



IG40 BA AND EX LOW PRESSURE PASSIVE GAUGES INSTRUCTION MANUAL

Publication number: D0300030001EN

Issue: B

Original Instructions

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Disclaimer

The content of this manual may change from time to time without notice. We accept no liability for any errors that may appear in this manual nor do we make any expressed or implied warranties regarding the content. As far as practical we have ensured that the products have been designed and constructed to be safe and without risks when properly installed and used in accordance with their operating instructions.

We accept no liability for loss of profit, loss of market or any other indirect or consequential loss whatsoever.

Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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Safety

Symbols used

Symbols for residual risks



WARNING:

Warnings are given where failure to observe the instruction could result in injury or death to people.



CAUTION:

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process.

Personnel qualifications

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed.

General safety instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.
- Consider possible reactions with the product materials.
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Communicate the safety instructions to all other users.

Responsibility and warranty

Edwards will not assume any responsibility or warranty in cases where the operator or third persons:

- Do not observe the information given in this document.
- Do not use the product as intended.
- Modify the product in any way (conversions, repair work, etc).

- Operate the product with accessories not listed in the corresponding product documentation.

Subject to technical alterations without prior notice. The figures are not binding.

Description

The IG40 BA is a Bayard-Alpert measurement system and the IG40 EX is an extractor measurement system. Operation of these sensors is based on the hot cathode ionisation effect.

The temperature resistant gauge head cable must not be exposed to a temperature exceeding 200 °C maximum (250 °C at the flange of the sensor).

Product identification

A nameplate is located on the protection cover. When communicating with Edwards, stating the information on the nameplate is necessary.

Validity

This document applies to products with part numbers

Product Description	Item number
IG40 BA DN40CF Bayard-Alpert Ion Gauge	D03000300
IG40 EX DN40CF Extractor Ion Gauge	D03000310
IG40 BA / EX cable 5 m Bakeable	D03000301
IG40 BA / EX cable 10 m Bakeable	D03000302
IG40 BA / EX cable 50 m Bakeable	D03000303

Intended use

The IG40 BA and EX may only be used for the measurements of total pressures in vacuum systems and only when connected to a PGC202 vacuum gauge controller instrument.

Technical data

General gauge head data

Table 1 General gauge head data

Description	IG40 BA	IG40 EX
Materials		
Lead-in pins		NiFe
Insulator		Al ₂ O ₃ ceramic
Pin sealing plate		NiFe
Flange		Stainless steel
Cathode		Iridium with yttrium oxide coating
Anode	Pt/Ir 90/10 and Mo/Pt wrapped wire	Stainless steel 1.4404
Collector		Tungsten
Reflector		NiFe
Flange connection		DN 40 CF
Electrode system configuration	Bayard-Alpert	Extractor system
Ambient temperature during operation		20 to 80 °C
Maximum flange temperature with bakeable gauge cable		250 °C
Maximum bakeout temperature (with no cable connected)		400 °C
Maximum recommended rate of temperature change during bakeout		5 °C per minute
Storage temperature		20 to 50 °C
Relative humidity		
Annual average		≤ 65% (non-condensing)
On 60 days		≤ 85% (non-condensing)
Use		Indoors (altitude 2000 m maximum above sea level)
X-ray limit	< 1 x 10 ⁻¹¹ mbar (hPa)	< 1 x 10 ⁻¹² mbar (hPa)
Upper limit of measuring range	1 x 10 ⁻² mbar (hPa)	1 x 10 ⁻⁴ mbar (hPa)
Lower limit of measuring range	2 x 10 ⁻¹¹ mbar (hPa)	2 x 10 ⁻¹² mbar (hPa)

