

# **MCS Digital (PWM)** Electronic Throttle Controls for **Caterpillar ACERT Engines**



# **MCS**

***We make your engine run***

	<b>ELECTRONIC THROTTLE CONTROLS</b>	<b>Caterpillar ACERT (PWM 500Hz) APPLICATION</b>	Page 2 of 10  V8.0
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## **Technical description :**

The **MCS**<sup>®</sup> Electronic Digital Throttle Controls have been developed to match the signal required to operate the Caterpillar ACERT Engine Management System. The signal generated by the Throttle Controls will allow a smooth and precise engine speed control.

The Hall Effect Sensor, fitted on the Throttle Control has two galvanic separated output signals. Depending upon setting, the sensor can deliver **one single PWM** signal or **two PWM** signals which could be parallel or redundant.

The **frequency** of each PWM output signal is **programmable** between 200Hz and 500Hz. Nevertheless the frequency is factory preset. The **duty cycle** of each PWM output signal is **programmable** between 5% and 95%.


For ACERT Engine Management System, the sensor is factory preset with **one single PWM 500Hz** output signal.

The **MCS**<sup>®</sup> Electronic Digital Throttle Controls can be connected directly to the ACERT Engine Management System

Optional wire harness according to customer specification (length and connector models) is available upon request.

Please don't hesitate to contact our factory if you need any assistance about your application.

## 1. Heavy Duty Electronic Throttle Pedal

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Two built-in return springs</li> <li>➤ Additional return spring built in the Sensor</li> <li>➤ Angle options : 30°, 35° or 45°</li> <li>➤ Protection classification : IP 66</li> <li>➤ Die cast aluminium treadle and mounting plates</li> <li>➤ Kick down virtual feedback and kick down signal available in option</li> <li>➤ <b>CE</b> certified</li> <li>➤ Complies with FMVSS 124</li> </ul>
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### Mechanical specification:

Pedal angle in rest position	45°, 35° or 30°
Pedal travel angle	22°
Return springs	2
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 66
Connector	AMP – 6 pins – waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


### Throttle Pedal part numbers:

MCS Part number	Pedal angle	MCS drawing number*
962 245 04	45°	501 284
962 235 02	35°	501 307
962 230 02	30°	501 364

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Throttle Pedals with options such as twin sensors, kick down, swivel arm, twin PWM outputs, wire harness or connectors are available upon request.

## 2. Electronic Suspended Throttle Pedal

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Two built-in return springs</li> <li>➤ Protection classification : IP 69K</li> <li>➤ Material: PA66 GF30</li> <li>➤ Magnetic kick down with optional kick down signal available in option</li> <li>➤ <b>CE</b> certified</li> <li>➤ Complies with FMVSS 124</li> </ul>
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### Mechanical specification:

Pedal angle in rest position	15°
Pedal travel angle	24°
Return springs	2
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 69K
Connector	AMP – 6 pins – waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


### Throttle Pedal part numbers:

MCS Part number	Pedal angle	MCS drawing number*
Available upon request	15°	-

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Throttle Pedals with options such as twin sensors, kick down, swivel arm, twin PWM output, wire harness or connectors are available upon request.

### 3. Medium Duty Electronic Throttle Pedal

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Two built-in return springs</li> <li>➤ Angle options : 30°, 35° or 45°</li> <li>➤ Protection classification : IP 69K</li> <li>➤ Material: PA66 GF30</li> <li>➤ Long or short treadle plate available</li> <li>➤ Magnetic kick down with optional kick down signal available in option</li> <li>➤ <b>CE</b> certified</li> <li>➤ Complies with FMVSS 124</li> </ul>
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#### Mechanical specification:

Pedal angle in rest position	45°, 35° or 30°
Pedal travel angle	24°
Return springs	2
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 69K
Connector	AMP – 6 pins – waterproof

#### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


#### Throttle Pedal part numbers:

MCS Part number	Pedal angle	MCS drawing number*
Available upon request	45°	-
Available upon request	35°	-
Available upon request	30°	-

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Throttle Pedals with options such as kick down, swivel arm, twin PWM output, wire harness or connectors are available upon request.

## 4. Electronic Hand Throttle

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Adjustable actuating force</li> <li>➤ Travel angle : 90°</li> <li>➤ Protection classification : IP 66</li> <li>➤ Allows engine constant RPM at selected rate through lever position</li> <li>➤ Easy to use in combination with Throttle Pedal or Throttle Position Sensor</li> <li>➤ Very convenient whenever engine is operated from more than one station</li> <li>➤ <b>CE</b> certified</li> </ul>
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### Mechanical specification:

Travel angle – Idle to full throttle -	90°
Actuating force	adjustable
Return spring	none
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 66
Connector	AMP - 6 pins - waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


### Hand Throttle part number:

MCS Part number	Travel angle	MCS drawing number*
972 290 04	90°	501 395

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Hand Throttle with options such as twin PWM output, wire harness or connectors are available upon request.

