

VIBRO-METER® MEASUREMENT CHAINS

IPC707

SIGNAL CONDITIONER

Charge-output signal conditioner for **CAxxx piezoelectric accelerometers** and **CPxxx dynamic pressure sensors**. Configurable high-pass and low-pass filters, optional velocity integrator, optional diagnostic circuitry. **SIL 2 (IEC 61508)** capable. Available in **Ex ia** (Zones 0, 1, 2) and **Ex ec / nA** (Zone 2) versions.



0.5–50 kHz
BANDWIDTH
(CONFIGURABLE)



pC → μA / mV
CHARGE TO
CURRENT OR
VOLTAGE



SIL 2
IEC 61508 · PL C
CAT 1 (ISO 13849)



Ex ia / ec
HAZARDOUS AREAS
(ZONES 0, 1, 2)



01 · OVERVIEW

Charge-amplifier signal conditioning for piezoelectric measurement chains

The IPC707 is a signal conditioner from Parker Meggitt's vibro-meter® product line, designed for operation with sensors that contain a piezoelectric sensing element and provide a charge output requiring an external charge amplifier.

It is a versatile and highly configurable device that converts the charge-based signal from a piezoelectric sensor into a current or voltage output, suitable for transmission to a monitoring system via a 2-wire (current) or 3-wire (voltage) cable.

It includes RFI filters, optional hazardous-area protection, a differential charge amplifier, configurable HP/LP filters, an optional integrator (velocity output), and a configurable output stage. Optional diagnostic circuitry indicates measurement-chain problems remotely.

Replaces the previous IPC704 (form, fit and functionally equivalent). **Use the interactive Configuration Wizard below the datasheet to size and order the right variant.**

APPLICATIONS

- Vibration measurement chains using CAxxx piezoelectric accelerometers
- Pressure measurement chains using CPxxx piezoelectric pressure sensors
- Safety-related applications (SIL 2 / PL c Cat 1)

02 · FEATURES & BENEFITS

Designed for precision, configured for your chain**For CAxxx accelerometers & CPxxx pressure sensors**

From the vibro-meter® product line — works with any piezoelectric sensor with symmetrical (differential) signal output.

**Configurable HP & LP filters**

3rd order Butterworth high-pass and low-pass filters — independent of transfer function. Standard or non-standard cutoffs.

**0.5 Hz to 50 kHz frequency range**

Wide configurable bandwidth covering low-frequency processes through high-frequency vibration / pressure pulsations.

**Optional velocity integrator**

Internal integrator converts the acceleration signal into a velocity output — selectable via the D-code transfer-function option.

**µA or mV output transfer**

pC → µA for long-distance current-signal transmission, or pC → mV for shorter-distance voltage-signal transmission.

**Ex versions for hazardous areas**

Ex ia (Zones 0, 1, 2 — intrinsic safety) and Ex ec / nA (Zone 2 — increased safety) certified versions. ATEX, IECEx, cCSAus, KGS, UKEX, INMETRO, CCC, EAC.

**SIL 2 / PL c Cat 1 capable**

Suitable for functional-safety contexts per IEC 61508 (SIL 2) and ISO 13849 (PL c Cat 1). Optional diagnostic circuitry detects sensor / cabling / conditioner faults.

**Removable screw-terminal connectors**

4 + 4 contact screw-terminal connectors. Optional MA130 DIN-rail mounting adaptor (TH 35).

