Inductive Sensortelemetry
Multi Channel Sensor Signal Amplifiers and Receivers
Configuration
(modular inductive Telemetry)

Number of channels up to 128

- Position (Differential transformer)
- Contactless distance (µe transducer)
- Hall sensor
- Strain gage half bridge
- Strain gage full bridge
- Thermocouple
- PT100 RTD
- Piezo electric
- Remote Control (option)

Multi channel sensor signal amplifier

Coupling
Inductive supply and transmitting 13.56 MHz

Multi channel receiver

90 to 270V AC
(9 to 36V DC)

0 to ±10V

Ethernet, USB, CAN

Remote Calibration

Piezo electric
PT100
Hall sensor
Strain gage
Thermocouple
Contactless distance
Position
Remote Control
Signal Flow Diagram Sensor Signal Amplifier

1. Strain Gage Bridge
2. Strain Gage Bridge
4. Strain Gage Bridge

Prog. Amplifier
Filter butterworth
A/D Converter 12/16 Bit
Sensors

Sampling rate up to 200k
Isochronous sampling

Logic

Power

5 V analog
5 V digital

Sampling

About 13 MBit/s

Digital multiplexer

Strain Gage Bridge

Remote shunt calibration

Remote shunt calibration

Remote shunt calibration
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: 2,000, (10,000 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>
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Page 4
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_Mf_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

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Cold junction compensation

Diameter 2.1 mm
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)
Environment 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
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4 Channel Temperature Sensor Signal Amplifier Type Sc
(Screw Terminal Block)

4 Channel PCM Transmitter (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 suppression 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_Sc_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

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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 suppression 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_Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

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<tr>
<td>2</td>
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<td>160</td>
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</table>

Wire length: 100 mm
4 Channel Temperature Sensor Signal Amplifier Type Micro

(Standard)

- 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 suppression 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_Em_<channels>_<accuracy>_temp_<mod>_<samplerate>_TC

- 4 PCM160,01
- 0.002 125
- 0.002 160
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
Integrated filter 1 Hz (10 Hz) for noise suppression 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>
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<tr>
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<td>0.002</td>
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Diameter 3.2 mm  
Radius = 2 mm
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)
- Enviromental 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

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8 Channel Temperature Sensor Signal Amplifier Type M
(Screw Terminal Block)

8 Channel PCM Transmitter (Screw Terminals)

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 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

8 Channel PCM Transmitter (Screw Terminals)
2/4/8 Channel Temperature Sensor Signal Amplifier Spot
(2 internal Channels)

Mux
Internal antenna

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
Enviromental 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

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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
Enviromental temperature range: -25 to +180°C
Max load: 20,000 g (depending on fixing)

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

- 4
- 0.02
- 180
- PCM12
- 1100
- 8 (2 intern)
- 1100
- 500
- 100
8(4) Channel Temperature Sensor Signal Amplifier Type Metal
(Piston / Conrod / Clutch Application)

8(4) Channel PCM Transmitter
For insulated thermocouple or PT100
Number of channels:
- 6 external (insulated thermocouple)
- 1 internal temperature (opt. converted to external channel)
- 1 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_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

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<td>0.02</td>
<td>180</td>
<td>500</td>
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2 Channel Sensor Signal Amplifier Type M
(Standard)

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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2 Channel Miniatur Sensor Signal Amplifier Type Epoxy
(Standard)

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 10 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, 160°C)
- Max load: 20,000 g (depending on fixing)

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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
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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</table>
2/4 Channel Sensor Signal Amplifier Type M
(Standard)

Radius = 2 mm
Diameter 3.2 mm

Solder pins

weight: 70 g

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)
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>RC</td>
<td>40000</td>
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** - : inductive
Fu: Radio Transmission
Multi channel signal Amplifier Type M waterproof

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)
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Protection: IP65
Max load: 20,000 g (depending on fixing)
Type: MSV_M_<channels>_<accuracy>_<temp>_<Vfreq>_<sys>_<sample>_<rmc>_wa

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<td>Ind</td>
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<tr>
<td>0.003</td>
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<td>3.4MHz</td>
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</tr>
</tbody>
</table>

Page 20
4 Channel Sensor Signal Amplifier Type S

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

Electronically programmable amplifier

- Electronically programmable amplifier
- Gain programmable
- Autozero, Zero

Sensor signal amplifier

4 Channel PCM Transmitter
- Strain gauge channels (full-, half- and quarterbridge, DC & AC)
- Channel number: 4
- Strain gauge resistance 120 to 1000 Ohm
- Continuous remote adjustable input range 0.1 mV/V to 12 mV/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 acquisition of every rotor module supply voltage
- Online survey of overload of the signals
- Detection of defective strain gauges (shortcut or cut-off)
- Remote shunt calibration function
- Integrated sinusoid test signal with different frequencies (360 Hz to 23.4 kHz)
- Remote activateable
- Channel samplerate (1/s): 4,000, 40,000, max. 20,000
- Bandwidth: 0 to 1 kHz/10 kHz / max. 50 kHz, (3 dB)
- Signal resolution: 12 bits, crosstalk: < -60 dB
- Signal/noise ratio: > 62 dB (amplifier)
- Zeropoint 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 to 125 °C/160°C
- Weight: 12 grams

Type: MSV_S_{channels}_<accuracy>_<temp>_<mod>_<samplerate>_RC_<brigde>

<table>
<thead>
<tr>
<th>4</th>
<th>0.02</th>
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<th>HSPCM12</th>
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<td>160</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>Ach</td>
</tr>
</tbody>
</table>

Mechanical Dimensions:

- 4CH_DMS
- Dimensions: 28.0 x 23.0 x 4.0
### 2/4 Channel Sensor Signal Amplifier Type SM (Miniature)

![Image of the amplifier](image)

#### 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 (-3 dB)
- 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_SM_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temperature</th>
<th>Sampling Rate</th>
<th>Max Load</th>
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</thead>
<tbody>
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<td>PCM</td>
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<td>3</td>
<td>0.01</td>
<td>125</td>
<td>PCM</td>
<td>8000</td>
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<td>4</td>
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<tr>
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<td>200000</td>
</tr>
</tbody>
</table>

