

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

VIBRO-METER

IPC704P-CP237 244-704-000-042 IPC704 244-704-000-042

FOUR-CHANNEL SIGNAL CONDITIONING CARD

Applicable product family: Vibro-Meter IPC704 machinery monitoring

OFFICIAL SOURCE

IPC704P-CP237 244-704-000-042.pdf

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IPC 704

Signal Conditioner Type IPC 704

FEATURES

- For CA... type piezoelectric accelerometers and CP... type dynamic pressure transducers
- Configurable high-pass and low-pass filters
- Frequency range : 0.5 Hz to 20 kHz
- Optional integrator
- Optional 2-wire current or 3-wire voltage transmission
- Available in standard and Exi versions



DESCRIPTION

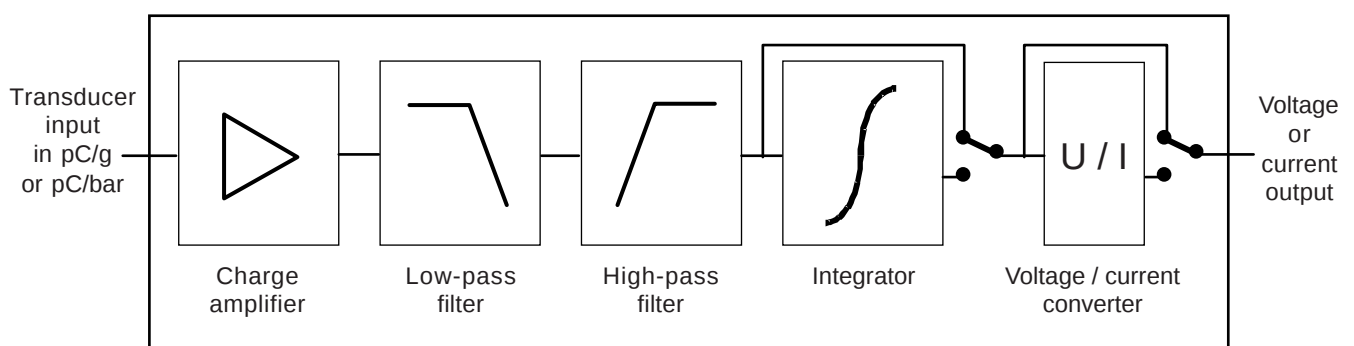
The IPC 704 signal conditioner converts the charge-based signal coming from a piezoelectric transducer into a current or a voltage signal. This current or voltage signal is transmitted to the processing electronics via any standard 2-wire or 3-wire transmission cable. This method is advantageous as it avoids having to use expensive low-noise cables that are necessary to transmit charge signals.

The current modulation technique allows a transmission distance of over 1000 m. A GSI galvanic separation unit is required for this configuration.

The IPC 704 electronic circuitry is fully floating and incorporated into a moulded aluminium enclosure. The conditioner has configurable high-pass and low-pass filters and an optional integrator. In addition, RFI filters protect the input and output against radio-frequency interference and other electromagnetic influences.

The IPC 704 signal conditioner is normally mounted in an ABA... type industrial polyester enclosure for environmental protection against dust, oil and water jets.

Block Diagram :



INPUT CHARACTERISTICS

Matching transducer	: Any piezoelectric transducer, symmetrical or non-symmetrical, case grounded or insulated
Dynamic range	: 100'000 pC peak
Input sensitivity	: Accelerometer : 10 to 200 pC/g Dynamic pressure transducer : 10 to 2000 pC/bar
Charge amplifier	: Symmetrical
RFI filter	: Symmetrical LC network
Resistance	: ≥ 50 kOhm (transducer and cable)
Capacitance	: ≤ 10 nF (transducer and cable)

TRANSFER CHARACTERISTICS

Transfer without integrator	: 0.1 to 10 mV/pC or 0.1 to 10 μ A/pC
Transfer with integrator	: 981 to 98100 mV/(pC.s) or 981 to 98100 μ A/(pC.s)
High-pass filter	
- Cut-off frequencies	: 0.5, 1, 2, 5 and 10 Hz, -3 dB
- Slope	: 24 dB/octave (4th order)
Low-pass filter	
- Cut-off frequencies:	200, 500, 1000, 2000, 5000, 10000, 20000 Hz, -1 dB
- Slope	: 12 dB/octave (2nd order)
Linearity error	: $\leq 0.2\%$
Temperature stability	: 100 ppm/°C typical

