

# TURBOMOLECULAR PUMPING STATIONS

 **EDWARDS**



# DEDICATED TO SCIENCE

## **Complete vacuum solutions for laboratory and R&D applications.**

At Edwards we have a deep understanding of research processes and the role that vacuum plays at every stage. This experience, coupled with innovative technologies and collaborative engineering, enables us to offer a comprehensive range of vacuum solutions that enhance performance across a broad range of scientific applications.

From the smallest school laboratory, to international R&D projects, our products and application know-how are facilitating educational development and scientific evolution across the globe.

This brochure contains the most common Edwards products used in a typical R&D or laboratory facility. There are many more products available via our product catalogue, website or by contacting your local sales representative.

Station  
300  
EDWARDS

ERIC

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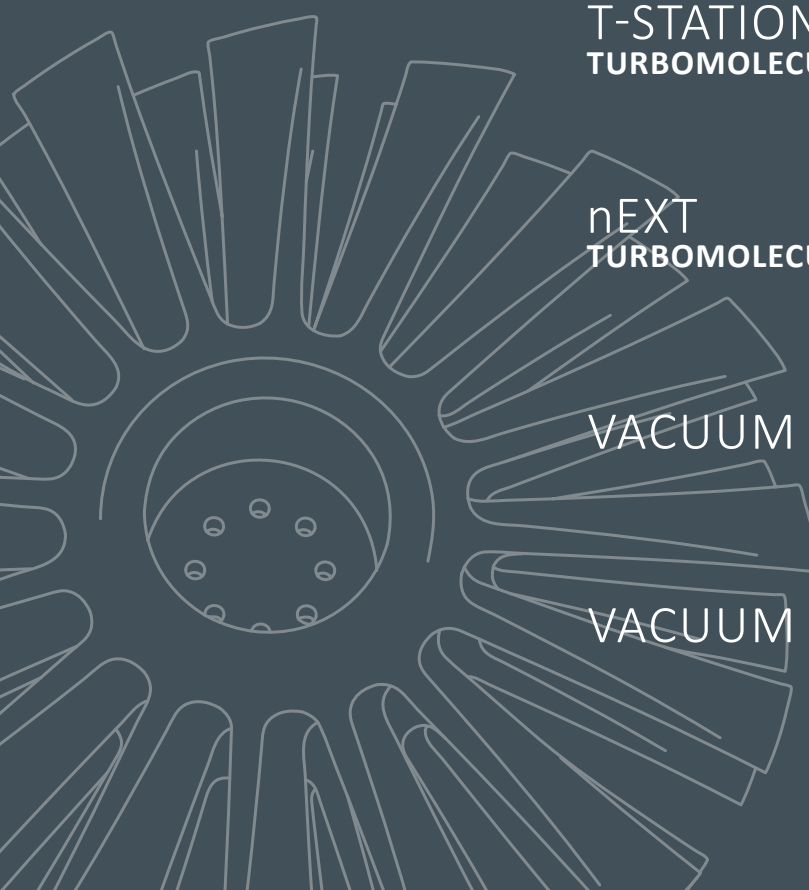
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# TURBOMOLECULAR PUMPING STATIONS

## FLEXIBLE, COMPACT AND END USER SERVICEABLE

The Edwards turbomolecular pumping stations are a comprehensive range of products providing versatile vacuum solutions in many different applications. All our nEXT turbomolecular pumping stations are supplied fully assembled and ready to run straight out of the box with nEXT turbomolecular pumps and backing pumps that are user serviceable.

There are 3 models in the turbomolecular pumping stations range the entry level T-Station 85 and the higher capacity T-Station 300 and the more sophisticated nEXT Turbomolecular pumping station also referred to as the TIC turbo cart. With this range of pumping solutions there will surely be one that addresses your vacuum requirements.



# T-STATION 85 TURBOMOLECULAR PUMPING STATION

T-Station 85 is a low cost, compact turbomolecular pumping station that seamlessly combines the nEXT85H turbomolecular pump with either a dry diaphragm or oil sealed backing pump, and a simple controller, providing pumping speeds of 47 to 84  $\text{ls}^{-1}$ .

