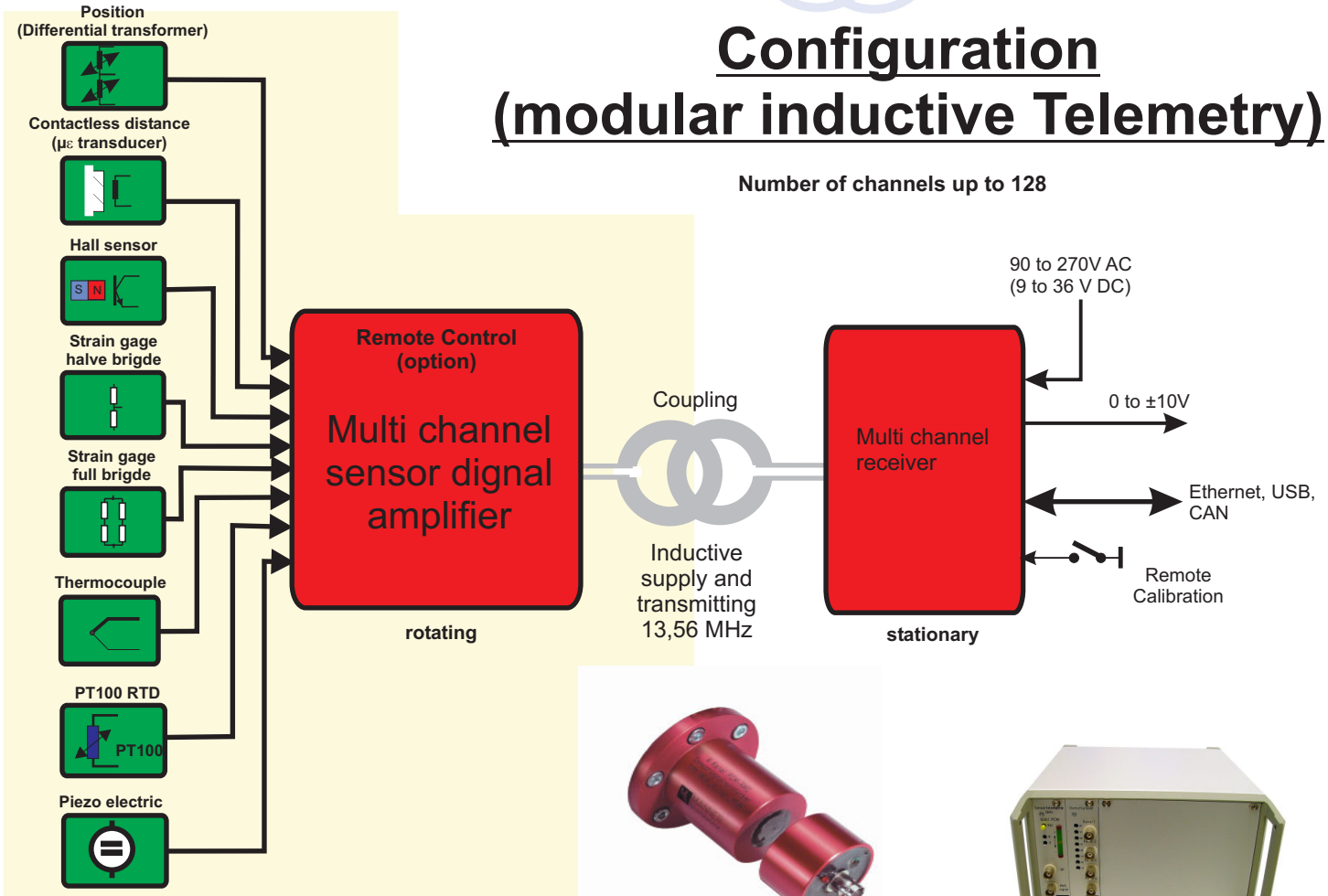
MANNER® Sensortelemetrie

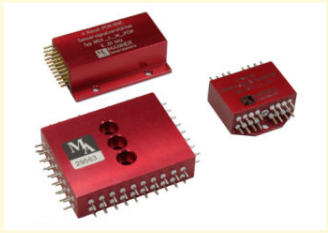
Inductive Sensortelemetry
Multi Channel Sensor Signal Amplifiers and Receivers

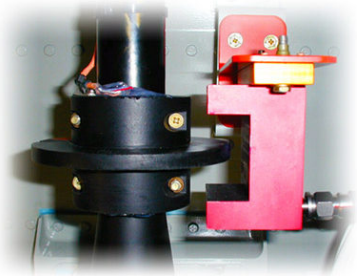
MANNER® Sensortelemetrie

Configuration
(modular inductive Telemetry)

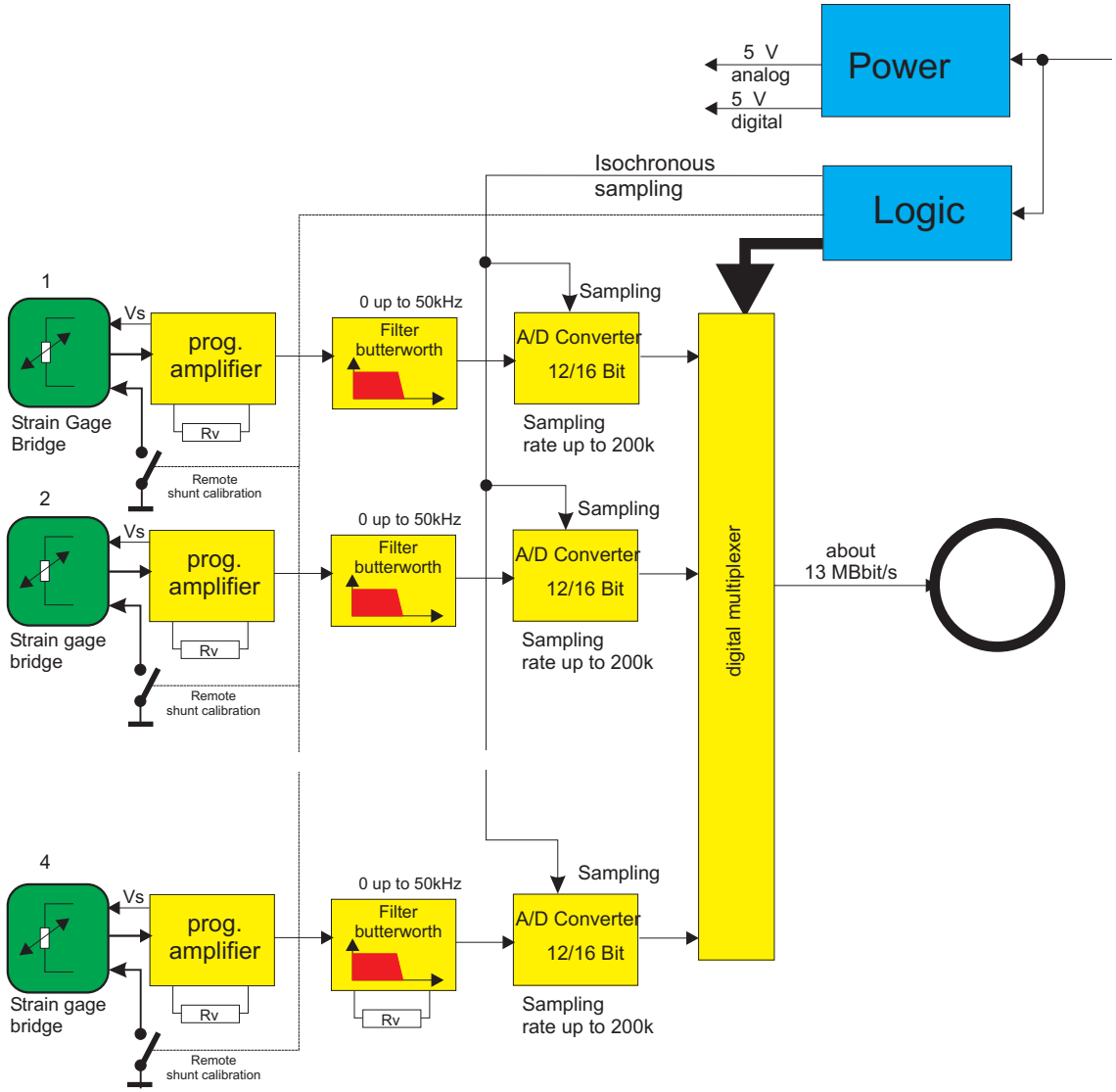
Number of channels up to 128





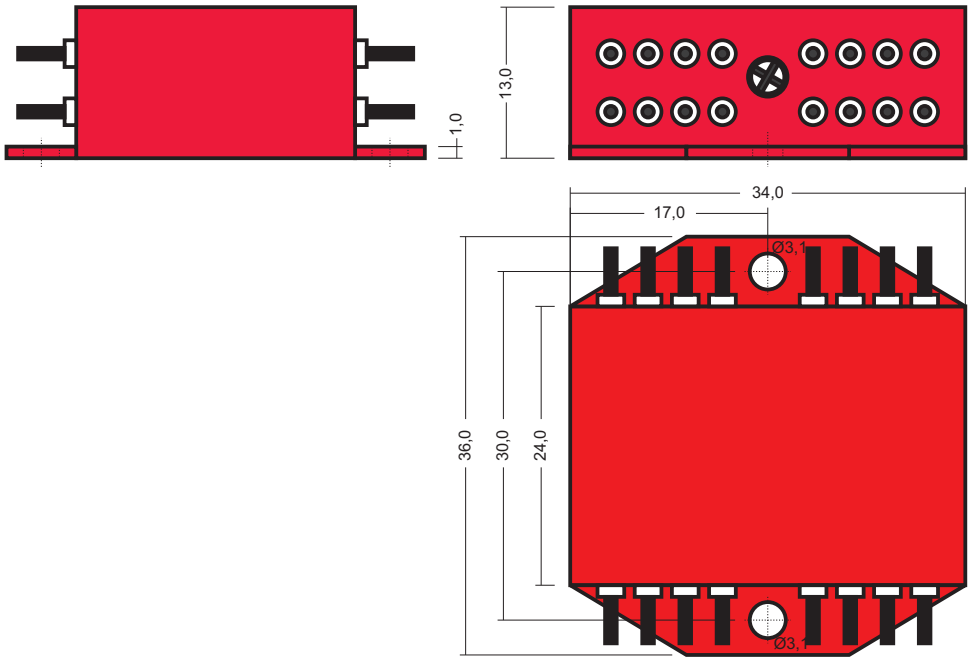


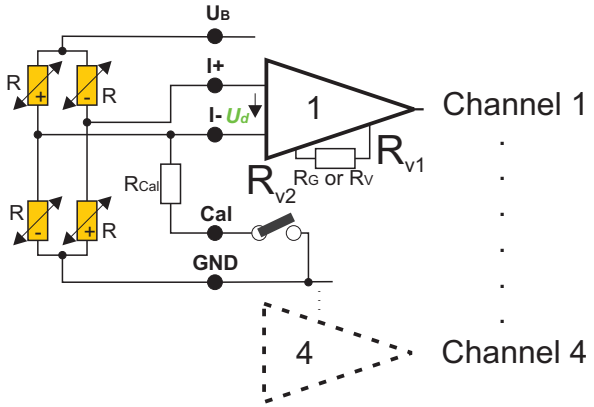
Signal Flow Diagram Sensor Signal Amplifier



Multi Channel Sensor Signal Amplifier Type M

(Standard)





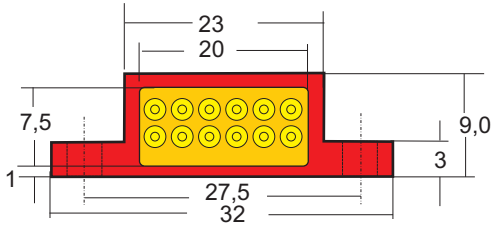
2/3/4 Channel FM Transmitter

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 brigde 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
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>_<mod>_<samplerate>

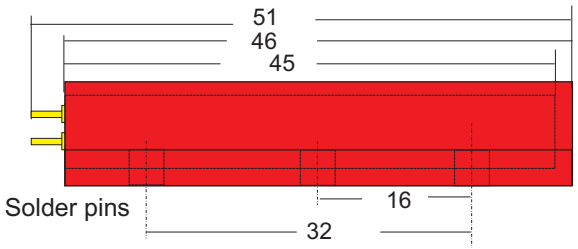
2	0,02	85	FM	1000(5000)
3	0,01	125		666 (3333)
4		150		500 (2500)

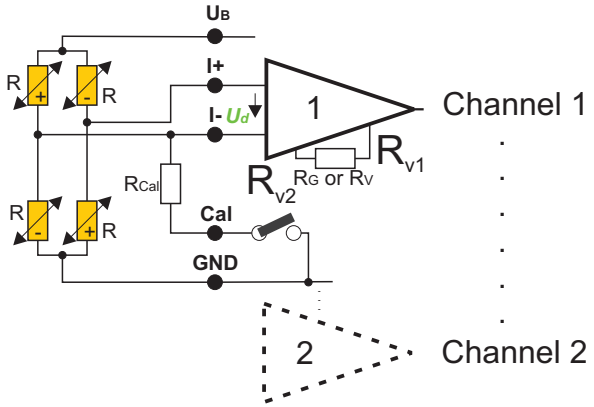
2 Channel Sensor Signal Amplifier Type M

(Standard)



Radius = 2 mm Diameter 2,7 mm





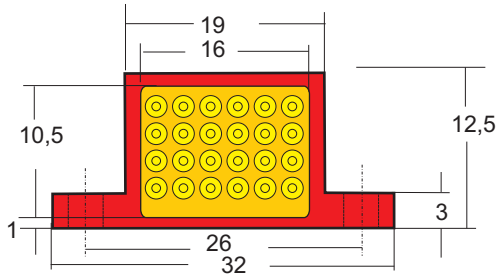
2 Channel PCM Transmitter

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 brigde 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
Enviromental 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>

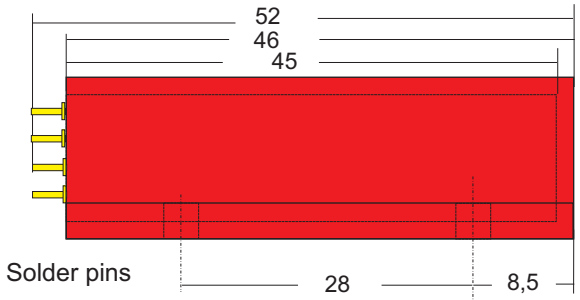
2	0,02	85	PCM12	4000
	0,01	125	PCM16	8000
	0,003	150		40000
				200000

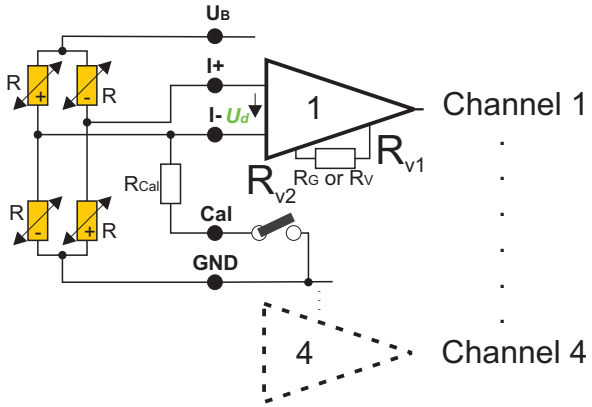
4 Channel Sensor Signal Amplifier Type M

(Standard)



Radius = 2 mm Diameter 3,2 mm





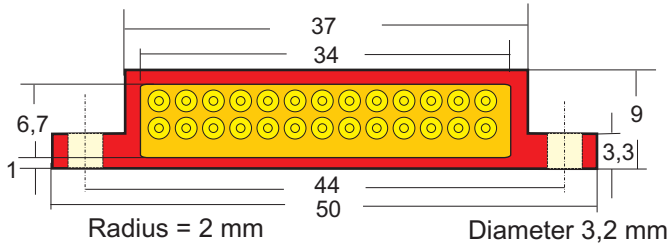
2/3/4 Channel PCM Transmitter

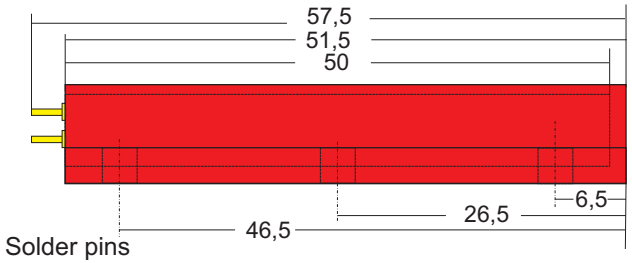
For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
Zero point drift: 0,02, (0,01, 0,003 option)
Remote shunt calibration
Enviromental 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>

2	0,02	85	PCM12	4000
3	0,01	125	PCM16	8000
4	0,003	150		40000
				200000

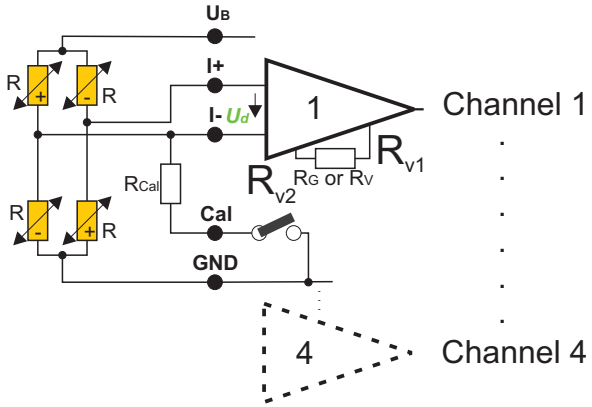
2/4 Channel Sensor Signal Amplifier Type M

(Standard)





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 brigde 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>

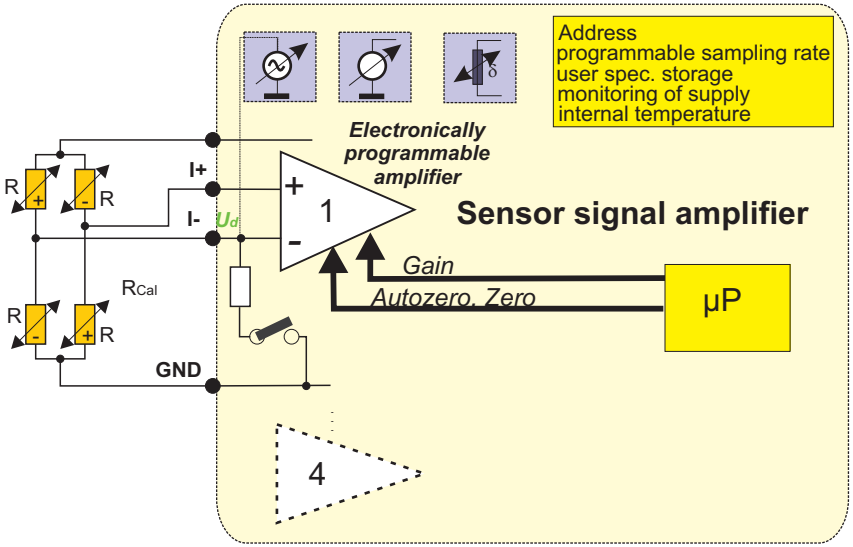
2	0,02	85	-	PCM12	4000	-
3	0,01	125	Fu	PCM16	8000	RC
4	0,003	150			40000	
					200000	

**- : inductive
Fu: Radio Transmission

4 Channel Sensor Signal Amplifier Type S

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



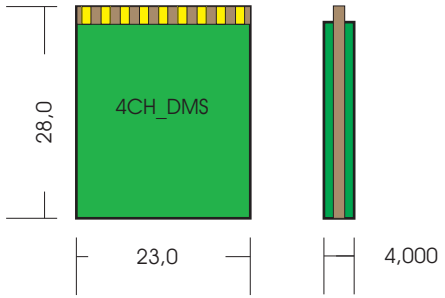
4 Channel PCM Transmitter

- 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 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 (360Hz... 23,4kHz) remote activateable
- 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)
- 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... 125 °C/160°C
- Weight: 12 grams

Type: MSV _Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC_<brigde>

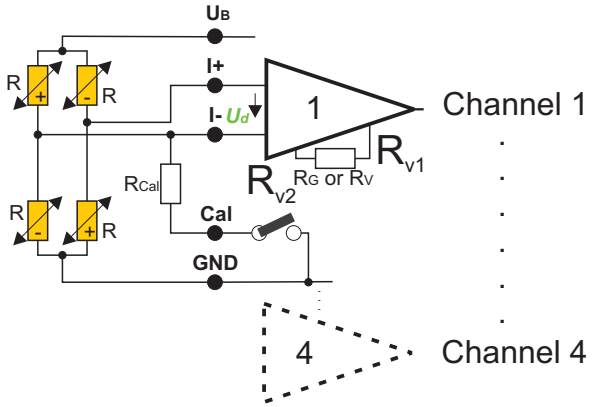
4	0,02	85	HSPCM12	4000	Dcf
	0,01	125	HSPCM16	8000	DCh
		160		40000	ACq
				200000	Ach

Mechanical Dimensions:



2/4 Channel Sensor Signal Amplifier Type SM

(Miniature)



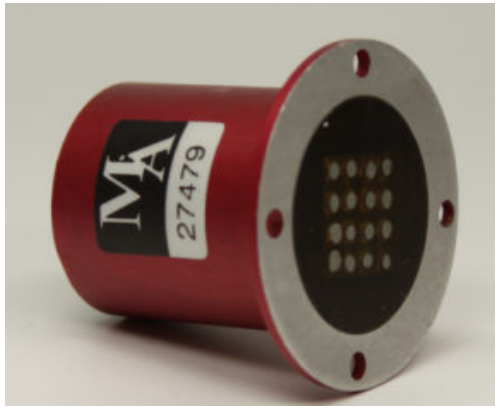
2/3/4 Channel PCM Transmitter

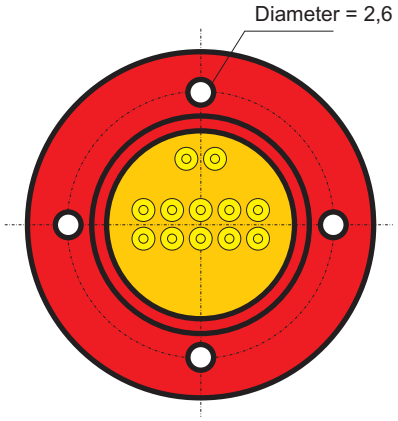
For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 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

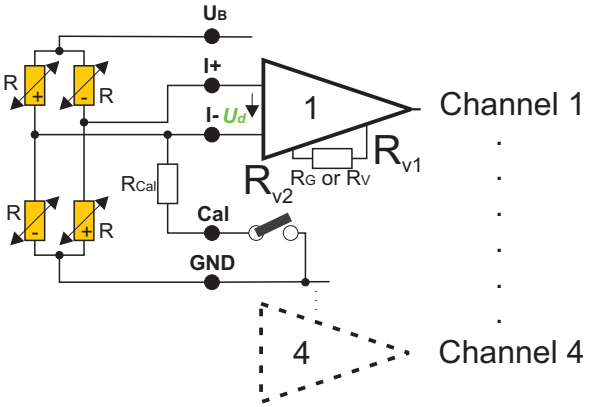
2	0,02	85	PCM	4000
3	0,01	125		8000
4	0,003	150		40000
				200000

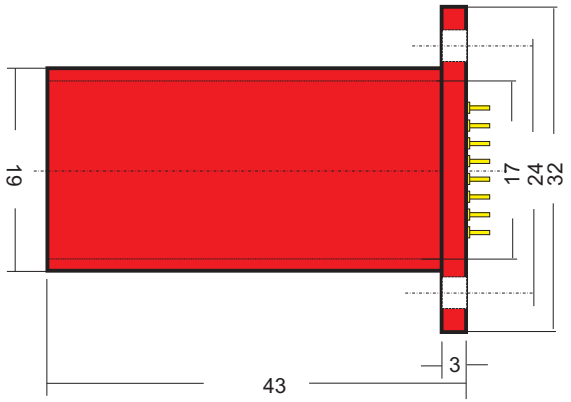
4 Channel Sensor Signal Amplifier Type R (Cartridge)

(Standard)









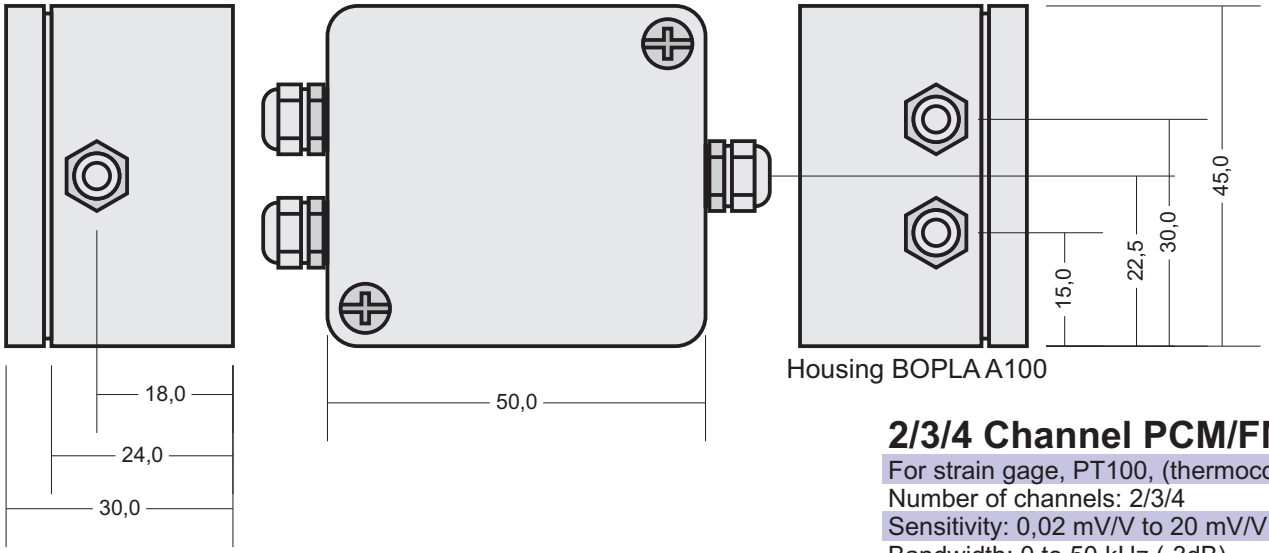
2/3/4 Channel PCM Transmitter

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 brigde 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
Enviromental 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>

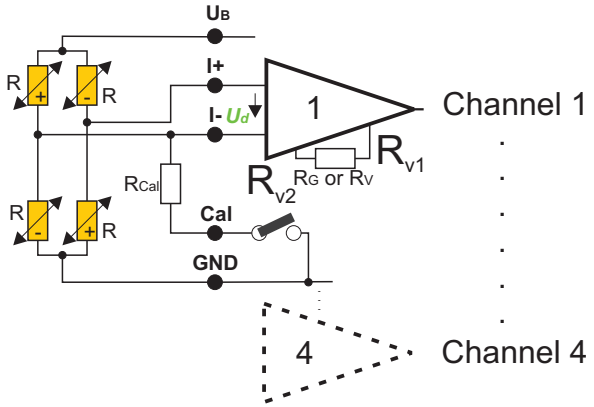
2	0,02	85	PCM	4000
3	0,01	125		8000
4	0,003	150		40000
				200000