OUTPUT CHARACTERISTICS

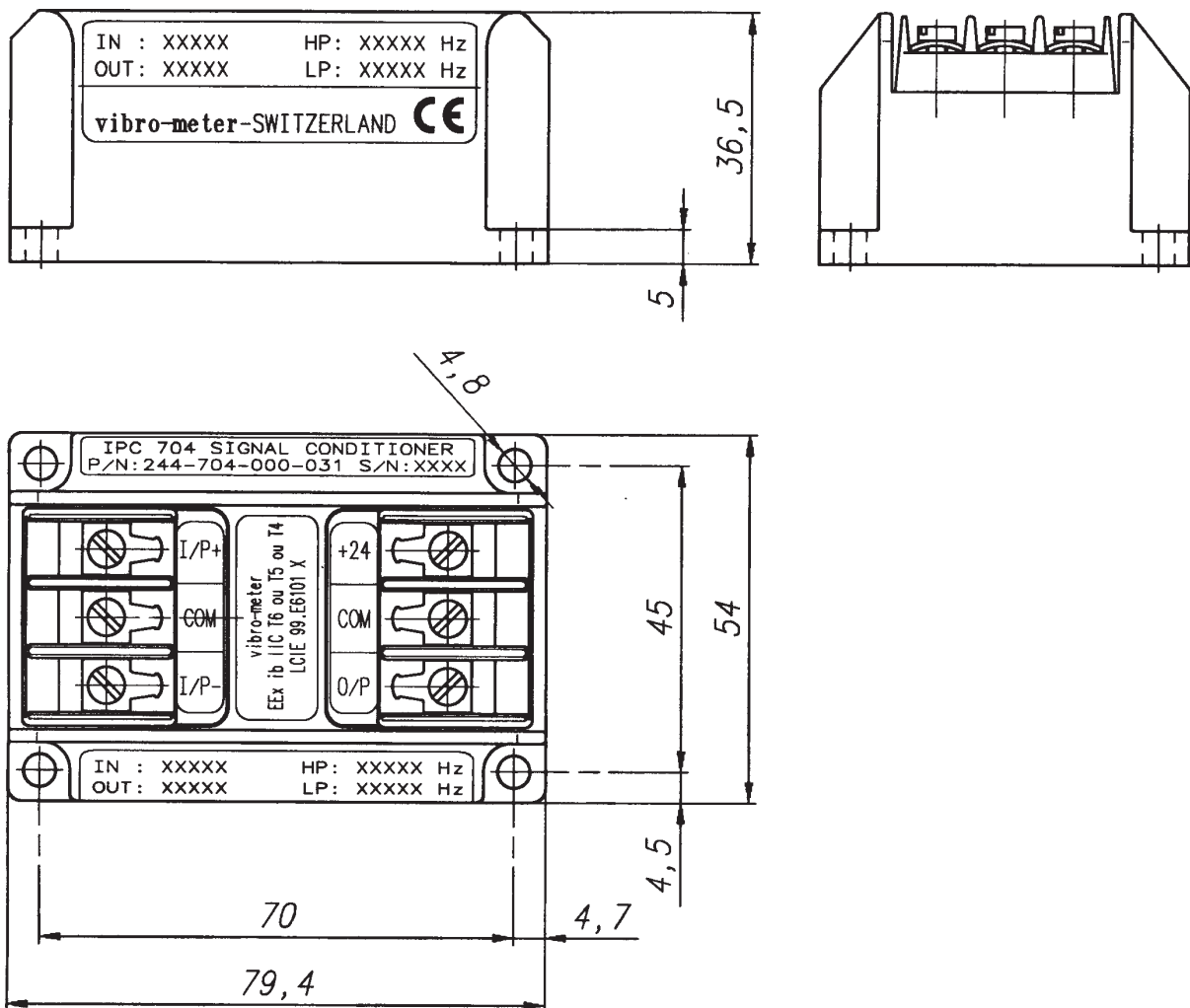
RFI filter	: Symmetrical LC network
2-wire current transmission	
- Dynamic range	: Max. ± 5 mA peak
- Standing current	: 12 mA ± 0.5 mA
- Electrical connection	: +24V = "+", COM = "-"
3-wire voltage transmission	
- Dynamic signal	: Max. ± 5 V peak
- Standing voltage	: 7.5 V ± 0.2 V
- Output sensitivity	: See ordering information