Table 2 Bakeable gauge head cable

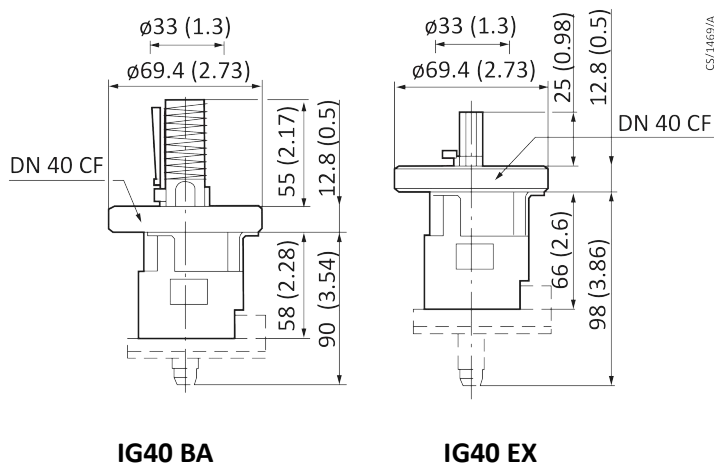
Description	Value
Maximum bakeout temperature	200 °C
Recommended rate of temperature change	5 °C per minute
Insulation materials used	PTFE, PEEK
Length	5, 10 or 50 m

Table 3 Operating characteristics when used with control unit PGC202

Description	IG40 BA	IG40 EX
Collector potential	0 V	
Cathode potential	+80 V	+100 V
Anode potential	+220 V	+220 V
Reflector potential	-	+205 V
Emission current range	100 µA, 10 mA	1.6 mA
Cathode heater current	1.5 A (typical)	
Cathode heater voltage	3 V (typical)	3.7 V (typical)
Sensitivity for nitrogen	17 mbar ⁻¹ (hPa ⁻¹) (typical)	6.25 mbar ⁻¹ (hPa ⁻¹) (typical)
Maximum bake-out power	90 mA/480 V	45 mA/480 V

Dimensions

Figure 1 Dimensions



Installation

Supplied equipment

Table 4 Gauges

Description	Quantity
Gauge	1
Operating manual	1

Table 5 Bakeable gauge head cable

Description	Quantity
Bakeable gauge head cable	1
Housing with cover	1
Ion collector cable	1
Countersunk screws	2
Operating manual	1

Assembly



WARNING:

Installation, mounting and removal may only be carried out with the operating unit switched off.



WARNING:

As a rule, all ionisation measurement systems must only be operated in connection with a properly earthed pump system.

When mounting the gauge head to the vacuum system, ensure that the gauge is not subjected to mechanical oscillations, vibrations or impacts.

Do not install a vent valve in the immediate vicinity of the gauge head. Sudden changes in air flow may result in mechanical damage to the sensitive cathode. The mounting position of the gauge head has no influence on the correct operation.

When installing several gauge heads at one common component (T-piece or cross for example) an optical separation is required. The gauge heads must not be in direct line of sight of each other. Interactions may cause incorrect measurements.



Note:

Humidity at the insulators (Figure 2 item 14) caused by condensing water for example, can give rise to incorrect measurements due to leakage currents.

Connecting the bakeable gauge head cable.



WARNING:

If during operation the IG 40 BA/EX suffers a malfunction then a live voltage maybe present at the gauge head measurement signal connection.

Affix the touch protection component at the BNC plug on the bakeable gauge head cable after it is connected to the PGC202 and before the PGC202 is switched on. The touch protection component is supplied together with the gauge head cable.



WARNING:

Switch the gauge off first before working at the gauge cable. After switching off, wait for at least 15 seconds.

Preparing the gauge head for the connection of the bakeable gauge head cable

Remove the plug guide (Figure 2 item 4) by unscrewing the cylinder head screws (Figure 2 items 5 and 6) from the gauge head (Figure 2 item 1).

The IG40 EX gauge head has been designed with a greater distance between gauge head flange (Figure 2 item 1) and plug guide (Figure 2 item 4).