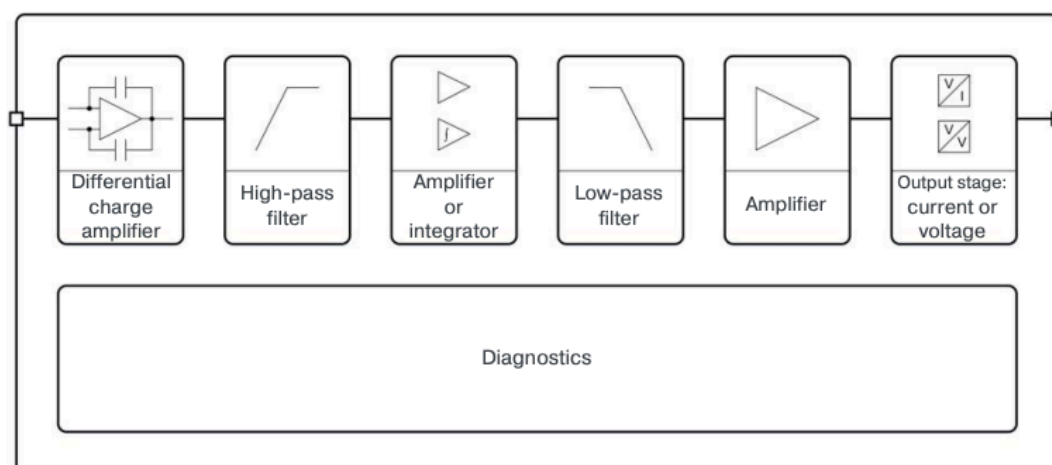
**Optional remote diagnostics**

Optional diagnostic circuitry detects sensor, cabling and/or signal-conditioner problems — reported remotely via the DC level of the output signal.

03 · SPECIFICATIONS

Complete technical data

BLOCK DIAGRAM



Internal block diagram showing the differential charge amplifier, RFI filters, configurable HP/LP filters, optional integrator and configurable output stage.

ENVIRONMENTAL

Operating and storage temperature	–40 to 85 °C (–40 to 185 °F)
Humidity	95% max., non-condensing
Protection rating (IEC 60529)	IP40. Indoor use only unless installed in industrial housing/enclosure (≥ IP54).
Chemical resistance	Suitable for environments containing trace levels of chemicals such as hydrogen sulfide or ammonia
Flammability	UL94 V-0
Vibration (IEC 60068-2-6)	5 g peak above resonant frequency and 0.35 mm peak below (10 to 500 Hz, 6 hours/axis)
Shock acceleration (IEC 60068-2-27)	15 g peak (half-sine, 11 ms duration, 9 shocks/axis)
Altitude	4 000 m (13 100 ft) max.

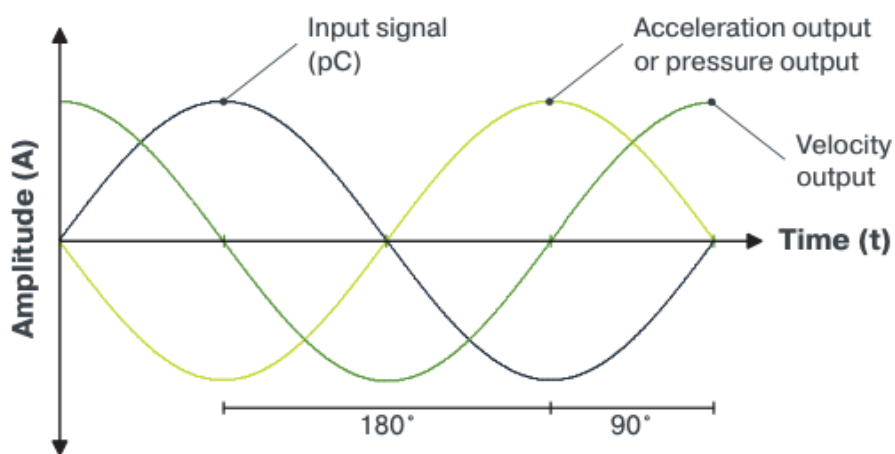
POWER SUPPLY

Input voltage range	24 V _{DC} ± 25% (18 to 30 V _{DC})
Current consumption (24 V _{DC} nominal)	20 mA max.

Note: Power the IPC707 using a low-voltage supply such as a sensor power supply output from a VM600 or VibroSmart®, a GSI127 galvanic separator, or other suitable supply. In safety-related applications, use a supply with a safe limitation of 40 V_{DC}.