SUPPLY

Voltage	: 18 to 30 VDC
Current	: Max. 25 mA

PHYSICAL CHARACTERISTICS

Enclosure	: Injection moulded aluminium, anodized
Mounting	: 2 or 4 x M4 screws
Weight	: Standard version : 170 g Exi version : 250 g (the conditioner is moulded into silicon)
Dimensions	: 79.4 x 54 x 36.5 mm
Electrical connections	
- Input	: 3 screw terminals - wire section max. 2.5 mm ²
- Output	: 3 screw terminals - wire section max. 2.5 mm ²



ENVIRONMENTAL (According to IEC 68.2 recommendations)

Temperature	
- Operation	: -30°C to +80°C
- Storage	: -40°C to +85°C
Humidity	: Max. 95% non-condensing
Protection class	: IP 40 according to IEC classification
Vibration	: 2 g peak between 10 and 500 Hz
Shock	: 15 g peak, 11 ms, half-sine pulse

ORDERING INFORMATION

IPC 704

To order please specify :

- Type and designation : IPC 704 Signal Conditioner
- Ordering number : **244-704-000-02** for standard version
244-704-000-03 for Exi version
- Parameters : IN, OUT, HP, LP

IN : Input sensitivity (1)	OUT : Output sensitivity (1, 4)		Max. dynamic range (2)
	2-wire current output	3-wire voltage output	
10 pC/g	100 μ A/g	100 mV/g	50 g, acceleration
	50 μ A/g	50 mV/g	100 g, acceleration
	20 μ A/g	20 mV/g	250 g, acceleration
	100 μ A/mm/s	100 mV/mm/s	50 mm/s, velocity
	50 μ A/mm/s	50 mV/mm/s	100 mm/s, velocity
	20 μ A/mm/s	20 mV/mm/s	200 mm/s, velocity
20 pC/g	100 μ A/g	100 mV/g	50 g, acceleration
	50 μ A/g	50 mV/g	100 g, acceleration
	20 μ A/g	20 mV/g	250 g, acceleration
	100 μ A/mm/s	100 mV/mm/s	50 mm/s, velocity
	50 μ A/mm/s	50 mV/mm/s	100 mm/s, velocity
	20 μ A/mm/s	20 mV/mm/s	200 mm/s, velocity
50 pC/g	100 μ A/g	100 mV/g	50 g, acceleration
	50 μ A/g	50 mV/g	100 g, acceleration
	20 μ A/g	20 mV/g	250 g, acceleration
	100 μ A/mm/s	100 mV/mm/s	50 mm/s, velocity
	50 μ A/mm/s	50 mV/mm/s	100 mm/s, velocity
	20 μ A/mm/s	20 mV/mm/s	200 mm/s, velocity
100 pC/g	100 μ A/g	100 mV/g	50 g, acceleration
	50 μ A/g	50 mV/g	100 g, acceleration
	20 μ A/g	20 mV/g	250 g, acceleration
	100 μ A/mm/s	100 mV/mm/s	50 mm/s, velocity
	50 μ A/mm/s	50 mV/mm/s	100 mm/s, velocity
	20 μ A/mm/s	20 mV/mm/s	200 mm/s, velocity
200 pC/g	100 μ A/g	100 mV/g	50 g, acceleration
	50 μ A/g	50 mV/g	100 g, acceleration
	20 μ A/g	20 mV/g	250 g, acceleration
	100 μ A/mm/s	100 mV/mm/s	50 mm/s, velocity
	50 μ A/mm/s	50 mV/mm/s	100 mm/s, velocity
	20 μ A/mm/s	20 mV/mm/s	200 mm/s, velocity

HP: High-pass filter	LP: Low-pass filter
0.5 Hz	200 Hz
1 Hz	500 Hz
2 Hz	1000 Hz
5 Hz	2000 Hz
10 Hz	5000 Hz
	10000 Hz
	20000 Hz

Notes:

