Inductive Sensortelemetry
Multi Channel Sensor Signal Amplifiers
and Receivers

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Multi-channel sensor signal amplifier

Position (Differential transformer)
Contactless distance (µ transducer)
Hall sensor
Strain gage half bridge
Strain gage full bridge
Thermocouple
PT100 RTD
Piezo electric

Remote Control (option)

Multi-channel receiver

Inductive supply and transmitting 13.56 MHz

Coupling

0 to ±10V
90 to 270V AC (9 to 36 V DC)
Ethernet, USB, CAN
Remote Calibration

Number of channels up to 128

Configuration (modular inductive Telemetry)
Signal Flow Diagram Sensor Signal Amplifier

1. Strain Gage Bridge
2. Strain Gage Bridge
3. Strain Gage Bridge

5 V analog
5 V digital

Isochronous sampling

Sampling rate up to 200k
Sampling rate up to 200k
Sampling rate up to 200k

Power

Logic

about 13 Mbit/s

Digital multiplexer

Digital multiplexer

A/D Converter 12/16 Bit
A/D Converter 12/16 Bit
A/D Converter 12/16 Bit

Filter

Filter

Filter

0 up to 50kHz
0 up to 50kHz
0 up to 50kHz

Sampling

Sampling

Sampling

Remote shunt calibration
Remote shunt calibration
Remote shunt calibration

5 V
5 V
5 V

Analog
Digital

Strain Gage Bridge

Prog. Amplifier

Prog. Amplifier

Prog. Amplifier

Vs
Vs
Vs

Rv
Rv
Rv

Logic about 13 Mbit/s
Multi Channel Sensor Signal Amplifier Type M
(Standard)

2/3/4 Channel FM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2/3/4
Sensitivity: 0,02 mV/V to 20 mV/V
Total samplerate: 2000, (10000 option)
Channel bandwidth: total sampling rate / 4 / number of channels
Strain gage bridge supply: 2,5 V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM
Integrated filter
Resolution: 14 Bits
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_M_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

<table>
<thead>
<tr>
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<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
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<tbody>
<tr>
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<td>85</td>
<td>FM</td>
<td>1000(5000)</td>
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<td>125</td>
<td>666</td>
<td>(3333)</td>
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<tr>
<td>4</td>
<td></td>
<td>150</td>
<td>500</td>
<td>(2500)</td>
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</table>
2 Channel Sensor Signal Amplifier Type M
(Standard)

Radius = 2 mm  Diameter 2.7 mm

Solder pins

2 Channel PCM Transmitter
For strain gage, PT100, (thermocouple option)
Number of channels: 2
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_Mf_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

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<td>125</td>
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<td>8000</td>
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<td>PCM16</td>
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</table>

Page 5
4 Channel Sensor Signal Amplifier Type M
(Standard)

For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5 (3,3”) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_Mf_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

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<td>0.02</td>
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<td>3</td>
<td>0.01</td>
<td>PCM16 8000</td>
</tr>
<tr>
<td>4</td>
<td>0.003</td>
<td>150 40000</td>
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</table>
2/4 Channel Sensor Signal Amplifier Type M
(Standard)

2/3/4 Channel PCM Transmitter
For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5 (3.3) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain / zero and autozero with 12 Bits resolution (option)
Enviromental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>

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<th>Bandwidth</th>
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<th>Bridge Resistance</th>
<th>Transmission</th>
<th>Resolution</th>
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<th>Environmental Temperature</th>
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<td>-</td>
<td>-</td>
<td>20 000</td>
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<td>0.01</td>
<td>125</td>
<td>Fu</td>
<td>PCM16</td>
<td>Radio</td>
<td>16 Bits</td>
<td>-</td>
<td>-</td>
<td>8000</td>
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<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>RC</td>
<td>40000</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>200 000</td>
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</table>

- : inductive
Fu: Radio Transmission

Diameter 3.2 mm
Radius = 2 mm
Solder pins

weight: 70 g
Microsized 4 channel sensor telemetry signal amplifier substrat with inductive transmission, special for strain gauge applications with remote controlled conditioning / set up and integrated test function.

**Description:**
Microsized 4 channel sensor telemetry signal amplifier substrat with inductive transmission, special for strain gauge applications with remote controlled conditioning / set up and integrated test function.

**4 Channel PCM Transmitter**
- Strain gauge channels (full - half - and quarterbridge, DC & AC)
- Channel number: 4
- Strain gauge resistance 120...1000 Ohm
- Continuous remote adjustable input range 0.1mV/V...12mV/V with 16 bit resolution
- Remote zero/autozero with 16 Bit resolution
- Stain gauge bridge voltage: 3.3 volts
- Remote dyn. (f = 1 kHz retangular) and static shunt calibration
- Remote changeable polarity of every strain gauge signal
- Signal out of range detection
- Online acquisition of every rotor channel temperature
- Online survey of overload of the signals
- Detection of defective strain gauges (shortcut or cut-off)
- Remote shunt calibration function
- Integrated sinusoid signal test with different frequencies (360Hz...23.4kHz)
- Channel samplerate (1/s): 4000, 40000, max. 200000
- Bandwith: 0..1 kHz/10kHz/ max. 50kHz, (3dB)
- Signal resolution: 12 bits, crosstalk: < -60 dB
- Signal/noise ratio: > 62 dB (amplifier)
- Zeroisntar drift (amplifier) 0.02%/°C at 1mV/V sensitivity
- Gain drift (amplifier): 0.02%/°C
- Digital serial data output: 3.39 Mbit (max. 12.8 Mbit)
- Supply: inductive 3,39/6,78/13.56 Mhz, digital clock generation from supply
- Temperature range: -25...125°C/160°C
- Weight: 12 grams

**Mechanical Dimensions:**
- Height: 28.0 mm
- Width: 23.0 mm
- Depth: 4.000 mm

**Type:** MSV_Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC_<brigde>

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<th>Mod</th>
<th>Samplerate</th>
<th>RC</th>
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<td>DCh</td>
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<td>0,01</td>
<td>125</td>
<td>HSPCM16</td>
<td>8000</td>
<td>40000</td>
<td>ACq</td>
<td>Ach</td>
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<tr>
<td>160</td>
<td>20000</td>
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2/4 Channel Sensor Signal Amplifier Type SM
(Miniature)

2/3/4 Channel PCM Transmitter
- For strain gage, PT100, (thermocouple option)
- Number of channels: 2/3/4
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 5 (3,3*) V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM
- Integrated filter
- Resolution: 12 Bits (16 Bits)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Enviromental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 20 000 g (depending on fixing)
- Type: MSV_SM_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC

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<td>2</td>
<td>0.02</td>
<td>85</td>
<td>4000</td>
</tr>
<tr>
<td>3</td>
<td>0.01</td>
<td>125</td>
<td>8000</td>
</tr>
<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>40000</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>200000</td>
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</table>
4 Channel Sensor Signal Amplifier Type R (Cartridge) (Standard)

2/3/4 Channel PCM Transmitter
For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_P_<channels>_ <accuracy> _<temp> _<mod> _<samplerate>

<table>
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<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
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<tr>
<td>2</td>
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<td>85</td>
<td>PCM</td>
<td>4000</td>
</tr>
<tr>
<td>3</td>
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<td>125</td>
<td>PCM</td>
<td>8000</td>
</tr>
<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>PCM</td>
<td>40000</td>
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</table>

Page 10
4 Channel Sensor Signal Amplifier Type M water proof

(Standard)

2/3/4 Channel PCM/FM Transmitter

For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5, (3.3)* V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM or FM
Integrated filter
Resolution: 12 (16 bit option)
Zero point drift: 0.02, (0.01 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Protection: IP67

Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_wa
2 0.02 85 FM 1000(5000) - wa
3 0.01 125 Fu PCM 666 (3333) RC
4 0.003 150 Fu 500 (2500)

**- : inductive
Fu: Radio Transmission

Page 11
4 Channel Sensor Signal Amplifier Type M water proof integrated Rotor Antenna

2/4 Channel PCM/FM Transmitter

- For strain gage. PT100, (thermocouple option)
- Number of channels: 2/4
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 10 kHz (-3dB)
- Strain gage bridge supply: 5, (3.3)* V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM, Spot-Mode
- Integrated rotor antenna
- Resolution: 12 (16 bit option)
- Zero point drift: 0.02, (0.01 option)
- Remote shunt calibration
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 20 000 g (depending on fixing)
- Protection: IP67

Type: MSV_Mr_<channels>_ <accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_wa

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<th>Channels</th>
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<th>Mod</th>
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<th>RMC</th>
<th>Wa</th>
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<tr>
<td>2</td>
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<td>85</td>
<td>FM</td>
<td>1000(5000)</td>
<td>-</td>
<td>wa</td>
<td></td>
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<tr>
<td>3</td>
<td>0.01</td>
<td>125</td>
<td>Fu</td>
<td>PCM</td>
<td>666 (3333)</td>
<td>RC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>4000</td>
<td>8000</td>
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</table>

** Fu: Radio Transmission

Page 12
Multi Channel Sensor Signal Amplifier Type M
(Standard)

8 Channel FM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 8
Sensitivity: 0.02 mV/V to 20 mV/V
Total sample rate: 2000, (10000 option)
Channel bandwidth: total samplerate / 4 / number of channels
Strain gage bridge supply: 2.5 V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM
Integrated filter
Resolution: 12 Bits
Zero point drift: 0.02, (0.01 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)
Type: MSV_M_<channels>_ <accuracy> _<temp> _<mod> _<samplerate>

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<td>85</td>
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<tr>
<td>0.01</td>
<td>125</td>
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* Max. sample rate/channel = total sample rate / No. of channels
8 Channel Sensor Signal Amplifier Type M (Standard)

**Multi Channel PCM Transmitter**

- For strain gage, PT100, thermocouple
- Number of channels: 2/4/8/12/16
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 5 (3,3*) V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM
- Integrated filter
  - Resolution: 12 Bits (16 Bits)
  - Zero point drift: 0.02, (0.01, 0.003 option)
  - Remote shunt calibration
  - Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 20 000 g (depending on fixing)

**Type:** MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>

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<td>8000</td>
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**-** : inductive
Fu: Radio Transmission

- Diameter 3.2 mm
- Solder pins
- Weight: 100 g

- Channel 1
- Channel 8

**Note:**
- Diameter 3.2 mm
- Solder pins
Multi Channel PCM Transmitter with Connector

- For strain gage, PT100, thermocouple
- Number of channels: 2/4/8/12/16/32
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 5 (3.3*) V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM, radio telemetry
- Integrated filter
- Resolution: 12 Bits (16 Bits)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 2 000 g (depending on fixing)
- Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_<Gl

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<th>Temperature</th>
<th>System</th>
<th>Mode</th>
<th>Samplerate</th>
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<th>Gain/Zero</th>
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<td>0.01</td>
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<td>Fu</td>
<td>PCM16</td>
<td>4000</td>
<td>RC</td>
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<td></td>
</tr>
<tr>
<td>24</td>
<td>0.003</td>
<td>150</td>
<td>RC</td>
<td>8000</td>
<td>40000</td>
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<td></td>
</tr>
<tr>
<td>32</td>
<td>0.003</td>
<td>150</td>
<td>RC</td>
<td>8000</td>
<td>200000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
32 Channel Sensor Signal Amplifier Type M (Standard)

Multi Channel PCM Transmitter with Connector

- For strain gage, PT100, thermocouple
- Number of channels: 2/4/8/16/32
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 5 (3.3*) V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM, radio telemetry
- Integrated filter
- Resolution: 12 Bits (16 Bits)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 2 000 g (depending on fixing)

Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Sample Rate</th>
<th>Max Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.02</td>
<td>85</td>
<td>PCM12</td>
</tr>
<tr>
<td>4</td>
<td>0.01</td>
<td>125</td>
<td>Fu</td>
</tr>
<tr>
<td>8</td>
<td>0.003</td>
<td>150</td>
<td>PCM16</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>RC</td>
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<tr>
<td>16</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 16
32 Channel Sensor Signal Amplifier Type C
(Standard)

Multi Channel PCM Transmitter with Connector

- For strain gage, PT100, thermocouple
- Number of channels: 2/4/8/12/16/32
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 5 (3.3*) V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM, radio telemetry
- Integrated filter
- Resolution: 12 Bits (16 Bits)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 2000g (depending on fixing)
- Type: MSV_M_<channels>_ <accuracy>_ <temp>_ <sys>_ <mod>_ <samplerate>_ <rmc>_ GI

<table>
<thead>
<tr>
<th>Channels</th>
<th>Sensitivity</th>
<th>Resistance</th>
<th>Samplerate</th>
<th>Rmc</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.02</td>
<td>85</td>
<td>PCM12</td>
<td>1000</td>
</tr>
<tr>
<td>4</td>
<td>0.01</td>
<td>125</td>
<td>Fu</td>
<td>PCM16</td>
</tr>
<tr>
<td>8</td>
<td>0.003</td>
<td>150</td>
<td></td>
<td>8000</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td>40000</td>
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<tr>
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</tr>
<tr>
<td>32</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
4/8 Channel Temperature Sensor Signal Amplifier Spot
(2 internal Channels)

4/8 Channel PCM Transmitter Spot
For insulated thermocouple or PT100
Number of channels: 4/8
Temperature measuring range: 0 to 650°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Integrated rotor antenna
Sample time (contact time): ~1.4 ms
Resolution: 12 Bits
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 180°C)
Max load: 20 000g (depending on fixing)

Type: MSV_Mr_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_spot

<table>
<thead>
<tr>
<th>Channel</th>
<th>Type</th>
<th>Accuracy</th>
<th>Temperature</th>
<th>Mod</th>
<th>Samplerate</th>
<th>Spot</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,02</td>
<td>85</td>
<td>PCM12</td>
<td>1100</td>
<td>spot</td>
<td></td>
</tr>
<tr>
<td>8 (2 internal)</td>
<td>0,01</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4 Channel Temperature Sensor Signal Amplifier Type M
(Standard)

4 Channel PCM Transmitter Spot
For non insulated / insulated thermocouple or PT100
Number of channels: 4
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
Environmental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)
Type: MSV_M_ <channels> <accuracy> <temp> <mod> <samplerate> TC

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>0,01</th>
<th>85</th>
<th>PCM16</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter 2,1 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Channel 1</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Channel 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4 Channel Temperature Sensor Signal Amplifier Type M
(Screw Terminal Block)

For non insulated / insulated thermocouple or PT100
Number of channels: 4 (non insulated / insulated thermocouple)
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 500/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
Enviromental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)

Type: MSV_Sc_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,01</td>
<td>85</td>
<td>PCM16</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>0,002</td>
<td>125</td>
<td></td>
<td>160</td>
</tr>
</tbody>
</table>
8 Channel Temperature Sensor Signal Amplifier Type M
(Screw Terminal Block)

8 Channel PCM Transmitter (Screw Terminals)
For insulated thermocouple or PT100

- 6 external (insulated thermocouple)
- 1 internal temperature
- 1 reference, 80% of selected range

