

## Signal conditioner

### FEATURES

- For CA piezoelectric accelerometers and CP dynamic pressure transducers
- Configurable high-pass and low-pass filters
- Frequency range: 0.5 Hz to 20 kHz
- Optional integrator to give a velocity output
- Optional 2-wire current or 3-wire voltage transmission
- Certified for use in potentially explosive atmospheres
- A range of installation options are available



### DESCRIPTION

The IPC 704 signal conditioner converts the charge-based signal from a piezoelectric transducer into a current or a voltage signal. This current or voltage signal is transmitted to the processing electronics via a standard 2-wire or 3-wire transmission cable.

The current modulation technique allows transmission over a distance of up to 1 km. A GSI galvanic separation unit is required for this configuration.

The electronic circuitry of the IPC 704 signal conditioner is incorporated into a moulded aluminium enclosure. The signal conditioner has configurable high-pass and low-pass filters and an optional inte-

grator to give a velocity output. Furthermore, RFI filters protect the input and output against radio-frequency interference and other electromagnetic influences.

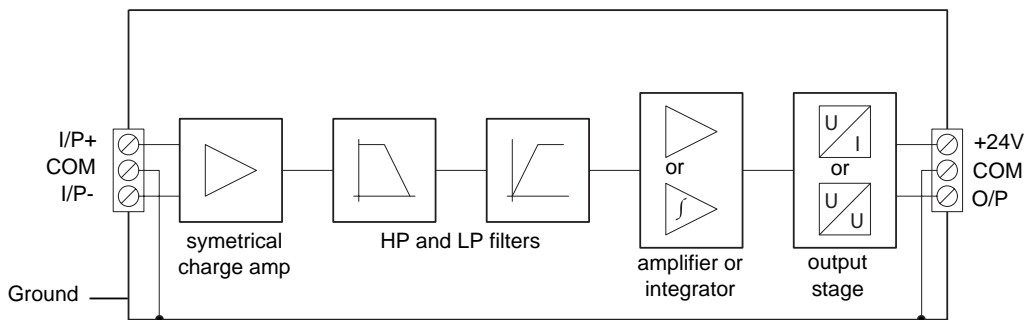
A range of installation options are available for the IPC 704 signal conditioner, including:

- A polyester enclosure providing environmental protection against dust, oil and water jets
- A mounting adaptor allowing the IPC 704 signal conditioner to be mounted on a DIN rail



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## BLOCK DIAGRAM



## SPECIFICATIONS

### ENVIRONMENTAL CHARACTERISTICS

(Specifications according to IEC 68.2 recommendations)

#### General

Temperature

- *Operation* : -30°C to +85°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

#### **Signal conditioner with industrial housing (ordering option G1)**

Protection class : IP 66 according to EN 60529

Impact resistance : > 4 mJ/mm<sup>2</sup> (DIN 53453)

Chemical resistance : Good resistance to seawater, acids, alkaline solutions, gasoline and oils

Flammability : UL94V-0 self-extinguishing

#### Explosive atmospheres

##### **Without industrial housing (ordering options A2 and G0/G2)**

- *EC type examination certificate* : LCIE 02 ATEX 6085 X II 2 G (Zones 1, 2) Ex ib IIC T6 to T4
- *cCSAus certificate* : cCSAus 1243981 Class I, Div 1, Groups A, B, C, D Ex ia (T6 to T4)
- *IECEX certification of conformity* : IECEX LCI 06.0009X Ex ib IIC T6 to T4
- *NEPSI certification of conformity* : GYJ071077X Ex ib IIC T6 to T4

##### **With industrial housing and stuffing glands (ordering option A2 and G1)**

#### Industrial housing

Available in Ex-approved version for use in hazardous locations

- *Environment* : II 2 G (Zones 1, 2) Ex e II
- *Surface resistivity for Ex version* : < 10<sup>9</sup> Ω (DIN 53482)

#### Stuffing glands

Available in Ex-approved version for use in hazardous locations

- *Environment* : II 2 G/D (Zones 1, 2) Ex e II

 For specific parameters of the mode of protection concerned and special conditions for safe use, please refer to the "EC type examination certificate" that is available from Vibro-Meter SA on demand.