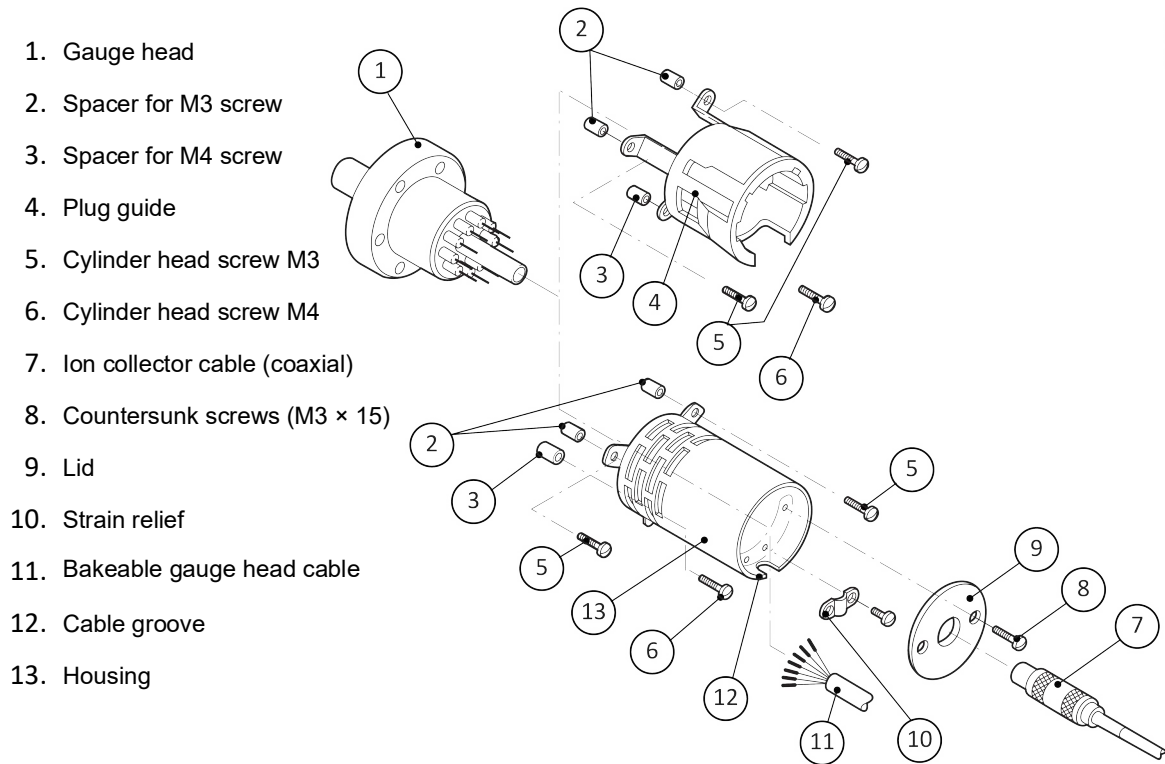
For this reason three spacers have been fitted between gauge head flange (Figure 2 item 1) and the plug guide (Figure 2 item 4). Do not loose the 3 spaces as these are required when installing the bakeable gauge head cable. Positioning of the plug guide is defined through the different bolt diameters on the gauge head (Figure 2 item 1).



Note:

The bakeable gauge head cable may also be connected after the gauge head has already been installed.

Figure 2 Gauge head connection



- 1. Gauge head
- 2. Spacer for M3 screw
- 3. Spacer for M4 screw
- 4. Plug guide
- 5. Cylinder head screw M3
- 6. Cylinder head screw M4
- 7. Ion collector cable (coaxial)
- 8. Countersunk screws (M3 × 15)
- 9. Lid
- 10. Strain relief
- 11. Bakeable gauge head cable
- 12. Cable groove
- 13. Housing