Temperature measuring range: 0 to 550°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Spot mode: min. contact time: 1,4 ms for 8 channel transfer
Resolution: 12 Bits
Zero point drift: ±0,02%
Environmental temperature range: -25 to +180°C
Weight: 3g
Max load: 20 000g (depending on fixing)
Type: MSV_Sc_<channels>_ <accuracy>_ <temp> _<mod>_ <samplerate>_ TC

<table>
<thead>
<tr>
<th>Channels</th>
<th>&lt;accuracy&gt;</th>
<th>&lt;temp&gt;</th>
<th>&lt;mod&gt;</th>
<th>&lt;samplerate&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,02</td>
<td>180</td>
<td>PCM</td>
<td>2000</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4/2 Channel Temperature Sensor Signal Amplifier Type M
(Standard)

4/2 Channel PCM Transmitter Spot
For non insulated / insulated thermocouple or PT100
Number of channels: 4
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
Enviromental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)

<table>
<thead>
<tr>
<th>Type</th>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
<th>TC</th>
</tr>
</thead>
<tbody>
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<td>0,01</td>
<td>85</td>
<td>PCM16</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0,002</td>
<td>125</td>
<td></td>
<td></td>
<td>160</td>
</tr>
</tbody>
</table>
4 Channel Temperature Sensor Signal Amplifier Type Micro (Standard)

**Diagram:**
- K1, K2, K3, K4
- HF
- Channel 1
- Channel 4
- Cold junction compensation

**4 Channel PCM Transmitter**

- For non insulated / insulated thermocouple
- Number of channels: 4
- Temperature measuring range: 0 to 500°C (different ranges option)
- Thermocouple type K (NiCr-Ni) (other types option)
- Transmission: inductive sensor telemetry PCM
- Sampling rate: 500/sec/channels
- Integrated filter 1 Hz (10 Hz) for noise supression on input lines
- Resolution: 16 Bits
- Zero point drift: 0.01, (0.002 option)
- Environmental temperature range: -25 to +85°C (125°C, 160°C)
- Max load: 20 000g (depending on fixing)

<table>
<thead>
<tr>
<th>Type</th>
<th>&lt;channels&gt;</th>
<th>&lt;accuracy&gt;</th>
<th>&lt;temp&gt;</th>
<th>&lt;mod&gt;</th>
<th>&lt;samplerate&gt;</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSV_Em</td>
<td>4</td>
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<td>85</td>
<td>PCM</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.002</td>
<td>125</td>
<td></td>
<td></td>
<td>2000</td>
<td></td>
</tr>
</tbody>
</table>

Wire length: 100 mm
2/4 Channel Universal Miniature Sensor Signal Amplifier Type M
(Standard)

4 Channel PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2/4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage bridge supply: 5 (3.3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Resolution: 16 Bits
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000g (depending on fixing)
Type: MSY_Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.01</td>
<td>85</td>
<td>PCM16</td>
<td>1000</td>
</tr>
<tr>
<td>2</td>
<td>0.002</td>
<td>125</td>
<td>160</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40000</td>
</tr>
</tbody>
</table>

Wire length: 100 mm
* 4 channel sensor signal amplifier
4 Channel Temperature Sensor Signal Amplifier Type R (Cartridge)
(Standard)

4 Channel PCM Transmitter
For non insulated / insulated thermocouple or PT100
Number of channels: 8 (non insulated / insulated thermocouple)
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
Environmental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)

Type: MSV_P_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC
<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temperature</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,01</td>
<td>85</td>
<td>PCM16</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>0,002</td>
<td>125</td>
<td></td>
<td>160</td>
</tr>
</tbody>
</table>

Cold junction compensation

Diameter = 2,6
8/10 Channel Temperature Sensor Signal Amplifier Type M
(Standard)

8/10 Channel PCM Transmitter
For non insulated / insulated thermocouple or PT100
Number of channels:
- 8 external (non insulated / insulated thermocouple)
- 1 internal temperature
- 1 reference, remote switchable 0/80% of selected range
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Resolution: 16 Bits
Zero point drift: 0.01, (0.002 option)
Environmental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)
Type: MSV_M_<channels>_ <accuracy> _<temp> _<mod> _<samplerate> _TC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.01</td>
<td>85</td>
<td>PCM16</td>
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</tr>
<tr>
<td>8</td>
<td>0.002</td>
<td>125</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>
8/10 Channel Temperature Sensor Signal Amplifier Type R (Cartridge) (Standard)

8/10 Channel PCM Transmitter
For non insulated / insulated thermocouple or PT100
Number of channels:
- 8 external (non insulated / insulated thermocouple)
- 1 internal temperature
- 1 reference, remote switchable 0/80% of selected range
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0.01, (0.002 option)
Environmental temperature range: -25 to +85°C (125°C, 160°C)
Max load: 20 000g (depending on fixing)
Type: MSV_P <channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,01</td>
<td>85</td>
<td>PCM16</td>
<td>2000</td>
</tr>
<tr>
<td>8</td>
<td>0,002</td>
<td>125</td>
<td>160</td>
<td></td>
</tr>
</tbody>
</table>
8(4) Channel Temperature Sensor Signal Amplifier Type Epoxy
(Piston / Conrod / Clutch Application)

8(4) Channel PCM Transmitter
For insulated thermocouple or PT100
Number of channels:
- 6 external (insulated thermocouple)
- 1 internal temperature
- 1 reference, 80% of selected range
Temperature measuring range: 0 to 650°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 1100/sec/channels
Spot mode: min. contact time: 1,4 ms for 8 channel transfer
Resolution: 12 Bits
Zero point drift: 0,02
Environmental temperature range: -25 to +180°C
weight: 3g
Max load: 20 000g (depending on fixing)
Type: MSV_Epo_<channels>_ <accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>0.02</th>
<th>180</th>
<th>PCM12</th>
<th>1100</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 (2 intern)</td>
<td>8</td>
<td>0.02</td>
<td>180</td>
<td>PCM12</td>
<td>1100</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>500</td>
<td>100</td>
</tr>
</tbody>
</table>
8(4) Channel Temperature Sensor Signal Amplifier Type Metal

(Piston / Conrod / Clutch Application)

8(4) Channel PCM Transmitter
For insulated thermocouple or PT100

<table>
<thead>
<tr>
<th>Number of channels:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 6 external (insulated thermocouple)</td>
</tr>
<tr>
<td>- 1 internal temperature (opt. converted to external channel)</td>
</tr>
<tr>
<td>- 1 reference, 80% of selected range (opt. converted to external channel)</td>
</tr>
</tbody>
</table>

| Temperature measuring range: 0 to 550°C (different ranges option) |
| Thermocouple type K (NiCr-Ni) (other types option) |
| Transmission: inductive sensor telemetry PCM |
| Sampling rate: 2000/sec/channels |
| Spot mode: min. contact time: 1.4 ms for 8 channel transfer |
| Resolution: 12 Bits |
| Zero point drift: 0.02 |
| Environmental temperature range: -25 to +180°C |
| Weight: 3 g |
| Max load: 20 000 g (depending on fixing) |

Type: MSV_Mo_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th>Channel</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.02</td>
<td>180</td>
<td>PCM12</td>
<td>2000</td>
</tr>
<tr>
<td>8</td>
<td>0.02</td>
<td>180</td>
<td>PCM12</td>
<td>1000</td>
</tr>
<tr>
<td>16</td>
<td>0.02</td>
<td>180</td>
<td>PCM12</td>
<td>500</td>
</tr>
</tbody>
</table>
16(12) Channel Temperature Sensor Signal Amplifier Type Metal
(Piston / Conrod / Clutch application)

**16(12) Channel PCM Transmitter**

For insulated thermocouple or PT100

- Number of channels:
  - 12 external (insulated thermocouple)
  - 2 internal temperature (opt. converted to external channel)
  - 2 reference, 80% of selected range (opt. converted to external channel)