The T-Station 85 comes with an integrated turbo and active gauge controller which enables single button start/stop of the system. This is combined with the ability to control one of our active gauges, vent valve control and delayed start of the turbomolecular pump to either time or pressure if a gauge is fitted, making the T-Station 85 ideal for general laboratory needs.



Plug and pump  
**No systemisation required**



Robust construction  
**Low cost of ownership**



## FEATURES AND BENEFITS

- Base plate includes rubber feet and cut-outs in the sides for manual handling, giving a compact low profile but stable design that can't be knocked over.
- All metal frame means rugged design that can take abuse without cracking or breaking.
- E2M1.5 or XDD1 high capacity backing pumps giving the choice between an oil sealed pump or a totally dry diaphragm pump.
- Integrated air cooler acts to cool internal power supply and pump/controller for quiet operation avoiding multiple fans.
- Customer integrated control features:
  - Single dedicated button to start/stop.
  - Easy to read accuracy display.
  - Ability to select vent mode where a TAV5 vent valve is fitted for automated venting with no user intervention.
- Available with either an NW40, ISO63 or CF63 inlet flange to suit your application.
- User serviceable nEXT85H turbomolecular pump.



## TECHNICAL DATA

|  |   |
|--|---|
| <b>Pumping speed for N<sub>2</sub></b>     |   |
| NW40                                       | 47 ls <sup>-1</sup>                         |
| ISO/CF63                                   | 84 ls <sup>-1</sup>                         |
| <b>Compression ratio for N<sub>2</sub></b> |   |
|  | >1 x 10 <sup>11</sup>                       |
| <b>Backing pump speed @50 Hz</b>           |   |
| E2M1.5 (TS85H Wet)                         | 1.6 m <sup>3</sup> h <sup>-1</sup>          |
| XDD1 (TS85H Dry)                           | 1.2 m <sup>3</sup> h <sup>-1</sup>          |
| <b>Ultimate vacuum</b>                     |   |
|  | <5 x 10 <sup>-10</sup> mbar*                |
| <b>Inlet flange</b>                        |   |
|  | NW40, ISO63 or CF63                         |
| <b>Exhaust flange</b>                      |   |
| E2M1.5 (TS85H Wet)                         | 11mm OD nozzle or 3/8" BSP                  |
| XDD1 (TS85H Dry)                           | Fitted silencer or 1/8" BSP                 |
| <b>Mass</b>                                |   |
| E2M1.5 system (TS85H Wet)                  | 21kg max                                    |
| XDD1 system (TS85H Dry)                    | 18kg max                                    |
| <b>Noise level</b>                         |   |
|  | ≤56 dB(A)                                   |
| <b>Leak tightness</b>                      |   |
|  | <1 x 10 <sup>-6</sup> mbar ls <sup>-1</sup> |
| <b>Operating temperature range</b>         |   |
|  | 12 to 40 °C                                 |



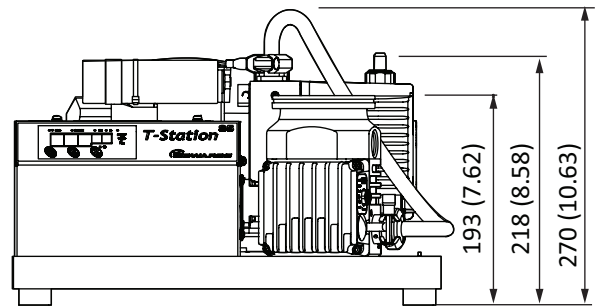
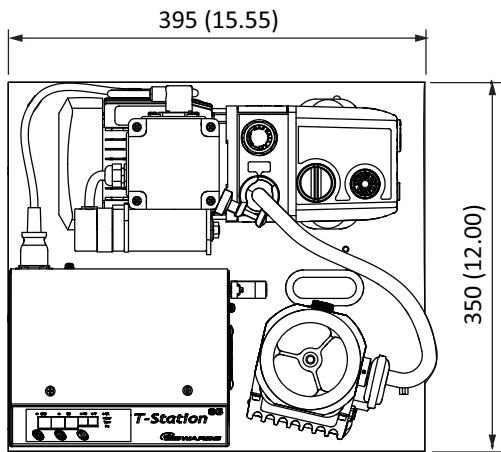
\*T-Station 85H Wet CF63