![Diagram of the amplifier](image)
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 (-3 dB)
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>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temperature</th>
<th>Mode</th>
<th>Samplerate</th>
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</thead>
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<td>PCM</td>
<td>4000</td>
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<tr>
<td>3</td>
<td>0.01</td>
<td>125</td>
<td>PCM</td>
<td>8000</td>
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<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>PCM</td>
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</tr>
<tr>
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<td>200000</td>
</tr>
</tbody>
</table>
4 Channel Sensor Signal Amplifier Type M water proof integrated Rotor Antenna

Housing BOPLA A100

(Standard)

Strain gage bridge

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 (-3 dB)
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

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Sampling Rate</th>
<th>RMC</th>
<th>Description</th>
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</thead>
<tbody>
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<td>FM 1000/5000</td>
<td>-</td>
<td>wa</td>
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<tr>
<td>3</td>
<td>0.01</td>
<td>125</td>
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<td>RC</td>
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<tr>
<td>4</td>
<td>0.003</td>
<td>150</td>
<td>500 (2500)</td>
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</table>

** - : inductive
Fu: Radio Transmission

Page 24
2/4 Channel Universal Miniature Sensor Signal Amplifier Type Ep (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: MSV_Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

Wire length: 100 mm
* 4 channel sensor signal amplifier
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: 2,000, (10,000 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>

For strain gage, PT100, thermocouple
Number of channels: 8
Sensitivity: 0.02 mV/V to 20 mV/V
Total sample rate: 2,000, (10,000 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>

* Max. samplerate/channel = total samplerate / 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>
8/16 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)
Enviromental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 2,000 g (depending on fixing)
Type: MSV_C_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_Gl

<table>
<thead>
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<tbody>
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<td>Sensitivity</td>
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<tr>
<td>System</td>
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<tr>
<td>Samplerate</td>
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<tr>
<td>RC</td>
<td>8000</td>
<td>40000</td>
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<tr>
<td>Max Load</td>
<td>20000</td>
<td>40000</td>
</tr>
</tbody>
</table>

Dimensions for parentheses are for 8 channel sensor signal amplifier
16(12) Channel Temperature Sensor Signal Amplifier Type Metal
(Piston / Conrod / Clutch application)

Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM

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)

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

16(12) Channel PCM Transmitter
For insulated thermocouple or PT100

Housing material: Steel
16/20 Channel Temperature Sensor Signal Amplifier
Type R (Cartridge)
(Standard)

Diameter = 2.6

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)
Type: MSV_P_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp Lower Limit</th>
<th>Temp Upper Limit</th>
<th>Samplerate</th>
<th>Load Limit</th>
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<tbody>
<tr>
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<td>85</td>
<td>2000</td>
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</tr>
<tr>
<td>16</td>
<td>0.002</td>
<td>125</td>
<td>500</td>
<td>100</td>
<td>160</td>
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<td></td>
</tr>
</tbody>
</table>
16 Channel Sensor Signal Amplifier Type M
(Standard)

Radius = 2 mm
Diameter 3.2 mm

Solder pins

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)
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>_<RCont>

<table>
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<th>16</th>
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<th>4000</th>
<th>-</th>
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<tbody>
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<td>0.01</td>
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<td>Fu</td>
<td>PCM16</td>
<td>8000</td>
<td>RC</td>
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<td>0.003</td>
<td>150</td>
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<td></td>
<td>40000</td>
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</tbody>
</table>

160000
32 Channel Sensor Signal Amplifier Type M
(Standard)

Multi Channel PCM Transmitter with Connector
For strain gage, PT100, thermocouple
Number of channels: 2/4/8/12/16/32
Sensitivity: 0.02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3 dB)
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>Max Load</th>
<th>Samplerate</th>
<th>Type</th>
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<tbody>
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<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>RC</td>
<td>4000</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
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<td>32</td>
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</tr>
</tbody>
</table>
# 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 (-3 dB)
- **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:** 2,000g (depending on fixing)

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

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Type</th>
<th>Sample Rate</th>
<th>Max Load</th>
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<tbody>
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</tbody>
</table>
**4 Channel Sensor Signal Amplifier Type Disc**

*Radial coupling*

---

**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 (-3 dB)
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>

<table>
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<th>Channels</th>
<th>Accuracy</th>
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<th>Mod</th>
<th>Samplerate</th>
<th>Rmc</th>
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<tr>
<td>4</td>
<td>0.01</td>
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<td>RC</td>
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<td>8</td>
<td>0.003</td>
<td>150</td>
<td>40000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>200000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Dimension changes with different number of channels
* Max. sampling rate/ channel = total sampling rate/ No. of channels
4/8/16/24/32 Channel Sensor Signal Amplifier

Type Rot with Hole

(Standard)

8 Channel Sensor Signal Amplifier

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 (-3 dB)
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>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
<th>RMC</th>
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</thead>
<tbody>
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<td>4</td>
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<td>40000</td>
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<tr>
<td>12</td>
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<tr>
<td>16</td>
<td></td>
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<td>2000</td>
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</tbody>
</table>

* 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
(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 (-3 dB)
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_AA_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<RC>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
<th>RC</th>
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<tbody>
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</tr>
<tr>
<td>4</td>
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<td>125</td>
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<td>8000</td>
<td>RC</td>
</tr>
<tr>
<td>8</td>
<td>0.003</td>
<td>150</td>
<td></td>
<td>40000</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>FM</td>
<td>2000000</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>20000</td>
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<td></td>
<td></td>
<td>10000</td>
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</tr>
</tbody>
</table>