- Temperature measuring range: 0 to 550°C (different ranges option)
- Thermocouple type K (NiCr-Ni) (other types option)
- Transmission: inductive sensor telemetry PCM
- Sampling rate: 2000/sec/channels
- Spot mode: min. contact time: 1,4 ms for 8 channel transfer
- Resolution: 12 Bits
- Zero point drift: 0,02
- Environmental temperature range: -25 to +180°C
- Weight: 3 g
- Max load: 20 000 g (depending on fixing)

Type: MSV_Mo_16_<accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,02</td>
<td>180</td>
<td>PCM12</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>1000</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>500</td>
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</tr>
<tr>
<td></td>
<td></td>
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<td>100</td>
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</tbody>
</table>
16 Channel Sensor Signal Amplifier Type M
(Standard)

16 Channel PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 16
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Zero point drift: 0,02, (0,01, 0,003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Enviromental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)

Type: MSV_M_<channels>_<accuracy>_<temp>_sys_<mod>_<samplerate>_<RCont>

| 16 | 0.02 | 85 | PCM12 | 4000 | - |
| 16 | 0.01 | 125| Fu   | PCM16| 8000 | RC |
| 16 | 0.003| 150|      |      | 40000| RC |
| 16 |      |    |      |      | 200000|   |

Weight: 190 g
### 16/20 Channel Temperature Sensor Signal Amplifier

**Type R (Cartridge) (Standard)**

![Diagram of the sensor signal amplifier](image)

#### 16/20 Channel PCM Transmitter

For non insulated / insulated thermocouple or PT100

- **Number of channels:**
  - 8 external (non insulated / insulated thermocouple)
  - 1 internal temperature
  - 1 reference, remote switchable 0/80% of selected range

- Temperature measuring range: 0 to 500°C (different ranges option)
- Thermocouple type K (NiCr-Ni) (other types option)
- Transmission: inductive sensor telemetry PCM
- Sampling rate: 2000/sec/channels
- Integrated filter 1 Hz (10 Hz) for noise supression on input lines
- Resolution: 16 Bits
- Zero point drift: 0.01, (0.002 option)
- Environmental temperature range: -25 to +85°C (125°C, 160°C)
- Max load: 20 000 g (depending on fixing)

#### Specifications Table

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<th>Temp Range</th>
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---

**Note:**

- Diameter = 2.6 cm
4 Channel Sensor Signal Amplifier Type Disc
(Standard)

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 50,000 g (depending on fixing)

For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 50,000 g (depending on fixing)

Type: MSV_RD <channels> <accuracy> <temp> <mod> <samplerate> <rmc>
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<td>RC</td>
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* Dimension changes with different number of channels
* Max. sampling rate/channel = total sampling rate/No. of channels

Page 33
4/8/16/24/32 Channel Sensor Signal Amplifier

Type Rot with Hole

(Standard)

Multi Channel FM/PCM Transmitter

For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 50 000 g (depending on fixing)

Type: MSV_RA_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<rmc>

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* Max. sampling rate/channel = total sampling rate/ No. of channels

* Dimension changes with different number of channels
4/8/16 Channel Sensor Signal Amplifier Type Rot
(Standard)

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3,3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0,01, 0,003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Environment temperature range: -25 to +85°C (125°C, 150°C)
Max load: 50 000 g (depending on fixing)

Type: MSV_AA_<channels>_<accuracy>_<temp>_<mod>_<samplerrate>_<RC>

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* Dimension changes with different number of channels

* Max. sampling rate/channel = total sampling rate/ No. of channels
4/8/16 Channel Sensor Signal Amplifier Type Rot with Integrated Connector
(Standard)

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 100 000 g (depending on fixing)
Type: MSV_AAC_<channels>_<accuracy>_<temp>_<mod>_<sample>_<RC>_PSm

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</tbody>
</table>

* Dimension changes with different number of channels

* Max. sampling rate/channel = total sampling rate/ No. of channels

Page 36
8 Channel Sensor Signal Amplifier Type Cylinder (Integrated Rotor Loop, Mounting on Shaft, divisible) (Standard)

Inner diameter: 17 to 300 mm
Outer diameter = Inner diameter + 25 mm

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 20 000 g (depending on fixing)

Type: MSV_RaHd_<channels>_<size>_<accuracy>_<temp>_<mod>_<samplerate>

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<td>16</td>
<td>FM*</td>
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<td></td>
<td>2000</td>
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* Dimension changes with different number of channels
* Max. sampling rate/channel = total sampling rate/ No. of channels
**8 Channel Sensor Signal Amplifier Type Cylinder**
(Integrated Rotor Loop, Mounting on Shaft, divisible axial Signal Pickup)

*(Standard)*

- Inner diameter: 17 to 300 mm
- Outer diameter = Inner diameter + 25mm

**Multi Channel FM/PCM Transmitter**
- For strain gage, PT100, thermocouple
- Number of channels: 2, 4, 8, 12, 16, (max. 128)
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 2.5 V, (3.3 V*)
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry FM, PCM
- Integrated filter
- Resolution: 14 Bits, (16 Bits*)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 20 000 g (depending on fixing)

**Type:** MSV_RaHa_<channels>_<size>_<accuracy>_<temp>_<mod>_<samplerate>

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* Dimension changes with different number of channels

* Max. sampling rate/channel = total sampling rate/ No. of channels

Page 38
4 Channel Sensor Signal Amplifier Type beared divisible
Shaft Transmitter with Speed Sensor
(Standard)

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 12 Bits, (16 Bits*)
Remote gain/zero and autozero with 12 Bits resolution (option)
Integrated speed sensor
Pulses/turn: 48
Max. speed: 2000 rpm
Max load: 2000 g (depending on fixing)
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Type: MSV_Gel_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

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</table>

* Dimension changes with different number of channels
4/8/12/16 Driveline Flange with integrated Sensor Signal Amplifier
(Standard)

Multi Channel FM/PCM Transmitter

- For strain gage, PT100, thermocouple
- Number of channels: 2, 4
- Sensitivity: 0.02 mV/V to 20 mV/V
- Bandwidth: 0 to 10 kHz (-3dB)
- Strain gage bridge supply: 2.5 V, (3.3 V*)
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry FM, PCM
- Integrated filter
- Resolution: 12 Bits, (16 Bits*)
- Zero point drift: 0.02, (0.01, 0.003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Integrated speed sensor
- Pulses/turn: 48
- Max. speed: 2000 rpm
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 2 000 g (depending on fixing)

Type: MSV_Flan_<channels>_<size>_<accuracy>_<temp>_<mod>_<samplerate>

<table>
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<th>Dxxx*yy</th>
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<th>Temperature</th>
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* Dimension changes with different number of channels

* Dimension changes with different number of channels
4/8/16 Channel Sensor Signal Amplifier Type beared with Transmitter
(End of Shaft)
(Standard)

Multi Channel FM/PCM Transmitter
For strain gage, PT100, thermocouple
Number of channels: 2, 4, 8, 12, 16, (max. 128)
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2,5 V, (3,3, 5 V* option)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 12 Bits, (16 Bits*)
Zero point drift: 0,02, (0,01, 0,003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Enviromental temperature range: -25 to +85°C (125°C, 150°C)
Protection: IP65
Max load: 5 000 g (depending on fixing)

Type: MSV_Rad_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<rmc>_<TC>

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</table>

* Dimension changes with different number of channels

* Max. sampling rate/channel = total sampling rate/ No. of channels
Modular Sensor Telemetry Amplifier distributed max. 64 Channels

Multi Channel PCM Transmitter
For strain gage, PT100, thermocouple
Number of total channels: 8, 12, 16, (max. 64)
Number of channels per Modul 4, 8, 12, 16
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 2.5 V, (3.3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Enviromental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 30 000 g (depending on fixing)

Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_<M>

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</table>

**- : inductive
Fu: Radio Transmission
M: Master modul
S: Slave modul

Page 42
Miniature beared 16 Channel Sensor Signal Amplifier with Stator Part
(Standard)

Multi Channel PCM Transmitter
For strain gage, PT100
Number of channels: 16, (max. 64)
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage bridge supply: 3.3 V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero point drift: 0.02, (0.01, 0.003 option)
Remote shunt calibration
Remote gain/zero and autozero with 12 Bits resolution (option)
Temperature range: -25 to +85°C (125°C, 150°C), protection: IP65
Max speed: 10000 rpm
Weight: 550 grams
Type: MSV_RaHm_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC

Certified according:
* Mil-STD-810F
* Def Stan 59-41
* ED-14E (DO-160E)
* MISP LL0060-200
Multi Channel Flexible Sensor Signal Amplifier Type Flex
for mounting around the Shaft, special for critical Space Situations

Height: 2,5 mm

56+n*34
n = Number of channels

---

**Multichannel Flex PCM Transmitter**

- For strain gage, PT100, thermocouple
- Number of channels: 16
- Sensitivity: 0,02 mV/V to 20 mV/V
- Bandwidth: 0 to 50 kHz (-3dB)
- Strain gage bridge supply: 3,3 V
- Strain gage bridge resistance: 350 (120, 1000) Ω
- Transmission: inductive sensor telemetry PCM
- Integrated filter
- Resolution: 12 Bits (16 Bits)
- Zero point drift: 0,02, (0,01, 0,003 option)
- Remote shunt calibration
- Remote gain/zero and autozero with 12 Bits resolution (option)
- Environmental temperature range: -25 to +85°C (125°C, 150°C)
- Max load: 20 000 g (depending on fixing)

**Type:** MSV_Flex_<channels>_<accuracy>_<temp>_sys>_<mod>_<samplerate>_<Kas>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
<th>Kas</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0,02</td>
<td>85</td>
<td>PCM16</td>
<td>1000</td>
<td>-</td>
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<tr>
<td>3</td>
<td>0,01</td>
<td>125</td>
<td>2000</td>
<td>K</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0,003</td>
<td>160</td>
<td>4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For special Shapes
for Turbine / Turbo Charger Applications:
see "Turbinen Telemetry"
Evaluation Unit (MAW_P)

Analog receiver

Pin Assignment of the D-Sub connector

Pin 1: Output 1 -10V to +10V
Pin 2: GND Output
Pin 3: Remote Calibration Signal
Pin 4: Output 1 -10V to +10V
Pin 5: GND Power Supply
Pin 6: not connected
Pin 7: Power Supply 9 to 36 VDC
Pin 8: not connected
Pin 9: not connected

2 Channel PCM Receiver

Bandwidth: 0 to 1kHz (10 kHz)
Number of channels: 1/2
Output: ±10 V, (0(4) to 20 mA option)
Digital interface (option): SPI, USB
RF-Power: 1, 3, 5 W
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits, (16 Bit*)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (-45 to +85°C)
Supply: 24 V DC (+/-5%), 15 V DC (+/-2%), 9 to 36 V DC (board supply)
Type: MAW_P_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<wa>

Cover 'Zero' and 'Gain' screws after adjustment if necessary
Evaluation Unit (MAW_F)
Digital Receiver

Pin Assignment of the D-Sub connector
- Pin 1: Data
- Pin 2: GND Output
- Pin 3: Remote Calibration Signal
- Pin 4: Data
- Pin 5: GND Power Supply
- Pin 6: not connected
- Pin 7: Power Supply 9 to 36 VDC
- Pin 8: Data
- Pin 9: Data

9...36 volts

Multi Channel PCM Receiver
Bandwidth: 0 to 1kHz (10 kHz)
Number of channels: 1..32
Output: ±10 V, (0(4) to 20 mA option)
Digital interface (option): SPI, USB, CAN, Ethernet TCP/IP, EtherCat (on request)
RF-Power: 1, 3, 5 W
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits, (16 Bit*)
Remote shunt calibration
Environmental temperature range: -25 to +85°C (-45 to +85°C)
Supply: 24 V DC (+/-5%), 15 V DC (+/-2%), 9 to 36 V DC (board supply)
Type: MAW_F_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<Mo>

with CAN-Bus or TCP/IP EtherCat or USB Option available
Evaluation Unit (MAW_G) Receiver

with CAN-Bus or TCP/IP or USB

Pin Assignment of the D-Sub connector

Pin 1 Data
Pin 2 GND Output
Pin 3 Remote Calibration Signal
Pin 4 Data
Pin 5 GND Power Supply
Pin 6 not connected
Pin 7 Power Supply 9 to 36 VDC
Pin 8 Data
Pin 9 Data

Multi Channel PCM Receiver

Bandwidth: 0 to 1 kHz (10 kHz)
Number of channels: 1..32
Output: ±10 V, (0(4) to 20 mA option)
Digital interface (option): SPI, USB, CAN, Ethernet TCP/IP
RF-Power: 1, 3, 5 W
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits, (16 Bit*)
Remote shunt calibration
Enviromental temperature range: -25 to +85°C (-45 to +85°C)
Supply: 24 V DC (+/-5%), 15 V DC (+/-2%), 9 to 36 V DC (board supply)
Type: MAW_G_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<wa>

<table>
<thead>
<tr>
<th>Channel</th>
<th>Modulation</th>
<th>Sample Rate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
<th>Wa</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>PCM12</td>
<td>4000</td>
<td>1W</td>
<td>15</td>
<td>USB</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>PCM16</td>
<td>40000</td>
<td>3W</td>
<td>24</td>
<td>CAN</td>
<td>RPM</td>
<td>IP65</td>
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<tr>
<td>8</td>
<td>Fu</td>
<td>5W</td>
<td>12B</td>
<td>TCP/IP</td>
<td>IP67</td>
<td></td>
<td>3,2</td>
</tr>
</tbody>
</table>
**Multi Channel Receiver**

- **Antenna**
- **Speed pickup**
- **Shaft encoder interface (option)**
- **Incremental/ Absolute converter (option)**
- **Remote calibration**
- **Ethernet (TCP/IP)**
- **CAN**
- **USB**

---

**Evaluation Unit (22TE)**

**4 Channel FM/PCM Receiver 22 TE**

- **Bandwidth:** 0 to 1kHz (10 kHz, 50 kHz option)
- **Output:** ±10 V
- **Interfaces (option):** USB
- **RF Power:** 1, 3, 5 W
- **Transmission:** Inductive sensor telemetry FM/PCM
- **Integrated filter**
- **Resolution:** 12 Bits, (16 Bit***)
- **Remote shunt calibration**
- **Environmental temperature range:** -25 to +65°C
- **Supply:** 9 to 270 V AC, 9 to 36 V DC (board supply)
- **Type:** MAW_22TE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Freq</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6</td>
<td>PCM12</td>
<td>1W</td>
<td>230VAC</td>
<td>U</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Fu</td>
<td>PCM16</td>
<td>3W</td>
<td>24B</td>
<td>I</td>
<td>RPM</td>
</tr>
<tr>
<td></td>
<td>3,2</td>
<td>20000</td>
<td>5W</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>F*</td>
<td>2000</td>
<td></td>
<td></td>
<td>USB</td>
<td></td>
</tr>
</tbody>
</table>

---

**Incremental/Absolute converter (option)**

**Digital interface (option)**

**Front side**

- 300 x 132 (3HE)
- 112 (21TE)

---

**** only for PCM version

---

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### Evaluation Unit (42TE)