## ORDERING INFORMATION

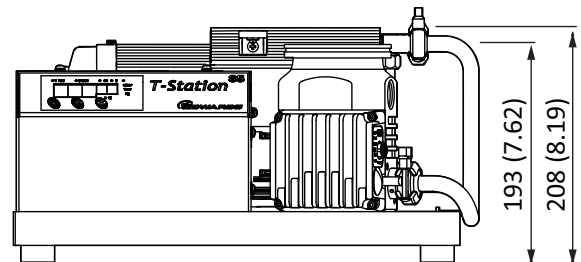
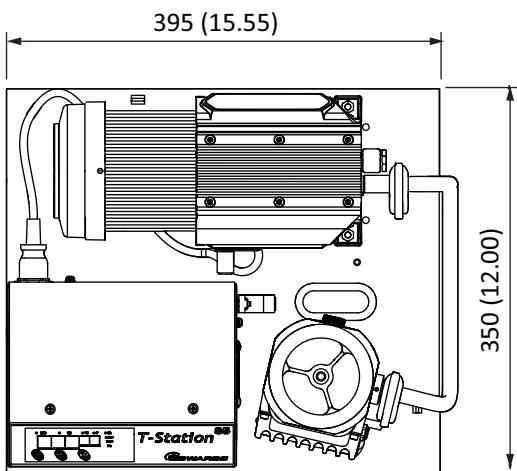
| Product description                            | Order number |
|--|--------------|
| T-Station 85H Wet NW40 200-240V                | TS85W1001    |
| T-Station 85H Wet ISO63 200-240V               | TS85W2001    |
| T-Station 85H Wet CF63 200-240V                | TS85W3001    |
| T-Station 85H Dry NW40 200-240V                | TS85D1001    |
| T-Station 85H Dry ISO63 200-240V               | TS85D2001    |
| T-Station 85H Dry CF63 200-240V                | TS85D3001    |
| T-Station 85H Wet NW40 100-120V                | TS85W1002    |
| T-Station 85H Wet ISO63 100-120V               | TS85W2002    |
| T-Station 85H Wet CF63 100-120V                | TS85W3002    |
| T-Station 85H Dry NW40 100-120V                | TS85D1002    |
| T-Station 85H Dry ISO63 100-120V               | TS85D2002    |
| T-Station 85H Dry CF63 100-120V                | TS85D3002    |
| Model EMF3 mist filter for E2M1.5 pump         | A46220000    |
| N/C TAV5 vent valve connector fitted           | B8G200835    |
| N/O TAV5 vent valve connector fitted           | B8G200834    |
| 2m electrical supply cable UK plug 10A         | A50505000    |
| 2m electrical supply cable North European plug | A50506000    |
| 2m electrical supply cable USA/Japan plug      | A50507000    |
| 2m electrical supply cable no plug             | A50508000    |
| APG100-XLC active pirani gauge NW16            | D02603000    |
| APGX-H active linear convection gauge NW16     | D02391000    |
| AIM-X active inverted magnetron gauge NW25     | D14642000    |
| WRG-S active wide range gauge NW25             | D14701000    |
| 0.5m active gauge cable                        | D40001005    |
| 1m active gauge cable                          | D40001010    |

## DIMENSIONS

### T-Station 85H Wet with E2M1.5 backing pump



### T-Station 85H Dry with XDD1 backing pump



# T-STATION 300 TURBOMOLECULAR PUMPING STATION

Edwards T-Station 300 turbomolecular pumping station builds on the existing popular T-Station 85 platform, by replacing the nEXT85H turbomolecular pump with the nEXT300 turbomolecular pump we have extended our portfolio and are providing a solution for customers and applications that require a higher pumping speed up to 300  $\text{ls}^{-1}$ .