TRANSFER FUNCTION (OPTION CODES C AND D)

TRANSFER SENSITIVITY	
Standard, without integrator	0.1, 0.2, 0.5, 1, 2, 5, 10, 20 and 50 $\mu\text{A/pC}$ or mV/pC
Standard, with integrator	981, 1962, 4905, 9810, 19620, 49050 and 98100 $\mu\text{A/pC}\cdot\text{s}$ or $\text{mV/pC}\cdot\text{s}$
Non-standard, without integrator	0.1 to 110 $\mu\text{A/pC}$ or mV/pC
Non-standard, with integrator	981 to 98100 $\mu\text{A/pC}\cdot\text{s}$ or $\text{mV/pC}\cdot\text{s}$
ACCURACY (AT AMBIENT TEMPERATURE)	
Without integrator	$\pm 2\%$
With integrator	$\pm 3\%$
Linearity error (INL)	$< 0.2\%$
Temperature stability	Without int.: $< 100 \text{ ppm}/^\circ\text{C}$ typical · With int.: $< 150 \text{ ppm}/^\circ\text{C}$ typical
Phase	Without int.: 180° between input and acceleration/pressure output. With int.: 270° between input and velocity output.



Phase relationship between the input signal, the acceleration/pressure output (without integrator), and the velocity output (with integrator).

INPUT CHARACTERISTICS

RFI filter	Symmetrical LC network
Charge amplifier	Differential (symmetrical)
DYNAMIC RANGE	
$< 10 \text{ kHz}$	50 000 pC
10 to 50 kHz	25 000 pC
Insulation resistance (sensor & cabling)	$> 20 \text{ k}\Omega$ — minimum required by optional diagnostics
Capacitance (sensor & cabling)	$< 15 \text{ nF}$ — maximum allowed by optional diagnostics
Compatible sensors	Any piezoelectric-based sensor with symmetrical (differential) signal. CAxxx accelerometers and CPxxx pressure sensors are compatible.

OUTPUT CHARACTERISTICS

Current output (2-wire transmission)

Dynamic signal (AC)	± 5 mA peak (max.)
Dynamic range (max.)	5 mA peak / output sensitivity
NOMINAL OUTPUT SIGNAL (DC)	
Without diagnostics	$12 \text{ mA}_{\text{DC}} \pm 0.2 \text{ mA}_{\text{DC}}$
With diagnostics	$13 \text{ mA}_{\text{DC}} \pm 0.2$ (normal) · $11 \text{ mA}_{\text{DC}}$ (sensor/cabling) · $10 \text{ mA}_{\text{DC}}$ (signal conditioner) · $< 8 \text{ mA}_{\text{DC}}$ (other)
Output impedance	$> 60 \text{ k}\Omega$

Voltage output (3-wire transmission)

Dynamic signal (AC)	± 5 V peak (max.)
Dynamic range (max.)	5 V peak / output sensitivity
NOMINAL OUTPUT SIGNAL (DC)	
Without diagnostics	$7.0 \text{ V}_{\text{DC}} \pm 0.2 \text{ V}_{\text{DC}}$
With diagnostics	$8.0 \text{ V}_{\text{DC}} \pm 0.2$ (normal) · $6.0 \text{ V}_{\text{DC}}$ (sensor/cabling) · $5.0 \text{ V}_{\text{DC}}$ (conditioner) · $< 3.0 \text{ V}_{\text{DC}}$ (other)
Output impedance	$< 500 \Omega$

FILTER CHARACTERISTICS**High-pass filter (option code E)**

Type	3 rd order Butterworth high-pass filter
CUTOFF FREQUENCY (–3 DB)	
Standard, without diagnostics	0.5, 1, 2, 5, 10 or 20 Hz
Standard, with diagnostics	1, 2, 5, 10 or 20 Hz
Non-standard	0.5 to 110 Hz (1 Hz min. with diagnostics)
Slope	–60 dB/decade (–18 dB/octave) min.