CS/1470/A

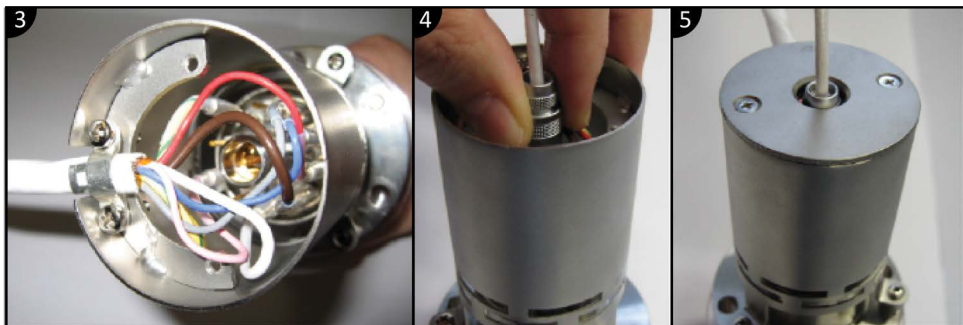
Connecting the bakeable gauge head cable to the flange on the gauge head



CAUTION:

Especially note the pin assignment. Provide the connection with great care. Do not subject the pin contacts to any bending forces (Risk: damaging of the current feed-through/leak).

1. Pull the cover (Figure 2 item 9) and then the housing (Figure 2 item 13) over the bakeable gauge head cable (Figure 2 item 11) so the connection sockets can be fitted to the gauge head (Figure 2 item 1).
2. Connect the bakeable gauge head cable to the gauge head as depicted in Figure 3. The individual wires of the gauge head cable are colour-coded.



CS/1471/A

3. Bolt the housing (Figure 2 item 13) onto the gauge head flange (Figure 2 item 1) with the bolts (Figure 2 items 5 and 6) and, in the case of the IG40 EX only, the 3 spacers

(Figure 2 items 2 and 3). Secure the entire cable with the strain relief (Figure 2 item 10).

4. Now the ion collector cable (Figure 2 item 7) can be inserted at the centre of the gauge head.
5. Secure the cover (Figure 2 item 9) with the bolts (Figure 2 item 8).

Fitting the gauge head including the bakeable gauge head cable

The gauge head including the bakeable gauge head cable can be now inserted into the vacuum chamber and bolted on.



Note:

Before connecting, Edwards recommends pumping down the system and if possible running a vacuum test or a direct leak search.

For removing or replacing the gauge head proceed in the reverse order. The plug must be unlocked in the gauge head housing, and for this reason unscrew the cover (Figure 2 item 9) first.

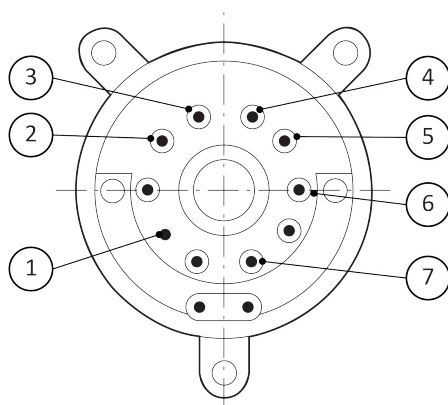
WARNING:



If during operation the IG 40 BA/EX suffers a malfunction then a live voltage maybe present at the gauge head measurement signal connection.

Affix the touch protection component at the BNC plug on the bakeable gauge head cable after it is connected to the PGC202 and before the PGC202 is switched on. The touch protection component is supplied together with the gauge head cable.

Figure 3 View onto the gauge head



CS/1472/A

Pin	Colour	IG40 EX	IG40 BA
1	yellow/green	LP*	LP*
2	grey	jumper	- [†]
3	blue	reflector	- [†]
4	red	anode	anode
5	brown	cathode	cathode
6	white	cathode	cathode
7	pink	jumper	- [†]

* LP (longest pin) = protective earth conductor (for facilitating installation)

† Function not available for IG40 BA but must be connected.

Operation



WARNING:

Do not use the IG 40 BA/EX for safety critical applications. The IG 40 BA/EX is not intended to be fail safe.



WARNING:

Do not use the IG 40 BA/EX to measure the pressure of explosive or flammable gases or mixtures.

Calibration

Each IG40 BA/EX gauge head has been individually calibrated in the course of final factory testing. This ensures a high accuracy of the pressure readout.

The appropriate sensitivity coefficient factor can be found on the calibration sticker located on the reverse side of the cover of this manual.