T-Station 300 is a cost effective, compact and modular pumping station, combining the nEXT300 turbomolecular pump with either the dry XDD1 diaphragm pump or the E2M1.5 oil-sealed rotary vane pump.

With an integrated turbo and active gauge controller that enables single start/stop control giving the choice of pumping speed, extending the performance envelope for the R&D sector.



Higher pumping speed



End user serviceable



## FEATURES AND BENEFITS

- **Higher pumping speeds**  
Providing a solution for customers and applications that require higher pumping speeds up to 300  $\text{ls}^{-1}$ .
- **Cost efficient pumping package**  
Cost effective, compact and modular.
- **Plug and pump**  
Simple user-friendly plug and pump solution with no systemisation and no additional air cooling required, supplied fully assembled and ready to go for quick and easy operation.
- **Robust construction**  
Designed to be compact with a low profile, the all metal frame is able to withstand abuse without cracking or breaking and the base plate comes with rubber feet for extra stability.
- **Easy serviceability**  
Easy user serviceable pumps make this great for low cost of ownership.





## TECHNICAL DATA

| <b>Pumping speed for N<sub>2</sub></b>     |  |
|--|--|
| ISO100                                     | 300 l/s  |
| CF100                                      | 300 l/s  |
| <b>Compression ratio for N<sub>2</sub></b> |  |
| ISO100                                     | >1 x 10 <sup>11</sup>  |
| CF100                                      | >1 x 10 <sup>11</sup>  |
| <b>Backing pump speed @50 Hz</b>           |  |
| E2M1.5                                     | 1.6 m <sup>3</sup> /h  |
| XDD1                                       | 1.2 m <sup>3</sup> /h  |
| <b>Ultimate vacuum</b>                     |  |
| ISO100                                     | <6x10 <sup>-8</sup> mbar   |
| CF100                                      | <5x10 <sup>-10</sup> mbar  |
| <b>Exhaust flange</b>                      |  |
| E2M1.5                                     | 11 mm OD nozzle or 3/8" BSP  |
| XDD1                                       | Fitted silencer or 1/8" BSP  |
| <b>Mass</b>                                |  |
| TS300 ISO100 E2M1.5                        | 26 kg  |
| TS300 CF100 E2M1.5                         | 29 kg  |
| TS300 ISO100 XDD1                          | 22 kg  |
| TS300 CF100 XDD1                           | 25 kg  |
| <b>Noise level</b>                         | <56 db(A) ± 3dB(A) Declared dual number noise emission values in accordance with ISO4871 |
| <b>Leak tightness</b>                      | <1x10 <sup>6</sup> mbar l/s  |
| <b>Operating temperature range</b>         |  |
| TS300 E2M1.5                               | +12 to +40 °C  |
| TS300 XDD1                                 | +5 to +35 °C   |

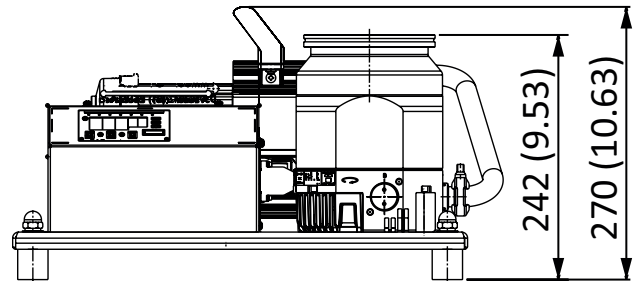
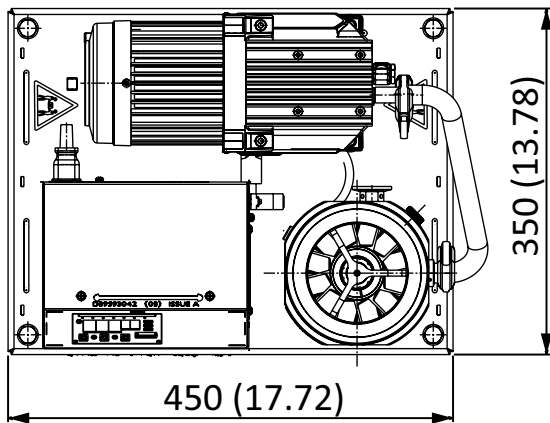