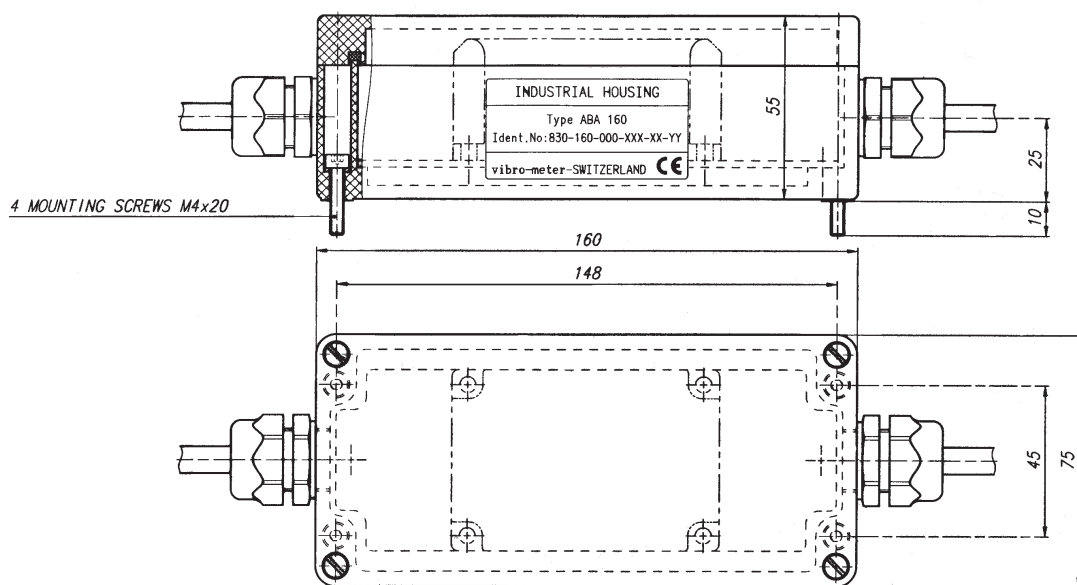
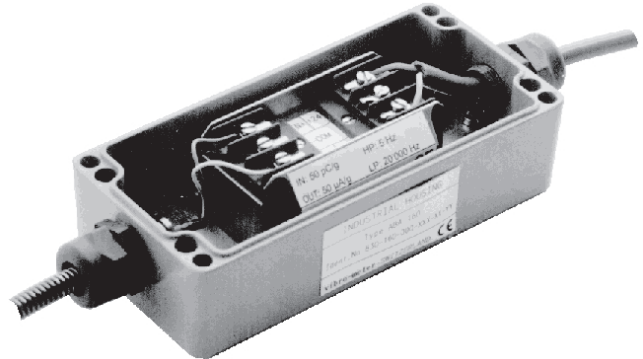
- 1) **Parameters IN and OUT** : Input and output sensitivities can be freely defined for any type of piezoelectric transducer. Example for dynamic pressure transducers :

IN : Input sensitivity (1)	OUT : Output sensitivity (1, 4)		Max. dynamic range (2)
	2-wire current output	3-wire voltage output	
CP 103: 232 pC/bar	250 μ A/bar	Not recommended	20 bar
CP 106: 16 pC/psi	125 μ A/psi		40 psi
CP 104: 190 pC/bar	1900 μ A/bar		2.6 bar
CP 211: 25 pC/bar	20 μ A/bar		250 bar

- 2) The maximum dynamic range is defined as follows : Max. dynamic range = 5 Vp / output sensitivity
- 3) **Parameters HP and LP**: The high-pass and low-pass filter cut-off frequencies cannot be freely defined. The lowest HP filter cut-off frequency is limited due to HP pole of the charge amplifier: 2.5 Hz with 10 pC/g, 1.6 Hz with 20 pC/g, 0.8 Hz with 50 pC/g input sensitivity.
- 4) **Caution**: The 3-wire voltage output without galvanic separation unit should only be used with piezoelectric transducers which are insensitive to frame voltage: CA 134 M2, CA136 M2 and CA 188. Dynamic pressure transducers should always be used with GSI galvanic separation units.

ABA 160 Industrial Housing for one IPC 704

This industrial housing is used for the mechanical and environmental protection of one IPC 704 signal conditioner. It is supplied with an aluminium base plate and two stuffing glands for input and output cables. This enclosure also insulates the IPC 704 electronic circuitry, thereby preventing earth loops.



Material	: Polyester reinforced with fibre-glass	Protection class	: IP 65, according to IEC classification
Sealing	: Silicone gasket	Temperature range:	: -40 to +100°C
Finish	: Black colour, surface resistance < 10 ⁹ Ω	Chemical	: Good resistance to sea water, acids, alkaline solutions, solvents, gasoline and oils
Exi certificate	: PTB Ex-81/3102	Flammability	: Self-extinguishing, halogen free
Mounting	: M4 x 20 Allen head screws	Stuffing glands	: Reinforced polyamid or nickel-plated brass
Dimensions	: 160 x 75 x 55 mm	Seals	: Perbunan N
Weight	: 440 g		

Ordering Information :