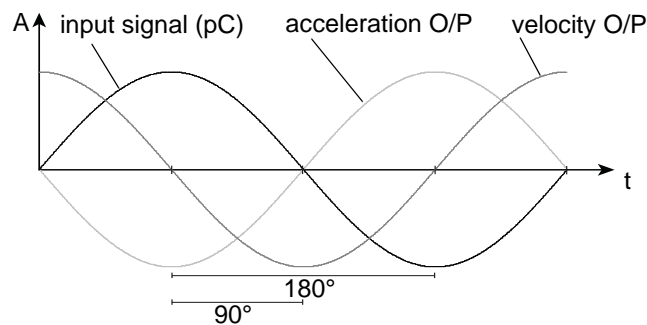
## SPECIFICATIONS (Continued)

### SUPPLY

Voltage	: 18 to 30 V <sub>DC</sub>
Current	: Max. 25 mA

### TRANSFER CHARACTERISTICS (ORDERING OPTION B)

Transfer without integrator	: 0.1 to 10 mV/pC or 0.1 to 10 $\mu$ A/pC
Transfer with integrator	: 981 to 98 100 mV/(pC.s) or 981 to 98 100 $\mu$ A/(pC.s)
Linearity error	: $\leq 0.2\%$
Temperature stability	: 100 ppm/ $^{\circ}$ C typical
Phase	: 180 $^{\circ}$ between input signal and acceleration output 90 $^{\circ}$ between acceleration and velocity outputs (see graph below)



### INPUT CHARACTERISTICS (ORDERING OPTION C)

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	: $\geq 50$ k $\Omega$ (transducer and cable)
Capacitance	: $\leq 10$ nF (transducer and cable)

### OUTPUT CHARACTERISTICS (ORDERING OPTION D)

RFI filter	: Symmetrical LC network
2-wire current transmission	
• Dynamic signal	: Max. $\pm 5$ mA peak
• Standing current	: 12 mA $\pm$ 0.5 mA
• Electrical connection	: +24 V = "+", COM = "-"
• Output sensitivity	: See ordering information
• Max. dynamic range	: 5 mA peak / output sensitivity
3-wire voltage transmission	
• Dynamic signal	: Max. $\pm 5$ V peak
• Standing voltage	: 7.5 V $\pm$ 0.2 V
• Output sensitivity	: See ordering information
• Output impedance	: 750 $\Omega$ (3-wire configuration)
• Max. dynamic range	: 5 V peak / output sensitivity



The 3-wire voltage output without galvanic separation unit should only be used with piezoelectric transducers which are insensitive to frame voltage. Dynamic pressure transducers should always be used with a GSI galvanic separation unit.

**SPECIFICATIONS** (Continued)

**FILTER CHARACTERISTICS (ORDERING OPTIONS E AND F)**

**High-pass filter**

- Cut-off frequencies (at -3 dB) : 0.5, 1, 2, 5 and 10 Hz
- Slope : 24 dB/octave (4th order)

 When selecting a high-pass filter, be careful to select an appropriate cut-off frequency of the charge amplifier (see graphs below).

