

Original Release: 01/18/2008

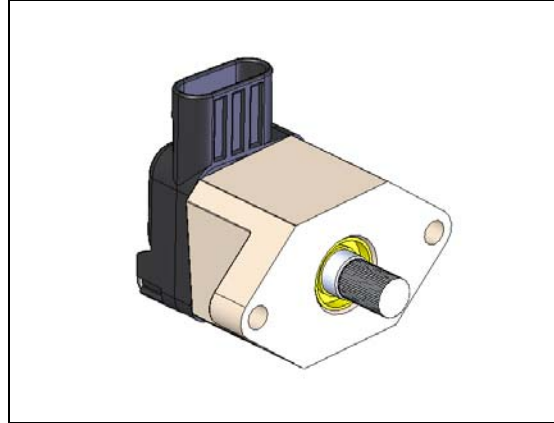
**Williams Customer Specification**

Original Project #: 300

Uses 133284 sensor

**Features:**

- 54° Shaft rotation
- Knurled shaft interface
- Sealed for debris intrusion
- Contact Sensor
  - Ratiometric APS output (13% to 77%)
  - Form C IVS output
  - +5V DC Operation
  - Isolated APS/IVS functions

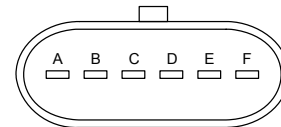


**Applications:**

- Used with the following engines:
  - Cummins (Prior to 2007)
  - Detroit Diesel III, IV, & V
  - International
  - Mack
  - MB NAFTA

**Sensor Mating Connector Pin Configuration**

- Connector A:
  - Packard Electric "Metri-Pack" Connector 12066317




View Facing Connector End

Pin	Function	Pin	Function
A	APS SIG	D	IVS2 N.O.
B	APS GND	E	IVS1 N.C.
C	APS SUP (5V)	F	IVS SUP (5V)

**Description:**

The remote sensor assembly is designed to provide an interface between an electronic sensor and mechanical input motion from the operator. A sensor is employed which provides a voltage proportional to the shafts angular displacement. The remote body provides holes for mounting the sensor to the remote and for mounting the remote to the host machine.

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

## Absolute Maximum Electrical/Mechanical Ratings

Supply Voltage (APS, IVS)	+/-5.5V
Output Current (APS, IVS)	+/- 10 mA
Short Circuit Duration – to GND or VCC	Indefinite
Operating Temperature	-40°C to +85°C
Storage Temperature	-40°C to +85°C
Static Load Limit	See Mechanical Specifications

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

## Electrical Specifications: Remote Assembly


Over -40°C to +85°C temperature range,  $V_{CC}$  = 5V unless noted

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
$V_{CC}$	APS Supply Voltage		4.5	5	5.5	V
$I_{CC}$	APS Supply Current			7	10	mA
$V_{CT}$	CT Output, APS	$\theta < \theta_{CT}$	11	13	15	%VCC
$V_{WOT}$	WOT Output, APS	$\theta > \theta_{WOT}$	75	77	79	%VCC
$V_{SPAN}$	Voltage Span		60	64	68	%VCC
$V_{IVS}$	IVS Supply, Voltage		4.5	5	5.5	V
$I_{IVS}$	IVS Supply, Current				10	mA
$V_{IVS}$	IVS <sub>1</sub> , IVS <sub>2</sub> Transition Voltage	For rated operation	3% of Span + $V_{CT}$	--	10% of Span + $V_{CT}$	%VCC

## Mechanical Specifications: Remote Assembly

Parameter	Conditions	Min.	Typ.	Max.	Units
Tang angle at CT	From Mechanical Reference <sup>1</sup>	--	-6	--	°
Shaft Angular Displacement	See Drawing	--	54	--	°
Actuation Force – without sensor	No Sensor attached	--	--	3.3 (.373)	ln*lb (N*m)
Maximum Input Torque	Applied to shaft	--	--	15 (1.70)	ln*lb (N*m)
Maximum Torque for mounting bolts	For mounting to host machine	--	--	65 (7.34)	in*lb (N*m)
Maximum Axial Load	Away from sensor	--	--	101 (450)	lbs (N)
Life expectancy, B10 life	No Axial load	$5 \times 10^6$	--	--	cycles
Life expectancy, B10 life	Maximum Axial load	$0.25 \times 10^6$	--	--	cycles

Notes: 1 – Mechanical reference is defined as line through center of sensor mounting bolt holes

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## Design Verification Testing (Regulatory, Mechanical, Environmental)

### Regulatory Validation

- **FMVSS-302 Flammability**  
Per Federal regulations


### Mechanical Validation

- **Full Stroke Endurance/Durability**  
With periodically monitored electrical output
- **Ultimate Strength**  
Axial loading with force vs displacement plots