* Dimension changes with different number of channels

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

Shaft
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 (-3 dB)
Strain gage bridge supply: 2.5 V, (3.3\textsuperscript{*}) V
Strain gage bridge resistance: 350 (120, 1000) \Omega
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 14 Bits, (16 Bits\textsuperscript{*})
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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<th>Bandwidth</th>
<th>Bridge Supply</th>
<th>Bridge Resistance</th>
<th>Transmission</th>
<th>Filter</th>
<th>Resolution</th>
<th>Zero Point Drift</th>
<th>Shunt Calibration</th>
<th>Gain/Zero</th>
<th>Max Load</th>
<th>Temperature Range</th>
<th>Type</th>
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<td>0 to 50 kHz</td>
<td>2.5 V</td>
<td>350 \Omega</td>
<td>FM, PCM</td>
<td></td>
<td>14 Bits</td>
<td>0.02 mV/V</td>
<td>Remote</td>
<td></td>
<td>100,000 g</td>
<td>-25 to +85°C</td>
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<tr>
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<td>0.01 mV/V</td>
<td>0 to 50 kHz</td>
<td>2.5 V</td>
<td>350 \Omega</td>
<td>FM, PCM</td>
<td></td>
<td>14 Bits</td>
<td>0.01 mV/V</td>
<td>Remote</td>
<td></td>
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<td>-25 to +85°C</td>
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<td>0.003 mV/V</td>
<td>0 to 50 kHz</td>
<td>2.5 V</td>
<td>350 \Omega</td>
<td>FM, PCM</td>
<td></td>
<td>14 Bits</td>
<td>0.003 mV/V</td>
<td>Remote</td>
<td></td>
<td>100,000 g</td>
<td>-25 to +85°C</td>
<td>MSV_AAC_8_003_000_000_FMM_4000_PSM</td>
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<td>0.001 mV/V</td>
<td>0 to 50 kHz</td>
<td>2.5 V</td>
<td>350 \Omega</td>
<td>FM, PCM</td>
<td></td>
<td>14 Bits</td>
<td>0.001 mV/V</td>
<td>Remote</td>
<td></td>
<td>100,000 g</td>
<td>-25 to +85°C</td>
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<td>0.0003 mV/V</td>
<td>0 to 50 kHz</td>
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<td>350 \Omega</td>
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<td>14 Bits</td>
<td>0.0003 mV/V</td>
<td>Remote</td>
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<td>100,000 g</td>
<td>-25 to +85°C</td>
<td>MSV_AAC_16_0003_0000_000_FMM_4000_PSM</td>
</tr>
</tbody>
</table>

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

* Dimension changes with different number of channels
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 + 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 (-3 dB)
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*)
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>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
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<tbody>
<tr>
<td>2</td>
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<td>PCM12</td>
<td>4000</td>
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<tr>
<td>4</td>
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<td>125</td>
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<td>8000</td>
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<tr>
<td>8</td>
<td>0.003</td>
<td>150</td>
<td></td>
<td>40000</td>
</tr>
<tr>
<td>16</td>
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<td></td>
<td>FM*</td>
<td>200000</td>
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<td>total sampling rate 10000</td>
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</table>

* Dimension changes with different number of channels

* Max. sampling rate/channel = total sampling rate/ No. of channels
4/8 Channel Sensor Signal Amplifier Type Cylinder
(Integrated Rotor Loop, Mounting on Shaft, disk version)
(Standard)

Pick up

Solder pins

Shaft

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

* Dimension changes with different number of channels

Multi Channel 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 (-3 dB)
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 12/16 Bits resolution (option)
Enviromental 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>

<table>
<thead>
<tr>
<th>Channels</th>
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<th>SAMPLING RATE</th>
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<tbody>
<tr>
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<td>4000</td>
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<tr>
<td>4</td>
<td>0.01 mV/V</td>
<td>PCM16</td>
<td>8000</td>
</tr>
<tr>
<td>8</td>
<td>0.003 mV/V</td>
<td></td>
<td>40000</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>FM*</td>
<td>20000</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>10000</td>
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</table>

* Max. sampling rate/channel = total sampling rate/ No. of channels
4/8 Channel Sensor Signal Amplifier Type Cylinder (Integrated Rotor Loop, Mounting on Shaft, divisible axial Signal Pickup)

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

Pickup

stator antenna

M3 Inbus

Solder pins

Shaft

Multi Channel 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>

Channel 1

Channel n

Divisible

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

Page 40
4/8 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
* Dimension changes with different number of channels

Multi Channel 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)
Environmetal 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>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temp</th>
<th>Mod</th>
<th>Samplerate</th>
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</tr>
<tr>
<td>4</td>
<td>0.01</td>
<td>125</td>
<td></td>
<td>8000</td>
</tr>
<tr>
<td>8</td>
<td>0.003</td>
<td>150</td>
<td></td>
<td>40000</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>FM*</td>
<td>20000</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td>10000</td>
</tr>
</tbody>
</table>

* Max. sampling rate/channel = total sampling rate/ No. of channels
4 Channel Sensor Signal Amplifier Type beared divisible
Shaft Transmitter with Speed Sensor
(Standard)

Inner diameter: 30 to 60 mm
Outer diameter = Inner diameter + 30 mm

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 (-3 dB)
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: 2,000 rpm
Environmental temperature range: -25 to +85°C (125°C, 150°C)
Max load: 2,000 g (depending on fixing)
Type: MSV_Gel_<channels>_<accuracy>_<temp>_<mod>_<samplerate>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
<th>Temperature</th>
<th>Mod</th>
<th>Samplerate</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>0.02</td>
<td>85</td>
<td>PCM12</td>
<td>4000</td>
</tr>
<tr>
<td>4</td>
<td>0.01</td>
<td>125</td>
<td>PCM16</td>
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</tr>
<tr>
<td></td>
<td>0.003</td>
<td></td>
<td></td>
<td>40000</td>
</tr>
</tbody>
</table>

* Dimension changes with different number of channels
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: 2,000 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>
<thead>
<tr>
<th>Channels</th>
<th>Dxxx*yy</th>
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<th>Modulation</th>
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<tr>
<td>16</td>
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</tbody>
</table>
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>

* 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 (-3 dB)
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: 30,000 g (depending on fixing)

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

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<th>Channels</th>
<th>Accuracy</th>
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<th>Mod</th>
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</tr>
</tbody>
</table>

** : inductive
Fu: Radio Transmission
M: Master modul
S: Slave modul
Modular Sensor Telemetry Amplifier distributed
max. 64 Channels

Planetary gear box
(D = 3000 mm)