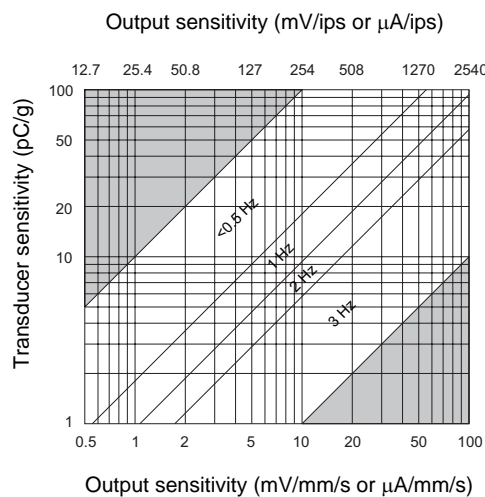
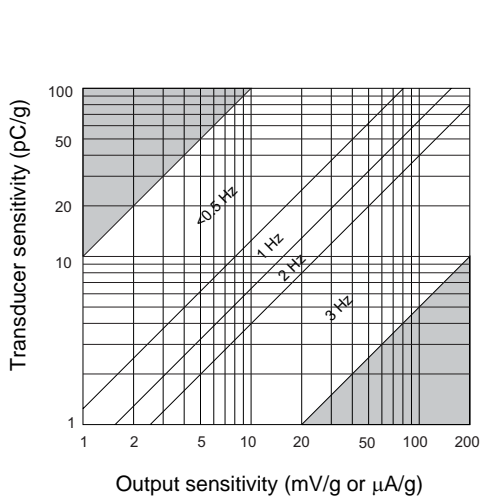
**Low-pass filter**

- Cut-off frequencies (at -1 dB) : 200, 500, 1000, 2000, 5000, 10 000, 20 000 Hz
- Slope : 12 dB/octave (2nd order)

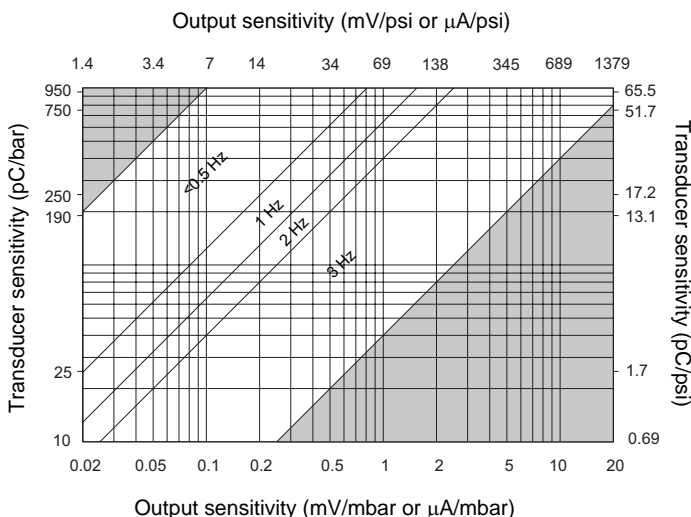
**Charge amplifier cut-off frequencies versus transfer unit**

a) Accelerometer (acceleration output)  
(Ordering options B01 and B02)

b) Accelerometer (velocity output)  
(Ordering options B03, B04, B05 and B06)



c) Pressure sensor  
(Ordering options B07, B08, B09 and B10)



## SPECIFICATIONS (Continued)

### PHYSICAL CHARACTERISTICS

#### Signal conditioner without industrial housing (ordering option G0)

- *Enclosure* : Injection moulded aluminium, anodized
- *Mounting* : 2 or 4 x M4 screws
- *Weight* : Standard version: 170 g  
Exi version: 250 g (the signal conditioner is moulded into silicon)
- *Dimensions* : Refer to mechanical diagram
- *Electrical connection (input)* : 3 screw terminals - wire section max. 2.5 mm<sup>2</sup>
- *Electrical connection (output)* : 3 screw terminals - wire section max. 2.5 mm<sup>2</sup>

#### Signal conditioner with industrial housing (ordering option G1)

##### Enclosure

- *Material* : Polyester reinforced with glass fibre
- *Cover seal* : Silicone gasket
- *Mounting* : M6 x 30 mm Allan screws
- *Dimensions* : Refer to mechanical diagram