## ORDERING INFORMATION

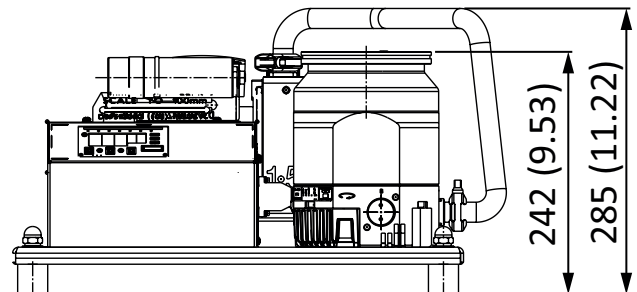
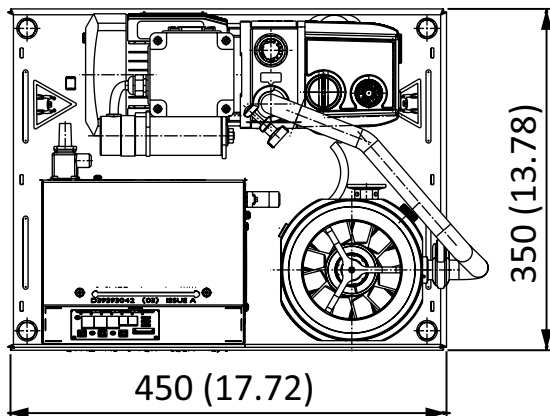
| Product description                            | Order number |
|--|--------------|
| T-Station 300D Dry ISO100 200-240V             | TS300D4001   |
| T-Station 300D Dry ISO100 100-120V             | TS300D4002   |
| T-Station 300D Dry CF100 200-240V              | TS300D5001   |
| T-Station 300D Dry CF100 100-120V              | TS300D5002   |
| T-Station 300D Wet ISO100 200-240V             | TS300W4001   |
| T-Station 300D Wet ISO100 100-120V             | TS300W4002   |
| T-Station 300D Wet CF100 200-240V              | TS300W5001   |
| T-Station 300D Wet CF100 100-120V              | TS300W5002   |
| Model EMF3 mist filter for E2M1.5 pump         | A46220000    |
| N/C TAV5 vent valve connector fitted           | B8G200835    |
| N/O TAV5 vent valve connector fitted           | B8G200834    |
| 2m electrical supply cable UK plug 10A         | A50505000    |
| 2m electrical supply cable North European plug | A50506000    |
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| AIM-X active inverted magnetron gauge NW25     | D14642000    |
| WRG-S active wide range gauge NW25             | D14701000    |
| 0.5m active gauge cable                        | D40001005    |
| 1m active gauge cable                          | D40001010    |

## DIMENSIONS

### T-Station 300 Dry with XDD1 backing pump



### T-Station 300 Wet with E2M1.5 backing pump



# nEXT TURBOMOLECULAR PUMPING STATION

nEXT turbomolecular pumping stations are configurable with turbomolecular pump speeds ranging from 47 to 400  $\text{ls}^{-1}$  and a choice of oil sealed or dry backing pumps ranging from 1 to 20  $\text{m}^3\text{h}^{-1}$ . All our nEXT turbomolecular pumping stations feature an integrated TIC turbo and instrument controller offering full control of the package via a simple intuitive interface.

The nEXT turbomolecular pumping stations are supplied fully assembled and ready to run straight out of the box and include common accessories such as mist filters and mains cables as appropriate to the chosen pumps. As fully featured high end stations they include RS232 serial communications and Windows® software for monitoring and control.