Low-pass filter (option code F)

Type	3 rd order Butterworth low-pass filter
Cutoff (standard)	500, 1 000, 2 000, 5 000, 10 000, 20 000 or 50 000 Hz
Cutoff (non-standard)	200 to 20 000 Hz
50 000 Hz restrictions	Available only without diagnostics (option code B1) and without the integrator (transfer units D1 or D2 only — excludes D3/D4)
Slope	–60 dB/decade (–18 dB/octave) min.

CONNECTORS

Screw-terminal connector (input)	4 contacts for sensor-side signals
Screw-terminal connector (output)	4 contacts for monitor-side signals
Electrical connections (IEC)	320 V / 17.5 A / 0.2 to 1.5 mm ²
Electrical connections (UL)	300 V / 10 A / 28 to 16 AWG
Tightening torque	0.2 to 0.25 N·m (0.15 to 0.18 lb-ft)

PHYSICAL

Housing material	Injection-moulded aluminium, painted
Dimensions	79.4 × 54 × 35.5 mm (3.1 × 2.1 × 1.4 in)
Weight	175 g (0.39 lb) approx.
Mounting (without DIN-rail adaptor)	Two M4 screws
Mounting (with MA130 DIN-rail adaptor, code G2)	TH 35 DIN rails (EN 50022 / IEC 60715)

04 · CONFIGURE & ORDER

Configure & order your IPC707



Part number reference

Full option-code breakdown for codes A – G