#### Input/output stuffing glands (ordering options H and I)

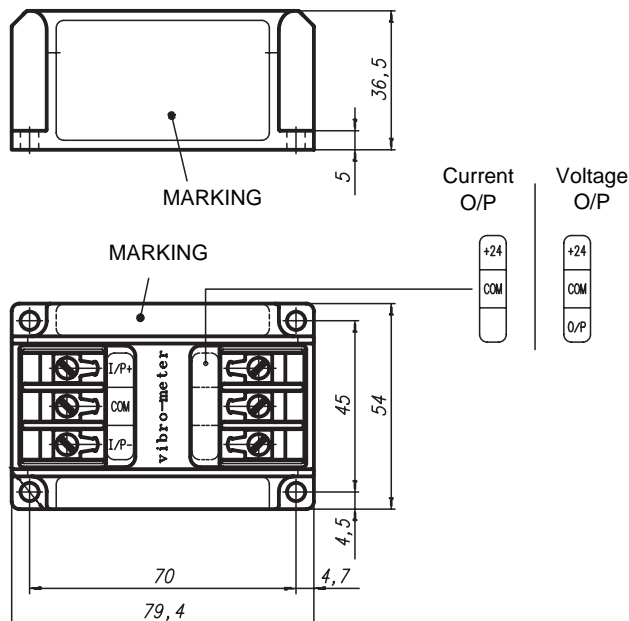
- *Type* : See ordering information
- *Material* : Nickel-plated brass with viton seal

#### Signal conditioner with mounting adaptor (ordering option G2)

- Universal DIN rail holder type : TSH35
- DIN rail type : EN50022-35 x 7.5 or EN50022-35 x 15