Low cost of ownership



Configurable/full control



## FEATURES AND BENEFITS

- Our range of turbomolecular pump options include choice of turbomolecular pump with speeds ranging from 47 to 400  $\text{ls}^{-1}$  and inlet flanges from DN40 to DN160.
- These pumps are fully controllable. TIC turbo and instrument controller offers full control of pumps and up to 3 active gauges as well as offering full serial remote communications.
- Our pumps have vent valve option. Optional turbomolecular pump vent valve can be ordered as part of cart assembly.
- All nEXT turbomolecular pumps and backing pumps are fully user serviceable.
- All metal frame with locking castors for a robust but easily mobile system. Bench mounting kit included for safe bench top operation.
- We also offer choice of backing pumps. Choice of oil sealed and dry backing pumps with capacities ranging from 1 to 20  $\text{m}^3\text{h}^{-1}$ .
- Backing pump mounted on anti-vibration mounts for low levels of transmitted vibration.

# 'PLUG AND PLAY' TURBOMOLECULAR PUMPING STATION

Everything about our range of nEXT turbomolecular pumping stations has been developed to provide a comprehensive vacuum solution with the latest technological advances for easy installation and operation. A simplified ordering matrix and expanded range, to include turbopumps with speeds from 42 ls<sup>-1</sup> to 400 ls<sup>-1</sup>, enables you to select the most appropriate combination for your application, fully assembled and ready to go.

1

## CHOOSE YOUR TURBOPUMP



nEXT85 (84 ls<sup>-1</sup>)



nEXT240 (240 ls<sup>-1</sup>)



nEXT300 (300 ls<sup>-1</sup>)



nEXT400 (400 ls<sup>-1</sup>)

2

## CHOOSE YOUR BACKING PUMP



E2M1.5 (1.6 m<sup>3</sup>h<sup>-1</sup>)



XDD1 (1.2 m<sup>3</sup>h<sup>-1</sup>)



RV5 (5.1 m<sup>3</sup>h<sup>-1</sup>)



nXDS



RV12 (12.0 m<sup>3</sup>h<sup>-1</sup>)

nXDS6i (6.2 m<sup>3</sup>h<sup>-1</sup>)  
nXDS10i (11.4 m<sup>3</sup>h<sup>-1</sup>)  
nXDS15i (15.1 m<sup>3</sup>h<sup>-1</sup>)  
nXDS20i (22.0 m<sup>3</sup>h<sup>-1</sup>)

3

## SELECT YOUR VOLTAGE



## ORDERING INFORMATION

nEXT turbomolecular pumping station:

T S   -   - 0 0

### Turbomolecular pump

- B nEXT240
- C nEXT300
- D nEXT400
- E nEXT240T
- F nEXT300T
- G nEXT400T
- J nEXT85D
- K nEXT85H

### Inlet flange

- 1 DN40NW (nEXT85)
- 2 DN63ISO-K (nEXT85)
- 3 DN63CF (nEXT85)
- 4 DN100ISO-K (nEXT240/300)
- 5 DN100CF (nEXT240/300)
- 6 DN160ISO-K (nEXT400)
- 7 DN160CF (nEXT400)

### Backing pump

- 1 E2M1.5
- 2 RV5
- 3 RV12
- A XDD1
- D nXDS6i
- E nXDS10i
- F nXDS15i
- G nXDS20i

### Vent option

- 0 Manual Vent
- 1 TAV5 Vent Valve

### Electrical supply

- 1 220-240 V 50/60 Hz (Europe)
- 2 110-120 V 50/60 Hz (USA)
- 3 200 V 50/60 Hz (Japan)
- 4 220-240 V 50/60 Hz (UK)

‡ For Japan low volts on E2M1.5 please order the USA voltage variant, for all other pumps please order Japan version and specify low volts on your order

# VACUUM MEASUREMENT

Edwards offers a complete range of active and digital gauges covering pressures from atmospheric to  $5 \times 10^{-10}$  mbar. Each type has its own benefits making them suitable for different applications. The below should give some guidance as to which may be more suited to your application:

## ACTIVE

Active gauges are complete self-contained head and driver electronics in a compact unit. These gauges typically need 24Vdc and then provide a 0-10V output that relates to the pressure. This output can be S-shaped or linear depending on the chosen unit. The benefits of active gauges are:

- Low power surface mount integrated circuit electronics used for a compact unit.
- Long flexible cables can be used as they only contain a drive voltage and high voltage output signals rather than low voltage signals that could be prone to interference.
- Non-specific controllers eg TIC and ADC can be used that can control multiple gauges without needing to specify exact gauges to use at time of ordering.