The IPC707 part number is composed of a fixed prefix and seven option codes (A – environment, B – diagnostics, C – transfer sensitivity, D – transfer units, E – high-pass cutoff, F – low-pass cutoff, G – installation).

Ordering number: 244-707-000-012 – **A** – **B** – **C** – **D** – **E** – **F** – **G**

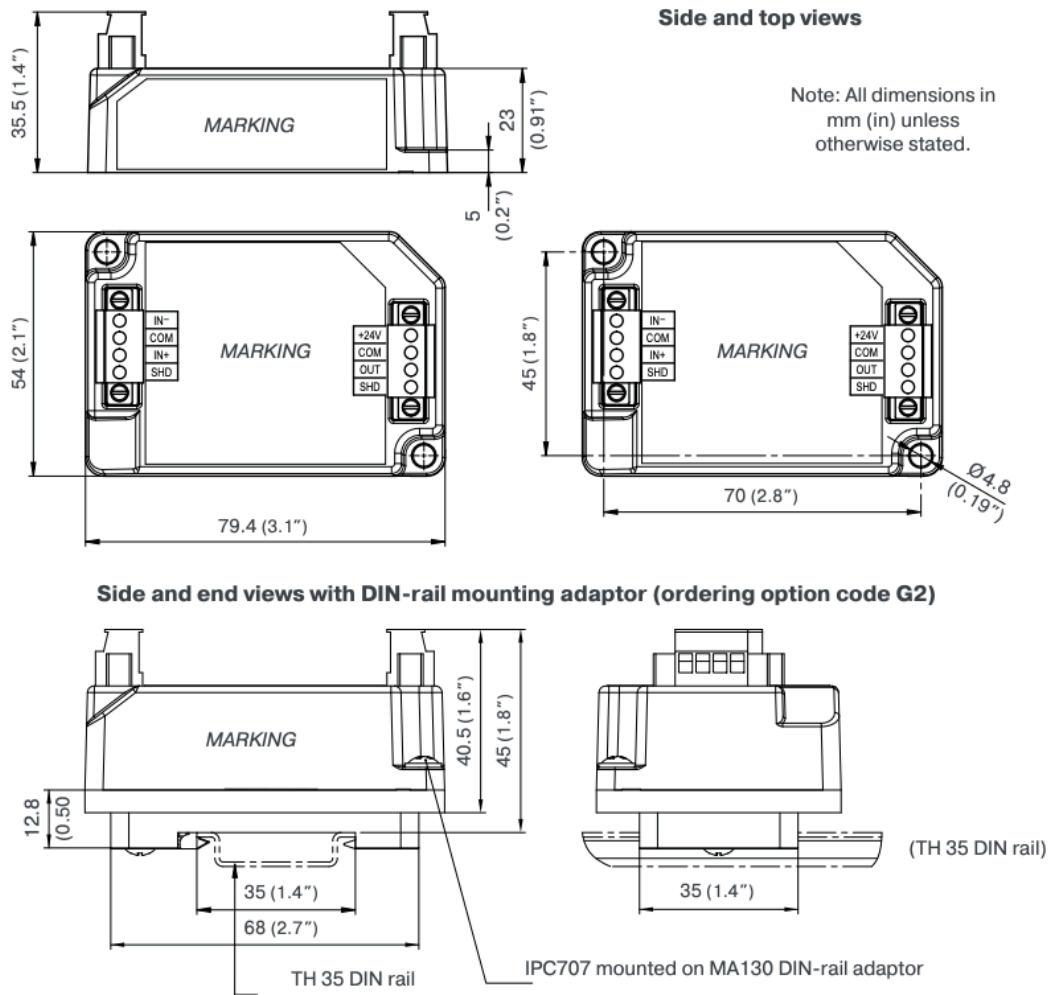
A Environment ¹	B Diagnostics	C Transfer sensitivity ²
1 Standard	1 Without	Pick a standard value — or any value in range STANDARD — NO INTEGRATOR 0.1 0.2 0.5 1 2 5 10 20 50 STANDARD — WITH INTEGRATOR (D3/D4) 981 1962 4905 9810 19620 49050 98100
2 Ex ia	2 With (SIL 2)	
3 Ex ec / nA		
D Transfer units ²	E High-pass cutoff	F Low-pass cutoff ³
1 $\mu\text{A/pC}$	Standard values — or any value 0.5–110 Hz	Standard values — or any non-standard value 200–20 000 Hz
2 mV/pC	STANDARD	STANDARD
3 $\mu\text{A/pC}\cdot\text{s}$ (integrator)	0.5 1 2 5 10 20	500 1000 2000 5000 10000 20000
4 mV/pC·s (integrator)		STANDARD — RESTRICTED
		50000
		50 000 Hz: only without diagnostics (B1) and without integrator (D1/D2).
G Installation		
1 Without DIN-rail adaptor		
2 With DIN-rail adaptor (MA130)		

