

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



# **MCS**

***We make your engine run***

	<b>ELECTRONIC THROTTLE CONTROLS</b>	<b>MAN</b> Redundant PWM 200Hz <b>APPLICATION</b>	Page 2 of 10 V3.0
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## **Technical description:**

The **MCS**® Electronic Digital Throttle Controls have been developed to match the signal required to operate the **M.A.N. - FFR** 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. The sensor delivers two redundant **PWM 200Hz** signals.


The frequency of each PWM output signal is factory preset at **200Hz** according to **M.A.N.** specification and tolerances for the **FFR** Engine Management System.

The **MCS**® Electronic Digital Throttle Control can be connected directly to the **FFR** 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 200Hz</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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
Relative Linearity	+/- 1%
Resolution	0.25 °


### Throttle Pedal part numbers:

MCS Part number	Pedal angle	MCS drawing number*
962 245 01	45°	501 232
962 235 01	35°	501 229
962 230 04	30°	501 457

\* 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, wire harness or connectors are available upon request.

## 2. Electronic Suspended Throttle Pedal

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 200Hz</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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
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 Analogue Throttle Pedals with options such as twin sensors, kick down, swivel arm, 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 200Hz</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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
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 Analogue Throttle Pedals with options such as kick down, swivel arm, wire harness or connectors are available upon request.

## 4. Electronic Hand Throttle

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 200Hz</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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
Relative Linearity	+/- 1%
Resolution	0.25 °


### Hand Throttle part number:

MCS Part number	Travel angle	MCS drawing number*
972 290 02	90°	501 287

\* 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 wire harness or connectors are available upon request.

## 5. Electronic Rotary Control

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 200Hz</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 - 200Hz Sensor – 2 channels**

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
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 wire harness or connectors are available upon request.

## 6. Throttle Position Sensor

	<ul style="list-style-type: none"> <li>➤ Digital output signal: PWM 200Hz</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 - 200Hz Sensor – 2 channels**

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
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 200Hz
- 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:

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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
Relative Linearity	+/- 1%
Resolution	0.25 °


### Side Mounted Hand Throttle 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 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 200Hz</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 - 200Hz Sensor – 2 channels

Current consumption	< 12 mA / channel
Power source (Vs)	Between 8 and 36 V DC / channel
Output current	Max. 10mA / channel
Range Channel # 1 (PWM 1)	78% - 29% +/- 1%
Range Channel # 2 (PWM 2)	22% - 71% +/- 1%
Frequency	200Hz +/- 15% - <b>set for FFR module</b>
Relative Linearity	+/- 1%
Resolution	0.25 °

### Direct Drive Hand Throttle part number:

MCS Part number	Travel angle	MCS drawing number*
Available upon request	45°	-

\* 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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