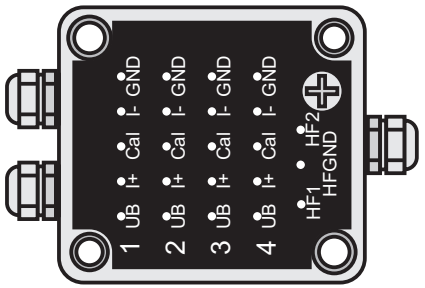
4 Channel Sensor Signal Amplifier Type M water proof

(Standard)



Housing BOPLA A100





Strain gage bridge

2/3/4 Channel PCM/FM Transmitter

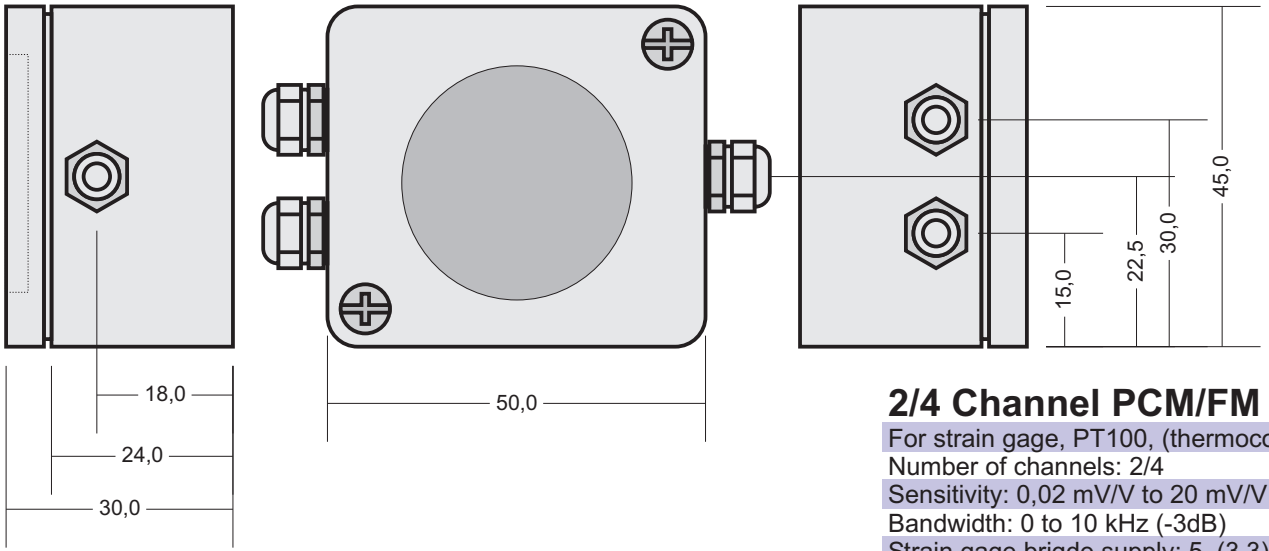
For strain gage, PT100, (thermocouple option)
Number of channels: 2/3/4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5, (3,3)* V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM or FM
Integrated filter
Resolution: 12 (16 bit option)
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
Enviromental 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			500 (2500)		
					4000		
					8000		
					40000		
					200000		

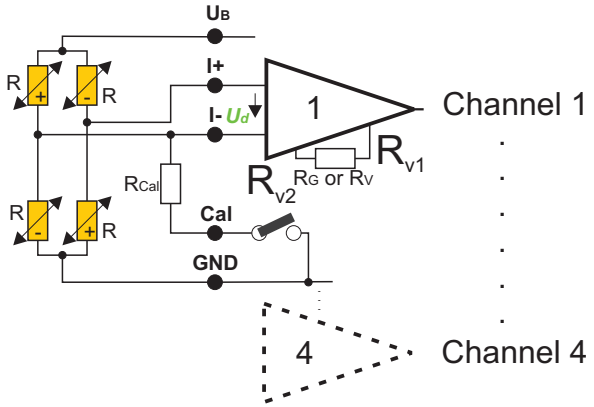
**- : inductive
Fu: Radio Transmission

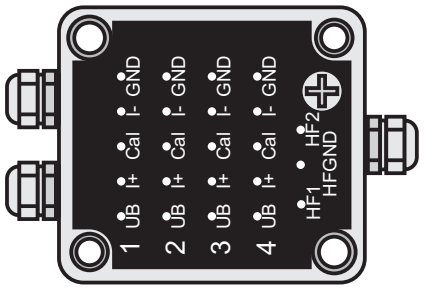
4 Channel Sensor Signal Amplifier Type M water proof integrated Rotor Antenna

Housing BOPLA A100



(Standard)





Strain gage bridge

2/4 Channel PCM/FM Transmitter

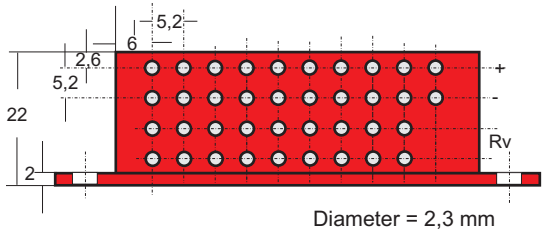
For strain gage, PT100, (thermocouple option)
Number of channels: 2/4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage brigde supply: 5, (3,3)* V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM, Spot-Mode
Integrated rotor antenna
Resolution: 12 (16 bit option)
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
Enviromental 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

2	0,02	85		FM	1000(5000)	-	wa
3	0,01	125	Fu	PCM	666 (3333)	RC	
4	0,003	150			500 (2500)		
					4000		
					8000		
					40000		
					200000		

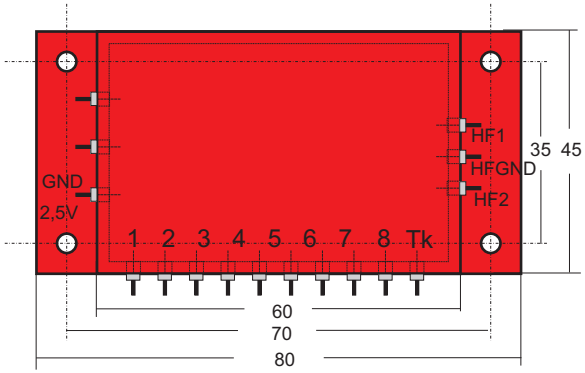
**- : inductive
Fu: Radio Transmission

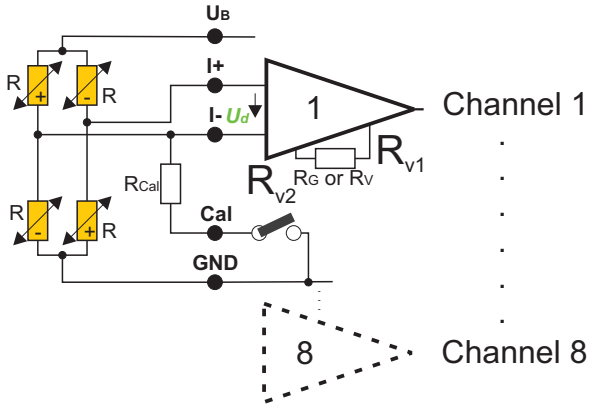
Multi Channel Sensor Signal Amplifier Type M

(Standard)



Diameter = 2,3 mm





8 Channel FM Transmitter

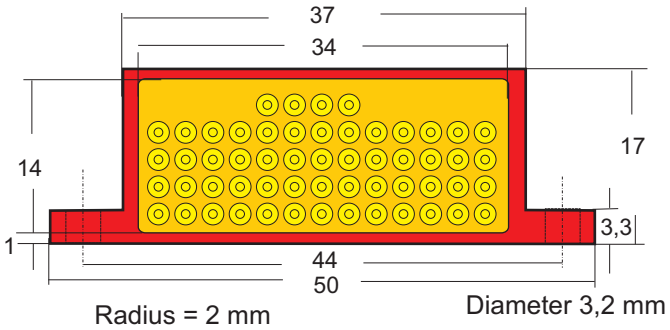
For strain gage, PT100, thermocouple
Number of channels: 8
Sensitivity: 0,02 mV/V to 20 mV/V
Total sample rate: 2000, (10000 option)
Channel bandwidth: total samplerate / 4 / number of channels
Strain gage brigde supply: 2,5 V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM
Integrated filter
Resolution: 12 Bits
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
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>_<mod>_<samplerate>

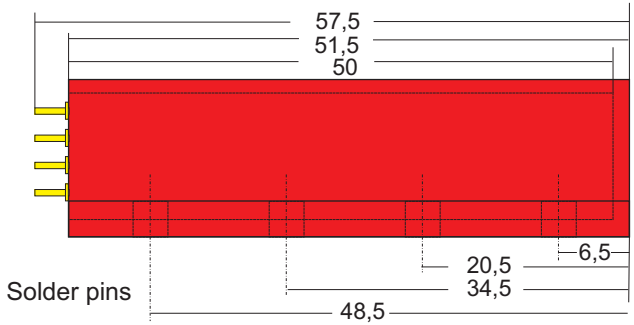
8	0,02	85	FM*	10000
	0,01	125	total samplerate	
		150		

* Max. samplerate/channel = total samplerate/ No. of channels

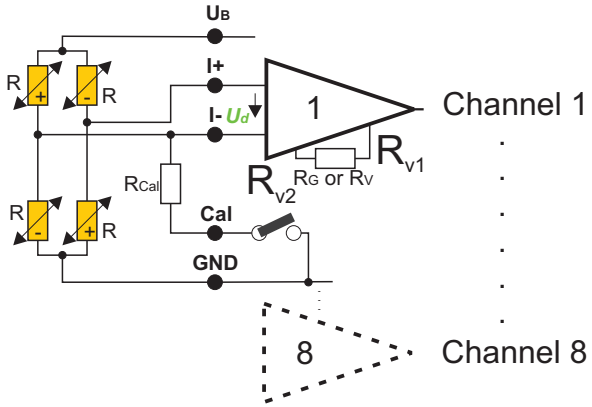
8 Channel Sensor Signal Amplifier Type M

(Standard)





weight: 100 g



Multi Channel PCM Transmitter

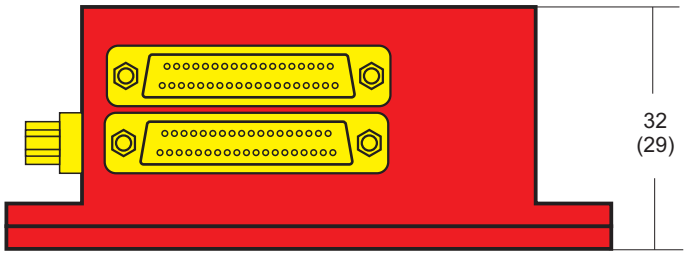
For strain gage, PT100, thermocouple
Number of channels: 2/4/8/12/16
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (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>

2	0,02	85		PCM12	4000	-
4	0,01	125	Fu	PCM16	8000	RC
8	0,003	150			40000	
12					200000	
16						

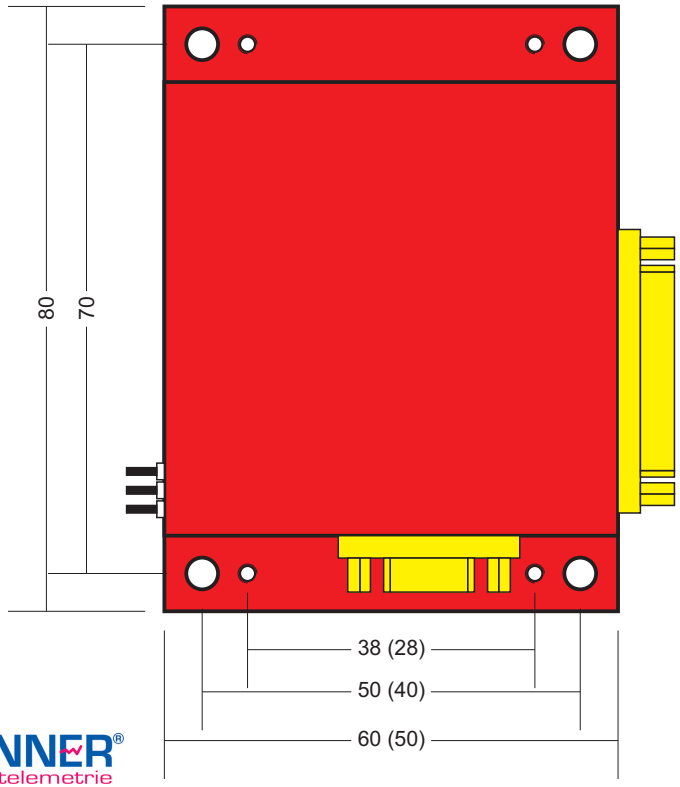
**- : inductive
Fu: Radio Transmission

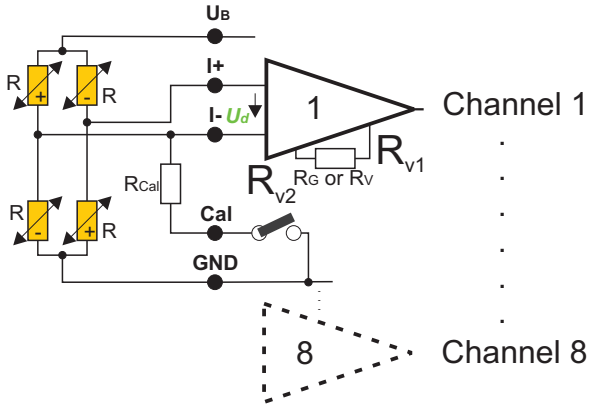
8/16 Channel Sensor Signal Amplifier Type C

(Standard)



Dimensions for parentheses are
for 8 channel sensor signal amplifier





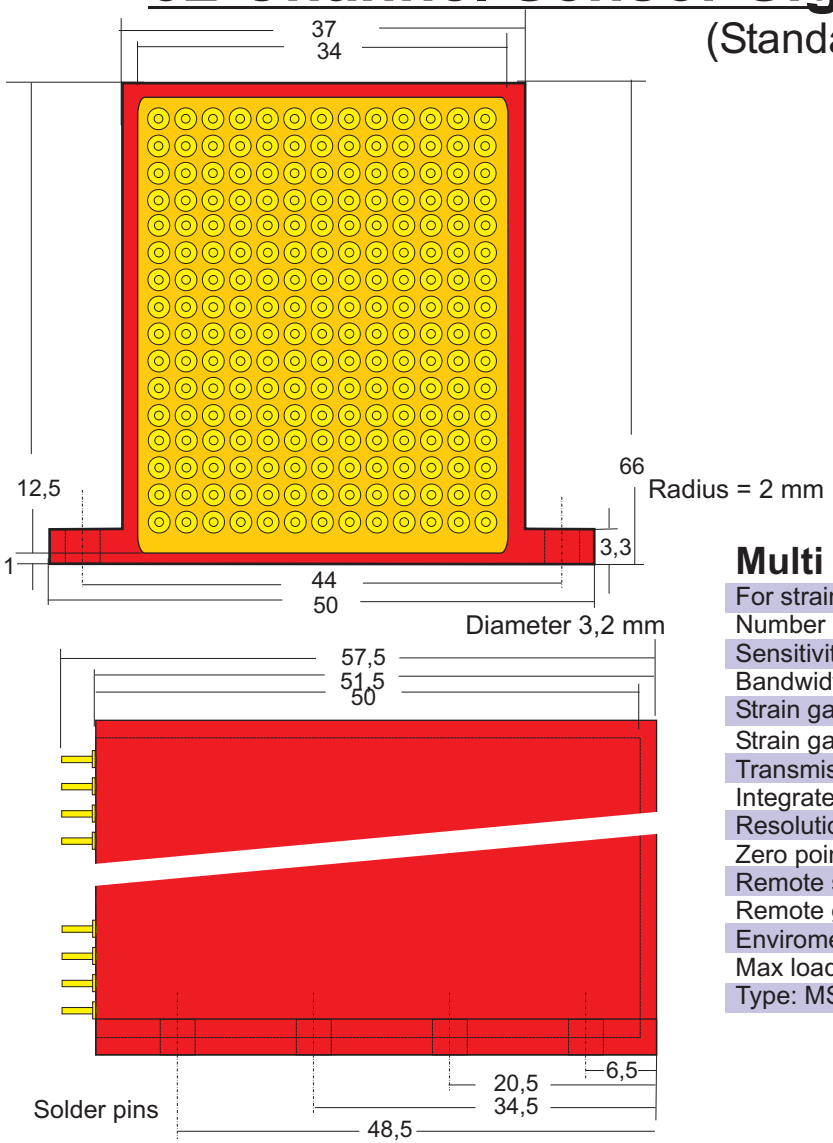
Multi Channel PCM Transmitter with Connector

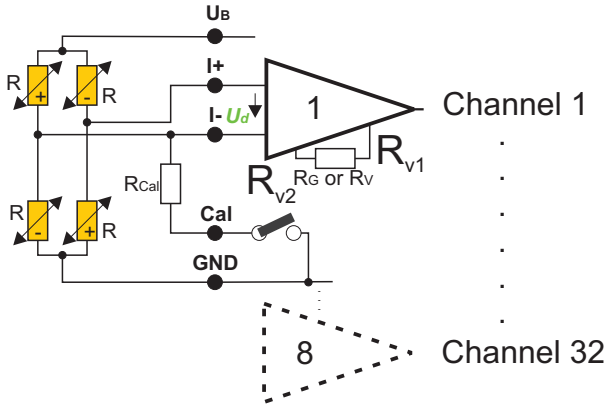
For strain gage, PT100, thermocouple
Number of channels: 2/4/8/12/16/32
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM, radio telemetry
Integrated filter
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_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_GI

8	0,02	85		PCM12	1000	-
16	0,01	125	Fu	PCM16	4000	RC
	0,003	150			8000	
					40000	
					200000	

32 Channel Sensor Signal Amplifier Type M

(Standard)





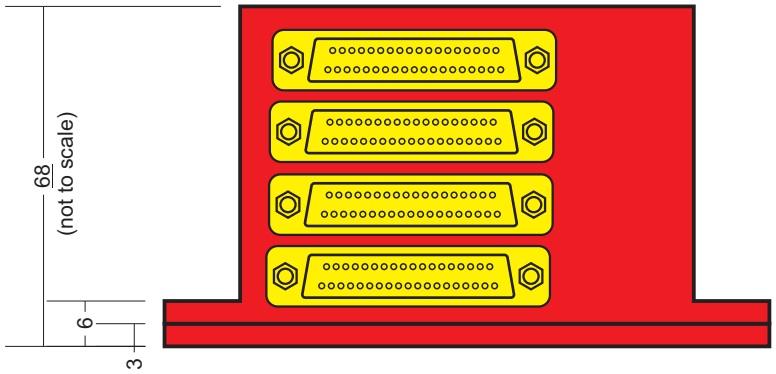
Multi Channel PCM Transmitter with Connector

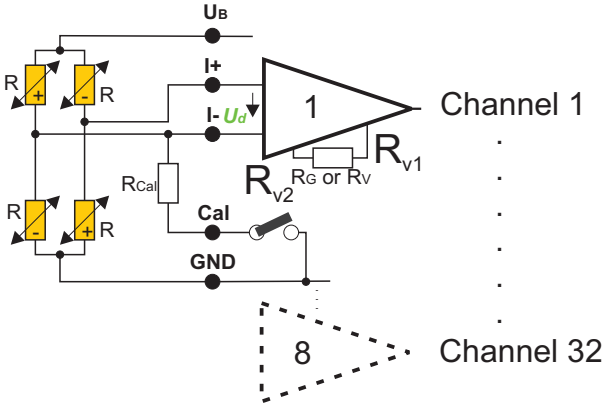
For strain gage, PT100, thermocouple
Number of channels: 2/4/8/12/16/32
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM, radio telemetry
Integrated filter
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_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>

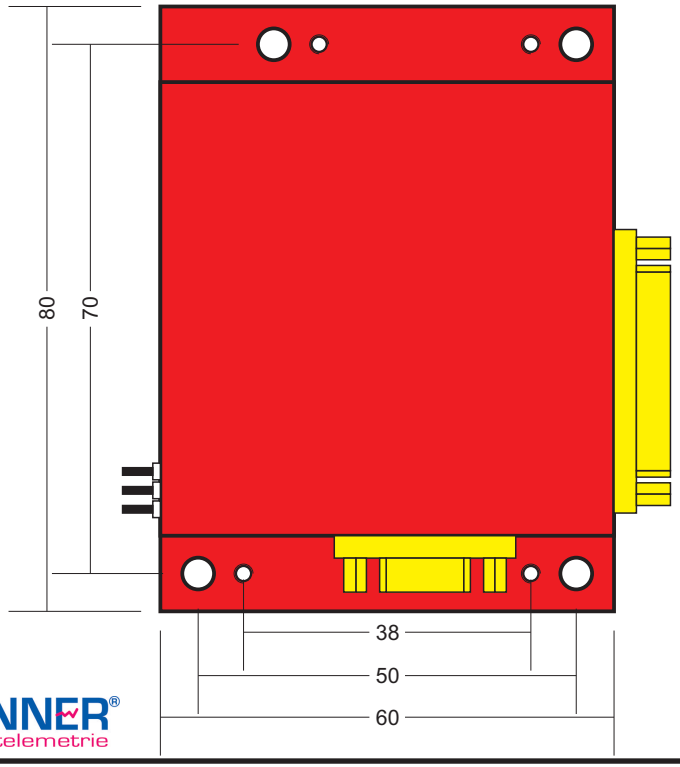
2	0,02	85		PCM12	1000	-
4	0,01	125	Fu	PCM16	4000	RC
8	0,003	150			8000	
12					40000	
16					200000	
32						

32 Channel Sensor Signal Amplifier Type C

(Standard)







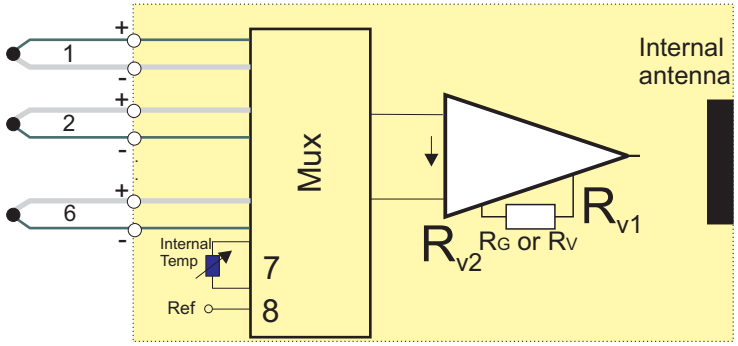
Multi Channel PCM Transmitter with Connector

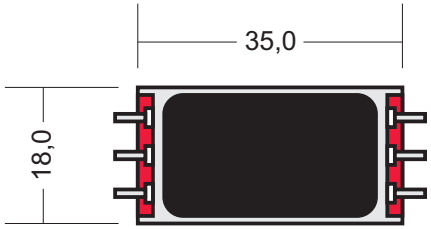
For strain gage, PT100, thermocouple
Number of channels: 2/4/8/12/16/32
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM, radio telemetry
Integrated filter
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 000g (depending on fixing)
Type: MSV_M_<channels>_<accuracy>_<temp>_<sys>_<mod>_<samplerate>_<rmc>_GI

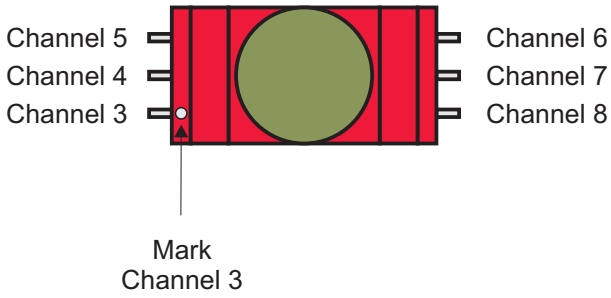
2	0,02	85		PCM12	1000	-
4	0,01	125	Fu	PCM16	4000	RC
8	0,003	150			8000	
12					40000	
16					200000	
32						

4/8 Channel Temperature Sensor Signal Amplifier Spot

(2 internal Channels)







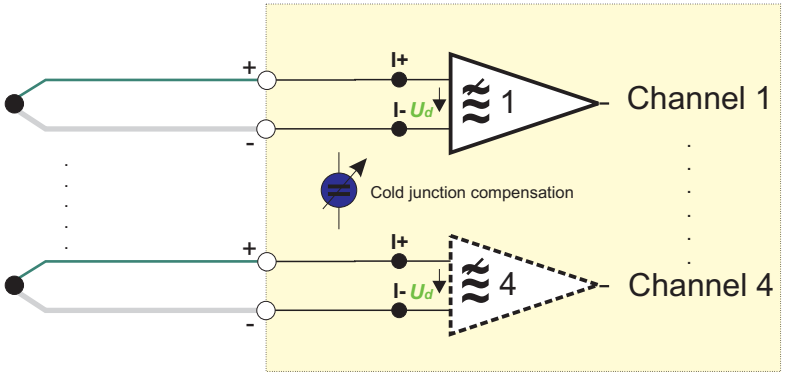
4/8 Channel PCM Transmitter Spot

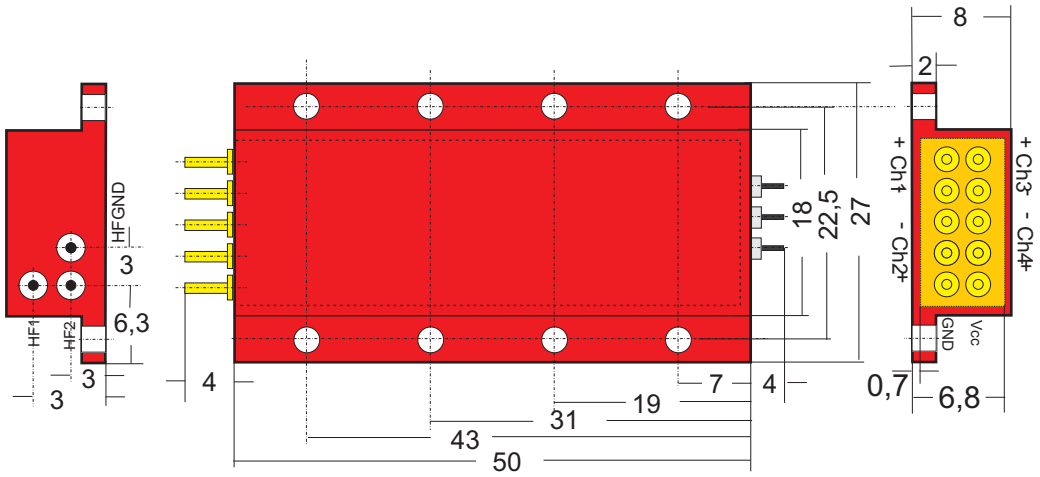
For insulated thermocouple or PT100
Number of channels: 4/8
Temperature measuring range: 0 to 650°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Integrated rotor antenna
Sample time (contact time): ~1,4 ms
Resolution: 12 Bits
Zero point drift: 0,02, (0,01 option)
Remote shunt calibration
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