## PRESSURE RANGE TABLE

| $10^{-12}$        | $10^{-11}$ | $10^{-10}$ | $10^{-9}$   | $10^{-8}$ | $10^{-7}$ | $10^{-6}$ | $10^{-5}$     | $10^{-4}$ | $10^{-3}$ | $10^{-2}$ | $10^{-1}$    | 1 | 10 | $10^2$ | $10^3$ |
|-------------------|------------|------------|-------------|-----------|-----------|-----------|---------------|-----------|-----------|-----------|--------------|---|----|--------|--------|
| Ultra High Vacuum |            |            | High Vacuum |           |           |           | Medium Vacuum |           |           |           | Rough Vacuum |   |    |        |        |
|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
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|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
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|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |
|                   |            |            |             |           |           |           |               |           |           |           |              |   |    |        |        |

Indicates the primary accuracy range for the specified gauge.  
 Indicates pressure range where the gauge can be used but will not provide accurate readings.

## DIGITAL

Digital gauges are similar to active in that they are self-contained including driving electronics, however they take this one step further and eliminate the need for a separate controller. The digital gauges simply need a supply voltage in the range of 15 to 48Vdc and then are serial comms enabled, so can be directly interrogated via a PC or PLC using either RS232 or RS485 communications. The benefits are:

- Elimination of an external controller reduces overall costs, where serial communications can be used.
- Units are compact and efficient due to the use of low power surface mount integrated circuit electronics.
- Long standard flexible serial cables can be used (although an external power supply will be required).



# VACUUM COMPONENTS AND FLANGE FITTINGS

**When you buy vacuum pump components from Edwards, you can expect the quality and service that only a leading international supplier can provide. We understand that flanges and fittings are critical to the performance of your vacuum system, and supply only high quality products which meet the highest specification.**

## **Convenience of supply:**

Single source supplier, able to provide the complete system solution either online or via local supply centres.

## **High quality and reliability:**

Precision material control ensures a dependable vacuum performance on sensitive or demanding applications.

## **Comprehensive choice:**

Complete range for all common flange sizes in aluminium and stainless steel.

## NW FLANGE ASSEMBLY

**NW fittings, otherwise known as ISO-KF, are the industry standard for many applications in the low to high vacuum range. They are ideal for achieving dependable cost effective performance down to  $10^{-7}$  mbar across a range of applications from light to harsh duty. A simple fastening method means that systems can be easily assembled and a leak tight vacuum seal is quickly achieved.**

- Manufactured to ISO 2861 and DIN 28403 standards
- Nominal diameters 10 mm to 50 mm
- Use with either elastomer or formed aluminium seals
- Choice of clamp type depending on application, access, convenience and cost
- For use in high-vacuum applications: pressures  $>10^{-7}$  mbar

*This brochure details our most popular flange components and valves. Please refer to our full Product Catalogue or visit [www.edwardsvacuum.com](http://www.edwardsvacuum.com) for a complete list if there are any components which are not listed here.*