Wind mill application

4 channel modules

4 channel modules

data and energy coppler

wiring

sensor connection
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 (-3 dB)
- 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: 10,000 rpm
- Weight: 550 grams

Certified according:
- * Mil-STD-810F
- * Def Stan 59-41
- * ED-14E (DO-160E)
- * MISP LL0060-200

Type: MSV_RaHm_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC

<table>
<thead>
<tr>
<th>Channels</th>
<th>Accuracy</th>
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<th>Mod</th>
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<td>16</td>
<td>0.01</td>
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<tr>
<td>64</td>
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</tr>
</tbody>
</table>
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 (-3 dB)
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)
Enviromental 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>
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<th>Sys</th>
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</tr>
<tr>
<td>3</td>
<td>0.01</td>
<td>125</td>
<td>2000</td>
<td>K</td>
<td>4000</td>
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<tr>
<td>4</td>
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<td>160</td>
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</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  Output1 -10V to +10V
Pin 2  GND Output
Pin 3  Remote Calibration Signal
Pin 4  Output1 -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

Cover 'Zero' and 'Gain' screws after adjustment if necessary

2 Channel PCM Receiver

Bandwidth: 0 to 1kHz (10 kHz)
Number of channels: 1/2
Output: 0 to ±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>_<sys>_<mod>_<samplerate>_<power>_<supply>_<output>_<int>_<RPM>_<wa>
Evaluation Unit (MAW_F)
Digital Receiver with digital output

with CAN-Bus or TCP/IP or EtherCat or USB Option available

Multi Channel PCM Receiver
- Bandwidth: 0 to 1kHz (10 kHz, 50 kHz)
- Number of channels: 1 to 64 (128)
- Digital interface (option): 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%), 9 to 36 V DC (board supply)
- Type: MAW_F_<channels>_<Freq>_sys_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<Mo>

<table>
<thead>
<tr>
<th>2</th>
<th>-</th>
<th>Ind</th>
<th>PCM12</th>
<th>4000</th>
<th>1W</th>
<th>15</th>
<th>USB</th>
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<th>-</th>
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<tr>
<td>4</td>
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<td>24</td>
<td>CAN</td>
<td>RPM</td>
<td>Hu</td>
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<td>8</td>
<td>3,2</td>
<td>Fu</td>
<td>200000</td>
<td>5W</td>
<td>12B</td>
<td>TCP/IP</td>
<td>La</td>
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<td>12</td>
<td>InFu</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CAT</td>
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</tbody>
</table>

Pin Assignment of the Power connector (Back panel):
- Pin 1: GND Power Supply
- Pin 2: nc
- Pin 3: nc
- Pin 4: Power Supply 9 to 36 VDC
### Evaluation Unit (MAW_F)
Analogic/Digital Receiver

#### Pin Assignment of the Power connector (Back panel)
- Pin 1: GND Power Supply
- Pin 2: nc
- Pin 3: nc
- Pin 4: Power Supply 9 to 36 VDC

#### 2/4 Channel PCM Receiver
- **Bandwidth:** 0 to 1kHz (10, 50 kHz)
- **Number of channels:** 2, 4
- **Output:** 0 to ±10 V, (0(4) to 20 mA option)
- **Digital interface (option):** CAN, USB, Ethernet (TCP/IP), EtherCAT
- **RF-Power:** 1, 3, 5 W
- **Transmission:** inductive sensor telemetry PCM
- **Integrated filter**
- **Resolution:** 12 Bits, (16 Bit, 24 Bit)
- **Remote shunt calibration**
- **Environmental temperature range:** -25 to +85°C (-45 to +85°C)
- **Supply:** 24 V DC (+/-5%), 9 to 36 V DC (board supply)
- **Type:** MAW_P_<channels>_<Freq>_<sys>_<mod>_<samplerate>_<power>_<supply>_<output>_<int>_<RPM>_<wa>

<table>
<thead>
<tr>
<th>Channel</th>
<th>Power</th>
<th>Freq</th>
<th>Sys</th>
<th>Mod</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>Int</th>
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<td>15</td>
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<td>6,8</td>
<td>Inba*</td>
<td>PCM16</td>
<td>8000</td>
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<td>24</td>
<td>I</td>
<td>USB</td>
<td>RPM</td>
<td>IP65</td>
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<tr>
<td>8</td>
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<td>3,4</td>
<td>Fu</td>
<td></td>
<td>20000</td>
<td>5W</td>
<td>12B</td>
<td>F</td>
<td>CAN</td>
<td></td>
<td>TCP/IP</td>
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<td></td>
<td></td>
<td></td>
<td>CAT</td>
</tr>
</tbody>
</table>

*Note: Inba = Incremental Absolut converter (option)
Evaluation Unit (MAW_F)  
Analogic/Digital Receiver

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>GND Power Supply</td>
</tr>
<tr>
<td>2</td>
<td>nc</td>
</tr>
<tr>
<td>3</td>
<td>nc</td>
</tr>
<tr>
<td>4</td>
<td>Power Supply 9 to 36 VDC</td>
</tr>
</tbody>
</table>

with CAN-Bus or TCP/IP or EtherCat or USB Option available

8 Channel PCM Receiver

- **Bandwidth:** 0 to 1kHz (10 kHz)
- **Number of channels:** 8
- **Output:** 0 to ±10 V, (0(4) to 20 mA option)
- **Digital interface (option):** CAN, USB, Ethernet (TCP/IP), EtherCAT
- **RF-Power:** 1, 3, 5 W
- **Transmission:** inductive sensor telemetry PCM

**Integrated filter**
- **Resolution:** 12 Bits, (16 Bit, 24 Bit)
- **Remote shunt calibration**
- **Environmental temperature range:** -25 to +85°C (-45 to +85°C)
- **Supply:** 24 V DC (+/-5%), 9 to 36 V DC (board supply)