4	0,02	85	PCM12	1100	spot
8 (2 internal)	0,01	125			
		180			

4 Channel Temperature Sensor Signal Amplifier Type M

(Standard)





Diameter 2,1 mm

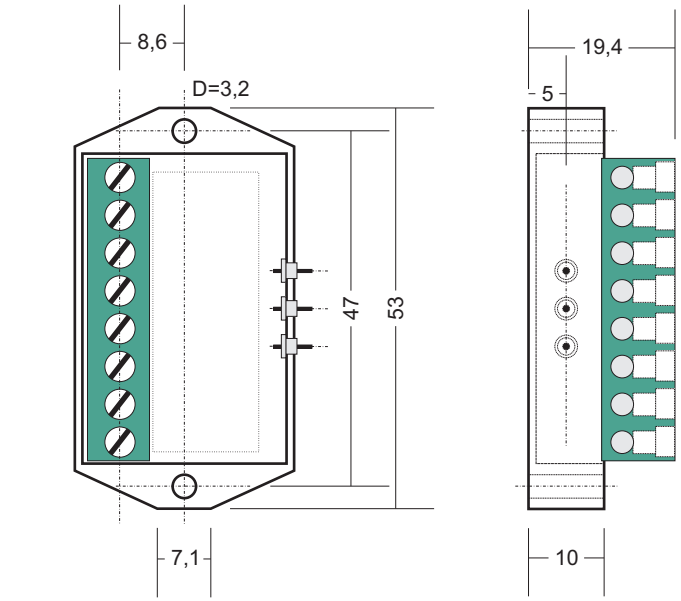
4 Channel PCM Transmitter Spot

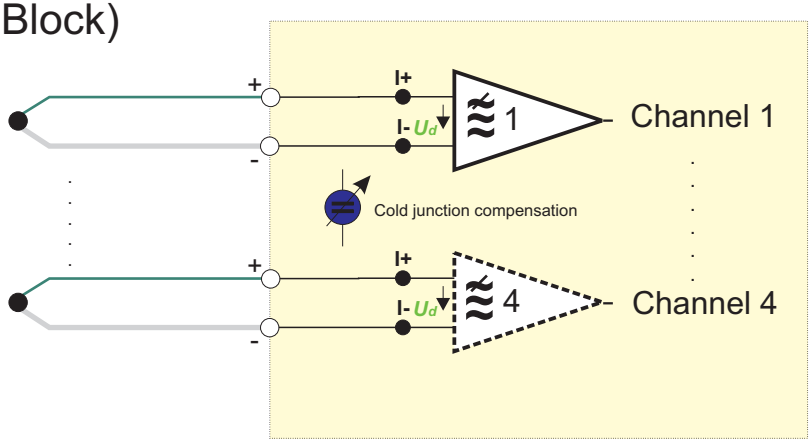
For non insulated / insulated thermocouple or PT100
Number of channels: 4
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
Enviromental 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

4	0,01	85	PCM16	2000
	0,002	125		
		160		

4 Channel Temperature Sensor Signal Amplifier Type M

(Screw Terminal Block)



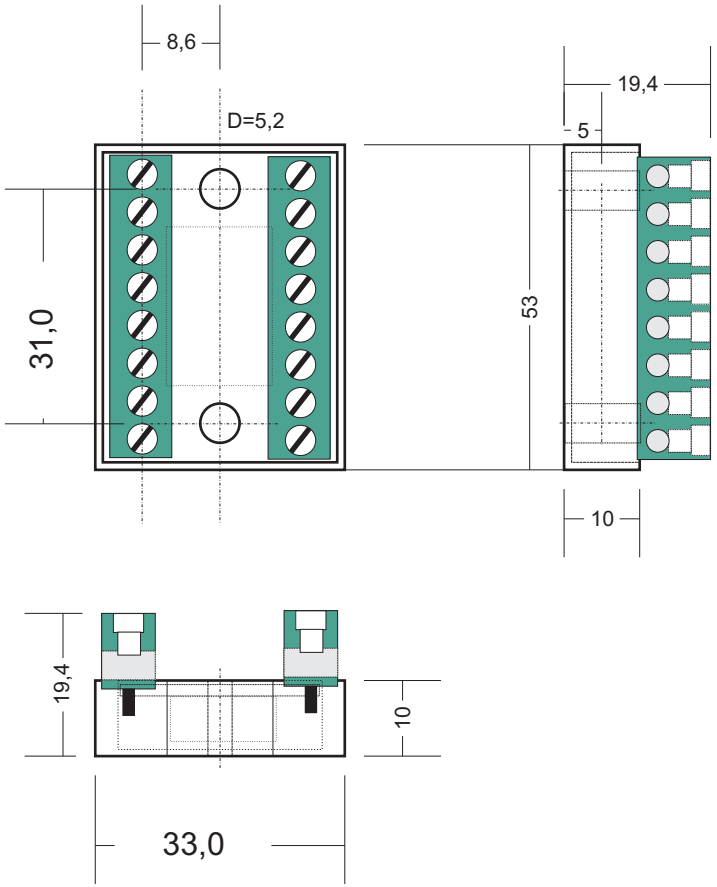


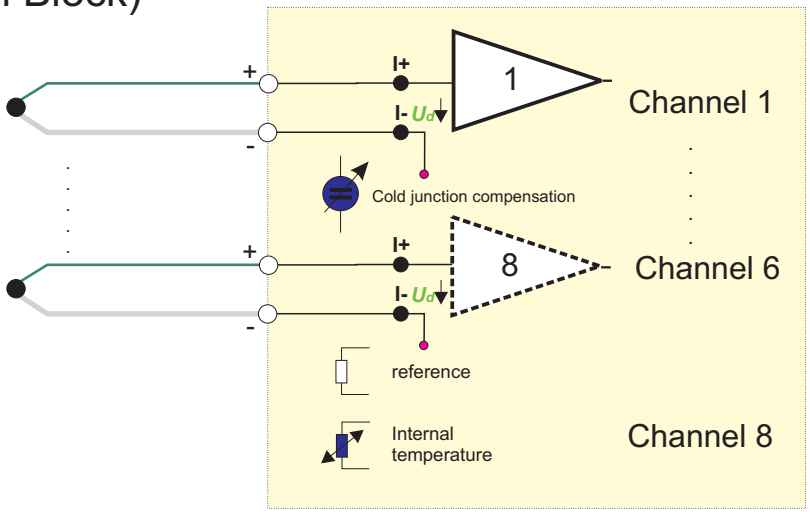
4 Channel PCM Transmitter (Screw Terminal Block)

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 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				
4	0,01	85	PCM16	500
	0,002	125		
		160		

8 Channel Temperature Sensor Signal Amplifier Type M

(Screw Terminal Block)





8 Channel PCM Transmitter (Srew 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

Enviromental temperature range: -25 to+180°C

Weight: 3g

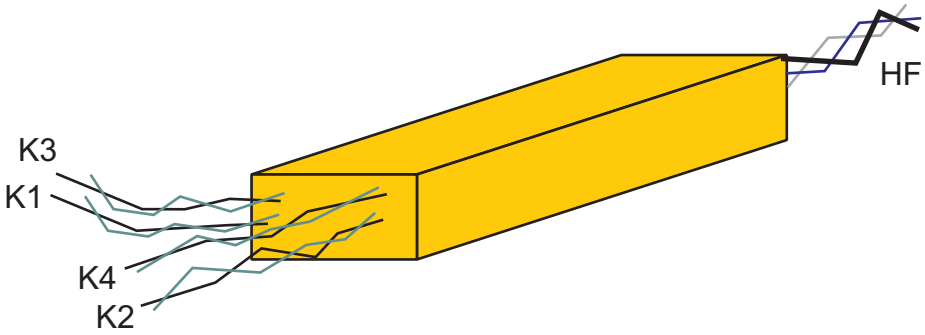
Max load: 20 000g (depending on fixing)

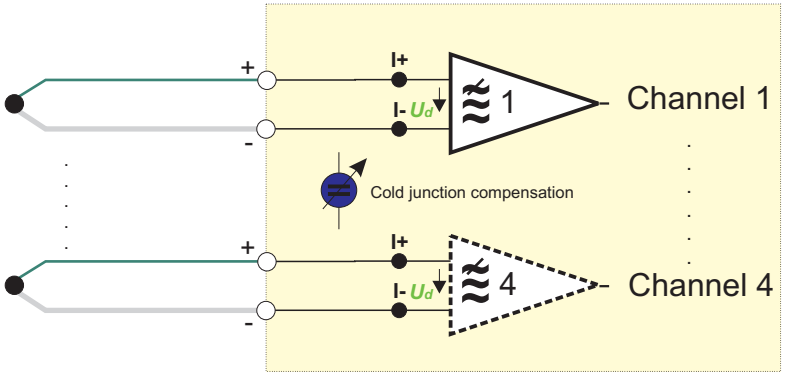
Type: MSV_Sc_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

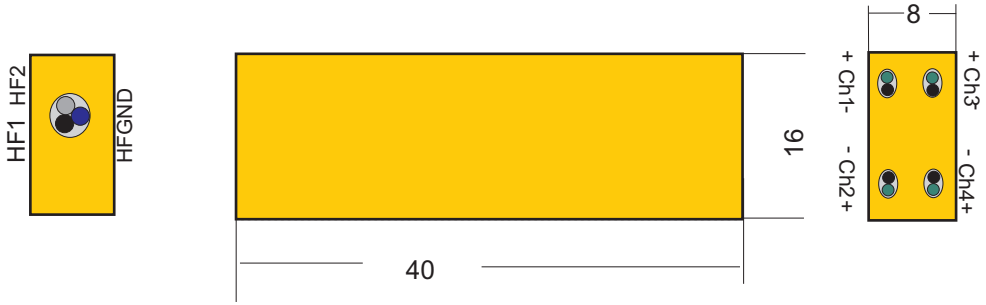
4 8	0,02	180	PCM	2000

4/2 Channel Temperature Sensor Signal Amplifier Type M

(Standard)







Wire length: 100 mm

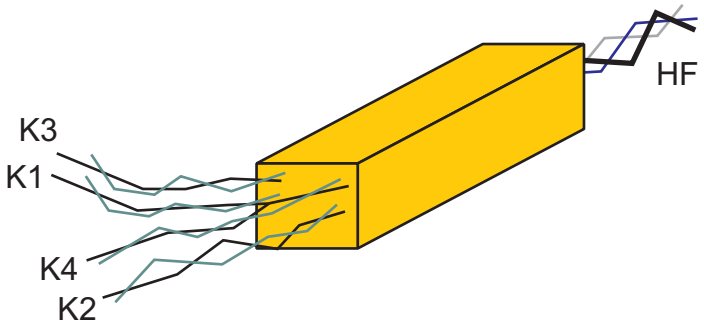
4/2 Channel PCM Transmitter Spot

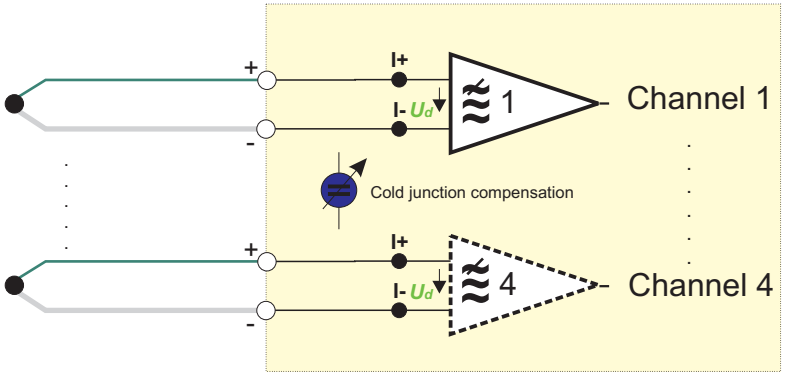
For non insulated / insulated thermocouple or PT100
Number of channels: 4
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for 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)
Type: MSV_Ep_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

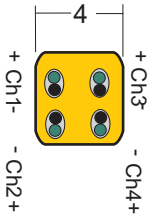
4	0,01	85	PCM16	2000
2	0,002	125		
		160		

4 Channel Temperature Sensor Signal Amplifier Type Micro

(Standard)







Wire length: 100 mm

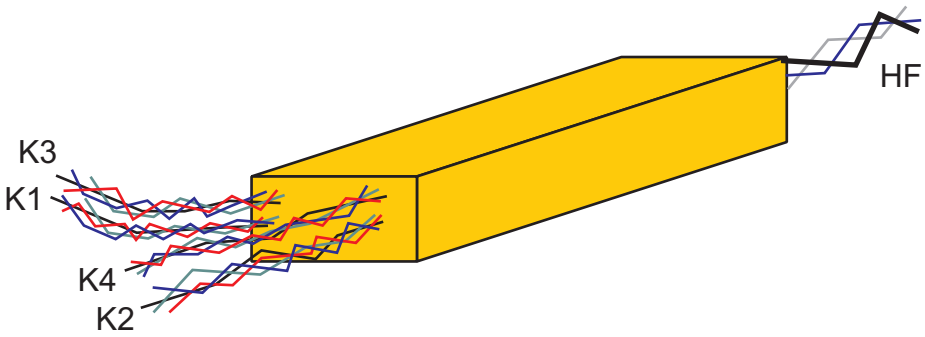
4 Channel PCM Transmitter

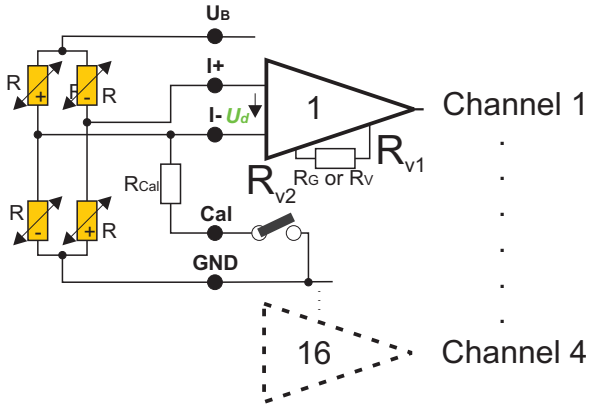
For non insulated / insulated thermocouple
Number of channels: 4
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 500/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression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

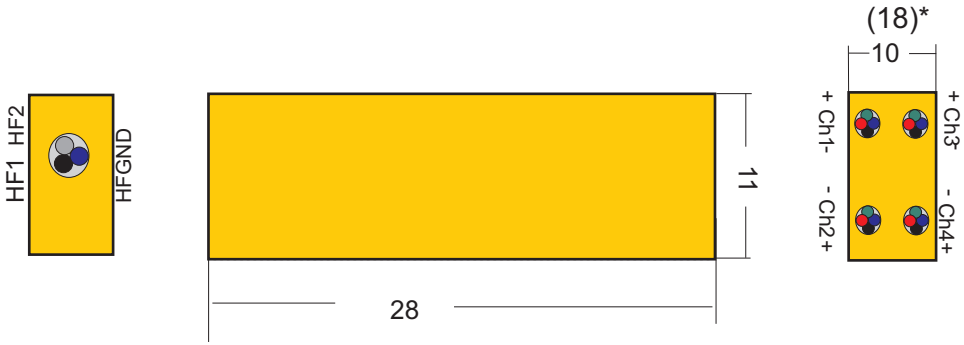
4	0,01	85	PCM16	2000
	0,002	125		
		160		

2/4 Channel Universal Miniature Sensor Signal Amplifier Type M

(Standard)







Wire length: 100 mm

* 4 channel sensor signal amplifier

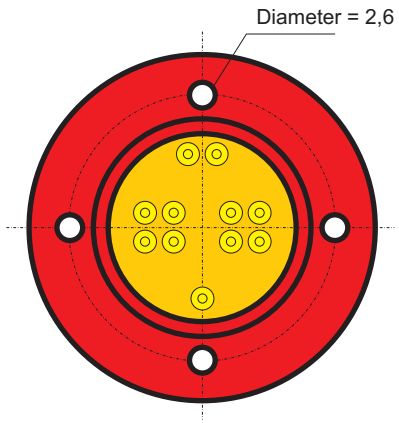
4 Channel PCM Transmitter

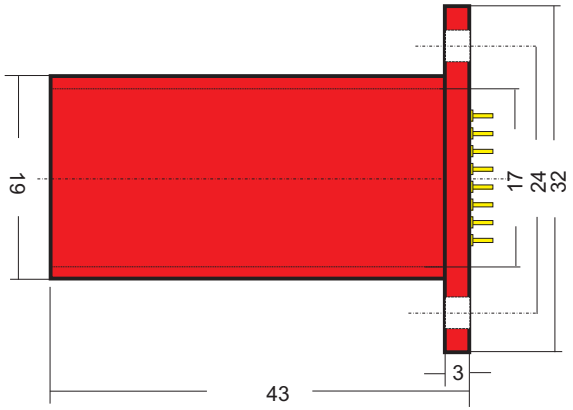
For strain gage, PT100, thermocouple
Number of channels: 2/4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Resolution: 16 Bits
Zero point drift: 0,02, (0,01, 0,003 option)
Remote shunt calibration
Enviromental 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>

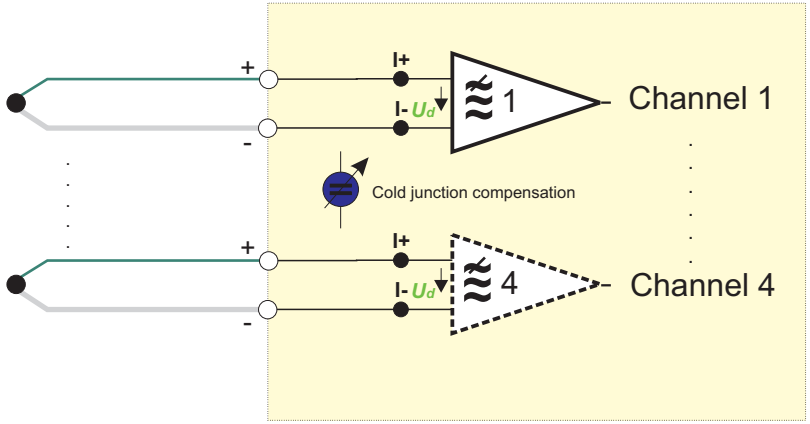
4	0,01	85	PCM16	1000
2	0,002	125		4000
		160		8000
				40000

4 Channel Temperature Sensor Signal Amplifier Type R (Cartridge)

(Standard)







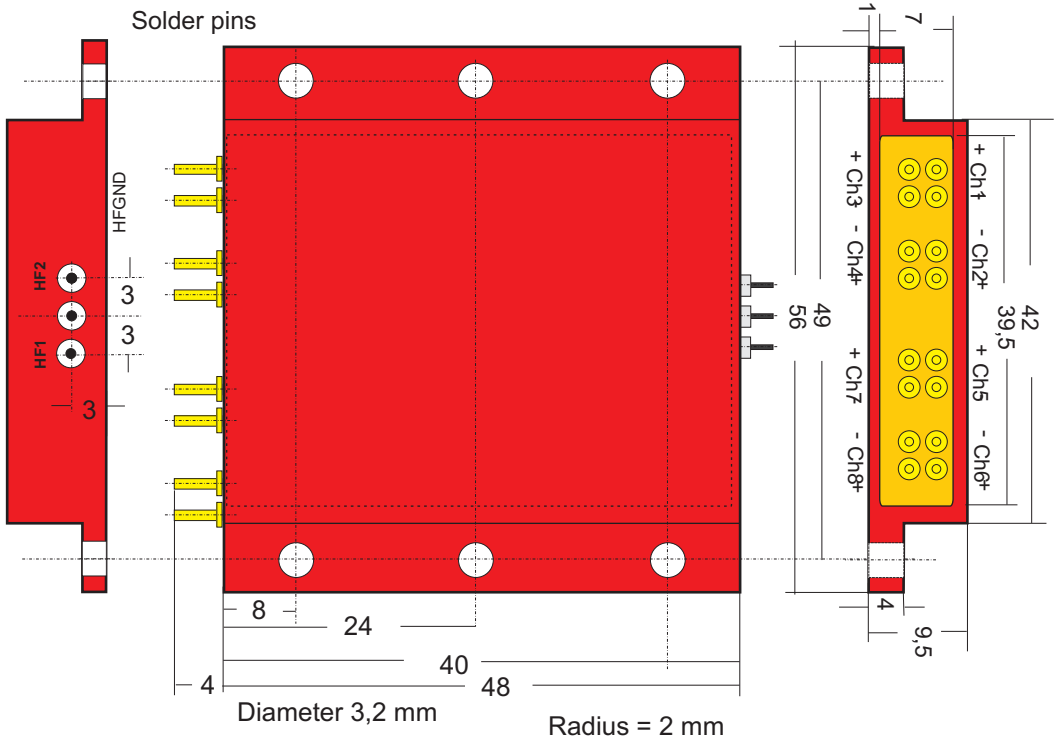
4 Channel PCM Transmitter

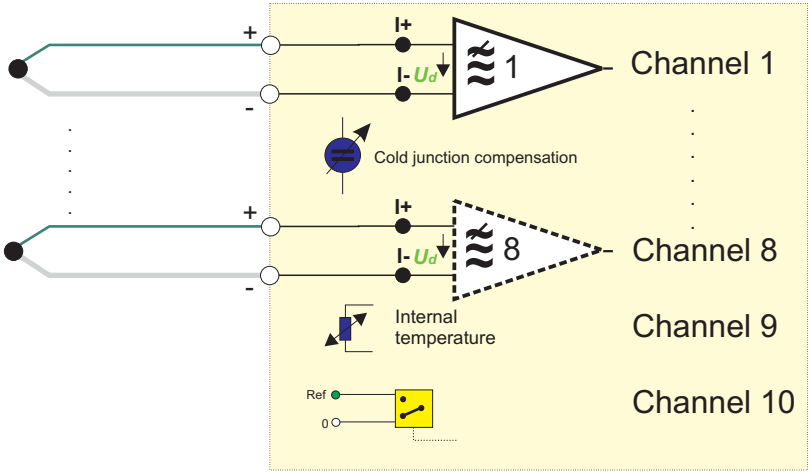
For non insulated / insulated thermocouple or PT100
Number of channels: 8 (non insulated / insulated thermocouple)
Temperature measuring range: 0 to 500°C (different ranges option)
Thermocouple type K (NiCr-Ni) (other types option)
Transmission: inductive sensor telemetry PCM
Sampling rate: 2000/sec/channels
Integrated filter 1 Hz (10 Hz) for noise supression on input lines
Resolution: 16 Bits
Zero point drift: 0,01, (0,002 option)
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

4	0,01	85	PCM16	2000
	0,002	125		
		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 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)

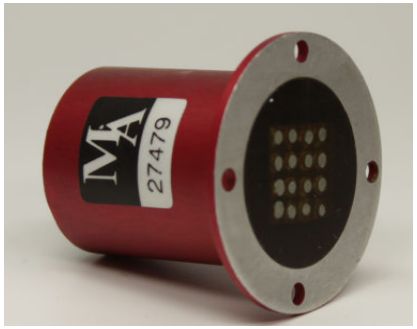
Max load: 20 000g (depending on fixing)

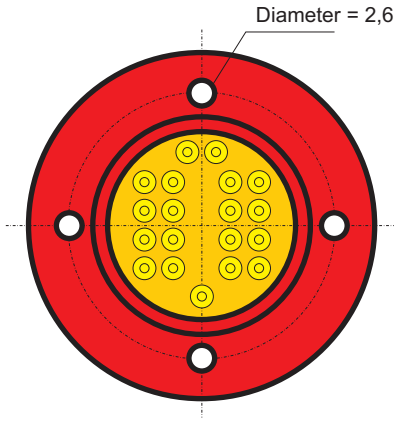
Type: MSV_M_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

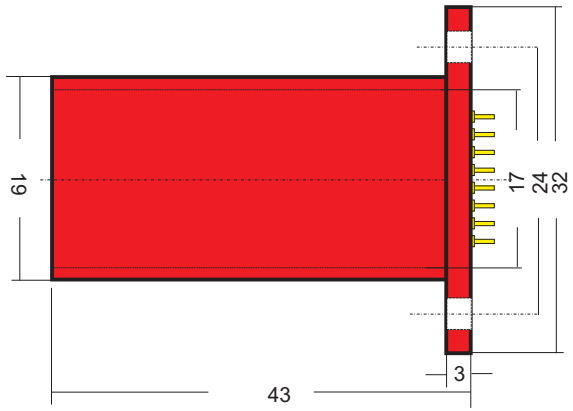
4	0,01	85	PCM16	2000
8	0,002	125		
		160		

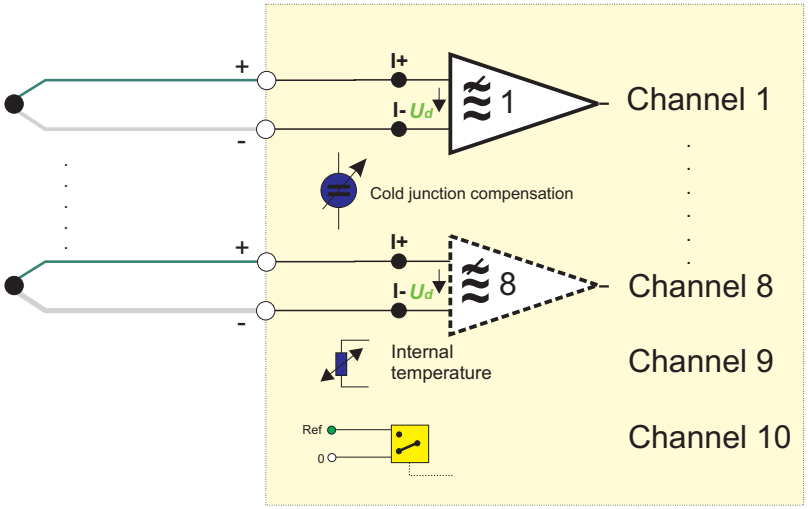
8/10 Channel Temperature Sensor Signal Amplifier Type R (Cartridge)

(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)

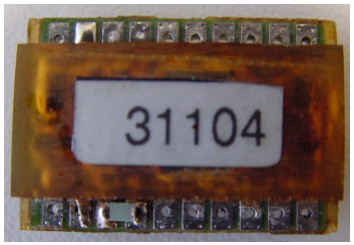
Max load: 20 000g (depending on fixing)

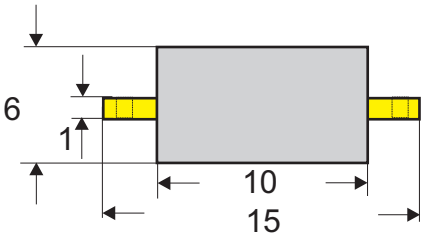
Type: MSV_P_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