# VACUUM COMPONENTS AND HARDWARE FLANGE FITTINGS

## TECHNICAL DATA

| Operating pressure range (absolute)   | Minimum               | Maximum |
|---|-----------------------|---------|
| Products are designed for vacuum applications however some will withstand a small over-pressure, this is indicated in the table below where appropriate |                       |         |
| "C" clamp and centring ring   | 10 <sup>-7</sup> mbar | 1 bar   |
| Stainless steel clamping ring and Co-seal   | 10 <sup>-7</sup> mbar | 10 bar  |
| Stainless steel clamp and metal seal  | 10 <sup>-8</sup> mbar | 3 bar   |
| Stainless steel clamp and Co-seal (all sizes)   | 10 <sup>-7</sup> mbar | 10 bar  |
| Polymer and aluminium clamps and Co-seal  | 10 <sup>-7</sup> mbar | 10 bar  |
| NW10 to NW25  | 10 <sup>-7</sup> mbar | 10 bar  |
| NW40 to NW50  | 10 <sup>-7</sup> mbar | 10 bar  |
| NW trapped O ring   | 10 <sup>-7</sup> mbar | 10 bar  |
| ISO trapped O ring  | 10 <sup>-7</sup> mbar | 1 bar   |
| O ring and centring ring (vacuum use only)  | 10 <sup>-7</sup> mbar | 1 bar   |
| Bellows   | 10 <sup>-7</sup> mbar | 1 bar   |
| Flexible pipelines <sup>(1)</sup>   | 10 <sup>-7</sup> mbar | 1.5 bar |
| Braided flexible pipelines <sup>(1)</sup>   | 10 <sup>-7</sup> mbar | 10 bar  |

<sup>(1)</sup> Depends on size

| Stainless steel equivalents |              |                   |
|-----------------------------|--------------|-------------------|
| AISI number                 | DIN standard | Composition       |
| 304L                        | 1.4306       | X2 CrNi 19 10     |
| 316L                        | 1.4404       | X2 CrNiMo 17 13 2 |

## CHEMICAL RESISTANCE

| Material  | Generally resistant to:  | Generally attacked by:  |
|---|--|---|
| <b>Nitrile</b><br>Butadiene acrylonitrile copolymer | Many hydrocarbons fats, oils greases, hydraulic fluids   | Ozone, ketones, esters, aldehydes, chlorinated and nitro hydrocarbons                   |
| <b>Neoprene</b><br>Chloroprene polymer              | Moderate chemicals and acids, ozone, oily fats, greases, many oils and solvents                              | Strong oxidizing acids and esters, ketones, chlorinated aromatic and nitro hydrocarbons |
| <b>Fluoroelastomer</b><br>Fluorocarbon polymer      | All aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable fats                       | Ketones, low molecular weight esters and nitro containing compounds                     |
| <b>Aluminium</b>                                    | Organic acids, fatty acids, freons, nitric acid  | Strong acids, alkalis chlorinated solvents, mercury                                     |
| <b>Stainless Steel</b>                              | Organic acids, alkalis, nitric acid. Sulphuric acid (10%)  | Oxidizing chlorines, some organic acids, hydrochloric acid, hydrofluoric acid           |
| <b>Polymer</b><br>Liquid crystal polymer            | Organic acids, glycols, chlorinated solvents, ketones, mineral and oxidising acids, caustic solutions freons | Sodium hydroxide, sulphuric acid (70%)  |

*This information is provided as a general guide only. Further guidance should be sought with respect to specific chemicals and their applications.*

Our components and flange fittings are designed to be leak-tight across the range of vacuum applications, and not intended to provide full structural support. When designing any vacuum system, it is essential that consideration is given to the static and dynamic loads imposed on each connection. If necessary, additional mechanical support should be provided and built into the design. Regular inspection including leak-checking and, where appropriate, periodic replacement of components should be considered to ensure system efficiency and safety is maintained.

| Operating temperature                          | Maximum       |
|--|---------------|
| "C" clamp and centring ring                    | -10 to 80 °C  |
| Polymer Co-seal                                | -10 to 100 °C |
| Aluminium Co-seal and nitrile seal             | -10 to 150 °C |
| Aluminium Co-seal and fluoroelastomer seal     | -10 to 100 °C |
| Polymer centring ring and nitrile O ring       | -10 to 125 °C |
| Polymer centring ring and fluoroelastomer seal | -10 to 100 °C |
| Nitrile O ring                                 | -10 to 150 °C |
| Fluoroelastomer O ring                         | -10 to 100 °C |
| Polymer clamp                                  | -10 to 125 °C |
| Stainless steel clamping ring                  | -10 to 200 °C |
| Aluminium swing/hinge clamp                    | -10 to 200 °C |
| Stainless steel clamp                          | 1.5 bar       |

*The maximum temperature for continuous operation with fluoroelastomer is 150 °C. It may be intermittently baked at 200 °C.*



## GLOBAL CONTACTS

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