NOTES

- For use in hazardous areas (potentially explosive atmospheres), each component of the measurement chain must be appropriately Ex certified — ordering option codes A2 (Ex ia) or A3 (Ex ec / nA).
- C-code: max 4 significant digits (max 5 digits before the decimal point, 2 after). Examples: 51252 → C51250, 7553.7 → C7554, 5.4 → C5.4, 0.826 → C0.83. Without integrator (transfer units D1/D2) the orderable range is 0.1–110; with integrator (D3/D4) it is 981–98100 — only the oblique out-of-range limits of the published transfer-function charts gate orderability.
- F-code: standard cutoffs are 500, 1 000, 2 000, 5 000, 10 000, 20 000 and 50 000 Hz; non-standard (typed) values are limited to 200–20 000 Hz. **A 50 000 Hz low-pass filter is available only in the version without diagnostics (B1) and cannot be combined with the optional integrator (transfer units D3/D4).** The option key above enforces both exclusions.

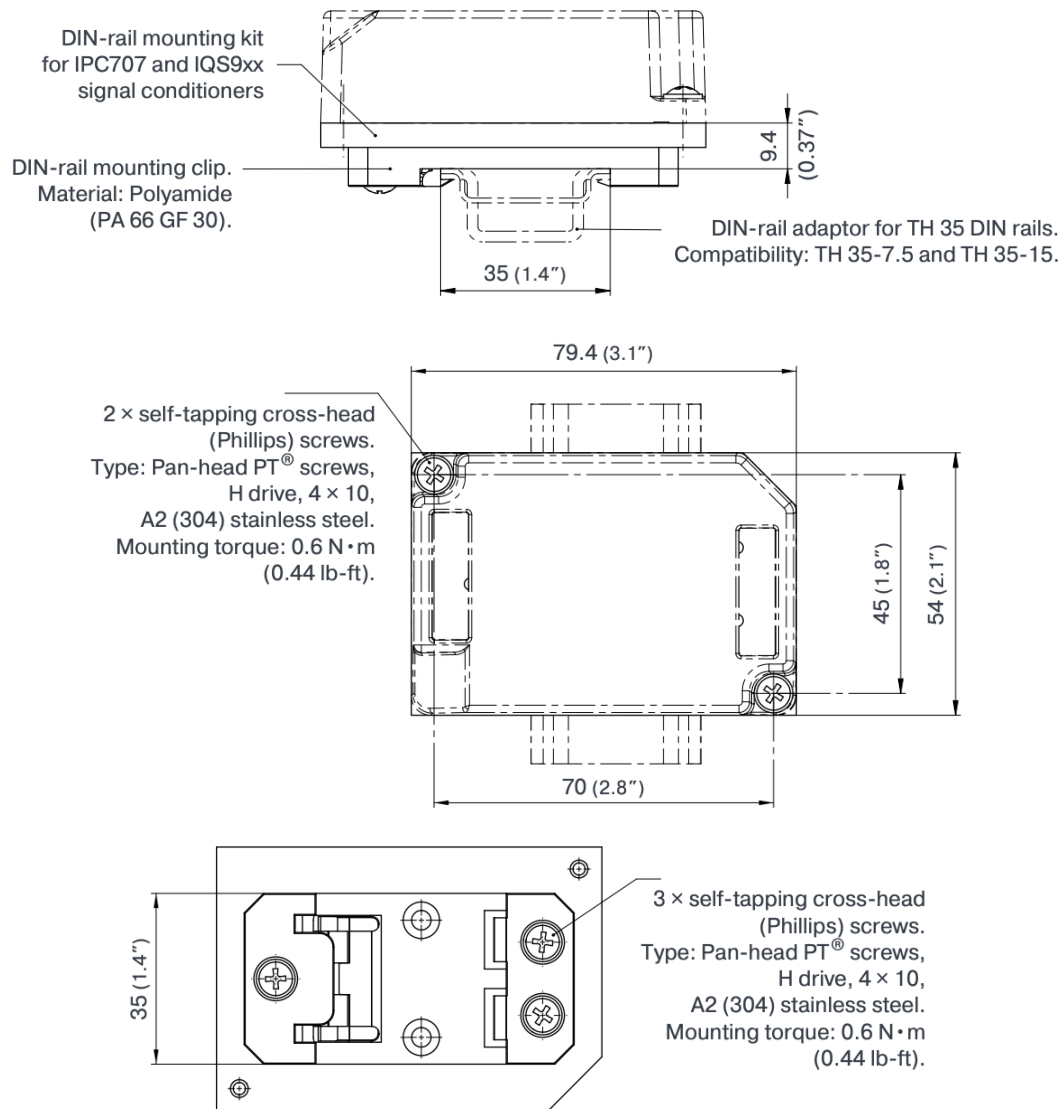
05 · MECHANICAL

Mechanical drawings



All dimensions in mm (in) unless otherwise stated.

MA130 DIN-RAIL MOUNTING ADAPTOR



Optional MA130 DIN-rail mounting adaptor (option code G2). Suitable for TH 35 DIN rails per EN 50022 / IEC 60715.

Note: All dimensions in mm (in) unless otherwise stated.

Ordering number (PNR): 809-130-000-021

06 · APPROVALS

Hazardous-area certifications & compliance

Available in Ex approved versions for use in hazardous areas.