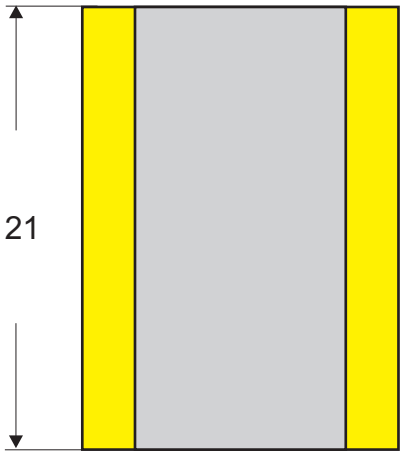
4	0,01	85	PCM16	2000
8	0,002	125		
		160		

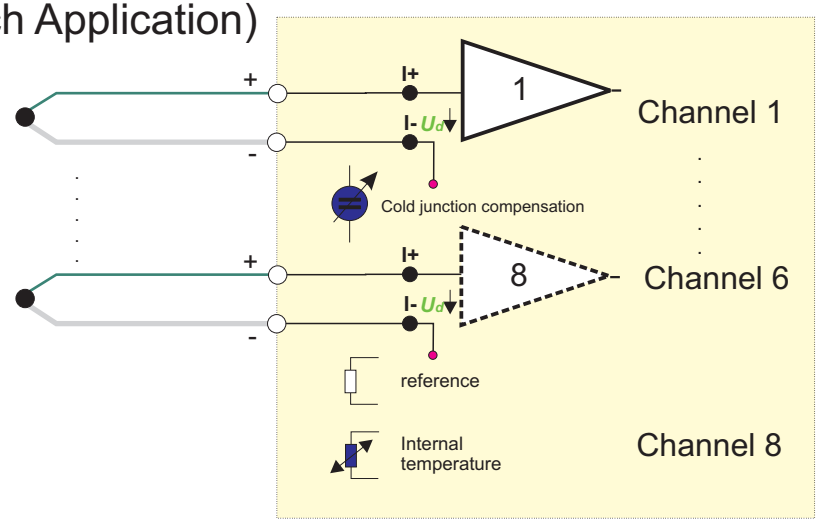
8(4) Channel Temperature Sensor Signal Amplifier Type Epoxy

(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

weight: 3g

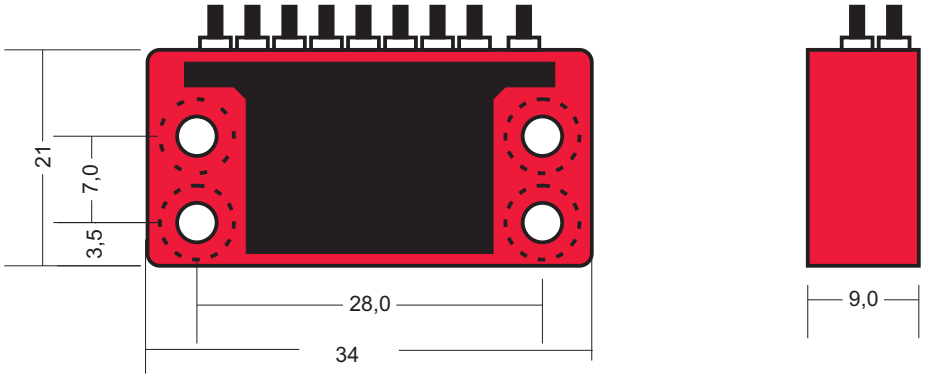
Max load: 20 000g (depending on fixing)

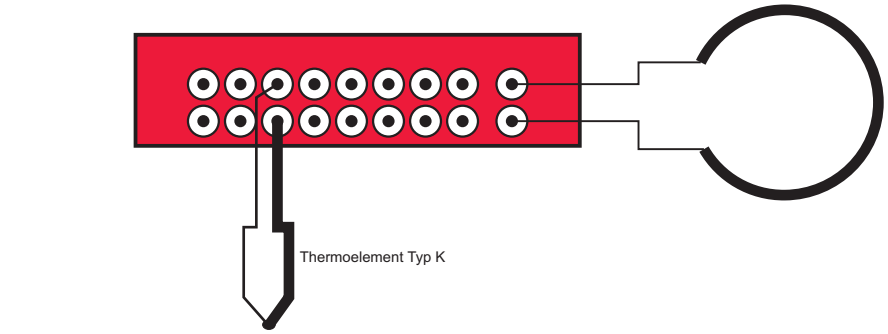
Type: MSV_Epo_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_TC

4	0,02	180	PCM12	1100
8 (2 intern)				1100
				500
				100

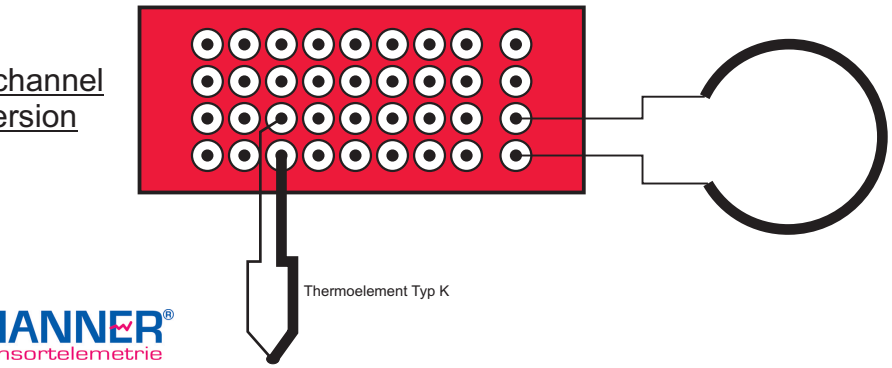
8(4) Channel Temperature Sensor Signal Amplifier Type Metal

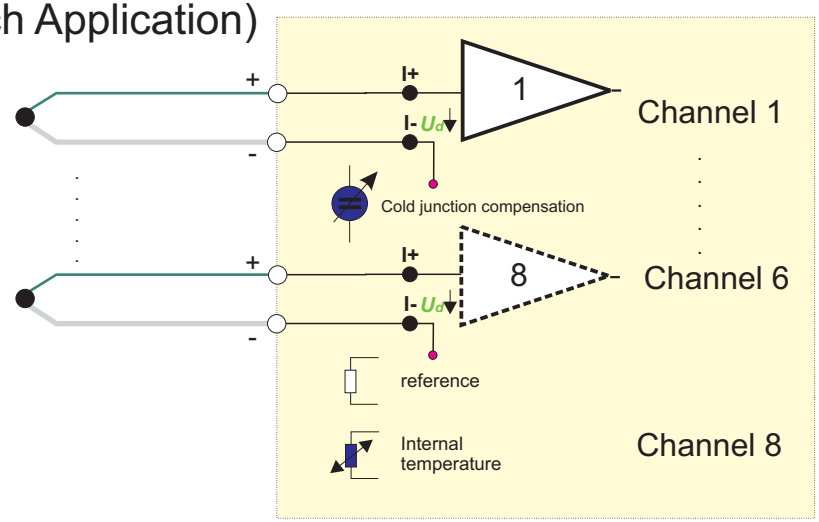
(Piston / Conrod / Clutch Application)





16 channel version





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

Enviromental temperature range: -25 to +180°C

Weight: 3 g

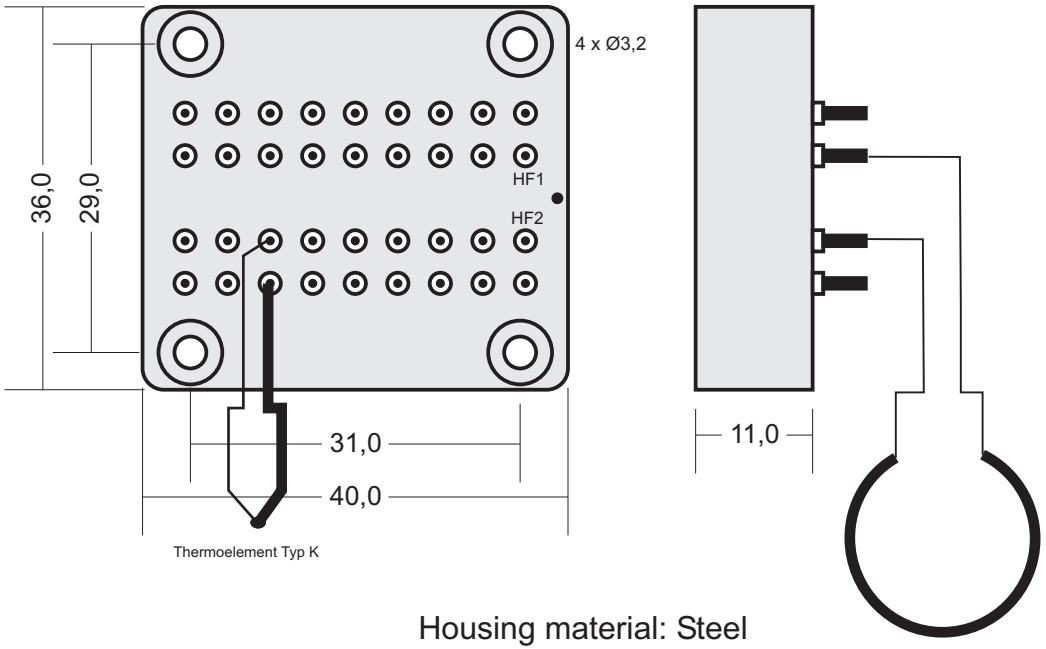
Max load: 20 000 g (depending on fixing)

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

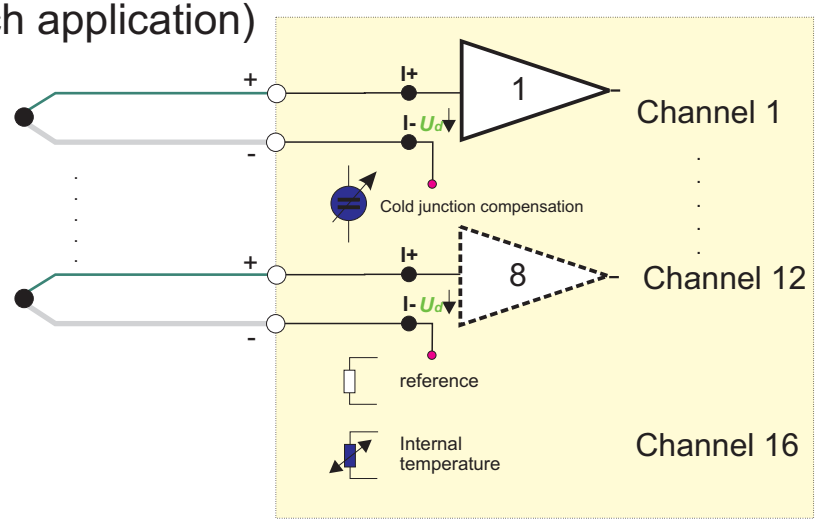
4	0,02	180	PCM12	2000
8				1000
16				500

16(12) Channel Temperature Sensor Signal Amplifier Type Metal

(Piston / Conrod / Clutch application)



Housing material: Steel



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

Samplingrate: 2000/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

Weight: 3 g

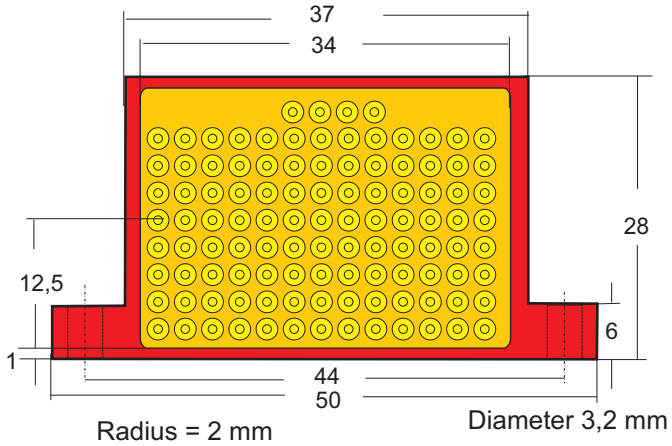
Max load: 20 000 g (depending on fixing)

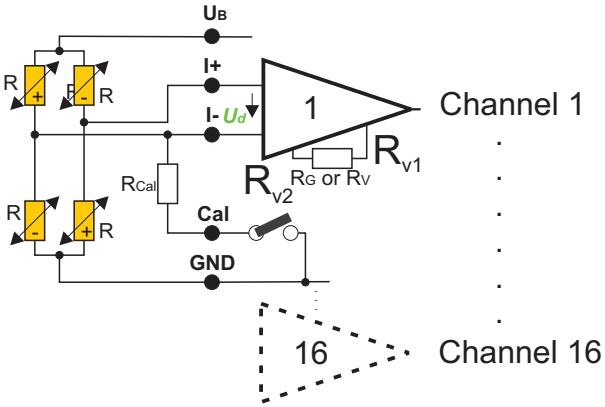
Type: MSV_Mo_16_<accuracy>_<temp>_<mod>_<samplerate>_TC

0,02	180	PCM12	2000
			1000
			500
			100

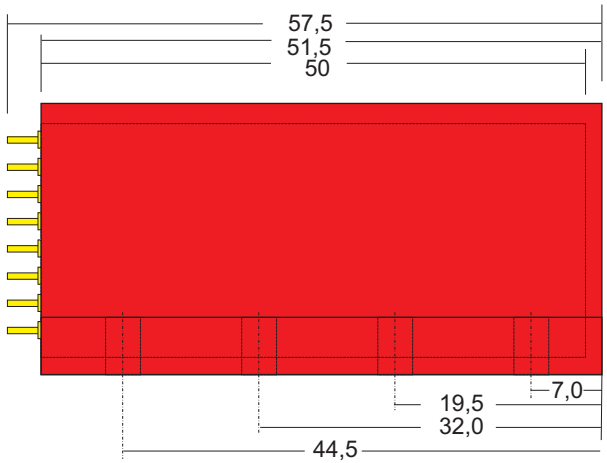
16 Channel Sensor Signal Amplifier Type M

(Standard)





Solder pins



weight: 190 g

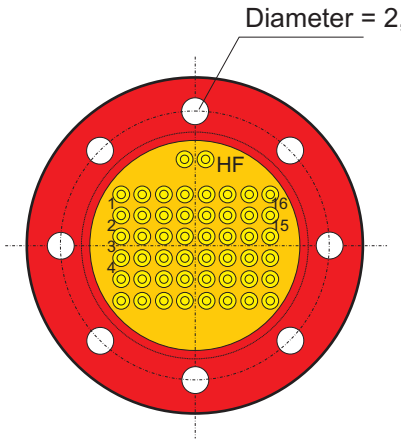
16 Channel PCM Transmitter

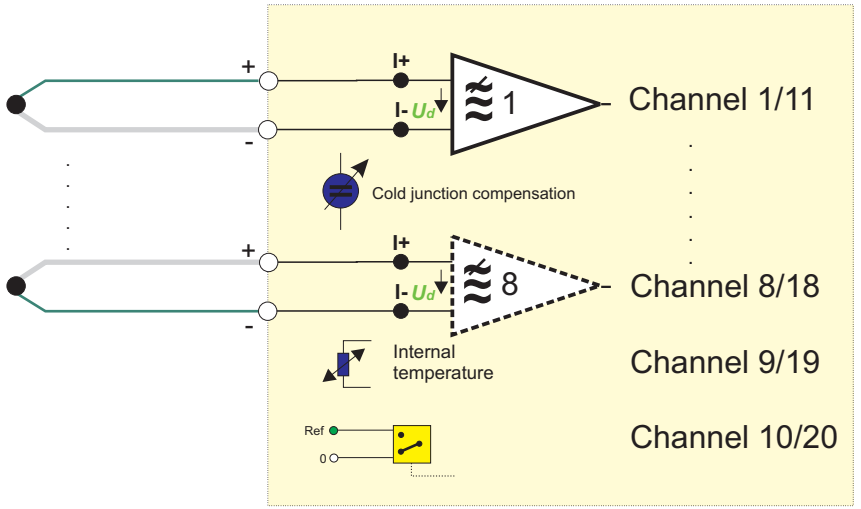
For strain gage, PT100, thermocouple
Number of channels: 16
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 5 (3,3*) V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits (16 Bits)
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>

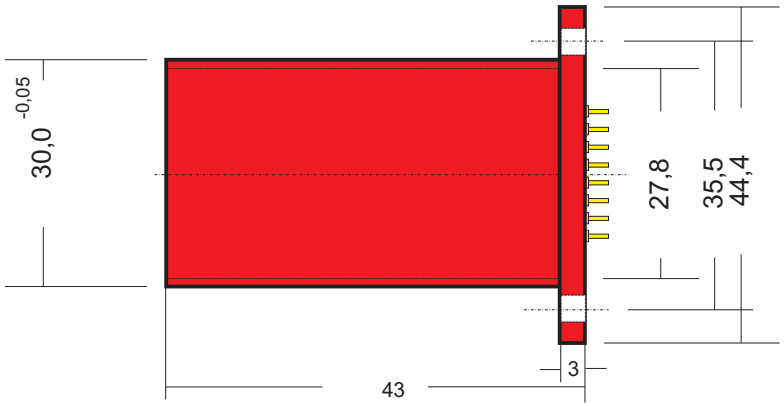
16	0,02	85	-	PCM12	4000	-
	0,01	125	Fu	PCM16	8000	RC
	0,003	150			40000	
					200000	

16/20 Channel Temperature Sensor Signal Amplifier Type R (Cartridge)

(Standard)







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)

Enviromental 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

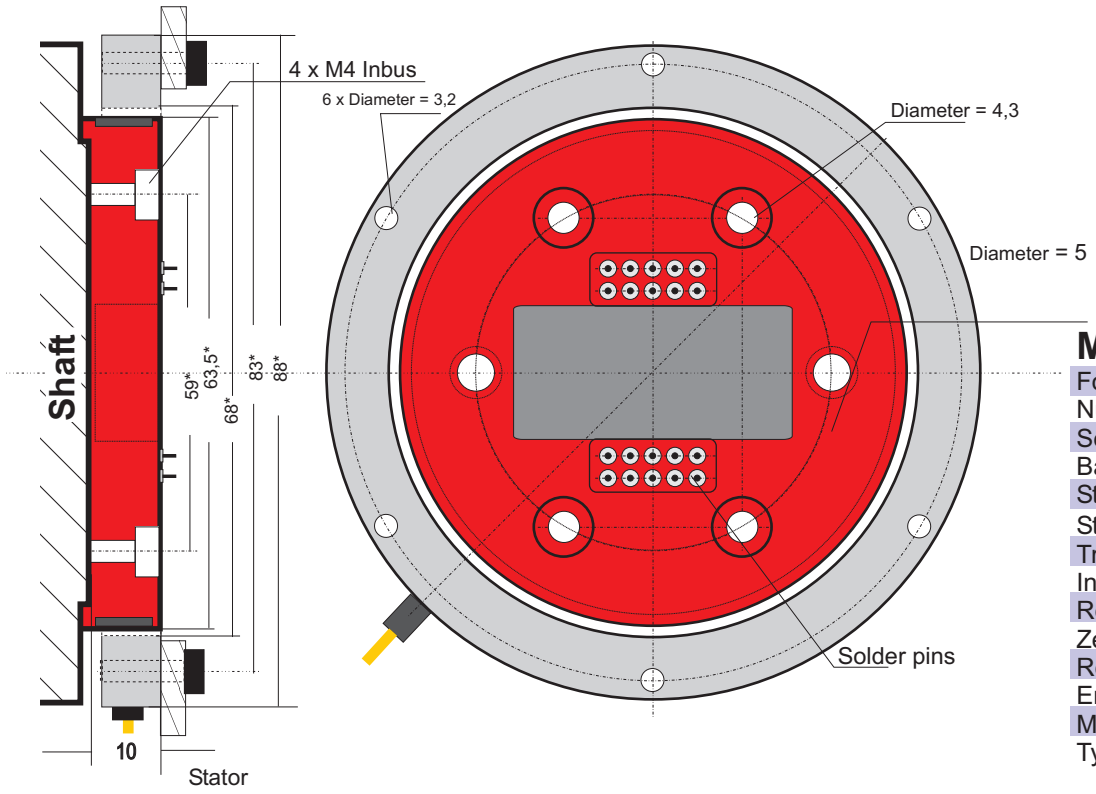
12	0,01	85	PCM16	2000
16	0,002	125		1000
		160		500
				100

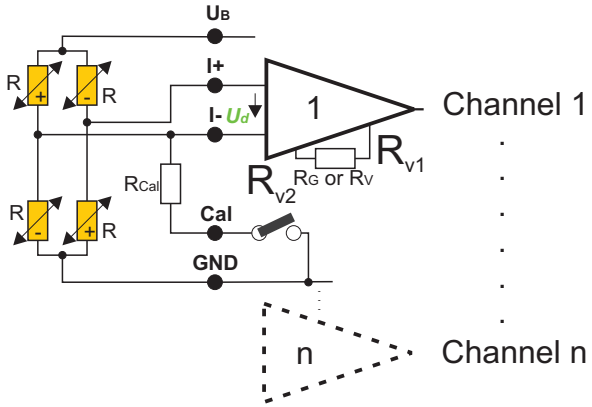
4 Channel Sensor Signal Amplifier Type Disc

(Standard)

4 Channel
Sensor Signal Amplifier

(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 (-3dB)
Strain gage brigde 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
Enviromental 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>

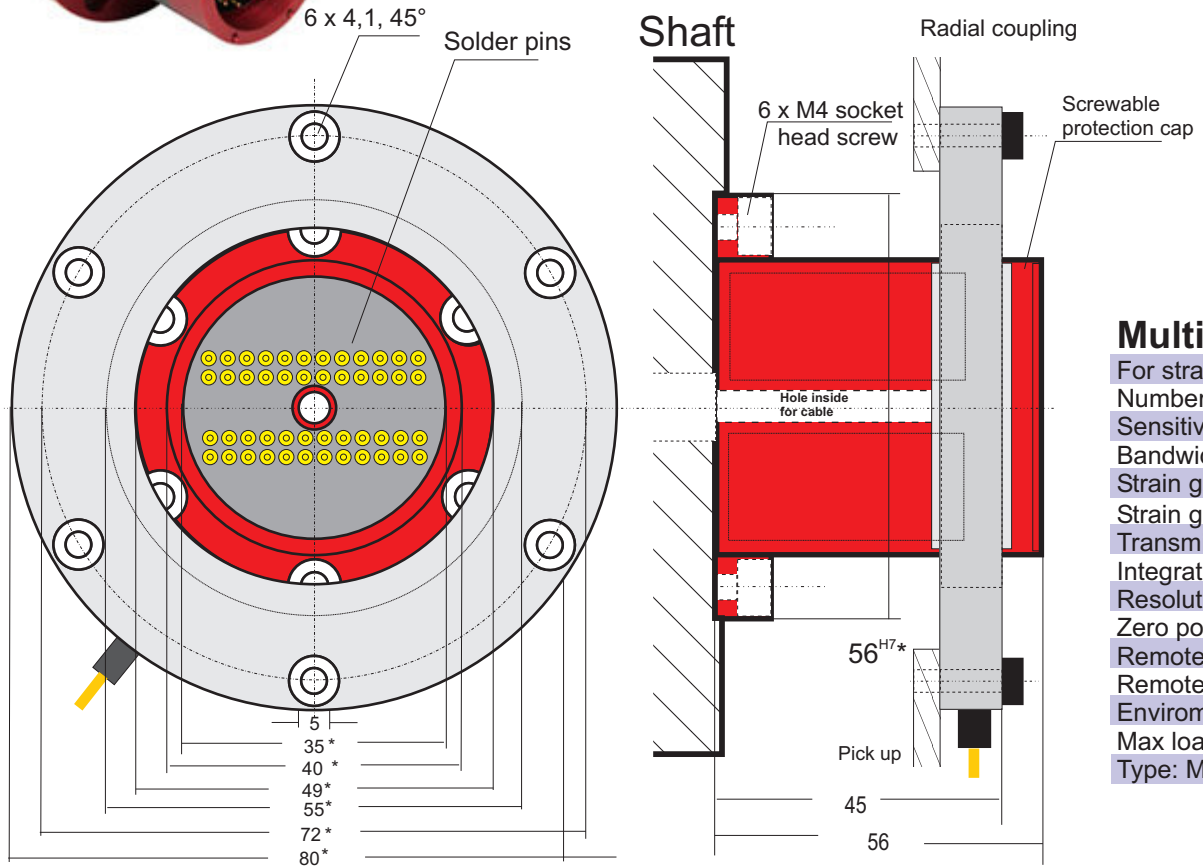
2	0,02	85	PCM12	4000	-
4	0,01	125	PCM16	8000	RC
8	0,003	150		40000	
12				200000	
16			FM*	2000	
			total sampling rate	10000	

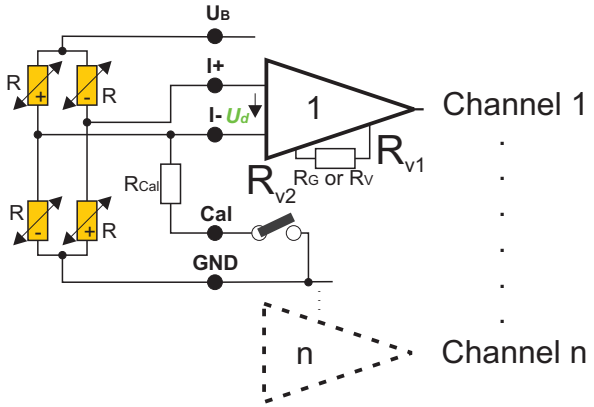
*** Dimension changes with different number ofchannels**

* 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 (-3dB)
Strain gage brigde 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: 50 000 g (depending on fixing)
Type: MSV_RA_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<rmc>

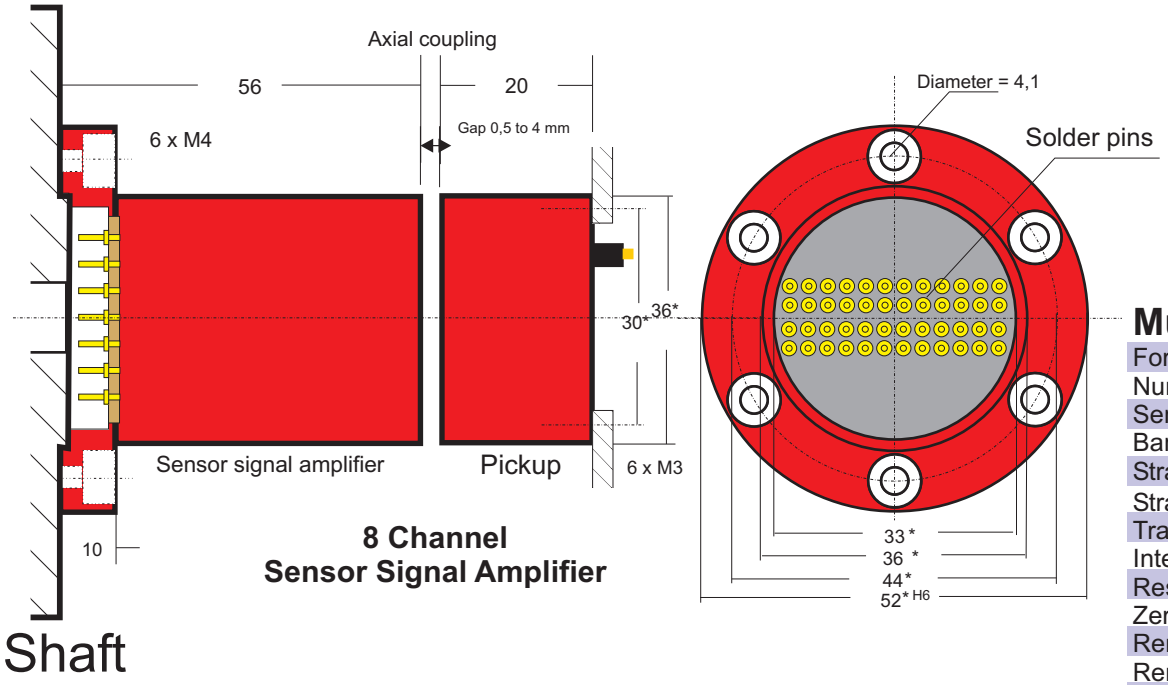
2	0,02	85	PCM12	4000	-
4	0,01	125	PCM16	8000	RC
8	0,003	150		40000	
12				200000	
16			FM*	2000	
			total sampling rate	10000	