**Front side**

- **Dimensions:** 300 (42 TE) x 132 (3 HE) x 225 (42 TE)

---

**Multi Channel FM/PCM Receiver 42 TE**

<table>
<thead>
<tr>
<th>Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output: ±10 V</td>
</tr>
<tr>
<td>Interfaces (option): USB</td>
</tr>
<tr>
<td>RF Power: 1, 3, 5, 10 W</td>
</tr>
<tr>
<td>Transmission: inductive sensor telemetry FM/PCM</td>
</tr>
<tr>
<td>Integrated filter</td>
</tr>
<tr>
<td>Resolution: 12 Bits, (16 Bit**)</td>
</tr>
<tr>
<td>Remote shunt calibration</td>
</tr>
<tr>
<td>Environmental temperature range: -25 to +65°C</td>
</tr>
<tr>
<td>Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)</td>
</tr>
</tbody>
</table>

**Type:** MAW_42TE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

<table>
<thead>
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<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Interface</th>
<th>RPM</th>
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<td>PCM12</td>
<td>8000</td>
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<td>24B</td>
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<td>U</td>
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<tr>
<td>12</td>
<td>Fu</td>
<td>PCM16</td>
<td>40000</td>
<td>5W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3,2</td>
<td></td>
<td>200000</td>
<td></td>
<td></td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

**Digital interface (option):**
- Ethernet (TCP/IP)
- CAN
- USB

**Shaft encoder interface (option):**
- Incremental/Absolute converter

**Remote calibration**
- Total sampling rate: 10000

**Supported interfaces:**
- Ethernet (TCP/IP)
- CAN
- USB

---

**Notes:**
- **Max. sampling rate/channel** = total sampling rate/ No. of channels
- **Only for PCM version**

---

*Page 50*
Evaluation Unit (84TE)

Multi Channel FM/PCM Receiver 84 TE

- Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
- Output: ±10 V
- Interfaces (option): USB
- RF Power: 1, 3, 5, 10 W
- Transmission: inductive sensor telemetry FM/PCM
- Integrated filter
- Resolution: 12 Bits, (16 Bit**)
- Remote shunt calibration
- Environmental temperature range: -25 to +65°C
- Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)

Type: MAW_84TE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

** only for PCM-Version

* Max. sampling rate/channel = total sampling rate/ No. of channels
Multi Channel FM/PCM Receiver ES

**Bandwidth:** 0 to 1kHz (10 kHz, 50 kHz option)
**Output:** ±10 V
**Interfaces (option):** USB
**RF Power:** 1, 3, 5, 10 W
**Transmission:** Inductive sensor telemetry FM/PCM
**Integrated filter**
**Resolution:** 12 Bits, (16 Bit***)
**Remote shunt calibration**
**Environmental temperature range:** -25 to +65°C
**Supply:** 9 to 270 V AC, 9 to 36 V DC (board supply)

**Type:** MAW_ES_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Freq</th>
<th>Mod</th>
<th>Samplerate</th>
<th>Power</th>
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<th>RPM</th>
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<tbody>
<tr>
<td>4</td>
<td>-</td>
<td>F</td>
<td>4000</td>
<td>1W</td>
<td>230VAC</td>
<td>U</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>PCM12</td>
<td>8000</td>
<td>3W</td>
<td>24B</td>
<td>I</td>
<td>RPM</td>
</tr>
<tr>
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<td>Fu</td>
<td>PCM16</td>
<td>40000</td>
<td>5W</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3,2</td>
<td></td>
<td>200000</td>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>F*</td>
<td></td>
<td>2000</td>
<td>USB</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Sampling Rate:**
- **10000 RPM**

**Only for PCM version**

---

*Max. sampling rate/channel = total sampling rate/ No. of channels*
Evaluation Unit (84TE, 6HE)

The connection to the rotor antenna is situated at the rear side.

Multi Channel FM/PCM Receiver 84TE HE6

- Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
- Output: ±10 V
- Interfaces (option): USB
- RF Power: 1, 3, 5, 10 W
- Transmission: inductive sensor telemetry FM/PCM
- Integrated filter
- Resolution: 12 Bits, (16 Bit**)
- Remote shunt calibration
- Enviromental temperature range: -25 to +65°C
- Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)
- Type: MAW_84H6_<channels>_ <Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

<table>
<thead>
<tr>
<th>Channels</th>
<th>F</th>
<th>F</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>F</td>
<td>4000</td>
<td>1W</td>
<td>230VAC U</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>8000</td>
<td>3W</td>
<td>24B</td>
<td>I</td>
<td>RPM</td>
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<td>12</td>
<td>Fu</td>
<td>40000</td>
<td>5W</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Fu</td>
<td>200000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>F*</td>
<td>2000</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
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<td>48</td>
<td>10000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Max. sampling rate/channel = total sampling rate/ No. of channels

Page 53
Block Diagram (Transmitter)
(remote control channel select (max. numbers of channels nxm))

- Strain gage bridge
- Digital multiplexer
- RMC-prog. amplifier
- Filter butterworth
- A/D converter 12/16 Bit
  - Rate 40k (200 kHz)
- Supply logic
- HF interface 13.56 MHz

Bank 1
- Mux
- Channel select
- Channel n

Bank m
- Mux
- Channel select
Interface Technique
(direct signal data acquisition)
Very Compact Digital Multi Channel Receiver with Digital Interface Technique
(direct signal data acquisition, no analog Output)
Digital combi Data Acquisition (Sensor Telemetry + stationary Channels) (direct signal data acquisition)

Configuration

Hall sensor
Strain gage halve bridge
Strain gage full bridge
Thermocouple
voltage 0..+/-10 V
Strain gage full bridge
Thermocouple
PT100 RTD
Remote control
(option)
Multi channel sensor signal amplifier
Coupling
Inductive supply and transmitting 13,56 MHz
Sensor telemetry interface
Data acquisition unit
Configureable analogic inputs
remote calibration
90 to 270V AC (9 to 36 V DC)
USB,TCP-IP
Data acquisition unit
USB,TCP-IP
Combi Data Acquisition (SYNCHRO)
(direct signal data acquisition)

**Advantages:**
* data acquisition system for rotor and stator signals in 1 unit
* very compact and lightweight data acquisition system
* Isochronous sampling of rotor and stator signals
* digital interface direct to PC with software
* additional speed acquisition channel (option)
* easy handling - ideal for mobile application

**Multi Channel PCM Receiver with additional stationary Channels, 24 TE**
- Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
- Output: digital Ethernet TCP/IP, USB
- Absolute synchronous data acquisition
- Number of stationary channels: 4/8
- Configurable stationary channels: high voltage or direct strain gauge interface
- Number of sensortelemetry channels: up to 128
- **Synchronous speed / mark acquisition (option)**
- RF Power: 1, 3, 5, 10 W
- Transmission: inductive sensor telemetry PCM
- Integrated filter
- Resolution: 16 Bit
- Remote adjustable input ranges, autozero, shunt calibration
- Environmental temperature range: -25 to +75°C
- Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)
- Size/weight: 110 x 260 x 90mm / 2 kg
- Type: MAW_84TE_<channels>_<accuracy>_<mod>_<samplerate>_<power>__supply

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,01</td>
<td>1000</td>
<td>1W</td>
<td>230VAC</td>
</tr>
<tr>
<td>8</td>
<td>0,003</td>
<td>PCM12B</td>
<td>3W</td>
<td>24B</td>
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<td>PCM16B</td>
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<td></td>
<td>10W</td>
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</tr>
<tr>
<td>32</td>
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<td></td>
<td>20000</td>
<td></td>
</tr>
</tbody>
</table>
Online remote programmable Sensor Telemetry

High resolution (12 Bit) initial remote setup of the of strain gage application at installation and calibration

RMC sensor telemetry

- Separate address for each amplifier
- Gain, zero adjustable with 12 bits resolution (internal storage)
- Address gain and zero point storage
- Monitoring of supply
- Sensor signal amplifier
- Electronically programmable amplifier
- µP
- Evaluation unit
- 0 to ±10V
- USB
- CAN
- Ethernet
- Digital data

Remote conditioning with Laptop
Setup of the Interface Software
(Software package remote control)

MENU->SETUP->HARDWARE CONFIGURATION

Selection between the different Interface-configurations. Please see separate configuration leaf or the marked settings beside. The setup of the interface has to be configured for each single user of your computer.