**Type:** MAW_P_<channels>_<Freq>_<sys>_<mod>_<samplerate>_<power>_<supply>_<output>_<int>_<RPM>_<wa>

<table>
<thead>
<tr>
<th>#</th>
<th>Channels</th>
<th>Freq</th>
<th>Sys</th>
<th>Mod</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>Int</th>
<th>RPM</th>
<th>USB</th>
<th>CAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
<td>6620</td>
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<td>15</td>
<td>U</td>
<td>B</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>8000</td>
<td>3W</td>
<td>24</td>
<td>I</td>
<td>USB</td>
<td>RPM</td>
<td>IP65</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>12B</td>
<td>40000</td>
<td>5W</td>
<td>12B</td>
<td>F</td>
<td>CAN</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>CAT</td>
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</table>

Resolution: 12 Bits, (16 Bit, 24 Bit)
Pin Assignment
of the D-Sub connector

<table>
<thead>
<tr>
<th>Pin 1</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 2</td>
<td>GND Output</td>
</tr>
<tr>
<td>Pin 3</td>
<td>Remote Calibration Signal</td>
</tr>
<tr>
<td>Pin 4</td>
<td>Data</td>
</tr>
<tr>
<td>Pin 5</td>
<td>GND Power Supply</td>
</tr>
<tr>
<td>Pin 6</td>
<td>not connected</td>
</tr>
<tr>
<td>Pin 7</td>
<td>Power Supply 9 to 36 VDC</td>
</tr>
<tr>
<td>Pin 8</td>
<td>Data</td>
</tr>
<tr>
<td>Pin 9</td>
<td>Data</td>
</tr>
</tbody>
</table>

Multi Channel PCM Receiver

Bandwidth: 0 to 1kHz (10 kHz)
Number of channels: 1 to 32
Output: 0 to ±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
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_G_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<swa>

| 2   | PCM12 | 4000 | 1W | 15 | USB | - | -         |
| 4   | 6     | PCM16| 40000| 3W | 24  | CAN| RPM | IP65       |
| 8   | Fu    | 5W   | 12B | TCP/IP | IP67 |- | -         |
| 3,2 |       |      |     |       |     |   |   |           |
Evaluation Unit (22TE)

4 Channel FM/PCM Receiver 22 TE

- **Bandwidth:** 0 to 1kHz (10 kHz, 50 kHz option)
- **Output:** 0 to ±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**
- **Enviromental 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>

- **4**
- **1W**
- **3W**
- **5W**
- **230VAC**
- **24B**
- **200000**
- **2000**
- **10000**

**Incremental/Absolut converter (option)**

**Remote calibration**

**Antenna**

**Speed pickup**

**Shaft encoder interface (option)**

**Digital interface (option)**

**Ethernet (TCP/IP)**

**USB**

**CAN**

**** only for PCM version

---

* Max. sampling rate/channel = total sampling rate/ No. of channels
**Evaluation Unit (42TE)**

**Front side**

---

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

<table>
<thead>
<tr>
<th>Bandwidth: 0 to 1 kHz (10 kHz, 50 kHz option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output: 0 to ±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>
<tr>
<td>Type: MAW_42TE_&lt;channels&gt;_F&lt;mod&gt;<em>samplerate</em>&lt;power&gt;<em>supply</em>&lt;output&gt;_RPM</td>
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**Table:**

<table>
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<th>Frequency</th>
<th>Mode</th>
<th>Sample Rate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>PCM12</td>
<td>F</td>
<td>4000</td>
<td>1W</td>
<td>230VAC</td>
<td>I</td>
<td>F</td>
</tr>
<tr>
<td>12</td>
<td>PCM16</td>
<td>F</td>
<td>40000</td>
<td>3W</td>
<td>24B</td>
<td>I</td>
<td>F</td>
</tr>
<tr>
<td>16</td>
<td>3,2</td>
<td>F*</td>
<td>200000</td>
<td>5W</td>
<td></td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

**Antenna**

**Speed pickup**

**Shaft encoder interface (option)**

**Digital interface (option)**

**Incremental/ Absolute converter (option)**

---

**Remote calibration**

**Ethernet (TCP/IP)**

**Demultiplexer**

**Multi Channel**

**Receiver**

---

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

* only for PCM version
Evaluation Unit (84TE)

Front side

Multi Channel FM/PCM Receiver 84 TE

Bandwidth: 0 to 1 kHz (10 kHz, 50 kHz option)
Output: 0 to ±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>

<table>
<thead>
<tr>
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<th>Frequency</th>
<th>Modulation</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>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>
<td>12</td>
<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></td>
<td>B</td>
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<td>32</td>
<td>F*</td>
<td></td>
<td>2000</td>
<td></td>
<td>USB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** total sampling rate 10000

** only for PCM-Version

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

- **Bandwidth:** 0 to 1 kHz (10 kHz, 50 kHz option)
- **Output:** 0 to ±10 V
- **Interfaces (option):** USB, CAN, Ethernet (TCP/IP)
- **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>Frequency</th>
<th>Modulation</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>PCM12</td>
<td>4000</td>
<td>1W</td>
<td>230VAC</td>
<td>U</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>12</td>
<td>Fu</td>
<td>4000</td>
<td>3W</td>
<td>24V</td>
<td>I</td>
<td>RPM</td>
</tr>
<tr>
<td>16</td>
<td>3,2</td>
<td>PCM16</td>
<td>200000</td>
<td>5W</td>
<td>F</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>F*</td>
<td></td>
<td>2000</td>
<td></td>
<td></td>
<td>USB</td>
<td></td>
</tr>
</tbody>
</table>

**Resolution:** 12 Bits, (16 Bit**)

**Remote calibration**

**90 to 270 volts**

**Antenna**

**Speed pickup**

**Shaft encoder interface (option)**

**Incremental Absolute converter (option)**

**Digital interface (option)**

**Remote calibration**

**Enviromental 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>

**Max. sampling rate/channel = total sampling rate/ No. of channels**
The connection to the rotor antenna is situated at the rear side.