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

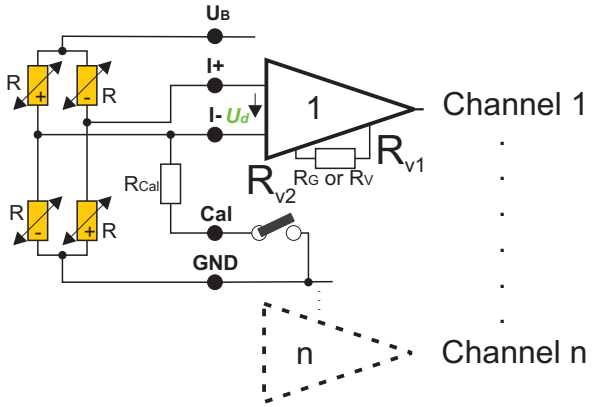
*** Dimension changes with different number ofchannels**

4/8/16 Channel Sensor Signal Amplifier Type Rot

(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 (-3dB)
Strain gage brigde 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: 50 000 g (depending on fixing)
Type: MSV_AA_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<RC>

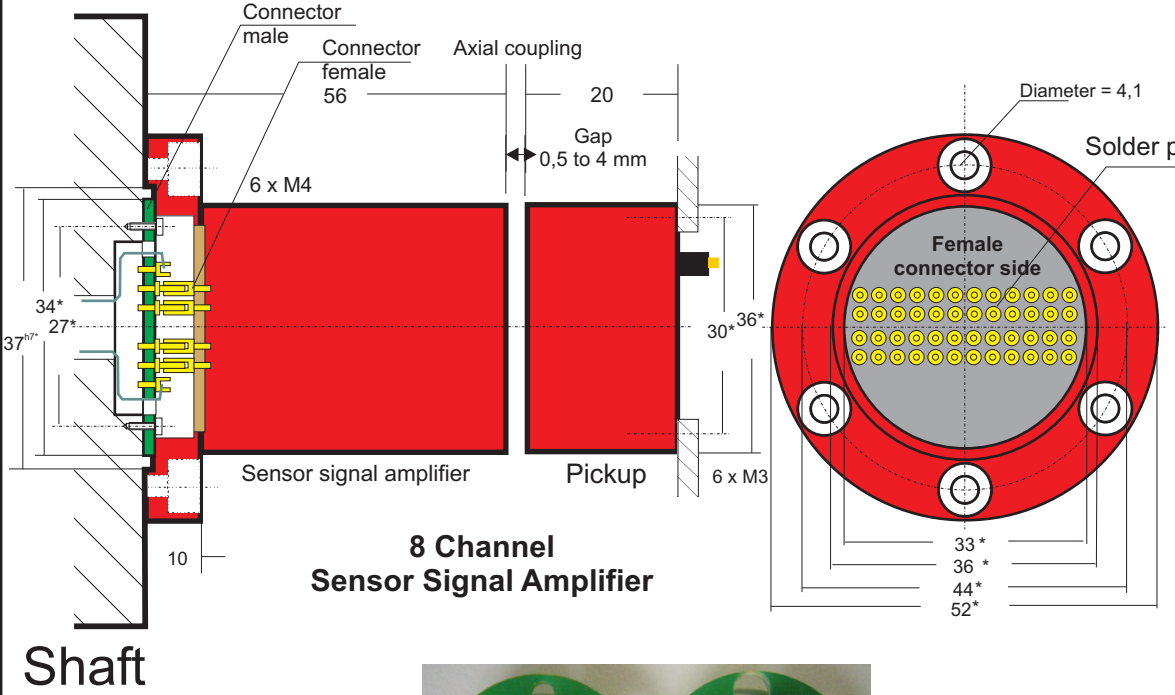
2	0,02	85	PCM12	4000	-
4	0,01	125	PCM16	8000	RC
8	0,003	150		40000	
12				200000	
16			FM*	2000	
			total sampling rate	10000	

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

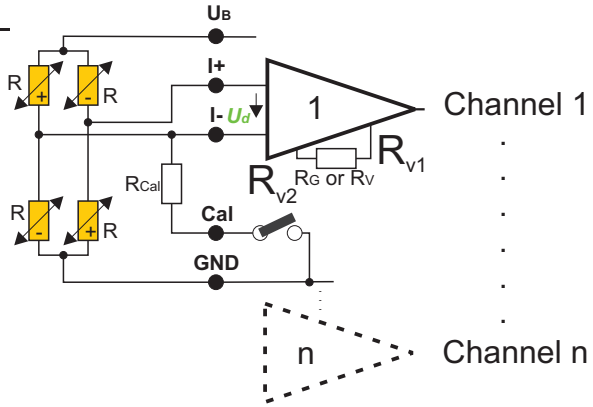
*** Dimension changes with different number of channels**

4/8/16 Channel Sensor Signal Amplifier Type Rot with Integrated Connector

(Standard)



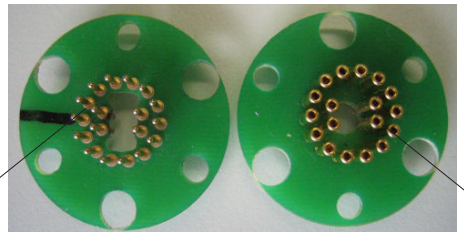
8 Channel Sensor Signal Amplifier



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 (-3dB)
Strain gage brigde 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: 100 000 g (depending on fixing)
Type: MSV_AAC_<channels>_<accuracy>_<temp>_<mod>_<sample>_<RC>_PSm

2	0,02	85	PCM12	4000	-
4	0,01	125	PCM16	8000	RC
8	0,003	150		40000	
12				200000	
16			FM*	2000	
			total sampling rate	10000	



Male connector

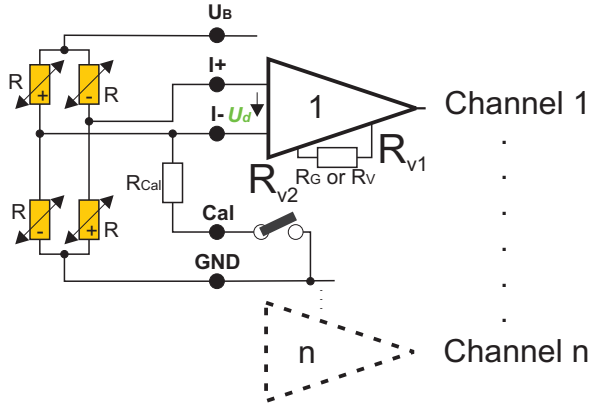
Female connector

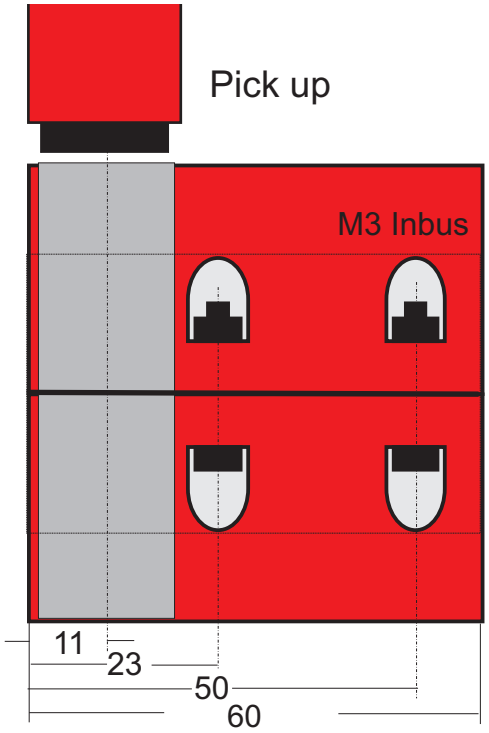
*** Dimension changes with different number of channels**

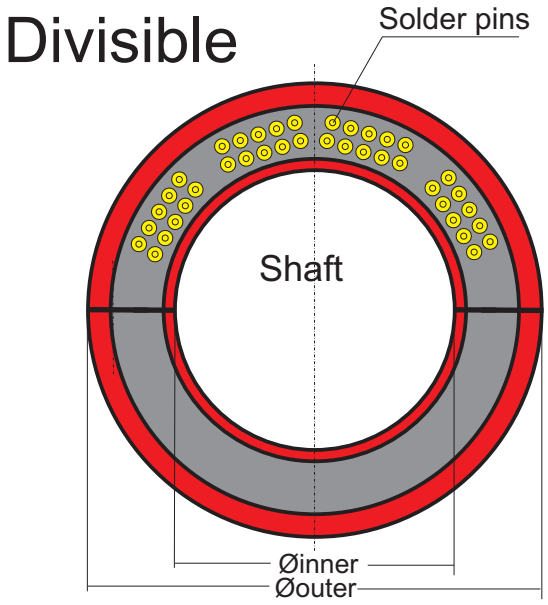
* Max. sampling rate/channel = total sampling rate/ No. of channels

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

(Standard)







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

Multi Channel FM/PCM Transmitter

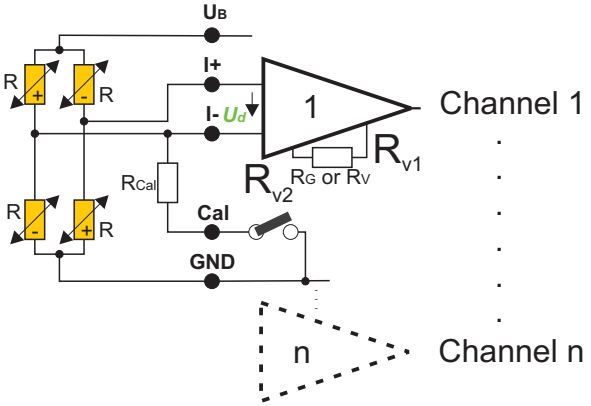
For strain gage, PT100, thermocouple				
Number of channels: 2, 4, 8, 12, 16, (max. 128)				
Sensitivity: 0,02 mV/V to 20 mV/V				
Bandwidth: 0 to 50 kHz (-3dB)				
Strain gage brigde supply: 2,5 V, (3,3 V*)				
Strain gage bridge resistance: 350 (120, 1000) Ω				
Transmission: inductive sensor telemetry 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: 20 000 g (depending on fixing)				
Type: MSV_RaHd_<channels>_<size>_<accuracy>_<temp>_<mod>_<samplerate>				
2	0,02	85	PCM12	4000
4	0,01	125	PCM16	8000
8	0,003	150		40000
12				200000
16			FM*	2000
			total sampling rate	10000

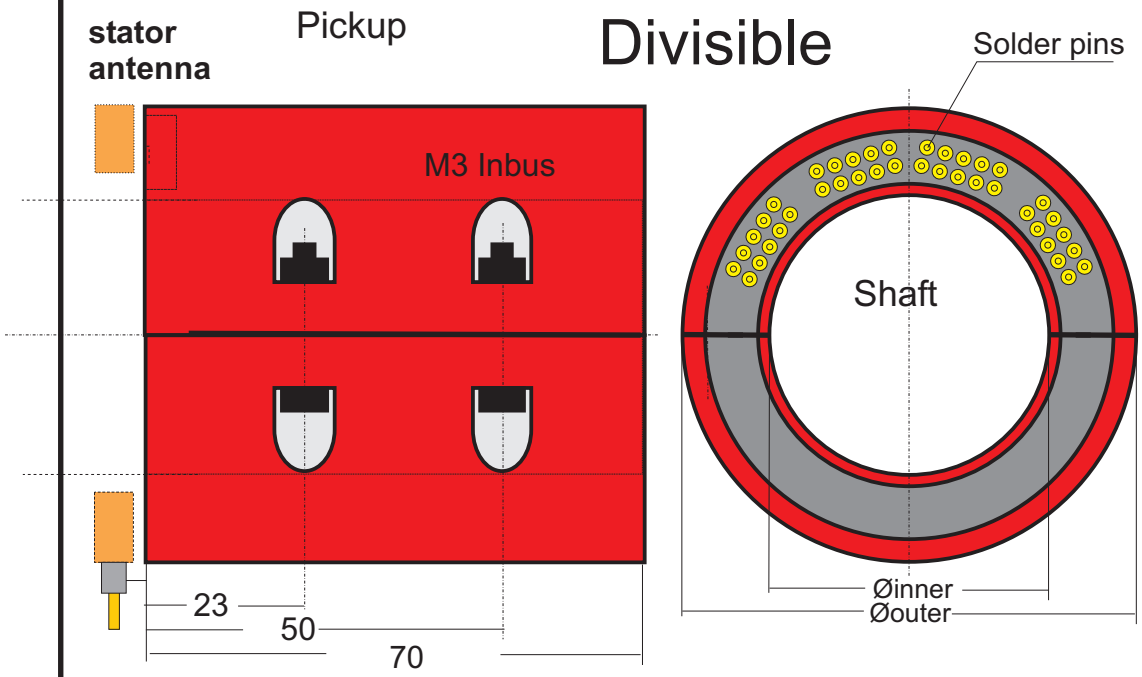
* Max. sampling rate/channel = total sampling rate/ No. of channels

*** Dimension changes with different number of channels**

8 Channel Sensor Signal Amplifier Type Cylinder (Integrated Rotor Loop, Mounting on Shaft, divisible 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 brigde 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: 20 000 g (depending on fixing)
Type: MSV_RaHa_<channels>_<size>_<accuracy>_<temp>_<mod>_<samplerate>

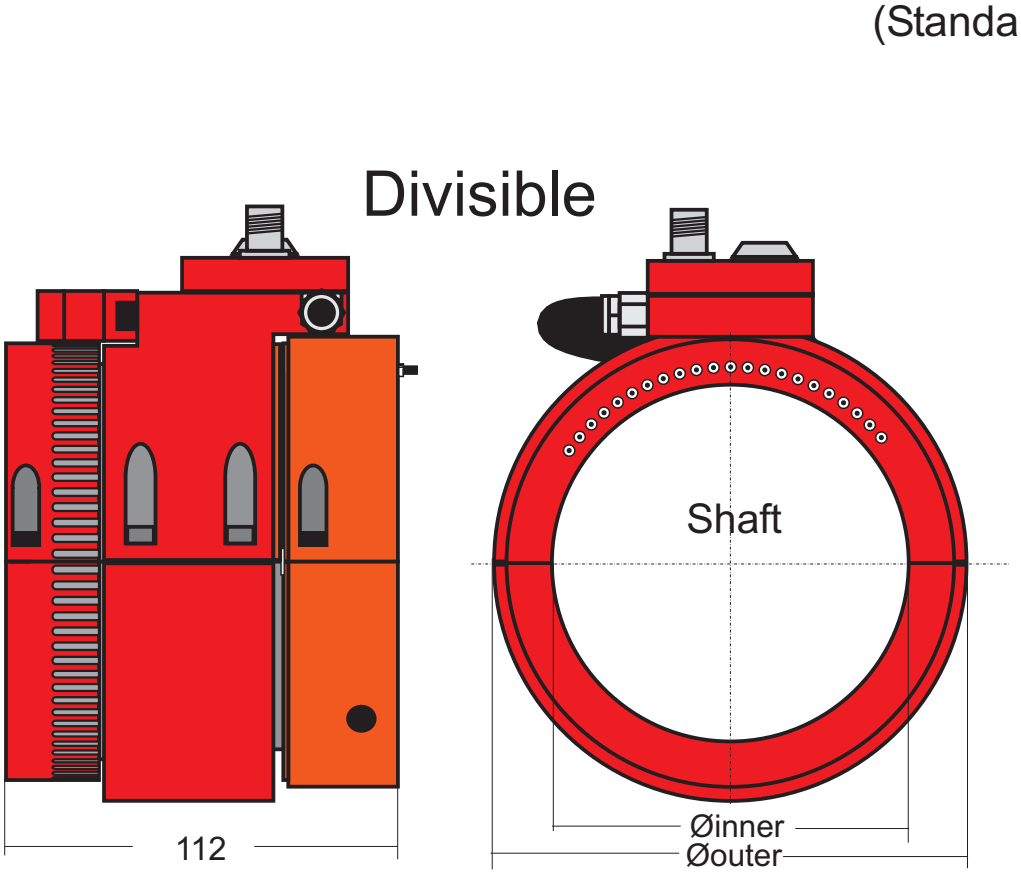
2	0,02	85	PCM12	4000
4	0,01	125	PCM16	8000
8	0,003	150		40000
12				200000
16			FM*	2000
			total sampling rate	10000

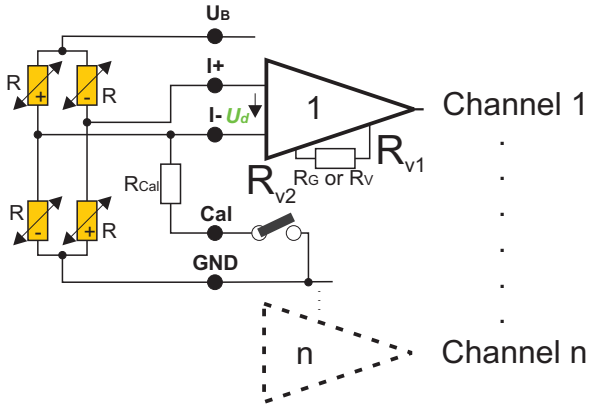
* Max. sampling rate/channel = total sampling rate/ No. of channels

*** Dimension changes with different number 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

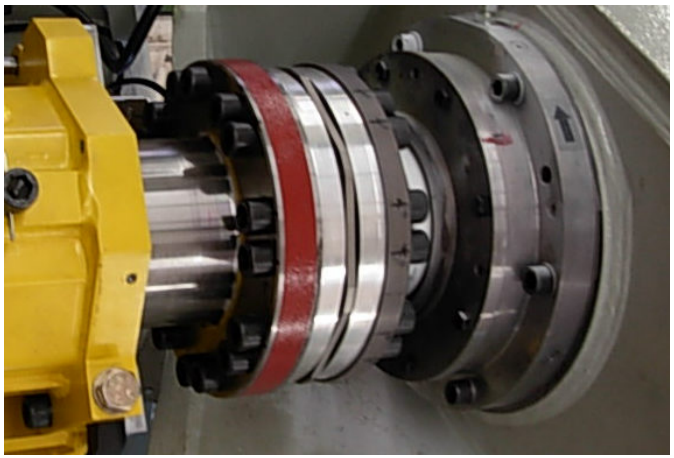
For strain gage, PT100, thermocouple
Number of channels: 2, 4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage brigde supply: 2,5 V, (3,3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 12 Bits, (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
Enviromental 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>

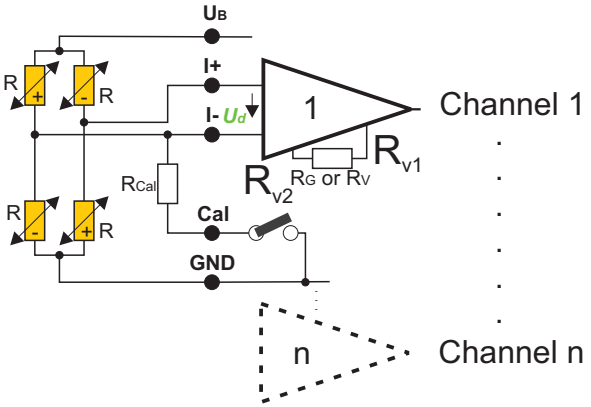
2	0,02	85	PCM12	4000
4	0,01	125	PCM16	8000
	0,003			40000

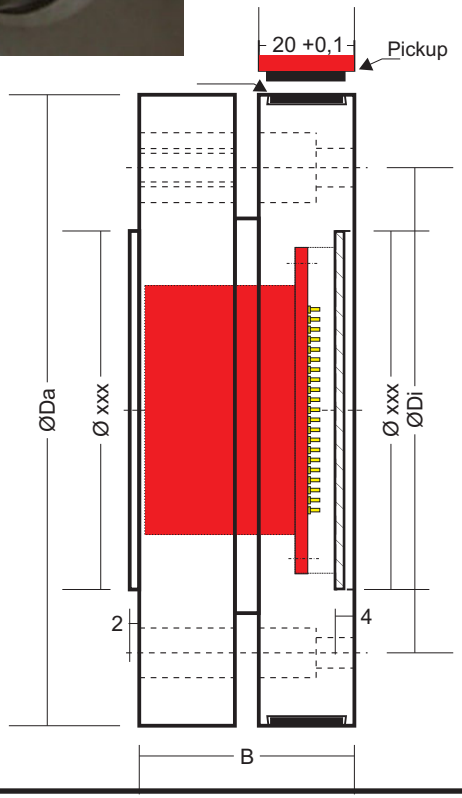
*** Dimension changes with different number of channels**

4/8/12/16 Driveline Flange with integrated Sensor Signal Amplifier

(Standard)







* Dimension changes with different number of channels

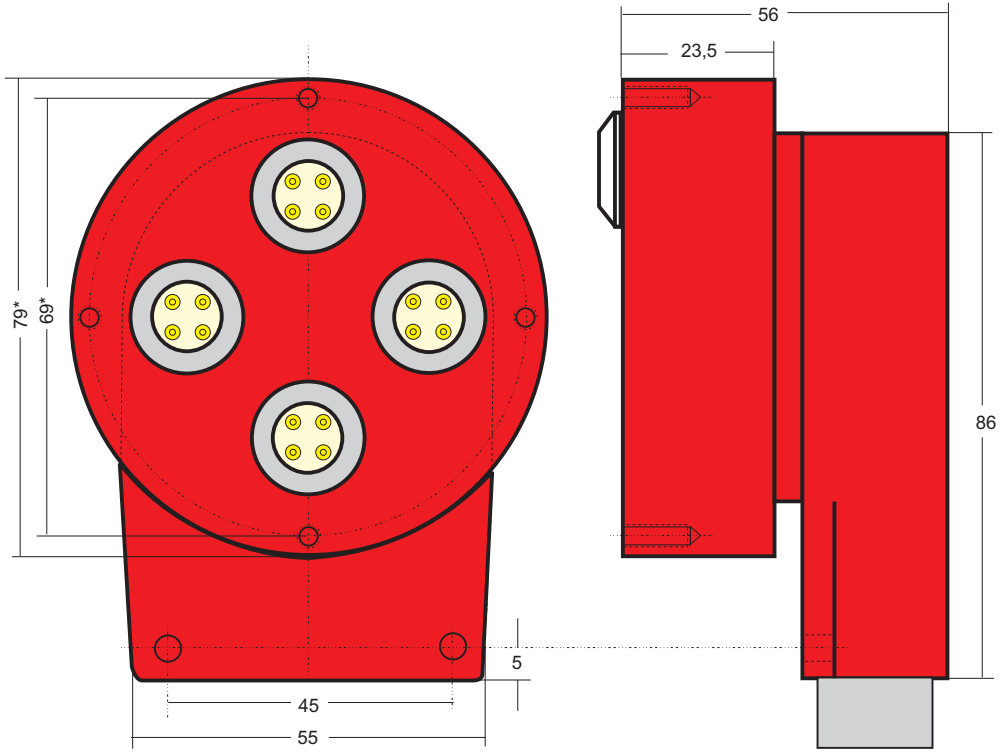
Multi Channel FM/PCM Transmitter

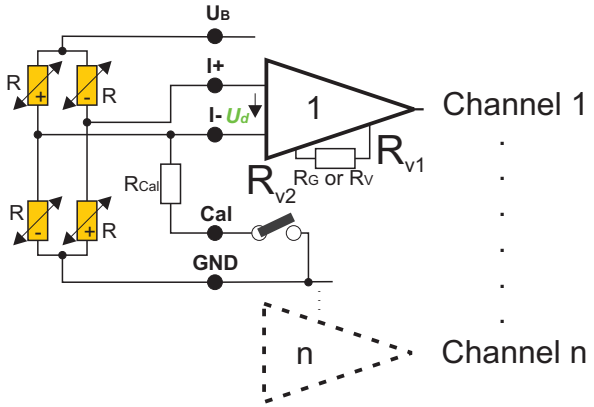
For strain gage, PT100, thermocouple
Number of channels: 2, 4
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 10 kHz (-3dB)
Strain gage brigde supply: 2,5 V, (3,3 V*)
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry FM, PCM
Integrated filter
Resolution: 12 Bits, (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
Enviromental 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>

4	Dxxx*yy	0,02	85	PCM12	4000
8		0,01	125	PCM16	8000
12		0,003			40000
16					

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 brigde 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)

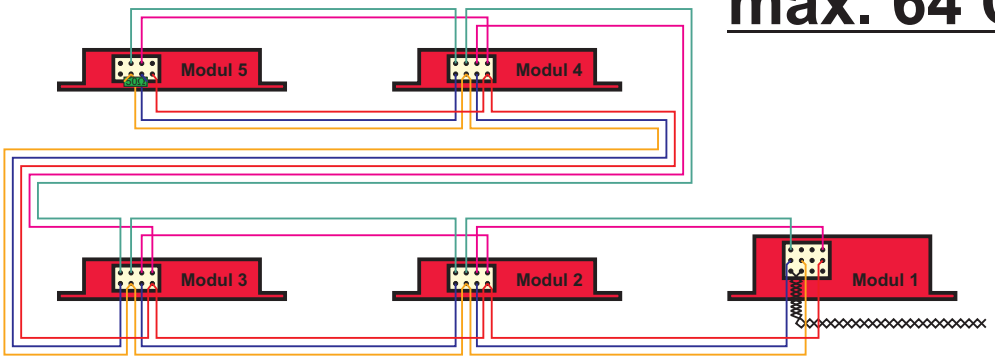
Type: MSV_Rad_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_<rmc>_<TC>

2	0,02	85	PCM12	4000	-	-
4	0,01	125	PCM16	8000	RC	TC
8	0,003	150		40000		
12				200000		
16			FM*	2000		
			total sampling rate	10000		

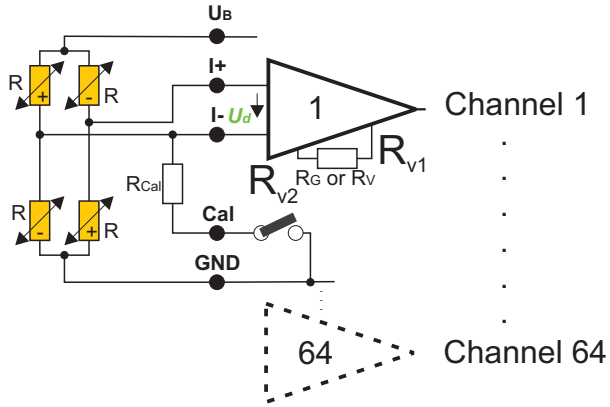
* Max. sampling rate/channel = total sampling rate/ No. of channels