## 5. Electronic Rotary Control

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Adjustable actuating force</li> <li>➤ Travel angle : 90°</li> <li>➤ Protection classification : IP 66</li> <li>➤ Allows engine constant RPM at selected rate through knob position</li> <li>➤ Easy to use in combination with Throttle Pedal or Throttle Position Sensor</li> <li>➤ Very convenient whenever engine is operated from more than one station</li> <li>➤ <b>CE</b> certified</li> </ul>
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### Mechanical specification:

Travel angle – Idle to full throttle -	90°
Actuating force	adjustable
Return spring	none
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 66
Connector	AMP – 6 pins - waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


### Rotary Control part number:

MCS Part number	Travel angle	MCS drawing number*
Available upon request	90°	-

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Rotary Control with options such as twin PWM output, wire harness or connectors are available upon request.

## 6. Throttle Position Sensor

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ One return spring: 20N Idle – 25N Full +/-2N</li> <li>➤ Travel angle : 42°</li> <li>➤ Protection classification : IP69K</li> <li>➤ Easy to be fitted on an existing pedal cable or linkage</li> <li>➤ Very convenient whenever engine is operated from more than one station</li> <li>➤ One additional external return spring required on throttle mechanism in order to be FMVSS 124 compatible</li> <li>➤ <b>CE</b> certified</li> </ul>
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### Mechanical specification:

Travel angle – Idle to full throttle -	42°
Return spring	1
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP69K
Connector	AMP – 6 pins - waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °

### Throttle Position Sensor part number:

MCS Part number	Travel angle	MCS drawing number*
Available upon request	42°	

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Throttle Position Sensor with options such as wire harness or connectors are available upon request.

## 7. Electronic Side Mounted Hand Throttle



- Digital output signal: PWM 500Hz
- Fitted with Hall Effect Sensor
- Adjustable actuating force
- Travel angle : 90°
- Protection classification : IP 66
- Allows engine constant RPM at selected rate through lever position
- Easy to use in combination with Throttle Pedal or Throttle Position Sensor
- Very convenient whenever engine is operated from more than one station
- **CE** certified

### Mechanical specification:

<b>Travel angle – Idle to full throttle -</b>	90°
<b>Actuating force</b>	adjustable
<b>Return spring</b>	none
<b>Storage temperature</b>	- 40°C to + 95° C
<b>Operating temperature</b>	- 40°C to + 85° C
<b>Protection classification (sealing)</b>	IP 66
<b>Connector</b>	AMP – 6 pins - waterproof

### Electrical specification:

#### PWM - 500Hz Sensor – 1 channel

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °


### Side Mounted Hand Throttle part number:

MCS Part number	Travel angle	MCS drawing number*
975 290 03	90°	503 211

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Side Mounted Hand Throttle with options such as wire harness or connectors are available upon request.

## 8. Direct Drive Hand Throttle

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 500Hz</li> <li>➤ Fitted with Hall Effect Sensor</li> <li>➤ Travel angle : 45°</li> <li>➤ Protection classification : IP 66</li> <li>➤ Allows engine constant RPM at selected rate through lever position</li> <li>➤ Easy to use in combination with Throttle Pedal or Throttle Position Sensor</li> <li>➤ Very convenient whenever engine is operated from more than one station</li> <li>➤ <b>CE</b> certified</li> </ul>
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### Mechanical specification:

Travel angle – Idle to full throttle -	45°
Return spring	none
Storage temperature	- 40°C to + 95° C
Operating temperature	- 40°C to + 85° C
Protection classification (sealing)	IP 66
Connector	AMP - 6 pins - waterproof

### Electrical specification:

**PWM - 500Hz Sensor – 1 channel**

Current consumption	< 12 mA / channel
Power source (Vs)	8 to 36 Volt DC
Output current	Max. 10mA
Range Channel # 1	Idle: 10% +/- 1% – Full throttle: 90% +/- 1%
Range Channel # 2	not activated
Frequency	500Hz +/-15% -set for ACERT Engine Mgt. System
Relative Linearity	+/- 1%
Resolution	0.25 °

### Direct Drive Hand Throttle part number:

MCS Part number	Travel angle	MCS drawing number*
976 245 02	45°	503 293

\* MCS reserves the right to update drawings at any time without notice.

Technical spec sheets and part numbers of Digital Direct Drive Hand Throttles with options such as wire harness or connectors are available upon request.

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