**Evaluation Unit (84TE, 6HE)**

---

**Multi Channel FM/PCM Receiver 84TE HE6**

- **Bandwidth:** 0 to 1 kHz (10 kHz, 50 kHz option)
- **Output:** 0 to ±10 V
- **Interfaces (option):** USB, Ethernet (TCP/IP), CAN
- **Remote shunt calibration**
- **Transmission:** inductive sensor telemetry FM/PCM
- **Enviromental temperature range:** -25 to +65°C
- **Supply:** 9 to 270 V AC, 9 to 36 V DC (board supply)

**Type:** MAW_6HE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

<table>
<thead>
<tr>
<th>Channels</th>
<th>Frequency</th>
<th>Modulation</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
<th>Output</th>
<th>RPM</th>
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</thead>
<tbody>
<tr>
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<td>F</td>
<td>4000</td>
<td>1W</td>
<td>230VAC</td>
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<td>-</td>
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<tr>
<td>8</td>
<td>PCM12</td>
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<td>3W</td>
<td>24B</td>
<td>I</td>
<td>RPM</td>
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<tr>
<td>12</td>
<td>PCM16</td>
<td>40000</td>
<td>5W</td>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>3,2</td>
<td>200000</td>
<td>B</td>
<td>USB</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>F*</td>
<td>2000</td>
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<tr>
<td></td>
<td>total sampling rate</td>
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<td>tcp/ip</td>
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<td></td>
</tr>
</tbody>
</table>

---

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

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

- **Bank 1**
  - Mux
  - RMC program amplifier
  - Filter butterworth
  - A/D converter 12/16 Bit
  - Rate 40k (200 kHz)
  - Channel select

- **Bank m**
  - Mux
  - RMC program amplifier
  - Filter butterworth
  - A/D converter 12/16 Bit
  - Rate 40k (200 kHz)

- Supply logic
- Digital multiplexer
- HF interface 13.56 MHz
- ca. 15 Mbit
Interface Technique
(direct signal data acquisition)
Very Compact Digital Multi Channel Receiver with Digital Interface Technique

(direct signal data acquisition, no analog Output)

Supply 9 to 36 V DC
0 to ±10 V

Coupling
Inductive supply and transmitting 13.56 MHz

Multi channel sensor signal amplifier

CAN-Bus/USB Interface
Supply 9 to 36 V DC
0 to ±10 V

Adjustment zero, gain, auto zero

Torque

Datei Info
Werte erneut senden
Zusatzfunktionen

MA MANNER Sensortelemetrie
Digital combi Data Acquisition (Sensor Telemetry + stationary Channels) (direct signal data acquisition)

Configuration

- Multi channel sensor signal amplifier
- Remote control (option)
- Coupling
- Inductive supply and transmitting 13.56 MHz
- Data acquisition unit
- Stationary sensor interface (max. 8 channels)
- Configureable analogic inputs
- Remote calibration
- USB, TCP-IP
- Hall sensor
- Strain gage half bridge
- Voltage 0 to ±10 V
- Strain gage full bridge
- Thermocouple
- PT100 RTD
- Remote calibration
- 90 to 270V AC (9 to 36 V DC)
- USB, TCP-IP
- Digital combi Data Acquisition (Sensor Telemetry + stationary Channels)
**Combi Data Acquisition (SYNCHRO)**
(direct signal data acquisition)

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

**Multi Channel PCM Receiver with additional stationary Channels, 24 TE**

- Bandwidth: 0 to 1 kHz (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 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>Modulus</th>
<th>Samplerate</th>
<th>Power</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0,01</td>
<td>F</td>
<td>1000</td>
<td>1W</td>
<td>230VAC</td>
</tr>
<tr>
<td>8</td>
<td>0,003</td>
<td>PCM12B</td>
<td>4000</td>
<td>3W</td>
<td>24B</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>PCM16B</td>
<td>8000</td>
<td>5W</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>40000</td>
<td>10W</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td>200000</td>
<td></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

Gain (remote)
Autozero, Zero (remote)

Evaluation unit

Output 10 V digits
Gain correction
Extention µm/m

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 configurated for each single user of your computer.

Settings for RPM Channel (optional):
Settings have to be made for correct RPM display in the software. Averaging factor 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 Aquisition:
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

Using of Remote Control Function

(Software package remote control)

- Transmission of the complete set of settings to the rotor electronic (Gain and zero point for all selected channels)
- Transmission of ‘Gain’ or ‘Zero point’ of the relevant channel
- Loading / storing of settings
- Setting of the RMC channel number of the telemetry system
- Presetting of the memory
- 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
- Automatic zero adjustment

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
Interface - Software

(software package data acquisition - optional)

Display selection
Configuration / bargraph oscilloscope / data recording

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.

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

System Information - Status

Start recording / Online

USB Interface Version 2.0 Binary / Fileformat

Configuration / Bargraph Oscilloscope / Data recording

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)

Visualization of recorded Data
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: \( U_{out} [V] = \frac{(Digitvalue-32768)}{2949.1} \) (16Bit) or \( U_{out} [V] = \frac{(Digitvalue-2048)}{184.3} \) (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
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>
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<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:  \( U_{out}[V] = \frac{(Digitvalue-32768)}{2949.1} \) (16Bit) or  \( U_{out}[V] = \frac{(Digitvalue-2048)}{184.3} \) (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; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02604; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02046; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02626; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02605; 02050; 02047; 02047; 02047
02050; 02047; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02572; 02050; 02050; 02047; 02047
02050; 02047; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02561; 02050; 02050; 02047; 02047
Signal Test Function via Scope Function

(Software package data acquisition module - 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.
## 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>
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

Realtime recorded Data File

Exportfunctions

Pview visualisation program
(part of software package data acquisition)