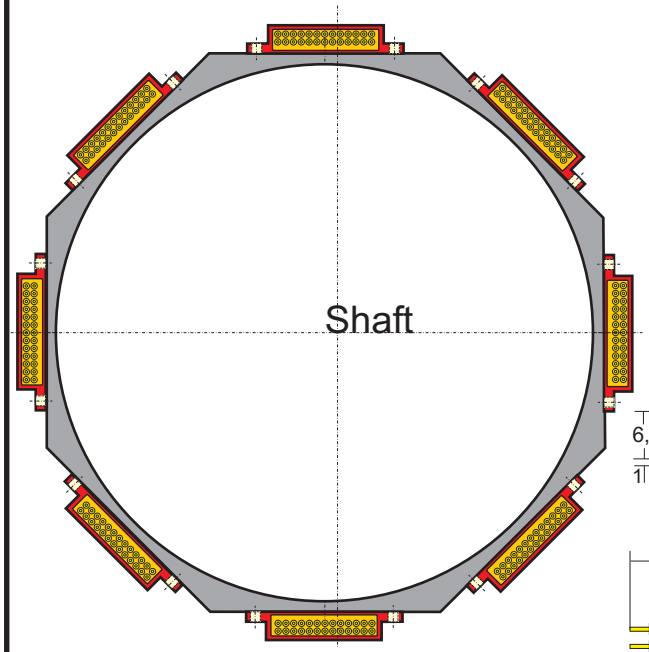
*** Dimension changes with different number of channels**

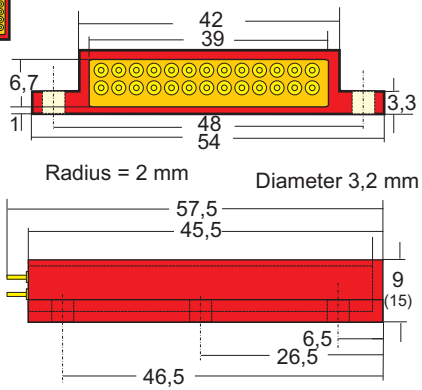
Modular Sensor Telemetry Amplifier distributed max. 64 Channels



4/8 Channel moduls







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 brigde 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>*

2	0,02	85	-	PCM12	4000	-	-
4	0,01	125	Fu	PCM16	8000	RC	Ma
8	0,003	150			40000		Sl
12					200000		
16							
32							
64							

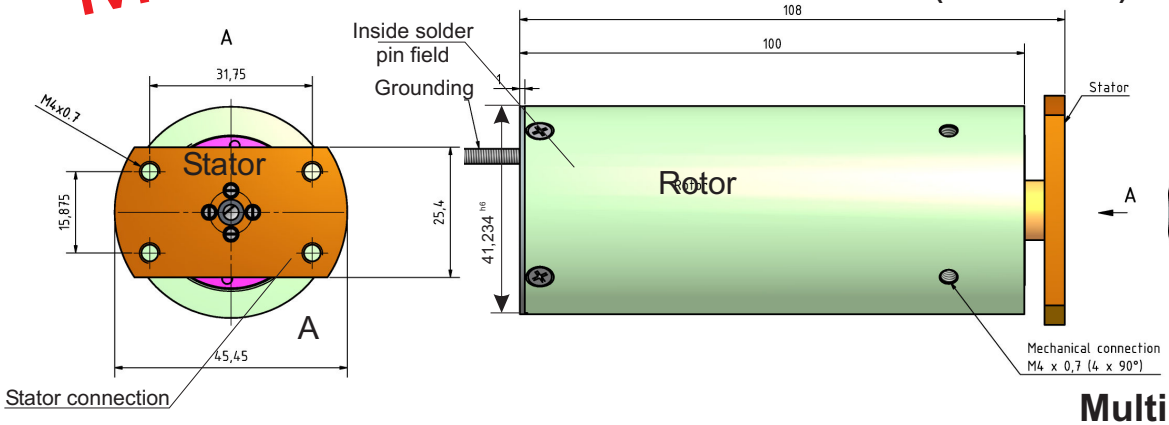
**- : inductive
Fu: Radio Transmission

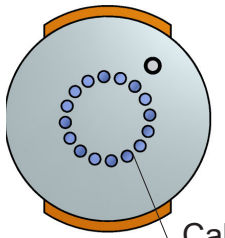
*M: Master modul
S: Slave modul

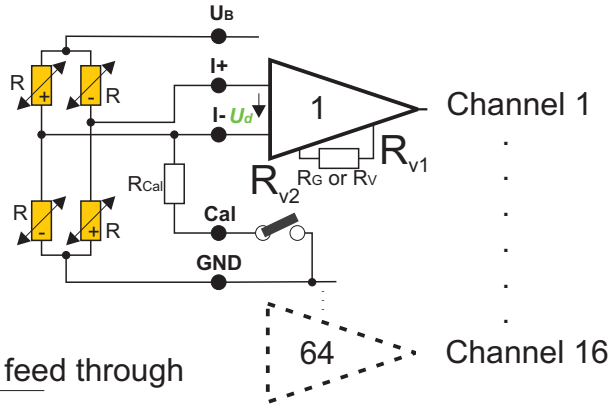
Miniature beared 16 Channel Sensor Signal Amplifier with Stator Part

Military Airborne qualified

(Standard)







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

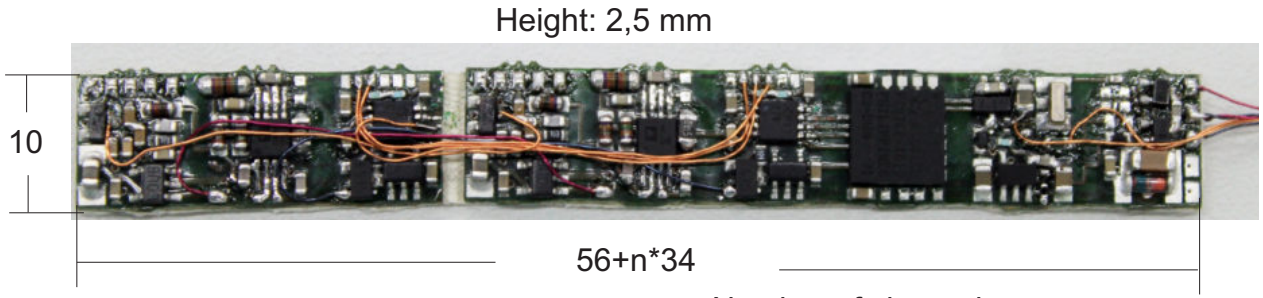
Multi Channel PCM Transmitter

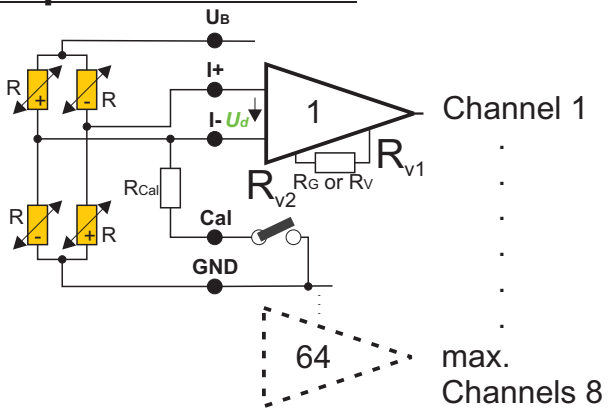
For strain gage, PT100
Number of channels: 16, (max. 64)
Sensitivity: 0,02 mV/V to 20 mV/V
Bandwidth: 0 to 50 kHz (-3dB)
Strain gage brigde supply: 3,3 V
Strain gage bridge resistance: 350 (120, 1000) Ω
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 14 Bits, (16 Bits*)
Zero 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), prodection: IP65
Max speed: 10000 rpm
Weigth: 550 grams
Type: MSV_RaHm_<channels>_<accuracy>_<temp>_<mod>_<samplerate>_RC

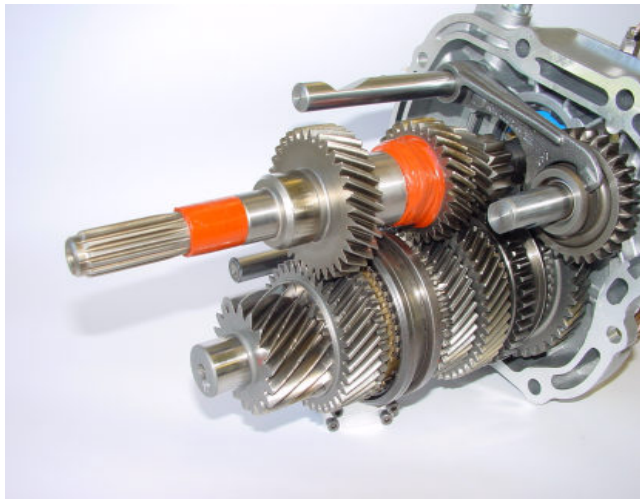
8	0,02	85	PCM12	4000	RC
16	0,01	125	PCM16	40000	
32	0,003	150		200000	
64					

Multi Channel Flexible- Sensor Signal Amplifier Type Flex

for mounting around the Shaft, special for critical Space Situations







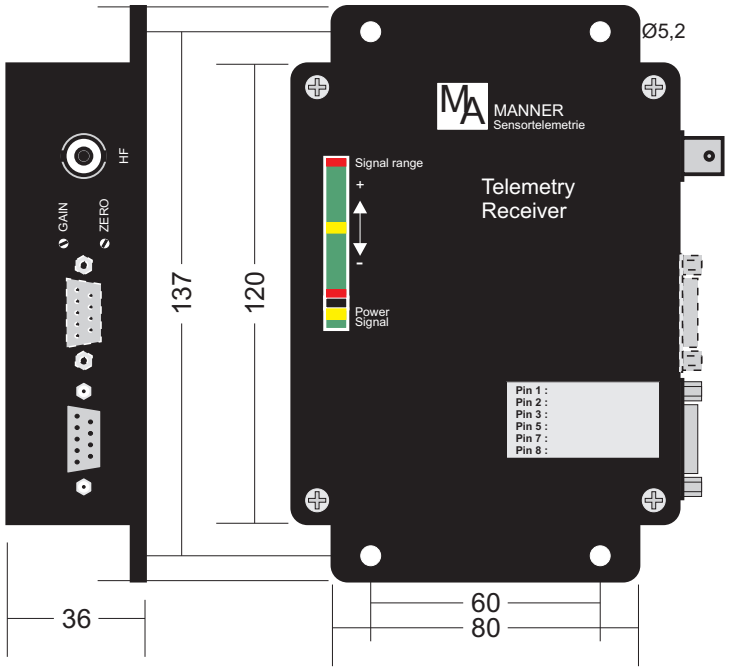
Multichannel Flex PCM Transmitter

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 brigde 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>

2	0,02	85	-	PCM16	1000	-
3	0,01	125			2000	K
4	0,003	160			4000	
5						
8						

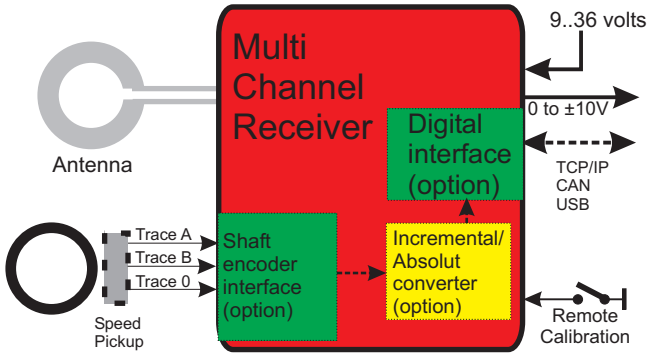
For special Shapes
for Turbine / Turbo Charger Applications:
see "Turbinen Telemetry"

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



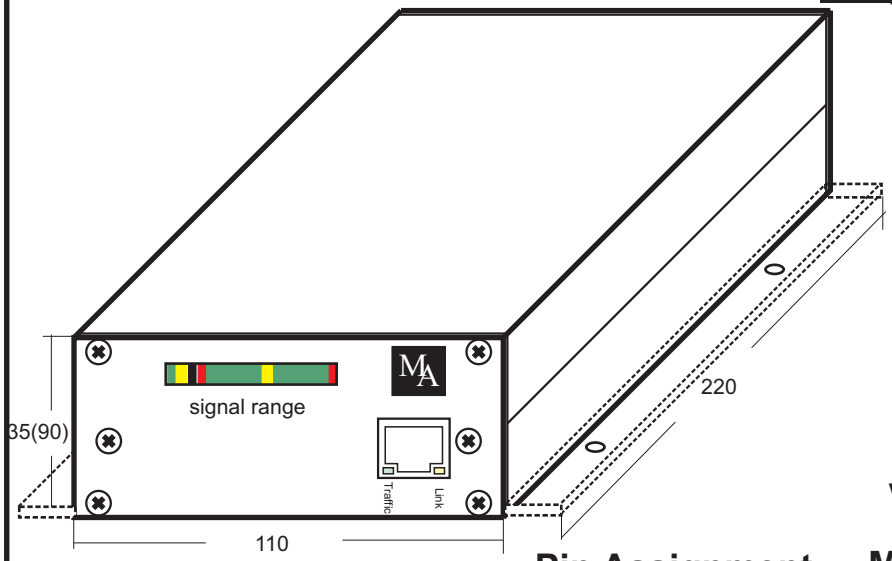
2 Channel PCM Receiver

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
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_P_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<wa>

2	-	PCM12	6700	1W	15	U	-	IP65
	6	PCM16	35000	3W	24	I	RPM	IP67
	Fu			5W	12B	F		
	3,2					B		
						USB		
						CAN		

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

Evaluation Unit (MAW_F)
Digital Receiver

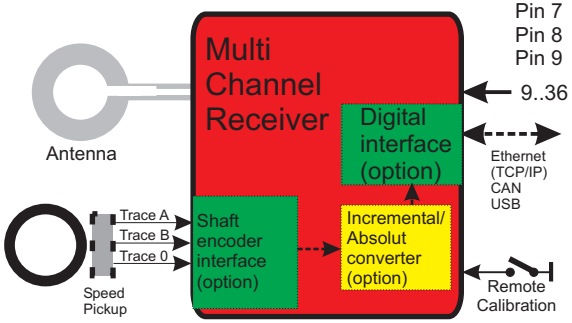


with CAN-Bus or TCP/IP EtherCat or USB Option available

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



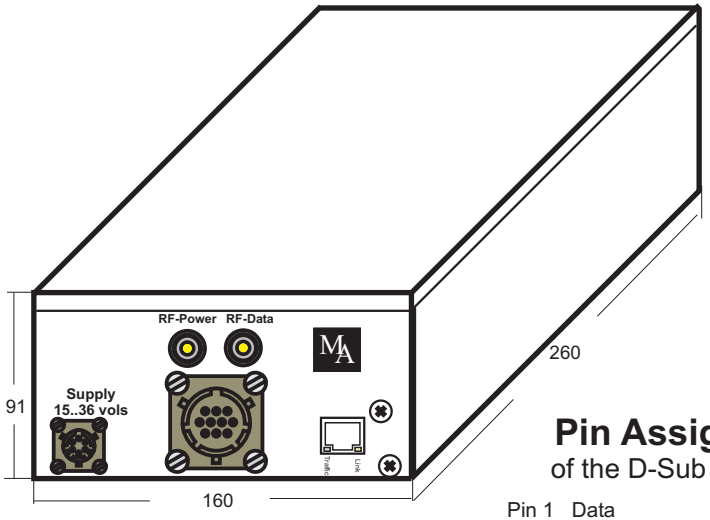
Multi Channel PCM Receiver

Bandwidth: 0 to 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
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_F_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>_<Mo>

2	-	PCM12	4000	1W	15	USB	-	-
4	6	PCM16	40000	3W	24	CAN	RPM	Hu
8	Fu			5W	12B	TCP/IP		La
	3,2							

Evaluation Unit (MAW_G) Receiver

with CAN-Bus or TCP/IP or USB

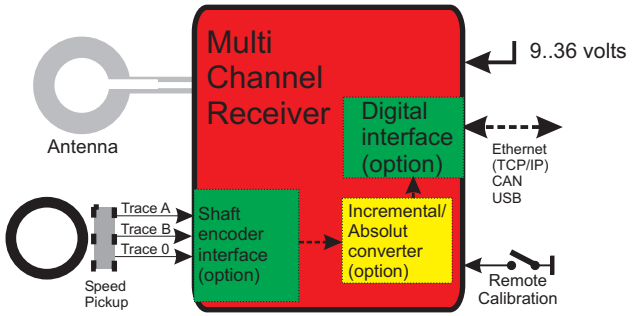


RMC-Programming

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

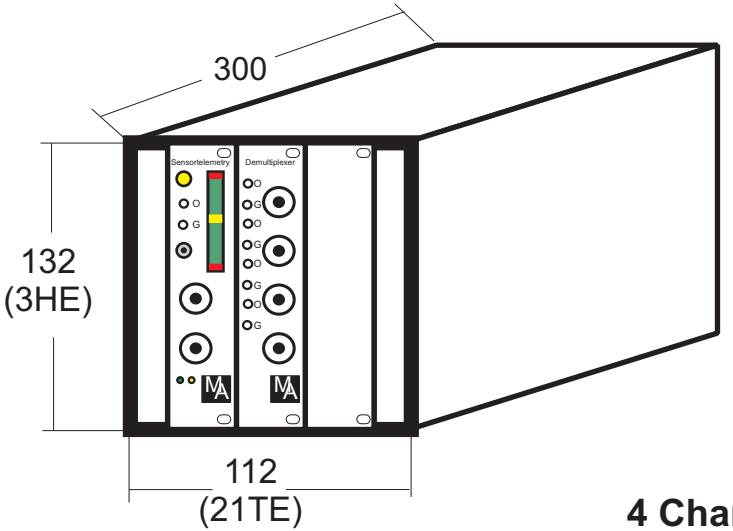


Multi Channel PCM Receiver

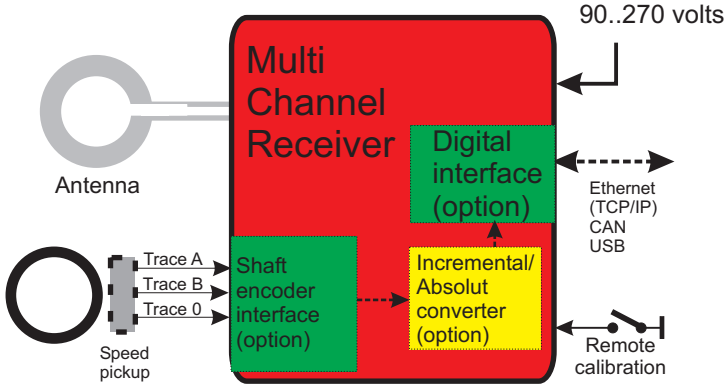
Bandwidth: 0 to 1kHz (10 kHz)
Number of channels: 1..32
Output: ±10 V, (0(4) to 20 mA option)
Digital interface (option): SPI, USB, CAN, Ethernet TCP/IP
RF-Power: 1, 3, 5 W
Transmission: inductive sensor telemetry PCM
Integrated filter
Resolution: 12 Bits, (16 Bit*)
Remote shunt calibration
Enviromental 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>

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)



Front side



4 Channel FM/PCM Receiver 22 TE

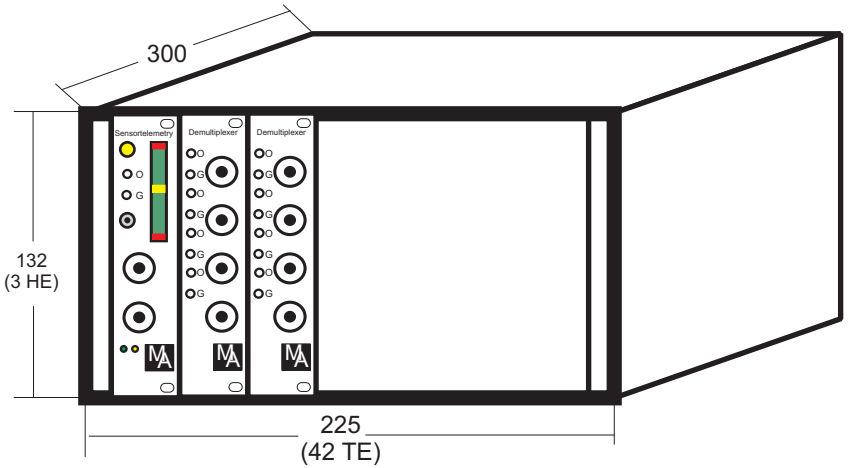
Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
Output: ±10 V
Interfaces (option): USB
RF Power: 1, 3, 5 W
Transmission: inductive sensor telemetry FM/PCM
Integrated filter
Resolution: 12 Bits, (16 Bit**)
Remote shunt calibration
Enviromental temperature range: -25 to +65°C
Supply: 9 to 270 V AC, 9 to 36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

4	-	F	4000	1W	230VAC	U	-
	6	PCM12	8000	3W	24B	I	RPM
	Fu	PCM16	40000	5W		F	
	3,2		200000			B	
		F*	2000			USB	
		total sampling rate	10000			CAN	
						TCP/IP	

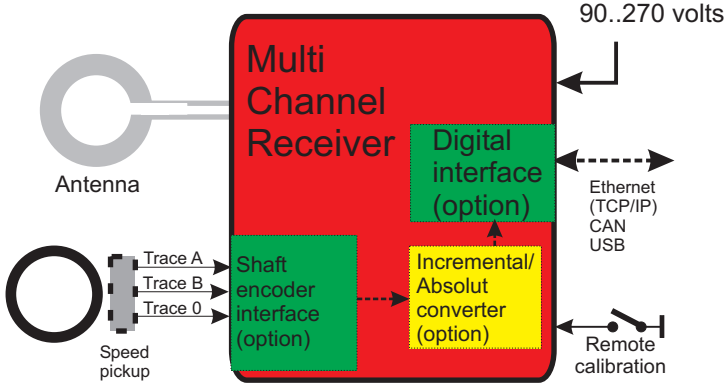
* Max. sampling rate/channel = total sampling rate/ No. of channels

** only for PCM version

Evaluation Unit (42TE)



Front side



Multi Channel FM/PCM Receiver 42 TE

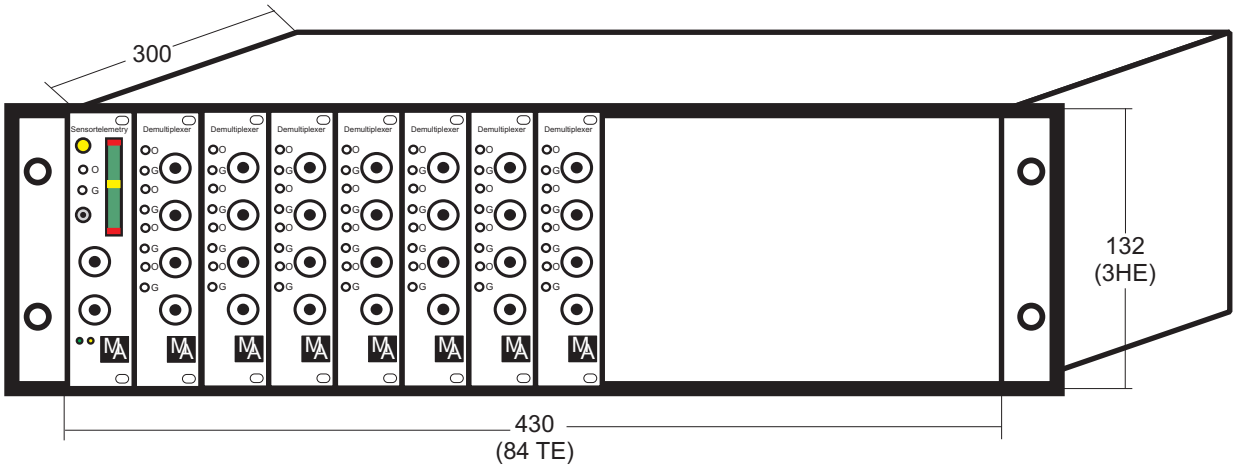
Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
Output: ±10 V
Interfaces (option): USB
RF Power: 1, 3, 5, 10 W
Transmission: inductive sensor telemetry FM/PCM
Integrated filter
Resolution: 12 Bits, (16 Bit**)
Remote shunt calibration
Enviromental temperature range: -25 to +65°C
Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)
Type: MAW_42TE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

4	-	F	4000	1W	230VAC	U	-
8	6	PCM12	8000	3W	24B	I	RPM
12	Fu	PCM16	40000	5W		F	
16	3,2		200000			B	
		F*	2000			USB	
		total sampling rate	10000			CAN	
						TCP/IP	

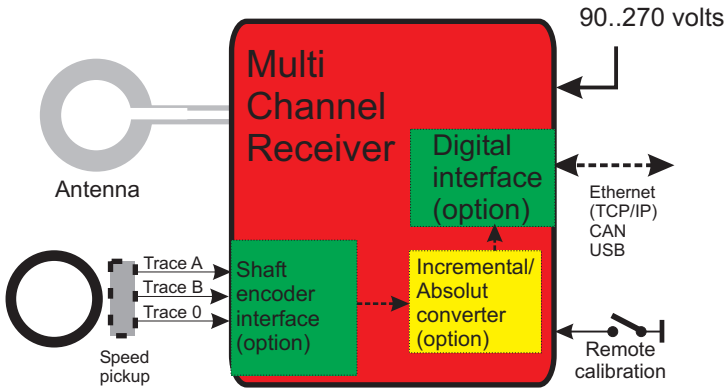
** only for PCM version

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

Evaluation Unit (84TE)



Front side



Multi Channel FM/PCM Receiver 84 TE

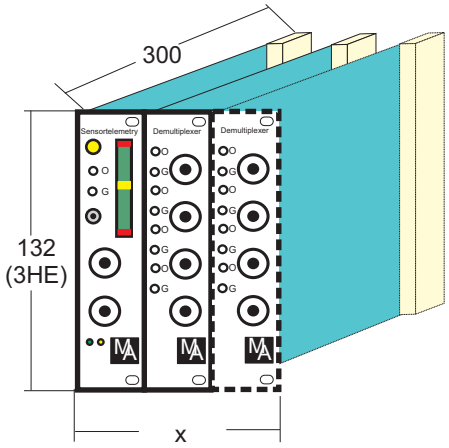
Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
Output: ±10 V
Interfaces (option): USB
RF Power: 1, 3, 5, 10 W
Transmission: inductive sensor telemetry FM/PCM
Integrated filter
Resolution: 12 Bits, (16 Bit**)
Remote shunt calibration
Enviromental temperature range: -25 to +65°C
Supply: 9 to 270 V AC, 9 to 36 V DC (board supply)
Type: MAW_84TE_<channels>_<Freq>_<mod>_<samplerate>_<power>_<supply>_<output>_<RPM>