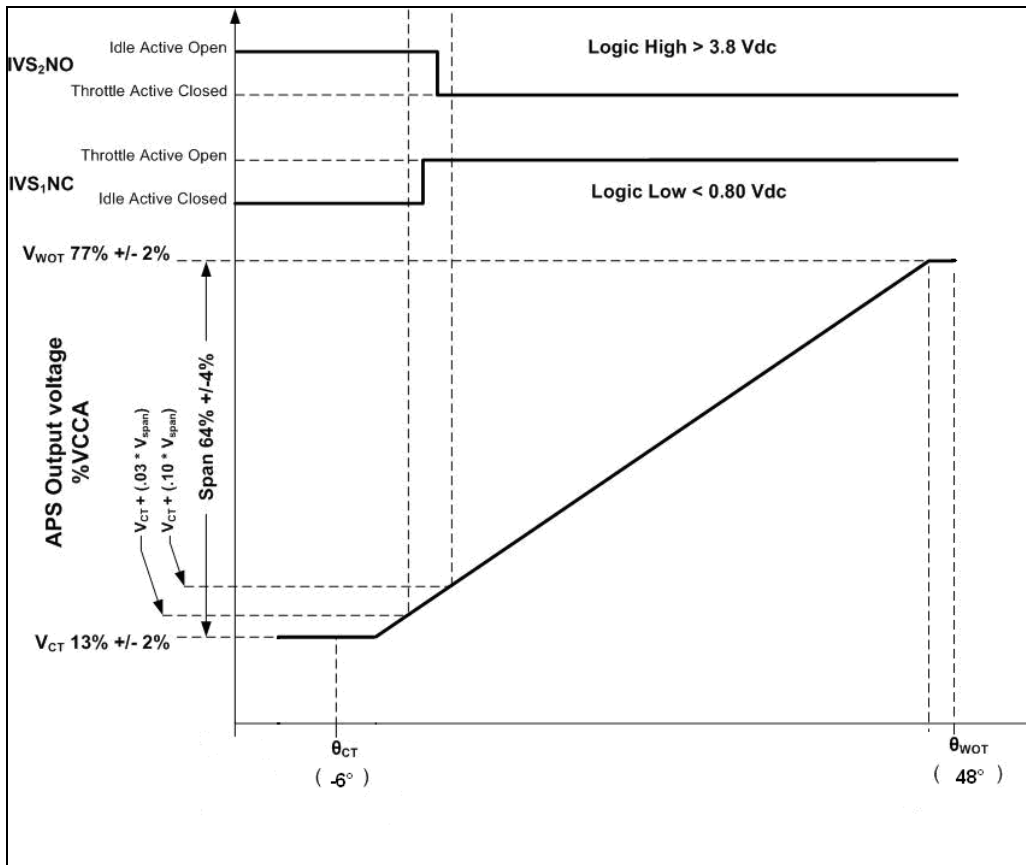
Full Stroke Cycles:	3x10 <sup>6</sup>
Cycle Rate:	1 Hz
Ultimate Load:	100lb Axial Load


### Pedal Environmental Validation: (Refer to Williams Spec WDS-010)

- |  |   |
|--|---|
| - <b>Thermal Cycle / Stress</b><br>SAE J1455 -40°C to +85°C                | - <b>Chemical Exposure</b><br>Diesel fuel, brake fluid, antifreeze, and plastic protectant exposure.  |
| - <b>Thermal Shock</b><br>-40°C to +85°C                                   | - <b>Pressure Wash</b><br>250 psig detergent at +75°C - 40 minute exposure, 0.05 rpm<br>1000 psig water at +75°C - 40 minute exposure, 0.05 rpm |
| - <b>Humidity</b><br>120 hour exposure at 95% humidity from +27°C to +75°C | - <b>Mechanical Shock</b><br>SAE J1455 One meter drop to concrete with additional harness drop test.  |
| - <b>Salt Spray Exposure</b><br>ASTM B-117 96 hr exposure                  |   |
| - <b>Dust Exposure</b><br>24 Hr exposure, pedals cycled                    |   |