User specific analysis program

Exel or other analysis programmes
# Railway Telemetry

## Technical Data:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8/12/16/24 Channel PCM Sensortelemtrie</strong></td>
<td></td>
</tr>
<tr>
<td>For strain gage, PT100, (thermocouple option)</td>
<td></td>
</tr>
<tr>
<td>Number of channels: 8/12/16/24</td>
<td></td>
</tr>
<tr>
<td>Sensitivity (remote adjustable): 0.02 mV/V to 12 mV/V</td>
<td></td>
</tr>
<tr>
<td>Bandwidth: 0 to 1 kHz (-3 dB)</td>
<td></td>
</tr>
<tr>
<td>High precise strain gage bridge supply: 3.3 V</td>
<td></td>
</tr>
<tr>
<td>bridge type: full-, half-, quarter bridge</td>
<td></td>
</tr>
<tr>
<td>Strain gage bridge resistance: 350 (120, 1000) Ω</td>
<td></td>
</tr>
<tr>
<td>Transmission: inductive sensor telemetry PCM</td>
<td></td>
</tr>
<tr>
<td>Data and supply frequency: 13.56 MHz</td>
<td></td>
</tr>
<tr>
<td>Resolution: 16 bit</td>
<td></td>
</tr>
<tr>
<td>Zeropoint drift: 0.005%/°K</td>
<td></td>
</tr>
<tr>
<td>Gain drift: 0.01%/°K</td>
<td></td>
</tr>
<tr>
<td>Remote shunt calibration</td>
<td></td>
</tr>
<tr>
<td>integrated data consistence check and transmission error detection</td>
<td></td>
</tr>
<tr>
<td>cyclic redundancy check (CRC)</td>
<td></td>
</tr>
<tr>
<td>remote gain adjustment with 16 Bit resolution</td>
<td></td>
</tr>
<tr>
<td>remote auto zero adjust 16 Bit resolution</td>
<td></td>
</tr>
<tr>
<td>read back function for programmed gain and zero point from Sensor signal amplifier storage</td>
<td></td>
</tr>
<tr>
<td>integrated sensor signal inside temperature monitoring</td>
<td></td>
</tr>
<tr>
<td>integrated sensor signal supply voltage monitoring</td>
<td></td>
</tr>
<tr>
<td>integrated storage for special data</td>
<td></td>
</tr>
<tr>
<td>conformity to railway norms in Terms of EMC: EN 60950, EN 55011, EN 50210, EN 61326</td>
<td></td>
</tr>
<tr>
<td>Environmental temperature range: -25 to +85°C (125°C, 150°C)</td>
<td></td>
</tr>
<tr>
<td>Max load: 20,000 g (depending on fixing)</td>
<td></td>
</tr>
<tr>
<td>Protection: IP67</td>
<td></td>
</tr>
<tr>
<td>Type: MSV_Mr &lt;channels&gt;<em>&lt;accuracy&gt;</em>&lt;temp&gt;<em>&lt;sys&gt;</em>&lt;mod&gt;<em>&lt;samplerate&gt;</em>&lt;rmc&gt; wa</td>
<td></td>
</tr>
<tr>
<td>Type:</td>
<td>Product Key Multi Channel Receiver</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>MAW_&lt;housing&gt;<em>&lt;channels&gt;</em>&lt;VFreq&gt;<em>&lt;sys&gt;</em>&lt;mod&gt;<em>&lt;samplerate&gt;</em>&lt;power&gt;<em>&lt;supply&gt;</em>&lt;outpA&gt;<em>&lt;outpZ&gt;</em>&lt;DInt&gt;<em>&lt;ZInt&gt;</em>&lt;RPM&gt;<em>&lt;wa&gt;</em>&lt;Temp&gt;<em>&lt;sta&gt;</em>&lt;OEM&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Type:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>housing type:</strong></td>
<td>G  Alu housing robust</td>
</tr>
<tr>
<td></td>
<td>HE84  Table housing, 19”</td>
</tr>
<tr>
<td></td>
<td>HE42  Table housing 1/2 19”</td>
</tr>
<tr>
<td></td>
<td>F  Tubus housing</td>
</tr>
<tr>
<td><strong>channels:</strong></td>
<td>(channel count)</td>
</tr>
<tr>
<td></td>
<td>1-128  rotating channel count</td>
</tr>
<tr>
<td><strong>Vfreq:</strong></td>
<td>(Supply frequency)</td>
</tr>
<tr>
<td></td>
<td>13.56 Mhz</td>
</tr>
<tr>
<td></td>
<td>6.78 Mhz</td>
</tr>
<tr>
<td></td>
<td>3.38 Mhz</td>
</tr>
<tr>
<td><strong>sys:</strong></td>
<td>(System type)</td>
</tr>
<tr>
<td></td>
<td>Ind  Inductive</td>
</tr>
<tr>
<td></td>
<td>Ba4  Data rate = Supply frequency/4 max 3,34 Mbit/s at 13.56 Mhz supply</td>
</tr>
<tr>
<td></td>
<td>Ba8  Data rate = Supply frequency/8</td>
</tr>
<tr>
<td></td>
<td>InFu  enhanced data rate up 200 Mbits/sec inductive supplied system</td>
</tr>
<tr>
<td></td>
<td>Fu  system radio transmission for data rates up 40 Mbit/sec battery supplied system</td>
</tr>
<tr>
<td><strong>Mod:</strong></td>
<td>(Type of modulation)</td>
</tr>
<tr>
<td></td>
<td>PCM12  Pulse Code Modulation with 12 bit modulation</td>
</tr>
<tr>
<td></td>
<td>PCM16  Pulse Code Modulation with 16 bit modulation</td>
</tr>
<tr>
<td></td>
<td>FM  Frequencymodulation (not for new systems)</td>
</tr>
<tr>
<td></td>
<td>HSPCM12  Highspeed Mod. for sample rate up 200000 sample/s</td>
</tr>
<tr>
<td></td>
<td>HCPCM12  Highspeed Mod. for sample rate up 200000 sample/s with additional sub system with a sample of 100 sample/s</td>
</tr>
<tr>
<td><strong>samplerate:</strong></td>
<td>samples/sec/channel</td>
</tr>
<tr>
<td></td>
<td>xxxx  xxxx sample/sec/channel</td>
</tr>
<tr>
<td><strong>power:</strong></td>
<td>(RF Supply power)</td>
</tr>
<tr>
<td></td>
<td>xxW  RF-supply with xx watts</td>
</tr>
<tr>
<td></td>
<td>xxWR  variable RF-supply with max xx watts</td>
</tr>
<tr>
<td><strong>supply:</strong></td>
<td>(System type)</td>
</tr>
<tr>
<td></td>
<td>24  24 volt supply (+/-10%)</td>
</tr>
<tr>
<td></td>
<td>24B  10 to 36 volts board supply</td>
</tr>
<tr>
<td></td>
<td>230VAC  90 to 270 volt AC-system 50/60 Hz</td>
</tr>
<tr>
<td><strong>outputA:</strong></td>
<td>(primary output analogic)</td>
</tr>
<tr>
<td></td>
<td>U  0 to ±10 volts</td>
</tr>
<tr>
<td></td>
<td>I  0 to 20 mA</td>
</tr>
<tr>
<td><strong>outputZ:</strong></td>
<td>(secondary output analogic)</td>
</tr>
<tr>
<td></td>
<td>U  0 to ±10 volts</td>
</tr>
<tr>
<td></td>
<td>I  0 to 20 mA</td>
</tr>
<tr>
<td><strong>DInt:</strong></td>
<td>(primary digital interface)</td>
</tr>
<tr>
<td></td>
<td>USB  USB Interface</td>
</tr>
<tr>
<td></td>
<td>TCP/IP  general Ethernetinterface</td>
</tr>
<tr>
<td></td>
<td>TCP#TC/IENA special Interface with IENA Protocol</td>
</tr>
<tr>
<td></td>
<td>CAN  CAN Interface</td>
</tr>
<tr>
<td><strong>ZInt:</strong></td>
<td>(secondary digital interface)</td>
</tr>
<tr>
<td></td>
<td>USB  USB Interface</td>
</tr>
<tr>
<td></td>
<td>TCP/IP  general Ethernetinterface</td>
</tr>
<tr>
<td></td>
<td>CAN  CAN Interface</td>
</tr>
<tr>
<td><strong>RPM:</strong></td>
<td>(stationary speed acquisition, RPM-avaluation)</td>
</tr>
<tr>
<td></td>
<td>Dz#A#ZW#xx#P##/S  Speed pulses</td>
</tr>
<tr>
<td></td>
<td>Dz#A#ZW#xx#Z##/S  online Speed speed calculation</td>
</tr>
<tr>
<td></td>
<td>Dz#A#ZW#100#W##/S  online turn angle calculation</td>
</tr>
<tr>
<td><strong>wa:</strong></td>
<td>(protection)</td>
</tr>
<tr>
<td></td>
<td>-  protection IP42</td>
</tr>
<tr>
<td></td>
<td>IP52  protection IP52</td>
</tr>
<tr>
<td></td>
<td>IP65  protection IP65 (water protected</td>
</tr>
<tr>
<td></td>
<td>230VAC  90 to 270 volt AC-system 50/60 Hz</td>
</tr>
<tr>
<td><strong>Temp:</strong></td>
<td>(temperature range)</td>
</tr>
<tr>
<td></td>
<td>-10 to +70 °C</td>
</tr>
<tr>
<td></td>
<td>-45 to +85°C</td>
</tr>
<tr>
<td><strong>sta:</strong></td>
<td>(optional additional non rotating channels)</td>
</tr>
<tr>
<td></td>
<td>4  4 additional non rotating channels</td>
</tr>
<tr>
<td></td>
<td>8  8 additional non rotating channels</td>
</tr>
<tr>
<td></td>
<td>16  16 additional non rotating channels</td>
</tr>
<tr>
<td><strong>OEM:</strong></td>
<td>(special customised solution in connectors)</td>
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<td>&lt;Company&gt;  special described features</td>
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</table>
### 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>