4	-	F	4000	1W	230VAC	U	-
8	6	PCM12	8000	3W	24B	I	RPM
12	Fu	PCM16	40000	5W		F	
16	3,2		200000			B	
32		F*	2000			USB	
		total sampling rate	10000			CAN	
						TCP/IP	

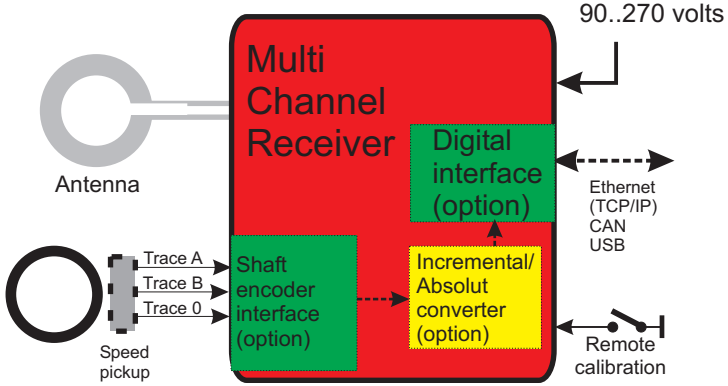
** only for PCM-Version

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

Evaluation Unit (ES)



Front side



Multi Channel FM/PCM Receiver ES

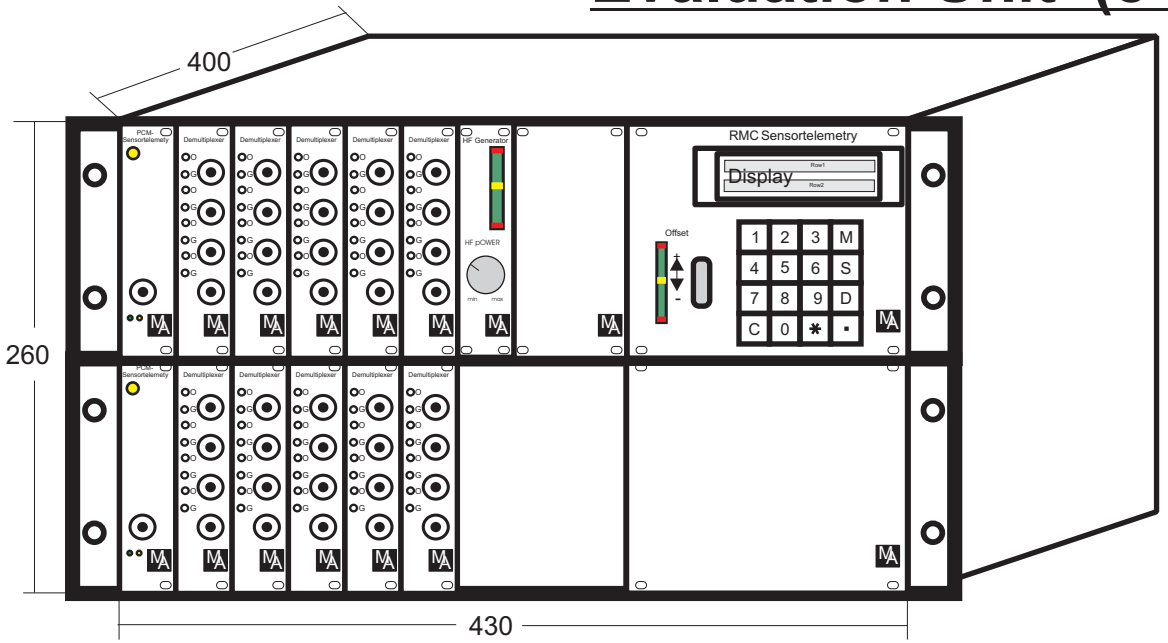
Bandwidth: 0 to 1kHz (10 kHz, 50 kHz option)
Output: ±10 V
Interfaces (option): USB
RF Power: 1, 3, 5, 10 W
Transmission: inductive sensor telemetry FM/PCM
Integrated filter
Resolution: 12 Bits, (16 Bit**)
Remote shunt calibration
Enviromental temperature range: -25 to +65°C
Supply: 9 to 270 V AC, 9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

4	-	F	4000	1W	230VAC	U	-
8	6	PCM12	8000	3W	24B	I	RPM
12	Fu	PCM16	40000	5W		F	
16	3,2		200000			B	
32		F*	2000			USB	
		total sampling rate	10000			CAN	
						TCP/IP	

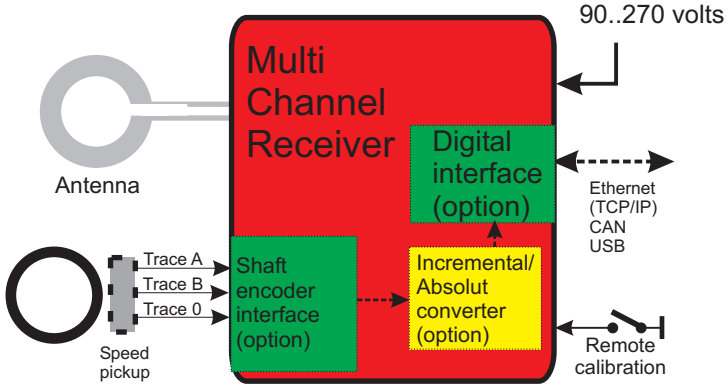
** only for PCM version

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

Evaluation Unit (84TE, 6HE)



Front 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>

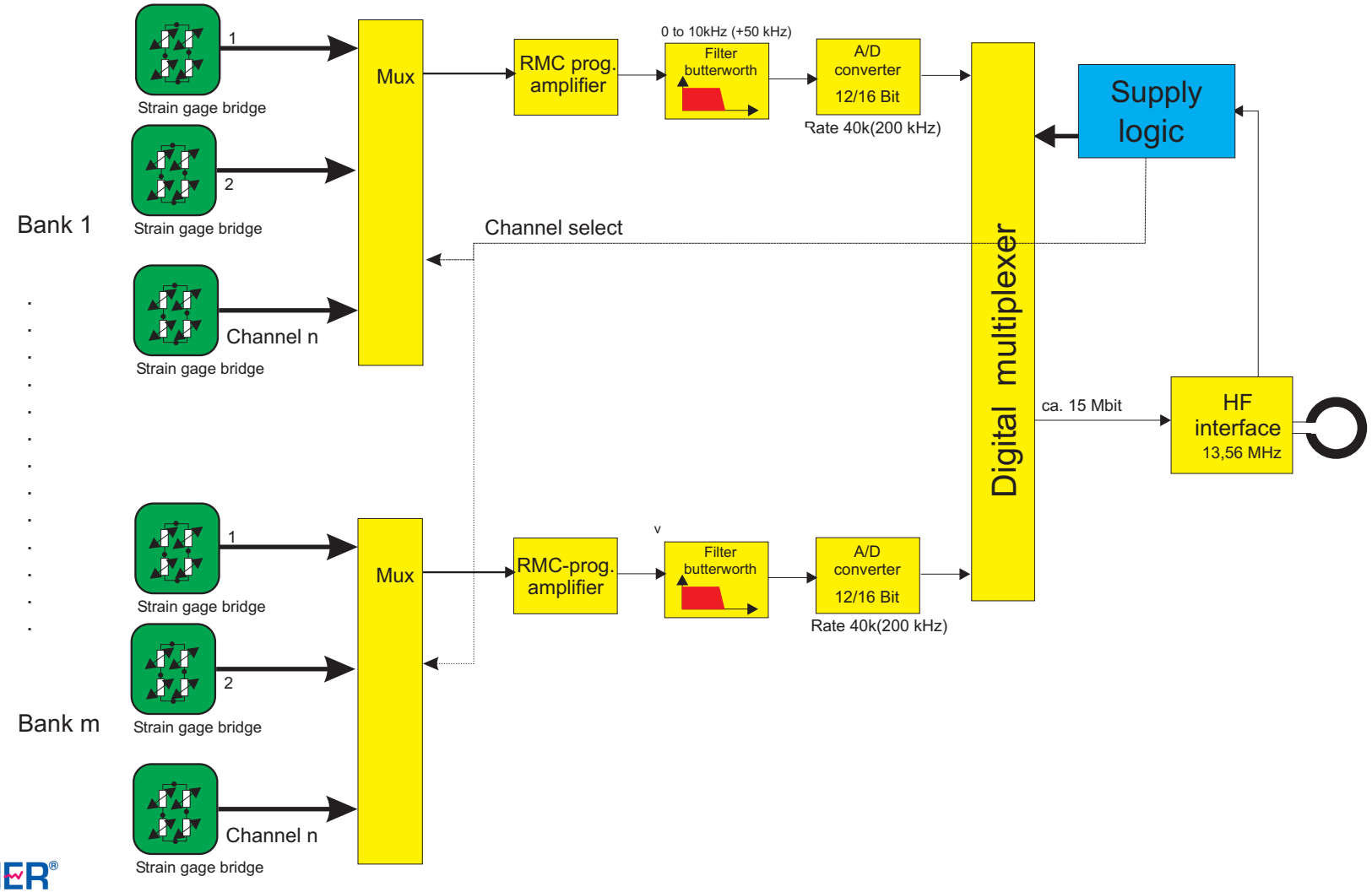
4	-	F	4000	1W	230VAC	U	-
8	6	PCM12	8000	3W	24B	I	RPM
12	Fu	PCM16	40000	5W		F	
16	3,2		200000			B	
32		F*	2000			USB	
total sampling rate			10000			CAN	
						TCP/IP	

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

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

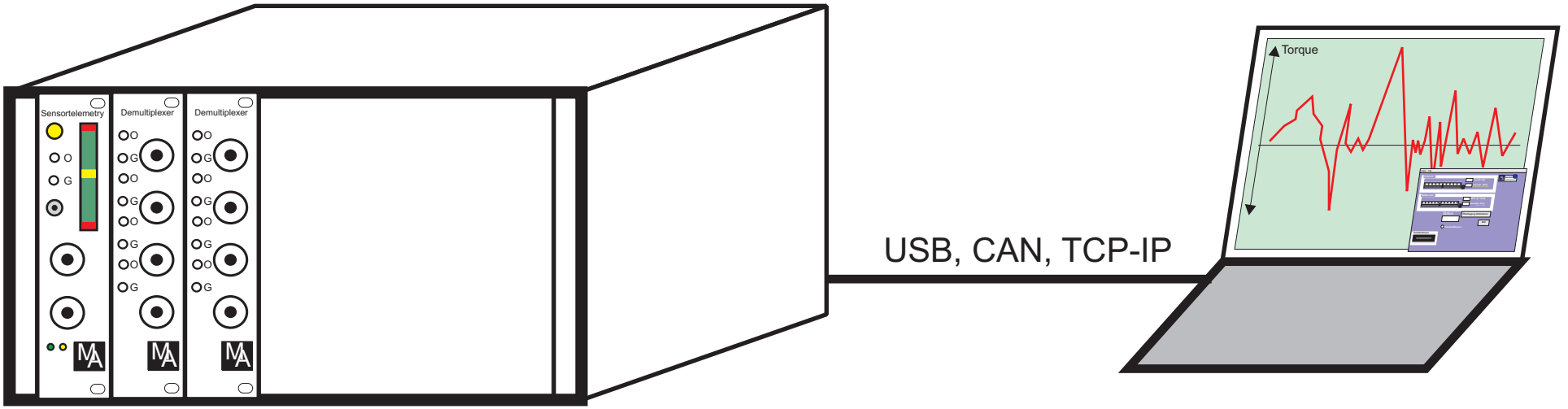
Block Diagram (Transmitter)

(remote control channel select (max. numbers of channels nxm))



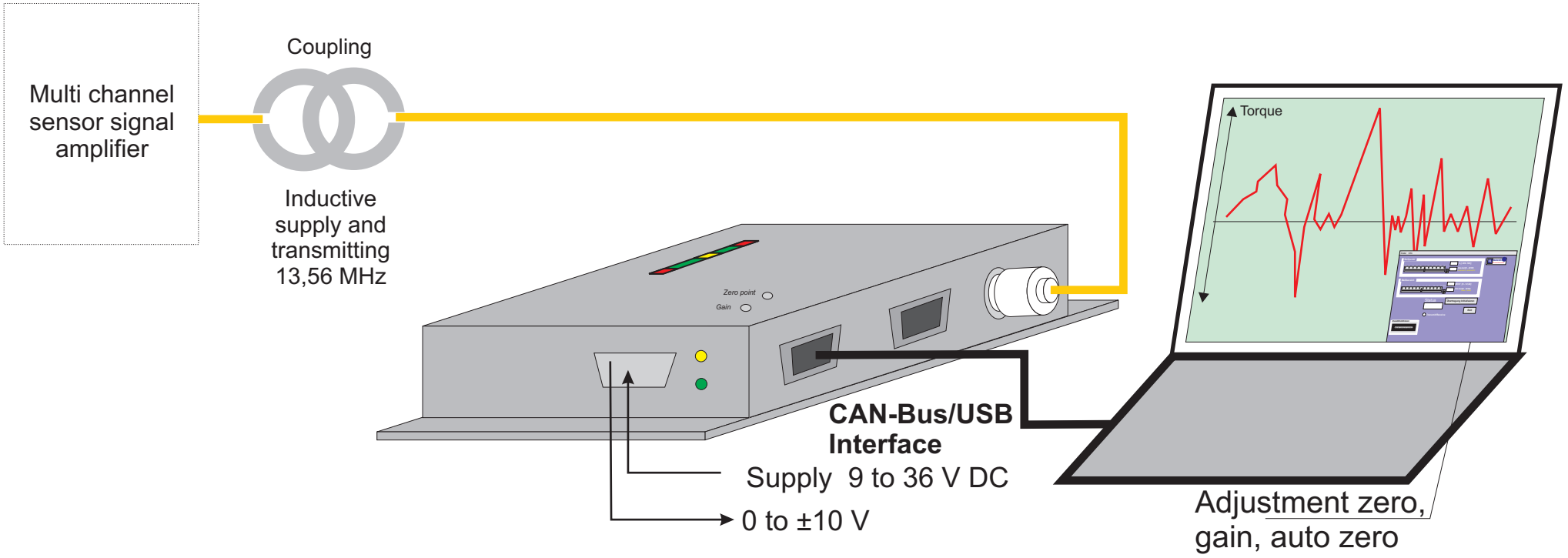
Interface Technique

(direct signal data acquisition)



Very Compact Digital Multi Channel Receiver with Digital Interface Technique

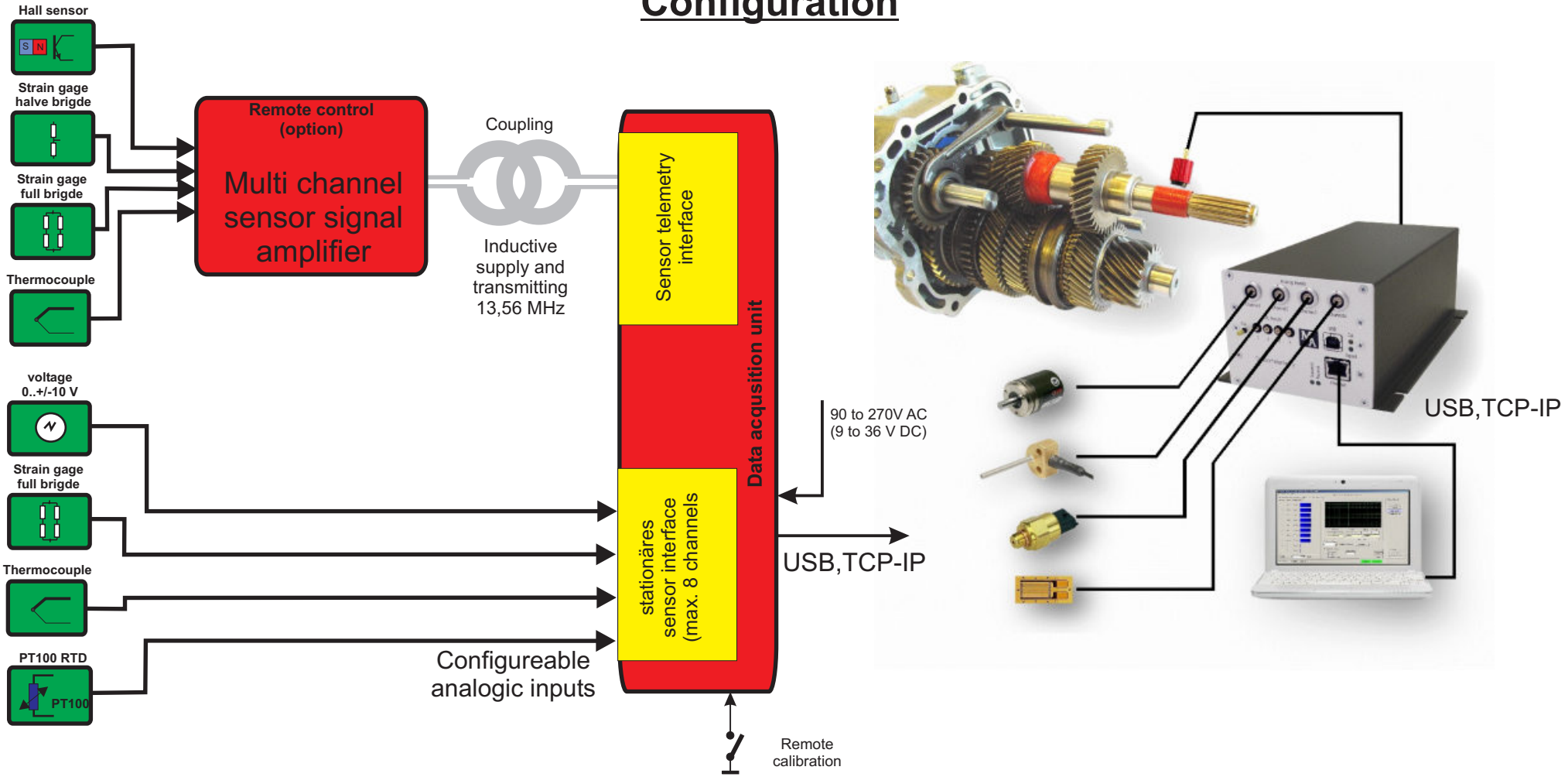
(direct signal data acquisition, no analog Output)



Digital combi Data Acquisition (Sensor Telemetry + stationary Channels)

(direct signal data acquisition)

Configuration



Combi Data Acquisition (SYNCHRO)

(direct signal data acquisition)

USB,TCP-IP

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 acquistion channel (option)
* easy handling - ideal for mobil application

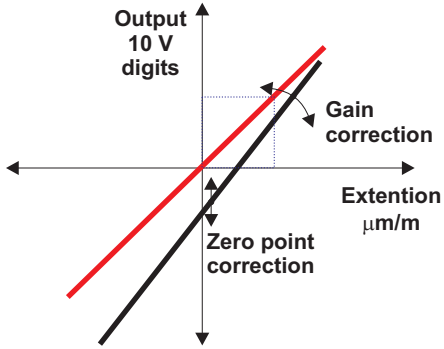
Multi Channel PCM Receiver with additonal stationary Channels, 24 TE

Bandwdith: 0 to 1kHz (10 kHz, 50 kHz option)
Output: digital Ethernet TCP/IP, USB
Absolute synchronous data acquisiton
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 acqusition (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
Enviromental 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

4	0,01	F	1000	1W	230VAC
8	0,003	PCM12B	4000	3W	24B
12		PCM16B	8000	5W	
16			40000	10W	
32			200000		

Online remote programmable Sensor Telemetry

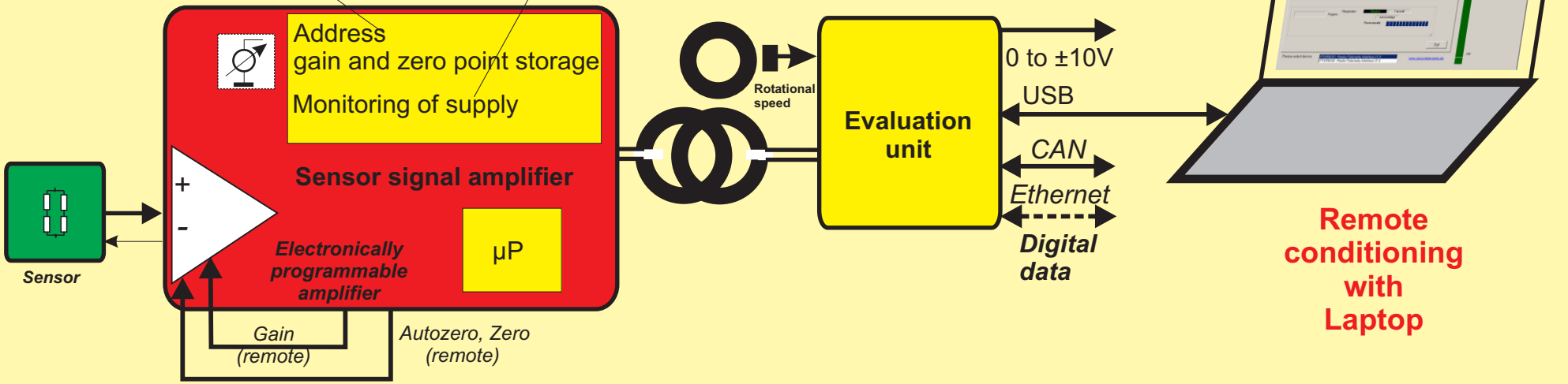
High resolution (12 Bit) initial remote setup of the of strain gage application at installation and calibration



Separate address for each amplifier

Gain, zero adjustable with 12 bits resolution (internal storage)

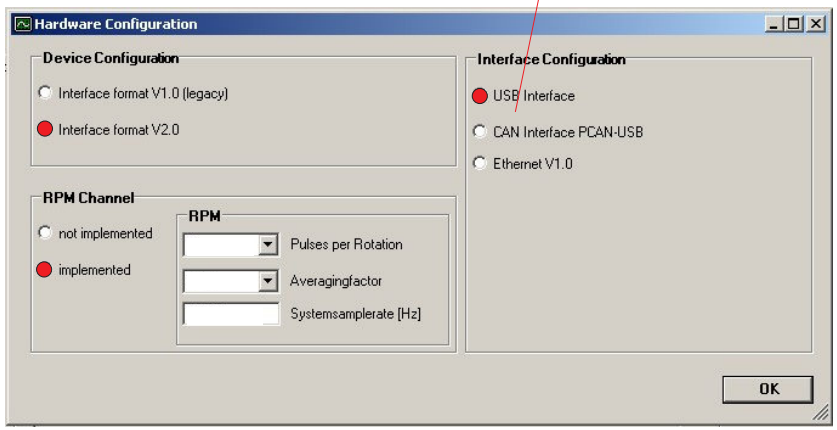
RMC sensor telemetry

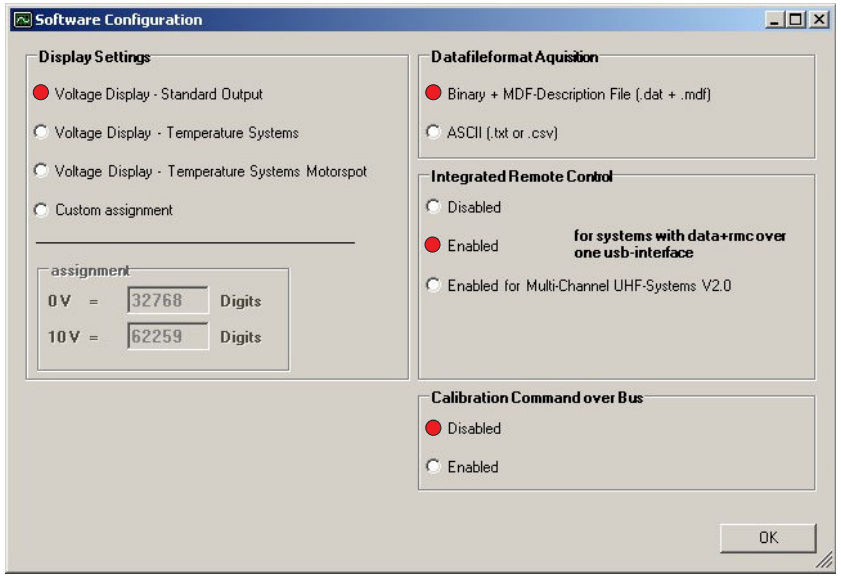


Setup of the Interface Software

(Software package remote control)

Different Interfaces





MENU->SETUP->HARDWARE CONFIGURATION

Selection between the different Interface-configurations. Please see seperate 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.
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 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 ist activated.

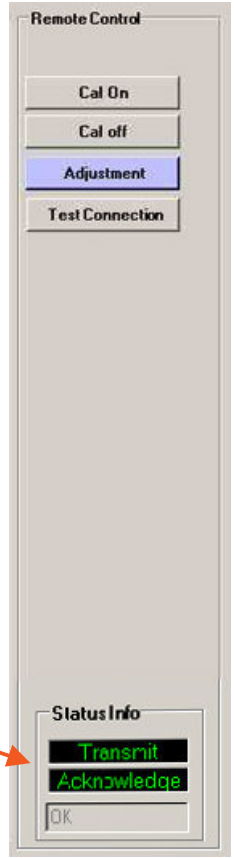
Cal off:
Via the RMC command the Shunt calibration ist deactivated.

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.

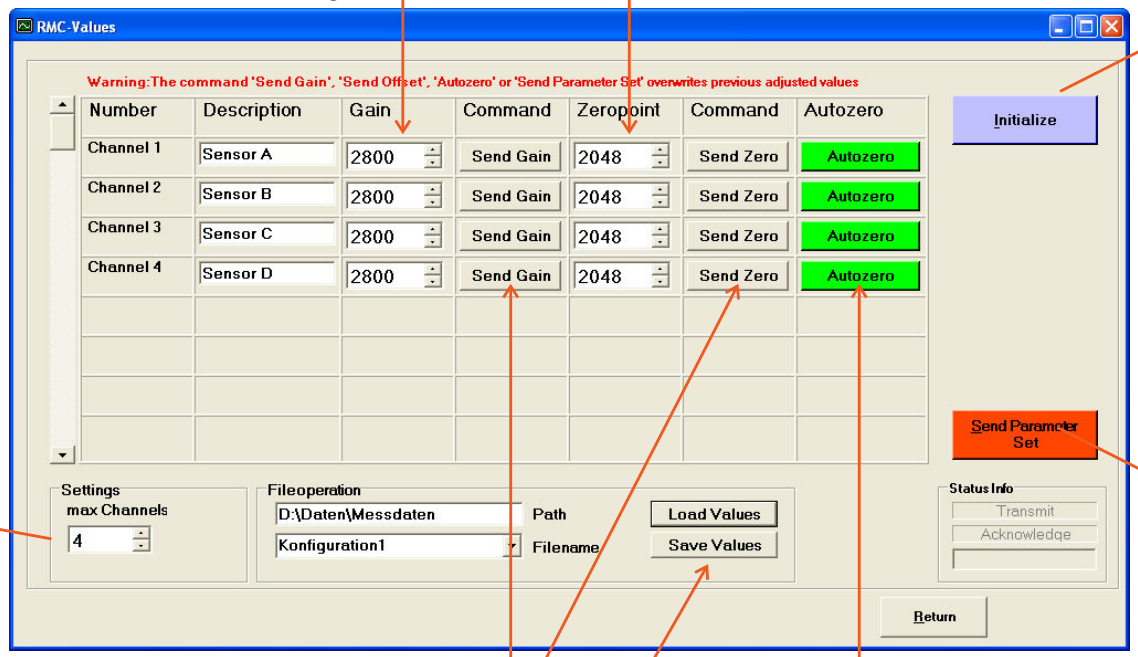


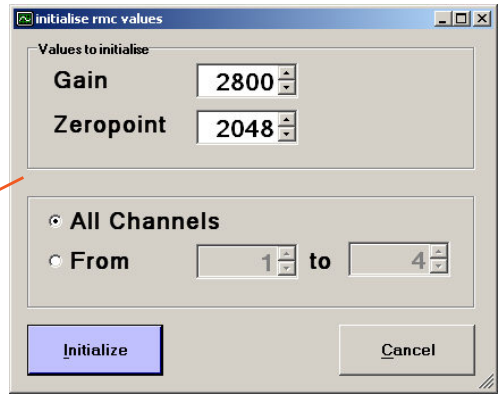
Using of Remote Control Function

(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.