Note:

Emission current " i_e " and calibration factor "CAL" can be found on the calibration sticker located on the reverse side of the cover of this manual.

Operation



CAUTION:

Humidity at the insulators (Figure 2 item 14) caused by condensing water for example, can give rise to incorrect measurements due to leakage currents.



Note:

In the presence of halogen gases like fluorine, chlorine, bromine and iodine and their compounds, the yttrium oxide coating will suffer rapid wear. As a result of this, the cathodes will burn out.

Maintenance



WARNING:

Contaminated parts can be detrimental to health and environment.

Before you begin to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.



CAUTION:

Dirt and damage can impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damage.



CAUTION:

Touching the product with bare hands increases the desorption rate.

Always wear clean, lint-free gloves and use clean tools when working in this area.

Exchanging the Cathode



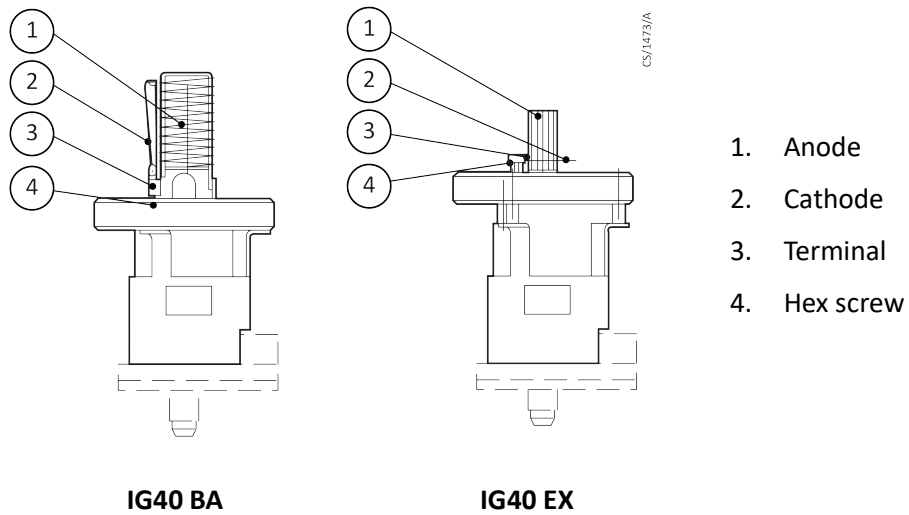
Note:

The cathode is supplied on a plate under a cover. The cathode must only be exchanged in a room which is free of dust. Wearing of clean gloves is mandatory.

Preparation

1. Switch off the operating unit.
2. Detach the gauge head cable from the gauge head.
3. Remove the gauge head from the vacuum system.
4. After loosening the hex screws at both terminals remove the faulty cathode.
5. Open the transport packaging, remove the replacement cathode in the same way and install it in the place of the old cathode.

The required 0.89 mm screwdriver is included with the replacement cathode.

Figure 4 View onto the gauge head

The cathode should be positioned as parallel as possible with respect to the anode. The initially applicable calibration values do not apply any longer after exchanging the cathode. Deviations up to 15% may occur.

Spares and accessories

Spares

When ordering spare parts, always indicate:

- All information on the product nameplate.
- Product description and item number according to the spare parts list.

Table 6 Spare parts

Product description	Item number
Spare cathode IG40 BA	D03000309
Spare cathode IG40 EX	D03000319

Accessories

Table 7 Gauge head cables

Product description	Item number
IG40 BA/EX cable 5 m bakeable	D03000301
IG40 BA/EX cable 10 m bakeable	D03000302
IG40 BA/EX cable 50 m bakeable	D03000305

Storage



CAUTION:

Inappropriate storage leads to an increase of the desorption rate and/or may result in mechanical damage of the product.

Cover the vacuum ports of the product with protective lids or grease free aluminum foil.
Do not exceed the admissible storage temperature range.