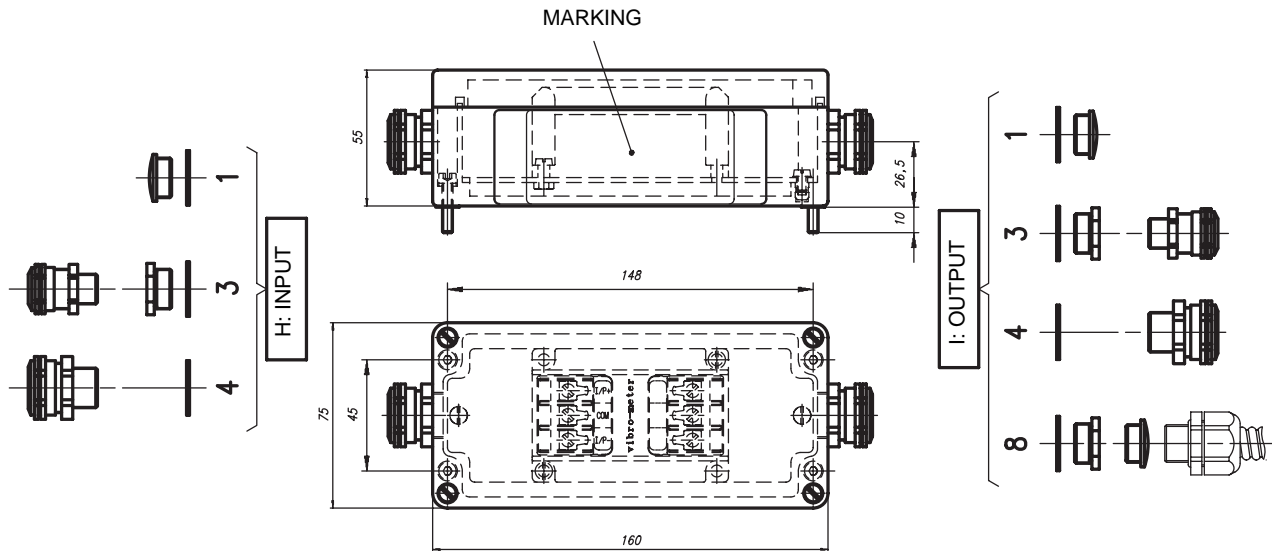
### MECHANICAL DIAGRAMS

#### Signal conditioner without industrial housing (ordering option G0)

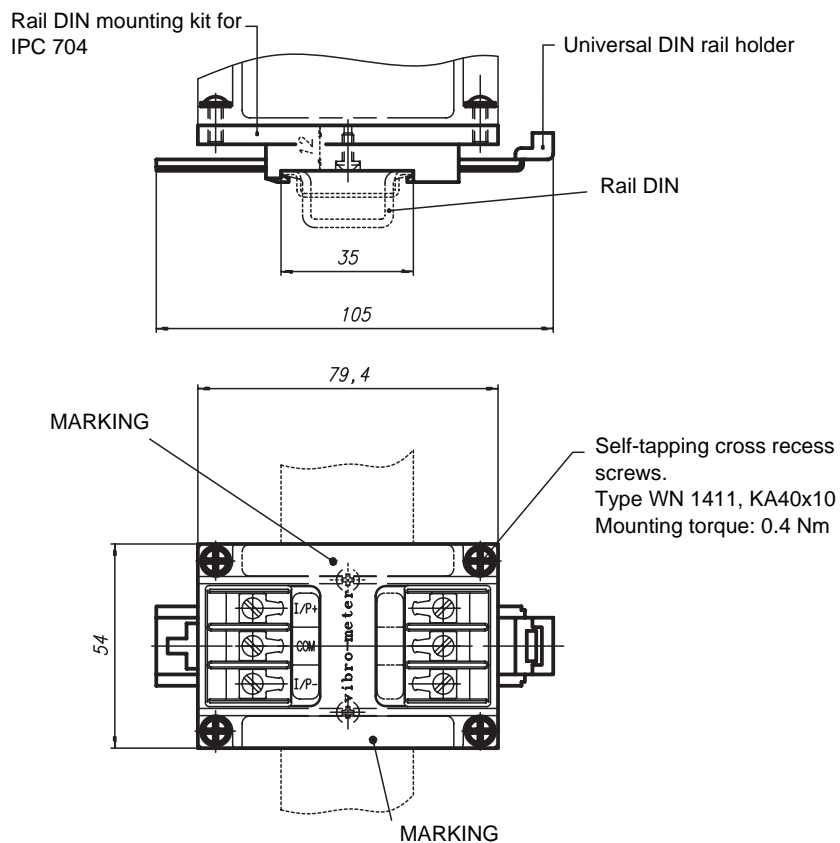


MECHANICAL DIAGRAMS (Continued)

Signal conditioner with industrial housing (ordering option G1)



Signal conditioner with mounting adaptor (ordering option G2)



## ORDERING INFORMATION

### IPC 704 signal conditioner

Ordering number :

244 - 704 - 000 - 042



ENVIRONMENT (A)	
Standard	1
Explosive	2

TRANSFER UNIT (B)		
INPUT	OUTPUT	
pC/g	μA/g	01
pC/g	mV/g	02
pC/g	μA/mm/s	03
pC/g	mV/mm/s	04
pC/g	μA/in/s	05
pC/g	mV/in/s	06
pC/bar	μA/mbar	07
pC/bar	mV/mbar	08
pC/psi	μA/psi	09
pC/psi	mV/psi	10

INPUT SENSITIVITY (C)
Sensor sensitivity

OUTPUT SENSITIVITY (D)
Value per mechanical unit

High-pass filter
0.5 Hz
1 Hz
2 Hz
5 Hz
10 Hz

HP FILTER (E)
Value in Hz

Low-pass filter
200 Hz
500 Hz
1000 Hz
2000 Hz
5000 Hz
10 000 Hz
20 000 Hz

LP FILTER (F)
Value in Hz

INSTALLATION (G)	
Signal conditioner only	0
Signal conditioner with industrial housing	1
Signal conditioner mounted on mounting adaptor	2