<table>
<thead>
<tr>
<th>Condition with range 4</th>
<th>Condition with range 3</th>
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<th>Remote Control</th>
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Conditioning with range 3
Conditioning with range 2
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Waterproof/oilproof
Remote Control
Samplerate/channel/sec/spot
Type of signal transmission
Supply frequency
Temperature range
Accuracy
max. Speed (opt.)
Size
Channel count
Housing type
Multi channel signal amplifier

---

**housing type:**

- **M** Alu housing Quad, robust
- **P** Cartridge housing
- **AA** Cartridge housing with integr. axial antenna (end shaft)
- **Ra** Cartridge housing with integr. radial antenna
- **RD** Disk housing end shaft with radial antenna
- **RaHd** Shaft transmitter (divisible, radial coupling)
- **RaHa** Shaft transmitter (divisible, axial coupling)
- **RaHm** Cartridge housing with integr. bearing/axial antenna
- **Flan** Intermediate Flange version with radial coupling
- **Flex** Flex-Version for Lamination directly on shaft

**channels:** (channel count)

- 1-128 rotating channel count

**Size:** (Dimensions of the sensor signal amplifier)

- xx/xx length, diameter
- xx/xx/xx length, width, height
- xx/xx/xx/xx length, width, height, divisible

**Speed:** (max. Speed in RPM)

- Sxxxx max. Speed in RPM

**accuracy:** (accuracy of sensor signal amplifier)

- 0.02 max. failure in offset drift and gain drift 0.02 %/°C
- 0.01 max. failure in offset drift and gain drift 0.01 %/°C
- 0.003 max. failure in offset drift and gain drift 0.003 %/°C
- 0.001 max. failure in offset drift and gain drift 0.001 %/°C

**temp:** (environmental temperature range)

- -10+85 environmental temperature range -10 to +85°C
- -25+125 environmental temperature range -25 to +125°C
- -50+85 environmental temperature range -50 to +85°C
- -40+160 environmental temperature range -40 to +160°C

**Vfreq:** (Supply frequency)

- 13.56 MHz
- 6.78 MHz
- 3.38 MHz

**sys:** (System type)

- Inductive
- Inductive
- Data rate = Supply frequency/4
- Data rate = Supply frequency/8
- enhanced data rate up 200 Mbit/sec
- system radio transmission for data rates up 40 Mbit/sec battery supplied system

**Mod:** (Type of modulation)

- Pulse Code Modulation with 12 bit modulation
- Pulse Code Modulation with 16 bit modulation
- Frequency modulation (not for new systems)
- Highspeed Mod. for sample rate up 200000 sample/s
- Highspeed Mod. for sample rate up 200000 sample/s with additional sub system with a sample of 100 sample/s

**Company**

- special described features

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