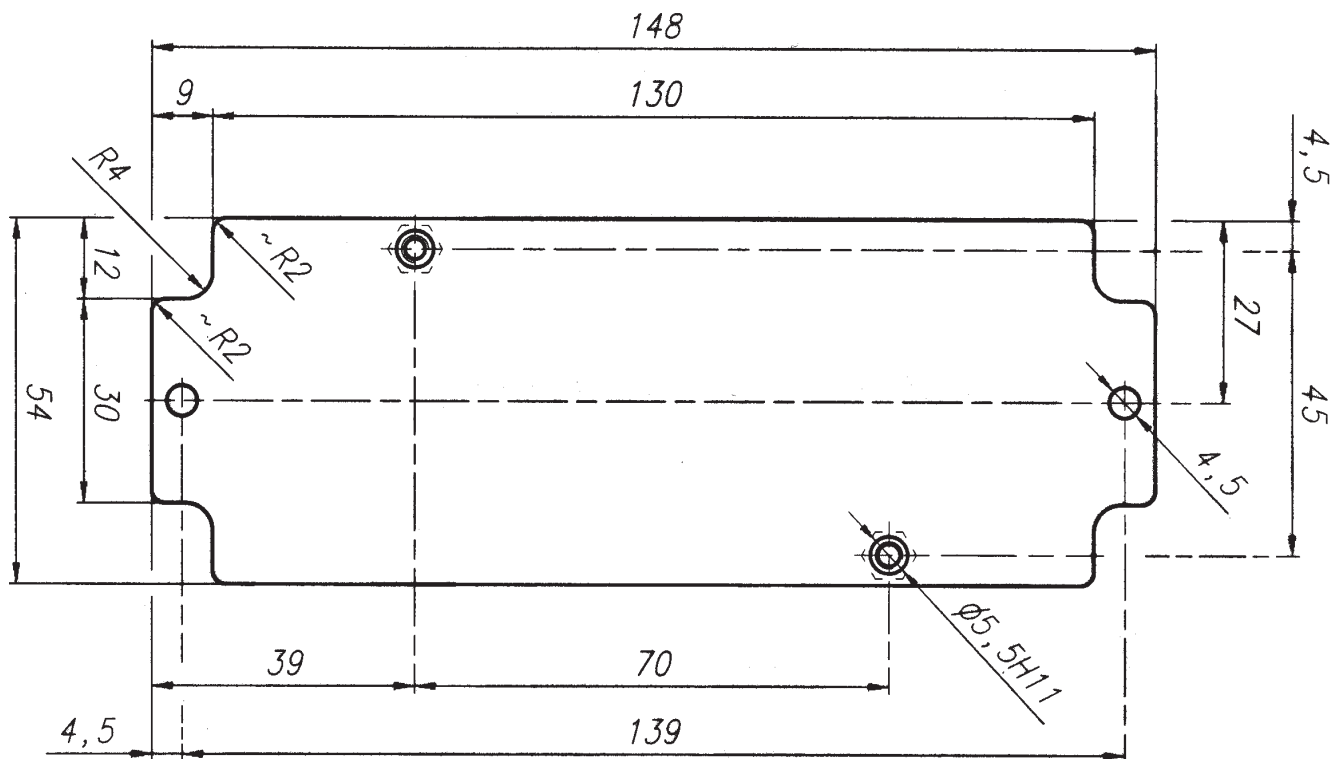
To order please specify :

- Type and designation : ABA 160 Industrial Housing
- Ordering number : 830-160-000-011 / X1 / X2

X1	Input stuffing gland	X2	Output stuffing gland
1	PG-11, for cable Ø 5-12 mm	1	PG-11, for cable Ø 5-12 mm
2	PG-7, for cable Ø 4-7 mm	2	PG-7, for cable Ø 4-7 mm
3	PG-7 combi, for cable Ø 1.5-3.2 mm and protection tube Ø 4-5 mm	3	PG-11 combi, for cable Ø 5-12 mm and protection tube Ø 12.6-15.6 mm
		4	PG-9 plug, for cable Ø 8.5 mm max. and KS 106 protection tube

Base Plate for IPC 704

This aluminium base plate can be used when an old IPC 620 unit is replaced by an IPC 704 signal conditioner. The housing of the IPC 620 can be recuperated and the IPC 704 mounted in it.



Ordering Information :

To order please specify :

- Type and designation : Base Plate for IPC 704
- Ordering number : 244-620-002S034



Due to the continual development of products, Vibro-Meter reserves the right to modify these specifications without forewarning.



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