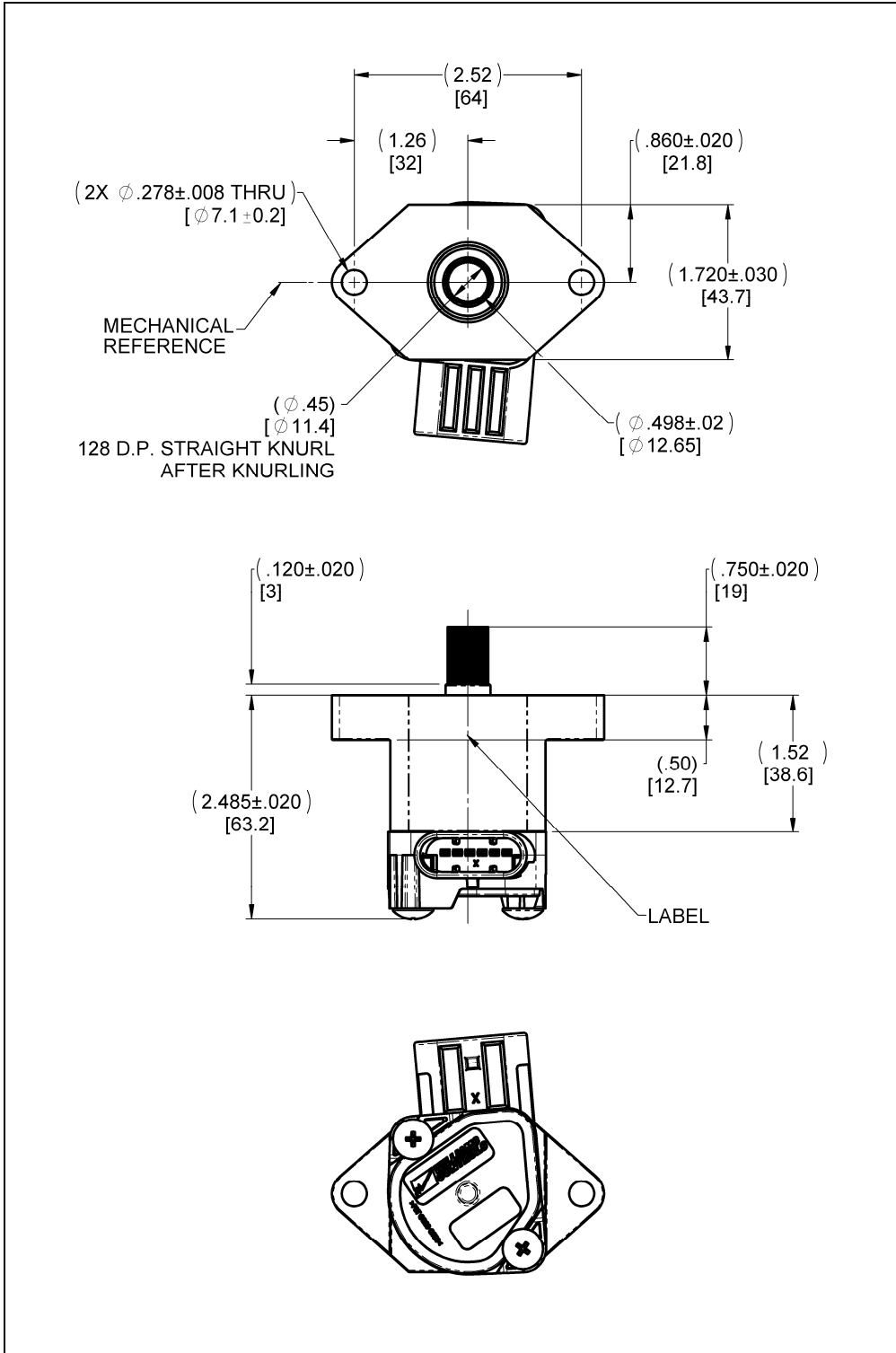
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## Typical Output Characteristics



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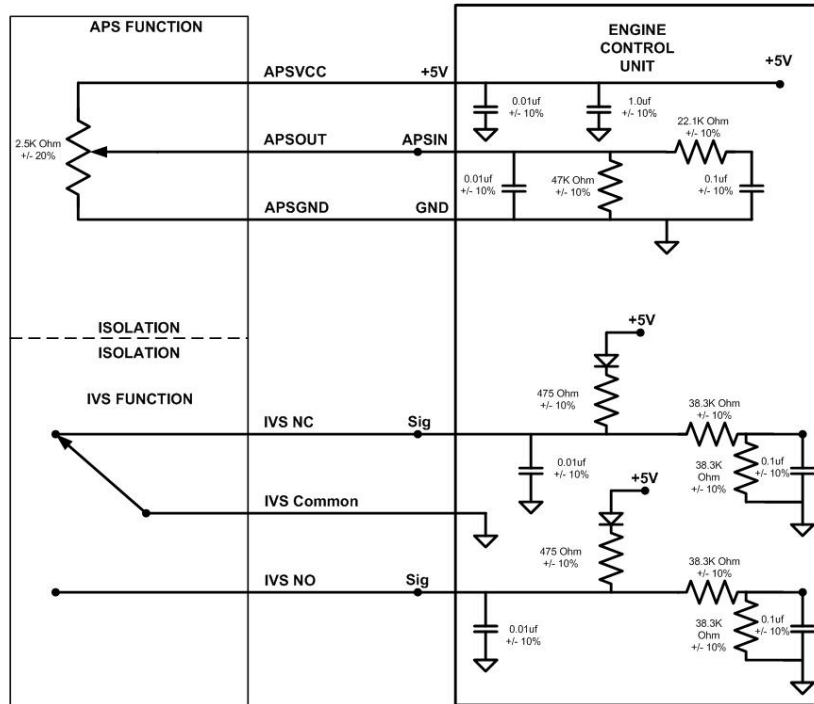
**Mechanical Dimensions and Characteristics (for reference only)**



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## Applications Information:

### Load Circuit




## Referenced Documents:

- Williams Controls DWG # 131032
- Williams Controls specification # WCS-133284
- Williams Controls Specification # WDS-010

## Revision History

Rev	Date	ECN#	Checked	Approved	Changes/Comments
A	01/18/2008	41818	SCN	SCN	New release

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