Settings for RPM Channel (optional):
Settings have to be made for correct RPM display in the software. Averagingfactor has an effect on a fluctuating rpm value especially at high rotational frequencies. Type in the proper samplerate from the technical data on the last pages of the documentation.

MENU->SETUP->SOFTWARE CONFIGURATION

Display Settings
Selection between standard-systems and temperature-systems

Data file format for Acquisition:
Selection between binary format and ASCII format

Integrated Remote Control
Activates or deactivates functions for RMC-programming of systems, which support data-aquisition and programming over the same USB-interface

Calibration Command (for non-RMC-systems)
If this function is supported by the hardware the remote calibration function can also
Using of Remote Control Function
(Software package remote control)

**Adjustment:**
With this function an additional window for RMC settings is opened.
(see following page)

**Cal on:**
Via the RMC command the Shunt calibration is activated.

**Cal off:**
Via the RMC command the Shunt calibration is deactivated.

**Test Connection**
Start / Stop of the test transmission. With this function a RMC command is send cyclic.
In the area 'Status Info' the answers can be checked.

**Status-Info:**

- **Transmit:** By transmission of a command appears in the first array of the 'Status Info' area in green letters 'Transmit' in an inactive status the array is grey.

- **Acknowledge or Errorstatus:** After sending a command, the answer is there shown.
  After a successful transmission in green letters 'Acknowledge' appears. During an errorstatus, the array in which 'Transmit' appears shines red. Under this array 'Errorstatus' is shown.
Using of Remote Control Function

(Software package remote control)

Digital value of the sensitivity
0 to 4095 - Min value = high gain
Max value = low gain
Doubling the sensitivity is about half of the gain.

Digital value of the zero point
(0 to 4095) 2048 is about in the middle

Presetting of the memory

Transmission of the complete set of settings to the rotor electronic
(Gain and zero point for all selected channels)
Activity display (green) at file operation

Start data display
Stop data display
Exit program
When data recording is active then stop data recording before exiting the program to prevent loss of data
Activity display (green) at data transmission from the telemetry system
Activity display (green) at file operation

Information about data rate, sampling rate etc.

Display of the binary values as they are sent (inverse to the output at the evaluation unit)

Display of the selected device (if multiple available)

No other program must be active at the PC while recording data into a file. This can effect a loss of data.
No other program must be active at the PC while recording data into a file. This can effect in buffer overflow and the loss of data. If buffer overflow occurs, it will be displayed in a field on the left side of “Data recording.” Due to some limitations, the maximum filesize should not exceed 4GB.
Data Display Software Pview
(Software package data acquisition - optional)
Visualisation of recorded Data
Data File - Binary Format
(Software package data acquisition - optional)

Data Format
The data are recorded in the MDF-Format.
Two files are generated. One binary file with the ending '.DAT' and one belonging description file with the ending '.MDF'.
The description file is necessary for the data viewing software PVIEW from Stiegele Datensysteme GmbH.
The binary file can be used from other data display or data analysing systems that are able to import digital values.

Correlation of the measured Values:
The range of a 12 bit system is from 0 to 4095, the range of a 16 bit system is from 0 to 65535
Assignment to the analog values (custom specific systems and temperature systems can differ from these values):

<table>
<thead>
<tr>
<th>Range</th>
<th>Analog value</th>
<th>Digital value (16 Bit-system)</th>
<th>Digital value (12 Bit-system)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100%</td>
<td>-10V</td>
<td>3277</td>
<td>205</td>
</tr>
<tr>
<td>0%</td>
<td>0V</td>
<td>32768</td>
<td>2048</td>
</tr>
<tr>
<td>+100%</td>
<td>+10V</td>
<td>62259</td>
<td>3891</td>
</tr>
</tbody>
</table>

Values out of this range are not inside the measuring range and cannot be displayed correctly at the analog outputs.

The analog value can be calculated by the following equation: \( U_{out} [V] = (Digitvalue-32768) / 2949.1 \) (16Bit) or \( U_{out} [V] = (Digitvalue-2048) / 184.3 \) (12Bit)
(This correlation is only valid with calibrated analogue-output)

Format of the Binary File (.DAT)
Definition: LB= Low Byte, HB=High-Byte, CHx = Channel x
(e.g. Ch1 = Channel 1 corresponding to the analog output channel at the evaluation unit)
First the Low-Byte and then the High-Byte of a channel is recorded.

LB-K17, HB-K17, LB-K16, HB-K16, ..., LB-K1, HB-K1 (first data set)
LB-K17, HB-K17, LB-K16, HB-K16, ..., LB-K1, HB-K1 (next data set)
...
LB-K17, HB-K17, LB-K16, HB-K16, ..., LB-K1, HB-K1 (last data set)

Sample file shown with a Hex Viewer

Channel 17
E2=Low Byte channel 17
0F=High Byte channel 17

Channel 0
next data set
Data File - ASCII Format
(Software package data acquisition - optional)

Data Format
The data are recorded in the CSV-Format.
The measured values are separated with a semicolon. After each complete data set a 'Carriage Return' + 'Linefeed' is added.
The channel description is in the first row of the file.

Correlation of the measured Values:
The range of a 12 bit system is from 0 to 4095, the range of a 16 bit system is from 0 to 65535
Assignment to the analog values (custom specific systems and temperature-systems can differ from these values):

<table>
<thead>
<tr>
<th>Range</th>
<th>Analog value</th>
<th>Digital value (16 Bit-system)</th>
<th>Digital value (12 Bit-system)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-100%</td>
<td>-10V</td>
<td>3277</td>
<td>205</td>
</tr>
<tr>
<td>0%</td>
<td>0V</td>
<td>32768</td>
<td>2048</td>
</tr>
<tr>
<td>+100%</td>
<td>+10V</td>
<td>62259</td>
<td>3891</td>
</tr>
</tbody>
</table>

Values out of this range are not inside the measuring range and cannot be displayed correctly at the analog outputs.

The analog value can be calculated by the following equation: \( U_{\text{out}} [\text{V}] = (\text{Digitvalue-32768}) / 2949.1 \) (16Bit) or \( U_{\text{out}} [\text{V}] = (\text{Digitvalue-2048}) / 184.3 \) (12Bit)
(This correlation is only valid with calibrated analogue-output)

Format of the ASCII File
The sample shows a recorded dataset of a 16 channel system:

CH16; CH15; CH14; CH13; CH12; CH11; CH10; CH09; CH08; CH07; CH06; CH05; CH04; CH03; CH02; CH01
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02064; 02050; 02050; 02047; 02047
Signal Test Function via Scope Function

(Software package data acquisition modul - optional)

Value which are displayed in Volt accords to the voltage output to standard systems. Temperature measurement systems or custom calibrated systems can differ from these values.