Return the equipment or components for service

Before you send your equipment to us for service or for any other reason, you must send us a completed Declaration of Contamination of Vacuum Equipment and Components – Form HS2. The HS2 form tells us if any substances found in the equipment are hazardous, which is important for the safety of our employees and all other people involved in the service of your equipment. The hazard information also lets us select the correct procedures to service your equipment.

We provide instructions for completing the form in the Declaration of Contamination of Vacuum equipment and Components – Procedure HS1.

Download the latest documents from www.edwardsvacuum.com/HSForms/, follow the procedure in HS1, fill in the electronic HS2 form, print it, sign it, and return the signed copy to us.



Note:

If we do not receive a completed HS2 form, your equipment cannot be serviced.

Disposal



WARNING:

Contaminated parts can be detrimental to health and environment.

Before beginning to work, find out whether any parts are contaminated. Follow the relevant regulations and take the necessary precautions when handling contaminated parts.



WARNING:

Products or parts thereof (mechanical and electric components, operating fluids, etc.) can be detrimental to the environment.

Dispose of such substances in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components according to the following criteria:

Contaminated components

Contaminated components (radioactive, toxic, caustic or biological hazard, etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.

Other components

Such components must be separated according to their materials and recycled.

Other Disposal Information

The IG40 BA/EX and associated cables are within the scope of the European Directive on Waste and Electronic Equipment, 2012/19/EU. Edwards offers customers a recycling service for the product/cables/associated gauge heads at the end of the product's life. Contact Edwards for advice on how to return the IG40 BA/EX and/or cables for recycling.

EU Declaration of Conformity

Edwards Ltd
Innovation Drive
Burgess Hill
West Sussex
RH15 9TW
UK

Declare that the following product

- Ion (IG 40) gauges connected to controllers (PGC)

D03000300	IG40 BA DN40CF +
D03000310	IG40 EX DN40CF +
D03000410	PGC202 Pirani/Ion Contr +*
D03000301	IG40 BA/EX cable 5 m bakeable +
D03000302	IG40 BA/EX cable 10 m bakeable +
D03000305	IG40 BA/EX cable 50 m bakeable +

Is in conformity with the relevant requirements of European CE legislation:

(+) 2014/35/EU	Low voltage directive (LVD)
(*) 2014/30/EU	Electromagnetic compatibility (EMC) directive Class B Emissions, Industrial Immunity
2011/65/EU	Restriction of certain hazardous substances (RoHS) directive as amended by Delegated Directive (EU) 2015/863

Based on the relevant requirements of harmonised standards:

EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements
EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

Documentation Officer: Jelena Havelkova, Spielberk Office Centre, Holandska 10, Brno, 63900 Czech Republic,
Tel: +42(0) 734 418 896, Email: documentation@edwardsvacuum.com

This declaration, based on the requirements of the listed Directives and EN ISO/IEC 17050-1, covers all product serial numbers from this date on: 2021-02-19

This declaration becomes invalid if modifications are made to the product.



Ian Keech – VP Engineering
Scientific Vacuum Division
Burgess Hill, UK



Andy Marsh – General Manager
Eastbourne, UK

ADDITIONAL LEGISLATION AND COMPLIANCE INFORMATION

EU EMC Directive: Class A/B Industrial equipment

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

EU RoHS Directive: Material Exemption Information

This product is compliant with no Exemptions

EU REACH Regulation Compliance

This product is a complex article which is not designed for intentional substance release. To the best of our knowledge the materials used comply with the requirements of REACH. The product manual provides information and instruction to ensure the safe storage, use, maintenance and disposal of the product including any substance based requirements.

Article 33.1 Declaration

This product does not knowingly or intentionally contain Candidate List Substances of Very High Concern above 0.1%ww by article as clarified under the 2015 European Court of Justice ruling in case C-106/14.

Additional Applicable Requirements

The product is in scope for and complies with the requirements of the following:

2012/19/EU

Directive on waste electrical and electronic equipment (WEEE)

材料成分声明

China Material Content Declaration



表示该有害物质在该部件的所有均质材料中的含量低于 GB/T 26572 标准规定的限量要求。

Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

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