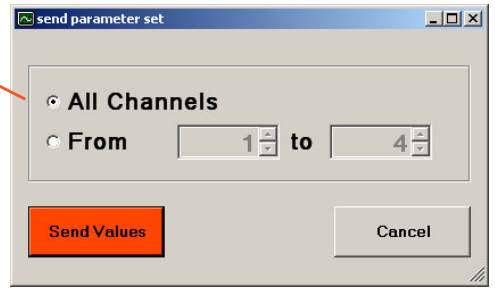
Digital value of the zero point
(0 to 4095) 2048 is about in the middle





Presetting of the memory

Setting of the RMC channel number of the telemetry system



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

automatic zero adjustment

Loading / storing of settings

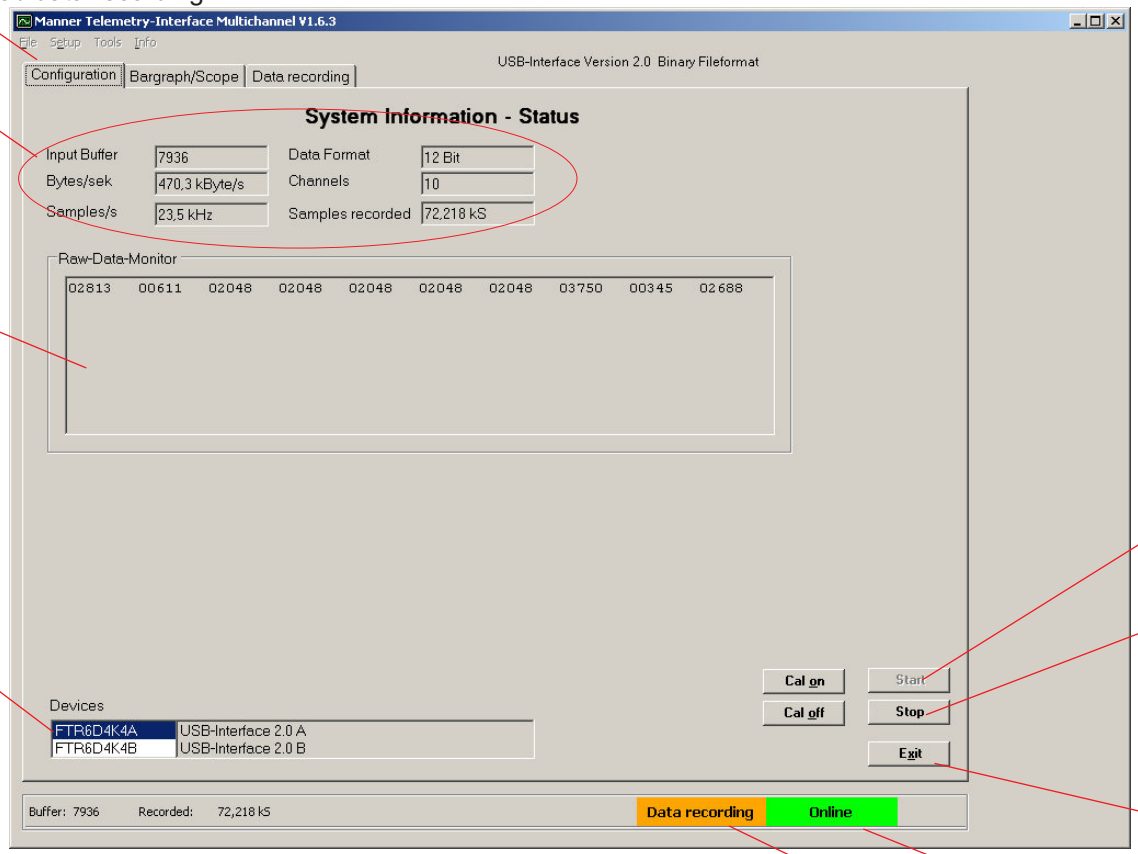
Interface - Software

(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)

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

No other program must be active at the PC while recording data into a file.
This can effect a loss of data.

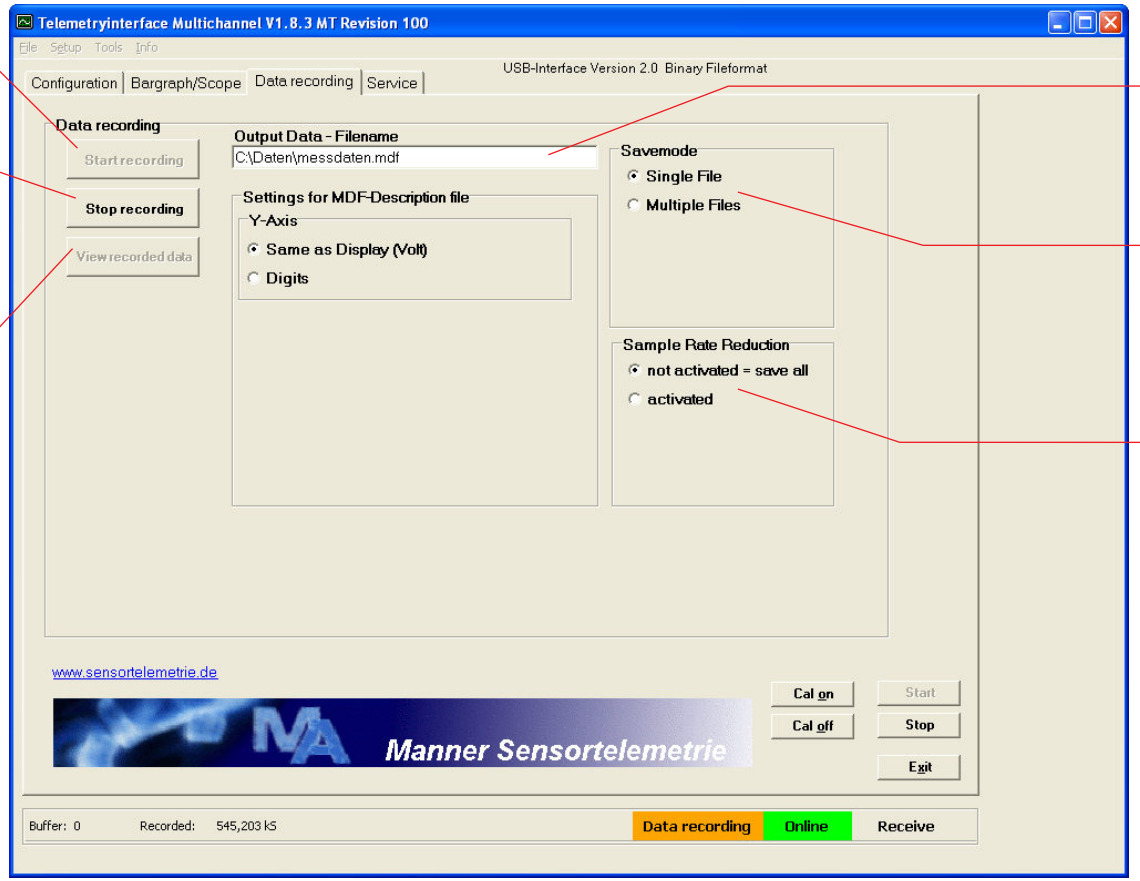
Control of Data acqisition

(Software package data acquisition - optional)

Start recording into a file

Stop recording into a file

Show data with additional data viewer PVIEW - if installed



File name

Recording of the measurement data in asingle file or in multiple files (to define in periods)

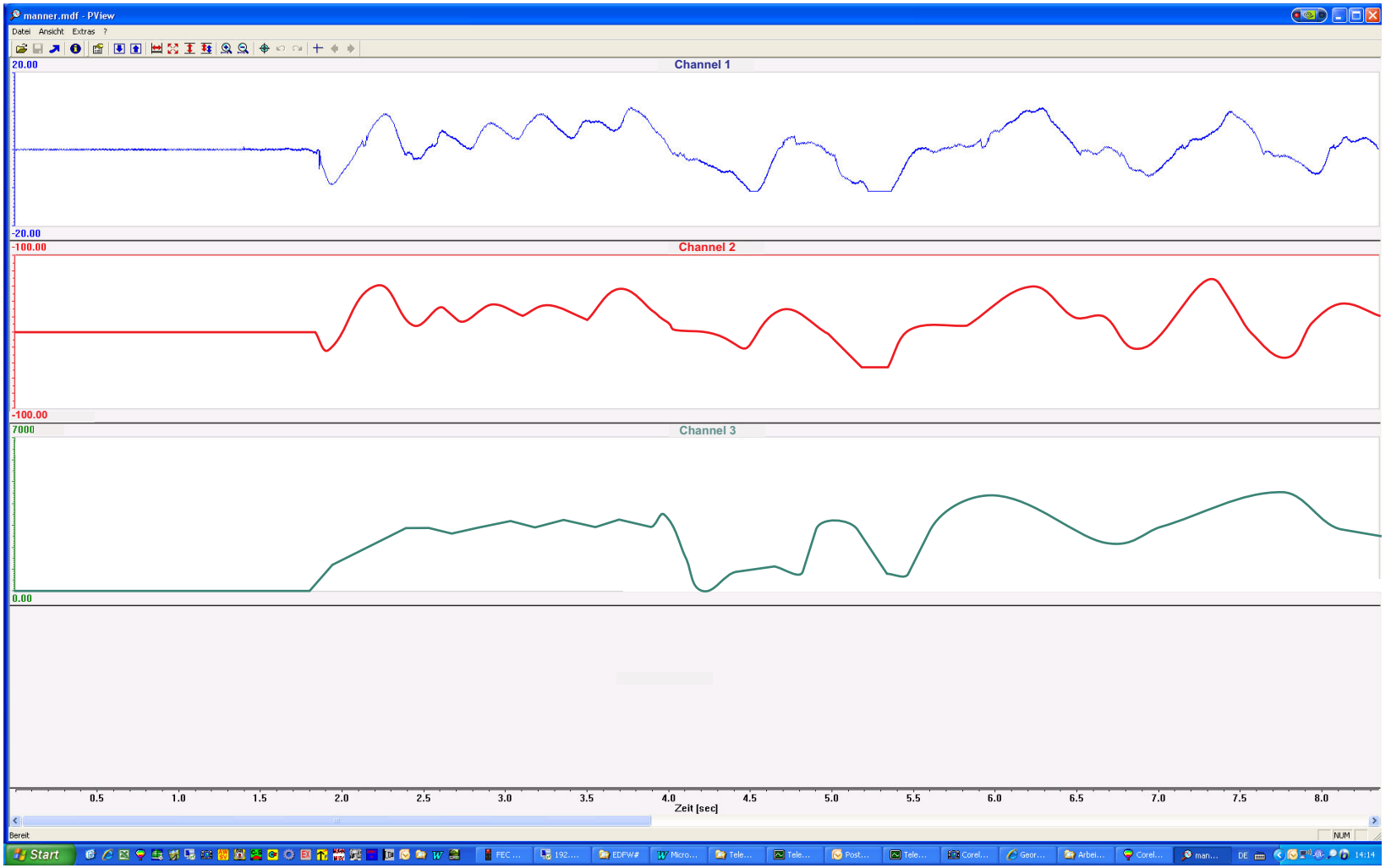
Reducing of the sampling rate

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 occures, 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):

Range	Analog value	Digital value (16 Bit-system)	Digital value (12 Bit-system)
-100%	-10V	3277	205
0%	0V	32768	2048
+100%	+10V	62259	3891

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: Uout [V]=(Digitvalue-32768) / 2949.1 (16Bit) or Uout [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.

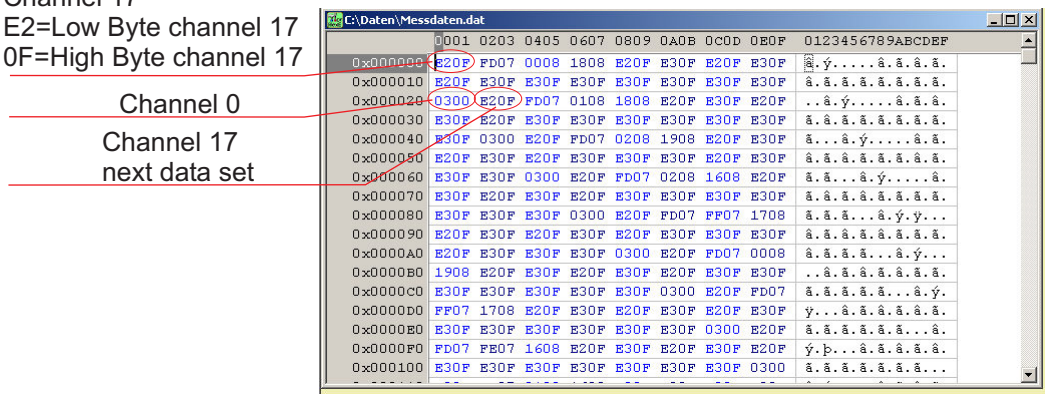
LB-K17, HB-K17, LB-K16, HB-K16, ... , LB-K1, HB-K1 (first data set)
LB-K17, HB-K17, LB-K16, HB-K16, ... , LB-K1, HB-K1 (next data set)
...
LB-K17, HB-K17, LB-K16, HB-K16, ... , LB-K1, HB-K1 (last data set)

Sample file shown with a Hex Viewer

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

Channel 0

Channel 17
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):

Range	Analog value	Digital value (16 Bit-system)	Digital value (12 Bit-system)
-100%	-10V	3277	205
0%	0V	32768	2048
+100%	+10V	62259	3891

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: Uout [V]=(Digitvalue-32768) / 2949.1 (16Bit) or Uout [V]=(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; 02624; 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; 02047; 02047; 02047
02050; 02047; 02047; 02047; 02050; 02049; 02048; 02050; 02046; 02050; 02047; 02561; 02050; 02050; 02047; 02047

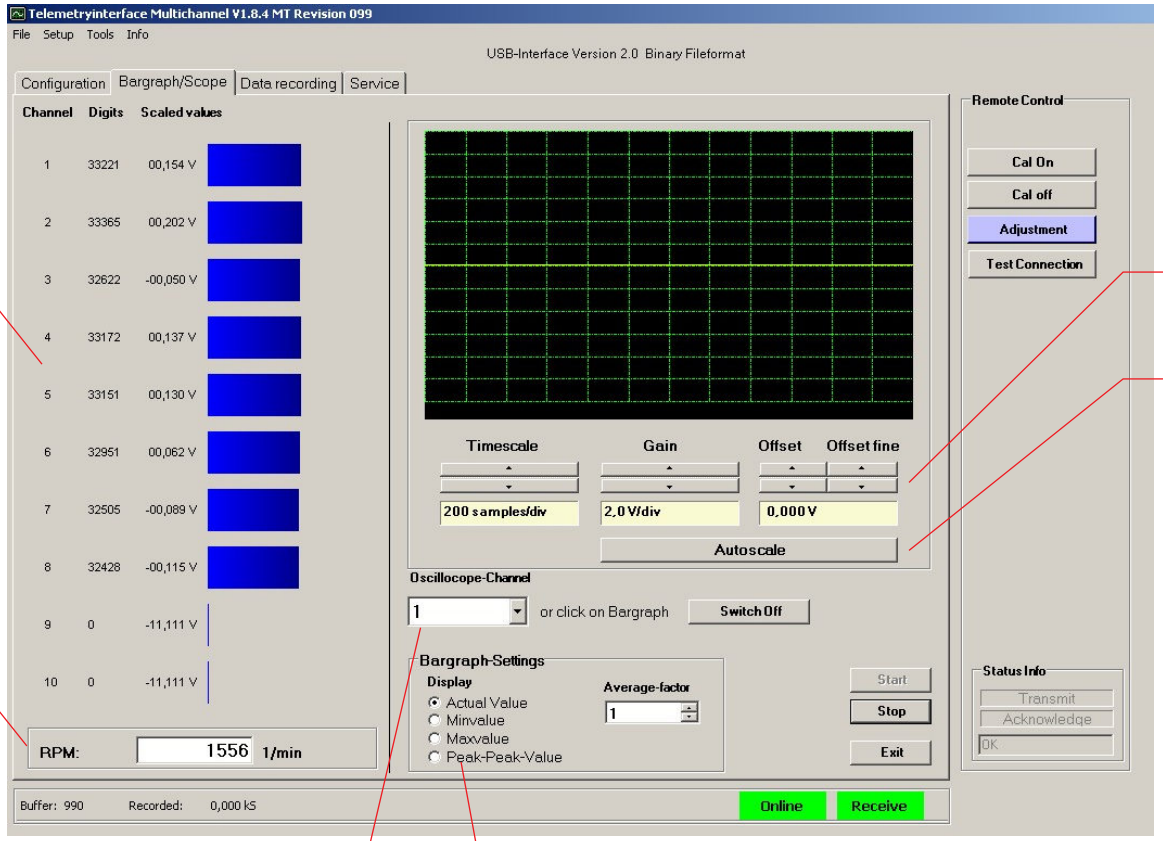
Signal Test Function via Scope Function

(Software package data acquisition 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

Display of RPM



Selection of time, gain and offset

Autoscale function for the settings of gain and offset

Selection of the channel shown at the oscilloscope

Analyse functions for the display

Channel Assignment

Series in the binary File	Assigned analog output Channel	Description
1	16	PT100
2	15	ICP
3	14	not used
4	13	not used
5	12	Strain gage channel 12
6	11	Strain gage channel 11
7	10	Strain gage channel 10
8	9	Strain gage channel 9
9	8	Strain gage channel 8
10	7	Strain gage channel 7
11	6	Strain gage channel 6
12	5	Strain gage channel 5
13	4	Strain gage channel 4
14	3	Strain gage channel 3
15	2	Strain gage channel 2
16	1	Strain gage channel 1
17	--	Rotation angle

Anpassen an Anlage !!!

Für USB

Data Interface

Realtime recorded Data File

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

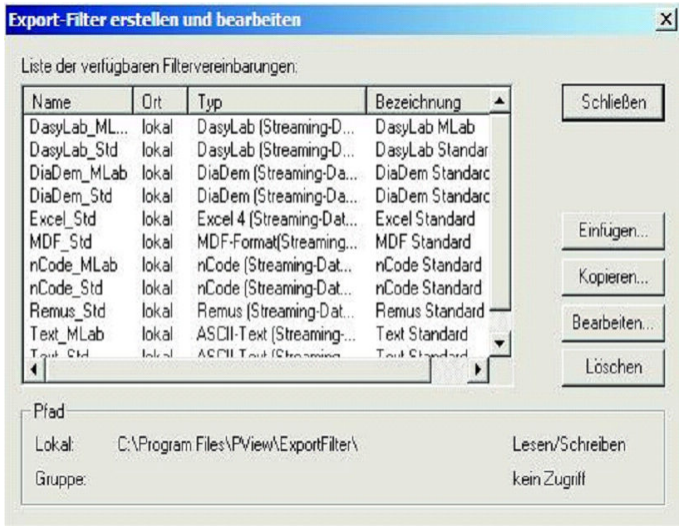
Definition:
LB = low byte,
HB =high byte
First the low byte and then the high byte of a channel is recorded
The range of a 12 and 16 bit system is from 0 to 65535
For 12 bit-systems, the lowest 4 bits are set to 0

Pview visualisation program (part of software package data acquisition)

User specific analysis program

Exel or other analysis programms

Exportfunctions

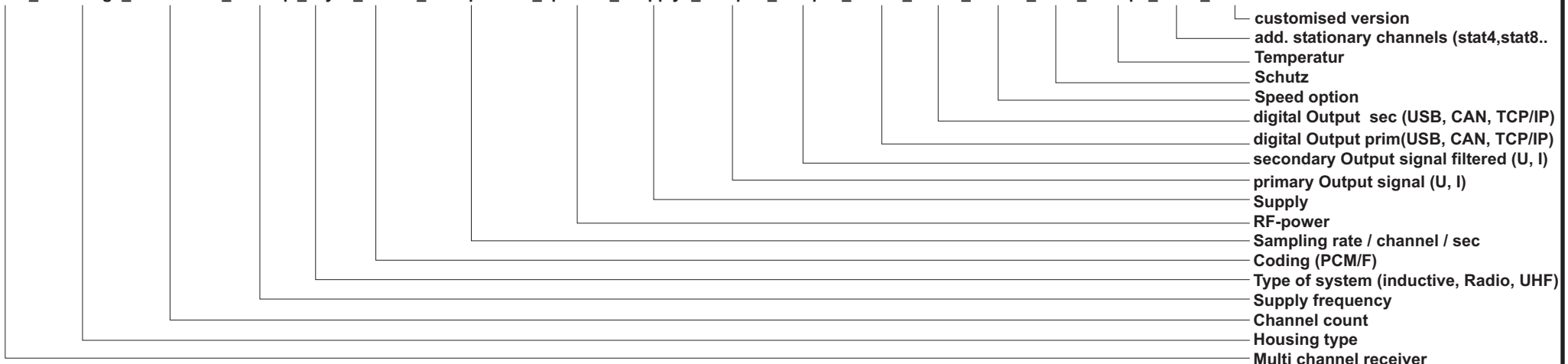


Not all items always used

Product Key Multi Channel Receiver

Type:

MAW_<housing>_<channels>_<VFreq>_<sys>_<mod>_<samplerate>_<power>_<supply>_<outpA>_<outpZ>_<DInt>_<ZInt>_<RPM>_<wa>_<Temp>_<sta>_<OEM>



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	13,56 Mhz
6,78MHZ	6,78 Mhz
3,38MHz	3,38 MHz

sys: (System type)

-	Inductive
Ind	Inductive
Ba4	Data rate = Supply frequency/4 max 3,34 Mbit/s at 13,56 Mhz supply
Ba8	Data rate = Supply frequency/8
InFu	enhanced data rate up 200 Mitbits/sec inductive supplied system
Fu	system radio transmission for data rates up 40 Mitbits/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
HCPCM12	Highspeed Mod. for sample rate up 200000 sample/s with additional sub system with a sample of 100 sample/s

samplerate: samples/sec/channel)

xxxx	xxxxx sample/sec/channel

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
I	0..20 mA

outputZ: (secondary output analogic)

U	+/-10 volts
I	0..20 mA

DInt: (primary digital interface)

USB	USB Interface
TCP/IP	general Ethernetinterface
TCP#TC/IENA	special 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-avaluation)

Dz#A#ZW#xxx#P##/S	Speed pulses
Dz#A#ZW#xxx#Z##/S	online Speed speed calculation
Dz#A#ZW#100#W##/S	online turn angle calculation

wa: (protection)

-	protection IP42
IP52	protection IP52
IP65	protection IP65 (water protected
230VAC	90..270 volt AC-system 50/60 Hz

Temp: (temperature range)

-	-10...+70 °C
-45+85	-45 +85°C
-	

sta: (optional additonal non rotating channels)

4	4 additional non rotating channels
8	8 additional non rotating channels
16	16 addtional non rotation channels

OEM: (special customised solution in connectors)

<Company>	special described features

MANNER® Sensortelemetrie

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>

- **Company**
- **Conditioning with range 4**
- **Conditioning with range 3**
- **Conditioning with range 2**
- **Conditioning with range 1**
- **Waterproof/oilproof**
- **Remote Control**
- **Samplerate/channel/sec/spot**
- **Type of signal transmission**
- **Type of system(Inductive, Radio, UHF**
- **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	Cartrige housing
AA	Cartrige housing with integr. axial antenna (end shaft)
Ra	Cartrige housing with integr. radial antenna
RD	Disk housing end shaft with radial antenna
Rad	Wheel transmitter with integr. bearing (end shaft)
RaHd	Shaft transmitter (divisable, radial coupling)
RaHa	Shaft transmitter (divisable, axial coupling)
RaHm	Cartrige 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/x	length, width, height, divisible

Speed: (max. Speed in RPM)

Sxxxxx	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°

MANNER® Sensortelemetrie

temp: (enviromental temperature range)

-10+85	enviromentral temperature range -10..+85°C
-25+125	enviromentral temperature range -25..+125°C
-25+160	enviromentral temperature range -25..+160°C
-10+180	enviromentral temperature range -10..+180°C
-50+85	enviromentral temperature range -50..+85°C
-40+160	enviromentral temperature range -40..+160°C

Vfreq: (Supply frequency)

-	13,56 Mhz
13,56MHz	13,56 Mhz
6,78MHZ	6,78 Mhz
3,38MHz	3,38 MHz

sys: (System type)

-	Inductive
Ind	Inductive
Ba4	Data rate = Supply frequency/4 max 3,34 Mbit/s at 13,56 Mhz supply
Ba8	Data rate = Supply frequency/8
InFu	enhanced data rate up 200 Mitbits/sec inductive supplied system
Fu	system radio transmission for data rates up 40 Mitbits/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
HCPCM12	Highspeed Mod. for sample rate up 200000 sample/s with additional sub system with a sample of 100 sample/s

samplerate: samples/sec/channel)

xxxx	xxxxx sample/sec/channel

R: (Option remote controlled gain and zero adjustment)

R	RMC

wa: (protection)

-	protection	IP42
IP52	protection	IP52
IP65	protection	IP65 (water protected)
oil	protection	against AFT-oils and Skydrol)

condw: Input conditioning Type w

yyE#xxxmV/V# #F#Gl	yy channels for strain gauge input (full brigde), range xxx mV/V, fixed configured, Glenair connector
yyIC#xxxg# #A#Gl	yy channels for ICP input, range xxx g, fixed configured ,Glenair connector
1DzAbs#TTL #F#Gl_#	1 channels turn angle aquisition on rotor side and calculation of dyn. turn angle Glenair connector

yyE#xxxmV/V# #F#Gl
- Connector type Gl = Glenair, Mi = Mil-Con.
- type of cond. F = fixed, A= changeable range
- type of input E = SG, IC =ICP-Sensor, TC = thermocouple, PT = TP100, Sp = voltage, DzAbs = shaftencoder
- number of inputs

OEM: (special customised solution in connectors)

<Company>	special described features