INPUT CABLE FITTING (H)	
(1) NO HOLE	0
M16 x 1.5 with plug	1
Cable gland M12 x 1.5 for cable Ø4 - Ø8 mm	3
Cable gland M16 x 1.5 for cable Ø6 - Ø11 mm	4

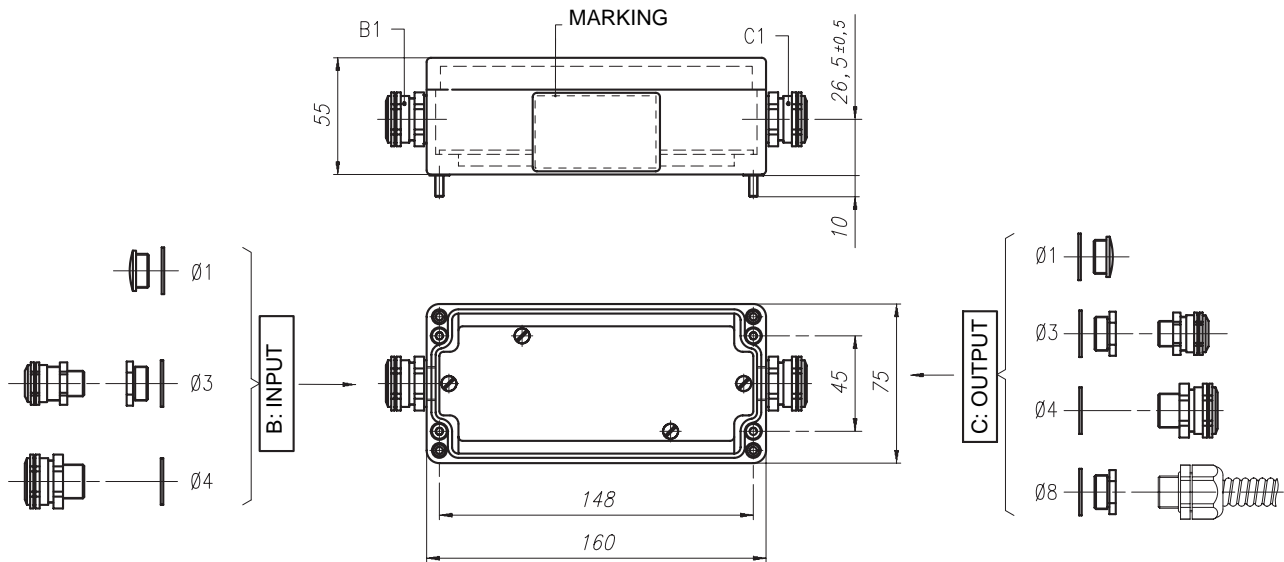
OUTPUT CABLE FITTING (I)	
(1) NO HOLE	0
M16 x 1.5 with plug	1
Cable gland M12 x 1.5 for cable Ø4 - Ø8 mm	3
Cable gland M16 x 1.5 for cable Ø6 - Ø11 mm	4
Adapter M16 x 1.5/PG9 with plug to be used for KS 106 (flexible protection tube)	8

**(1): With option H0, only option I0 is available. For special options (ie. H1/3/4 and I0 or I1/3/4/8 and H0), please contact your nearest Vibro-Meter sales office.**

MOUNTING ACCESSORIES

ABA 160 industrial housing

Mechanical diagram



Ordering number : 830 - 160 - 000 - 111 - A - B1 - C1

ENVIRONMENT (A)	
Standard polyester	1
(2) Explosive polyester	2

CABLE FITTING INPUT (B)	
(1) NO HOLE	00
(2) M16 x 1.5 with plug	01
(2) Cable gland M12 x 1.5 for cable Ø4 - Ø8 mm	03
(2) Cable gland M16 x 1.5 for cable Ø6 - Ø11 mm	04

CABLE FITTING OUTPUT (C)	
(1) NO HOLE	00
(2) M16 x 1.5 with plug	01
(2) Cable gland M12 x 1.5 for transducer cable Ø4 - Ø8 mm	03
(2) Cable gland M16 x 1.5 for transducer cable Ø6 - Ø11 mm	04
(2) Adapter M16 x 1.5/PG9 to be used for KS 106 (flexible protection tube)	08

(1): With option B00, only option C00 is available. For special options (ie. B01/03/04 and C00 or C01/03/04/08 and B00), please contact your nearest Vibro-Meter sales office.