Display of the received data of the measuring channels showing the digital values, the equivalent analog values

Selection of the channel shown at the oscilloscope

Display of RPM

Selection of time, gain and offset

Autoscale function for the settings of gain and offset

Analyse functions for the display

Selection of the channel shown at the oscilloscope
### Channel Assignment

<table>
<thead>
<tr>
<th>Series in the binary File</th>
<th>Assigned analog output Channel</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16</td>
<td>PT100</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>ICP</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>not used</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>not used</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>Strain gage channel 12</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>Strain gage channel 11</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>Strain gage channel 10</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>Strain gage channel 9</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>Strain gage channel 8</td>
</tr>
<tr>
<td>10</td>
<td>7</td>
<td>Strain gage channel 7</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>Strain gage channel 6</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>Strain gage channel 5</td>
</tr>
<tr>
<td>13</td>
<td>4</td>
<td>Strain gage channel 4</td>
</tr>
<tr>
<td>14</td>
<td>3</td>
<td>Strain gage channel 3</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>Strain gage channel 2</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>Strain gage channel 1</td>
</tr>
<tr>
<td>17</td>
<td>--</td>
<td>Rotation angle</td>
</tr>
</tbody>
</table>
Realtime recorded Data File

Format of the binary file (.DAT) or ASCII file (.CSV)

Definition:
LB = low byte,
HB = high byte
First the low byte and then the high byte of a channel is recorded.
The range of a 12 and 16 bit system is from 0 to 65535.
For 12 bit-systems, the lowest 4 bits are set to 0.

Exportfunctions

Pview visualization program
(part of software package data acquisition)

User specific analysis program

Exel or other analysis programs
### Product Key Multi Channel Receiver

**Type:**
- **housing type:**
  - G  Alu housing robust
  - HE84 Table housing, 19”
  - HE42 Table housing 1/2 19”
  - F  Tubus housing
- **channels:** (channel count)
  - 1-128 rotating channel count
- **Vfreq:** (Supply frequency)
  - 13.56 Mhz
  - 13.56Mhz
  - 6.78MHz
  - 3.38MHz
- **sys:** (System type)
  - Inductive
  - Inductive
  - Data rate = Supply frequency/4
    - max 3.34 Mbit/s at 13.56 Mhz supply
  - Data rate = Supply frequency/8
  - Enhanced data rate up 200 Mbits/sec
  - Inductive supplied system
  - inductive supplied system
  - System radio transmission for data rates
  - up 40 Mbit/sec battery supplied system
- **Mod:** (Type of modulation)
  - PCM12  Pulse Code Modulation with 12 bit modulation
  - PCM16  Pulse Code Modulation with 16 bit modulation
  - FM  Frequencymodulation (not for new systems)
  - HSPCM12  Highspeed Mod. for sample rate up 200000 sample/s
  - HSPCM12 with additional sub system with a sample of 100 sample/s
- **power:** (RF Supply power)
  - xxW  RF-supply with xx watts
  - xxWR  variable RF-supply with max xx watts
- **supply:** (System type)
  - 24  24 volt supply (+/-10%)
  - 24B  10...36 volts board supply
  - 230VAC  90...270 volt AC-system 50/60 Hz
- **outputA:** (primary output analogic)
  - U  +10 volts
  - U  -10 volts
  - I  0..20 mA
- **outputZ:** (secondary output analogic)
  - U  +10 volts
  - U  -10 volts
  - I  0..20 mA
- **Dint:** (primary digital interface)
  - USB  USB Interface
  - TCP/IP  general Ethernetinterface
  - TCP#TC#E# general Interface with IENA Protocol
  - CAN  CAN Interface
- **Zint:** (secondary digital interface)
  - USB  USB Interface
  - TCP/IP  general Ethernetinterface
  - CAN  CAN Interface
- **RPM:** (stationary speed acquisition, RPM-avulation)
  - Dz#A#Z#0#0#0#S  Speed pulses
  - Dz#A#Z#0#0#0#S  online Speed speed calculation
  - Dz#A#Z#1#0#0#0#S  online turn angle calculation
- **Temp:** (temperature range)
  - -10...+70 °C
  - -45...85
  - +45...+85°C
- **sta:** (optional additional non rotating channels)
  - 4  4 additional non rotating channels
  - 8  8 additional non rotating channels
  - 16  16 additional non rotating channels
- **OEM:** (special customised solution in connectors)
  - special described features

---

Not all items always used
## Product Key Multi Channel Sensor Signal Amplifier

**Type:** MSV_Hous_<channels>_<size>_<speed>_<accuracy>_<temp>_<Freq>_<sys>_<mod>_<samplerate>_<rmc>_<wa>_<cond1>_<cond2>_<cond3>_<cond4>_<OEM>

**Conditioning** with range:
- **1:** Conditioning with range 1
- **2:** Conditioning with range 2
- **3:** Conditioning with range 3
- **4:** Conditioning with range 4

**Company**

**Waterproof/oilproof**

**Remote Control**

**Samplerate/channel/sec/spot**

**Type of system** (Inductive, Radio, UHF)

**Type of signal transmission**

**Supply frequency**

**Temperature range**

**Accuracy max. Speed (opt.)**

**Channel count**

**Size**

**Housing type**
- Cartridge housing with integral axial antenna (end shaft)
- Cartridge housing with integral radial antenna
- Radial shaft transmitter with integral axial antenna
- Radial shaft transmitter with integral radial antenna
- Cartridge housing with integral integral antenna
- Disk housing with integral axial antenna
- Wheel transmitter with integral bearing (end shaft)
- Wheel transmitter with integral radial antenna
- Disk housing with integral axial antenna
- Wheel transmitter with integral radial antenna
- Intermediate Flange version with radial coupling
- Flange Version for Lamination directly on shaft

**Mod:**
- PCM12: Pulse Code Modulation with 12-bit modulation
- PCM16FM: Pulse Code Modulation with 16-bit modulation
- PCM16: Pulse Code Modulation with 16-bit modulation
- PCM12HSP: Highspeed Mod. for sample rate up to 200,000 sample/s

**Channels:**
- 1 - 128 rotating channel count

**Dimensions of the sensor signal amplifier**
- xx/xx/xx/xx: length, width, height:
- xx/xx/xx/xx: length, diameter:
- xx/xx: length, width:

**Speed:**
- xxx xxx: max. speed in RPM

**Accuracy of sensor signal amplifier**
- 0.02 V/V: max. failure in offset drift and gain drift 0.003%/°C
- 0.001 V/V: max. failure in offset drift and gain drift 0.001%/°C

**Environmental temperature range**
- -10+85°C
- -50+85°C
- -40+160°C

**Remote Controlled Gain and Zero Adjustment**
- R, RMC

**System Type**
- Inductive (Ba4)
  - Data rate = Supply frequency/4
  - max. data rate: 3,34 Mbit/s at 13,56 MHz supply
- Radio (Ba8)
  - Data rate = Supply frequency/8
  - enhanced data rate up to 200 Mbit/sec
  - inductive supplied system
  - for data rates up to 40 Mbit/sec battery supplied system
  - for new systems

**Protection**
- IP42
- IP52
- IP65

**Synchronization Frequency**
- 13,56 MHz
- 13,56 MHz
- 6,78 MHz
- 3,38 MHz

**Input conditioning Type**
- Y (Option remote controlled gain and zero adjustment)
  - E = SG (strain gauge input, full bridge)
  - ICP (ICP-Sensor)
  - TC = thermocouple
  - PT = PT100
  - Sp = voltage
  - DzAbs = shaft encoder

**Software Interface**
- #E#G
  - #F#Gl
  - #G#Gl
  - #H#Gl
  - #I#Gl
  - #J#Gl

**Company**
- Special described features

---

**Connector Type**
- Gl = Glenair, Mi = Mil-Con.

**Type of connector**
- F = fixed, A = changeable

**Type of conditioning**
- G = fixed, E = SG, ICP, TC, PT, DzAbs, G = Glenair, Mi = Mil-Con.