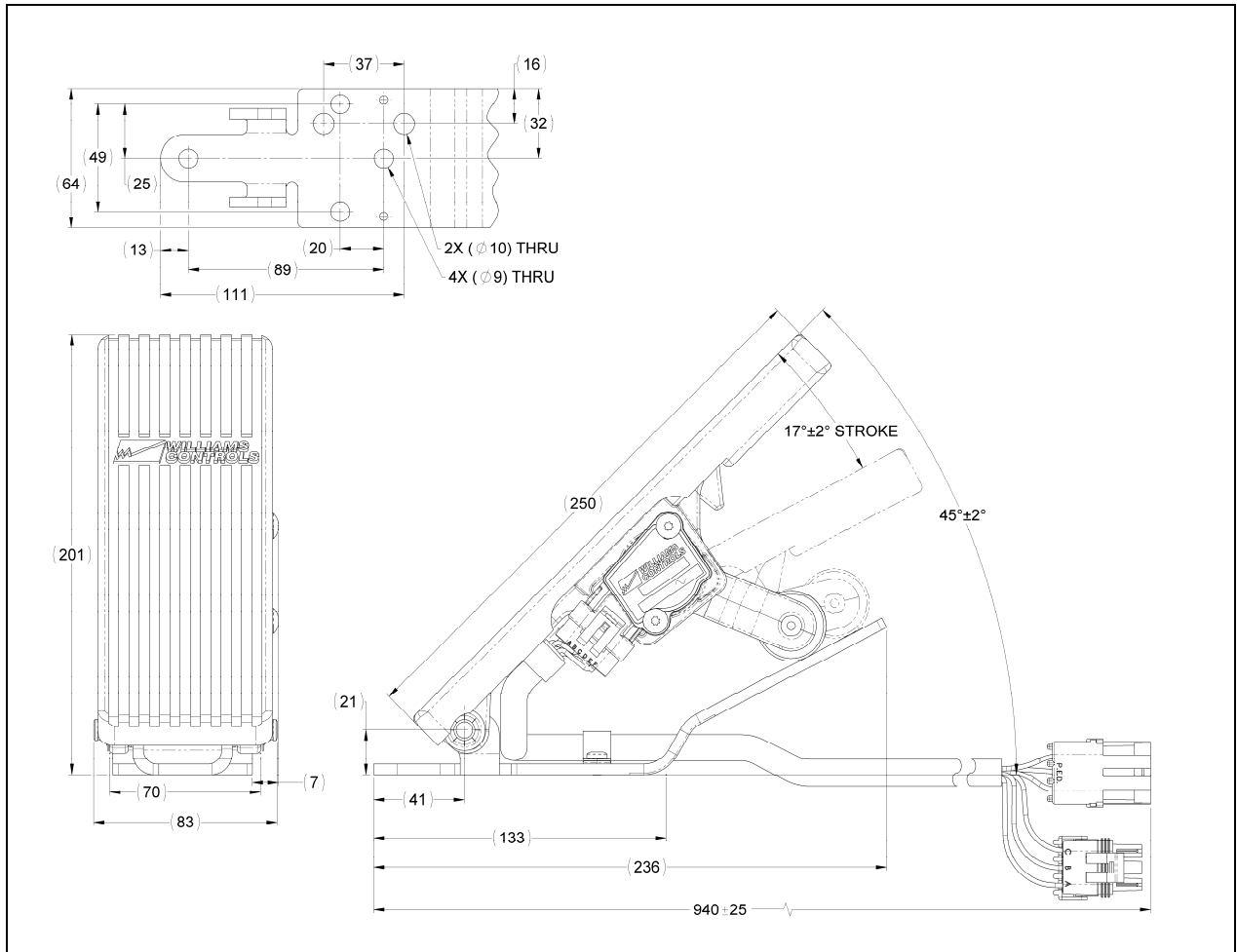
Thermal Cycle:	Refer to Williams Spec WDS-010
Thermal Stress:	
Thermal Shock:	
Humidity:	
Vibration:	
Salt Spray:	
Dust Exposure:	
Chemical Immersion:	
Pressure Wash:	
Mechanical Shock:	


Typical Output Characteristics



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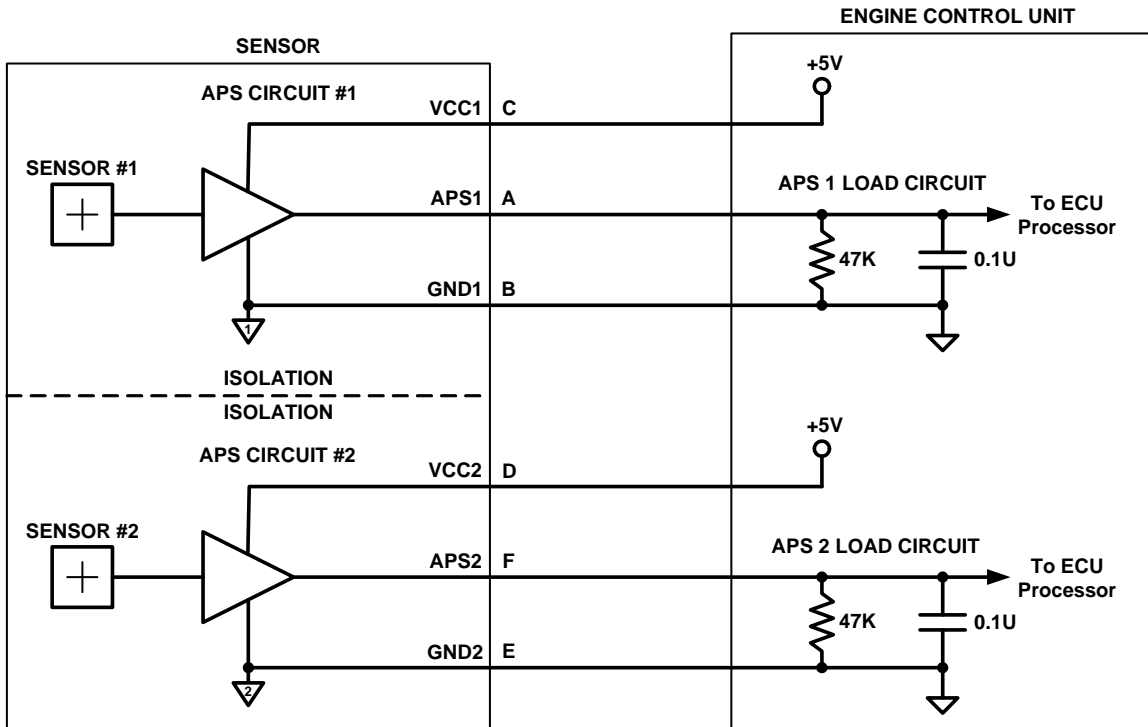
Mechanical Dimensions and Characteristics (for reference only)



 WILLIAMS CONTROLS		PROCEDURE NAME:	DEPT:		030	
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Applications Information:

Load Circuit




Referenced Documents:

- Williams Controls DWG # 351571
- Williams Controls Specification # WDS-010
- FMVSS-124 & FMVSS-302
- SAE J1455
- ASTM B-117
- Cummins Specification AEB 15.67

Revision History

Rev	Date	ECN#	Changes/Comments
A	08/04/2008	000384	Initial Release
B	03/25/2009	000682	Updated/ Revise Load Circuit
C	10/15/2009	001203	Cummins 2010 Compliant

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