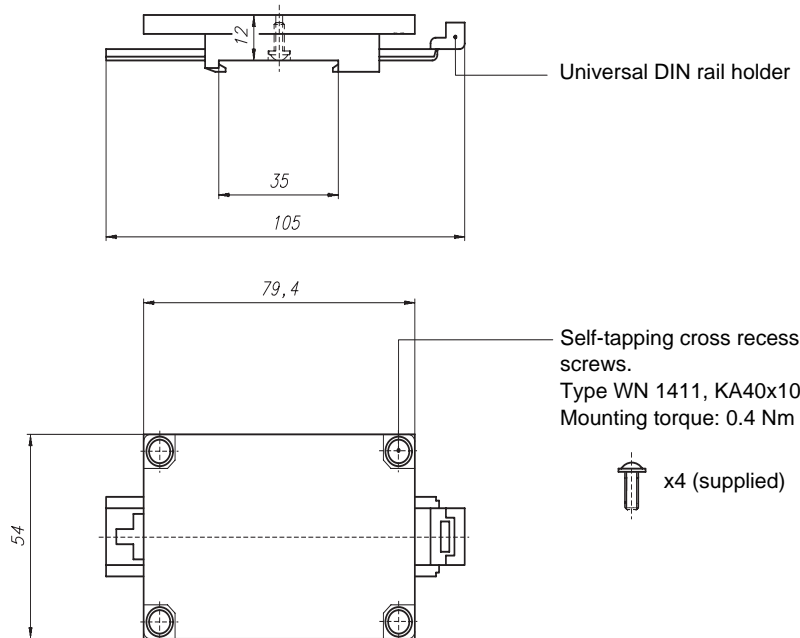
(2): Only with Vibro-Meter certified Ex i products.



## MOUNTING ACCESSORIES (Continued)

### MA 130 mounting adaptor

Mechanical diagram

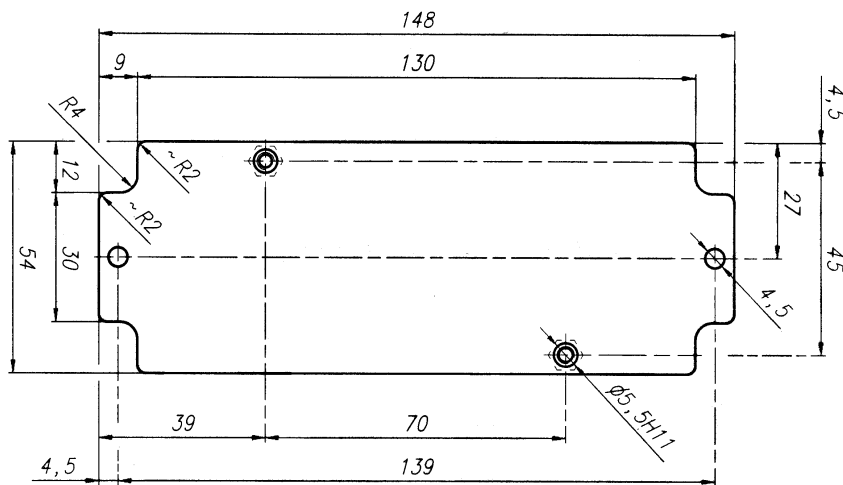


Ordering number : 809-130-000-011

### Base plate for IPC 704 signal conditioner

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 on it.

Mechanical diagram



Ordering number : 244-620-002S034



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