Type of protection Ex ia — intrinsic safety (option code A2)

REGION	CERTIFICATE	MARKING
Europe	EU type examination · LCIE 18 ATEX 3026 X	II 1G (Zones 0, 1, 2) · Ex ia IIC T6...T4 Ga
International	IECEX · IECEX LCIE 18.0023X	Ex ia IIC T6...T4 Ga
North America	cCSAus · 70198728	Class I, Div. 1, Groups A, B, C, D · Ex ia IIC T6...T4 Ga Class I, Zone 0 · AEx ia IIC T6...T4 Ga
South Korea	KGS* · KGS 18-GA4BO-0549X	Ex ia IIC T6...T4
United Kingdom	UK type examination* · CML 21 UKEX 2543 X	II 1G · Ex ia IIC T6...T4 Ga
Kyrgyzstan (EAEU)	EAĎC KG certificate of conformity* · EAĎC KG417 039.CH.02.04445	0Ex ia IIC T6...T4 Ga
Brazil	INMETRO* · INMETRO BVC20.3861-X	Ex ia IIC T6...T4 Ga
China	CNEx CCC* · 2022312310000425	Ex ia IIC T6/T5/T4 Ga

Type of protection Ex ec / Ex nA — increased safety / non-sparking (option code A3)

REGION	CERTIFICATE	MARKING
Europe	Type examination · LCIE 18 ATEX 1012 X	II 3G (Zone 2) · Ex ec IIC T6...T4 Gc
International	IECEX · IECEX LCIE 18.0023X	Ex ec IIC T6...T4 Gc
North America	cCSAus · 70198728	Class I, Div. 2, Groups A, B, C, D · Ex ec IIC T6...T4 Gc Class I, Zone 2 · AEx ec IIC T6...T4 Gc
South Korea	KGS · KGS 18-GA4BO-0548X	Ex nA IIC T6...T4
United Kingdom	UK type examination · CML 21 UKEX 4544 X	II 3G · Ex ec IIC T6...T4 Gc
Kyrgyzstan (EAEU)	EAĎC KG certificate of conformity · EAĎC KG417 039.CH.02.04445	2Ex ec IIC T6...T4 Gc
Brazil	INMETRO · INMETRO BVC20.3861-X	Ex ec IIC T6...T4 Gc
China	CNEx CCC · 2022312310000425	Ex ec IIC T6/T5/T4 Gc

*Not engraved/marked on all versions of the product. When using Ex ec or Ex nA, install the IPC707 in a housing/enclosure with rating ≥ IP54.

GENERAL APPROVALS

Conformity	EU declaration of conformity (CE marking). UK (UKCA) declaration of conformity.
EMC	EMC compliant (2014/30/EU): EN 61000-6-2:2005 · EN 61326-1:2013 · EN 61326-3-2:2008 (SIL).
Electrical safety	EN 61010-1:2010
Environmental management	RoHS compliant (2011/65/EU)
Hazardous areas	Ex approved versions (see above)
Functional safety	SIL 2 (IEC 61508). PL c Cat 1 (ISO 13849).

07 · ACCESSORIES

Accessories & companions

ABA17x

Industrial housings

Industrial housings — refer to corresponding data sheet.

MA130

DIN-rail mounting adaptor

DIN-rail mounting adaptor for IPC707 (and IQS9xx) signal conditioners. Suitable for TH 35 DIN rails (EN 50022 / IEC 60715). PNR: 809-130-000-021.

GSI127

Galvanic separation unit

Galvanic separation unit — strongly recommended for installations affected by frame voltage. Always required when used with CPxxx pressure sensors.

Parker Hannifin Corporation – usually referred to as just Parker – is a global leader in motion and control technologies, providing precision-engineered solutions for a wide variety of mobile, industrial and aerospace markets. For more than a century the company has been enabling engineering breakthroughs that lead to a better tomorrow.

Parker Meggitt joined the Parker Aerospace Group in September 2022 following the successful acquisition of Meggitt PLC, a world leader in aerospace, defense and energy. This includes the Meggitt facility in Fribourg, Switzerland, operating as the legal entity Meggitt SA (formerly Vibro-Meter SA). Accordingly, the vibro-meter® product line is now owned by Parker.

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In this publication, a dot (.) is used as the decimal separator and thousands are separated by thin spaces. Example: 12345.67890.

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