

# CXS chemical dry vacuum pump

## Reactor vacuum duty

Chemical reactions are widely used in the synthesis of new compounds in the chemical, petrochemical, fragrance and pharmaceutical industries. Many processes require vacuum to avoid high temperatures, remove oxygen and reaction products, or shift the equilibrium in gas phase reactions.

The pressure under which reactions are conducted varies between 50 and  $10^{-1}$  mbar, but is usually 10-20 mbar. Reactors typically have capacities of 2 m<sup>3</sup> or below, requiring vacuum pumping speeds of around 100-200 m<sup>3</sup>/h. Capacities can be extended, using larger backing pumps or one or more mechanical or vapour booster stages, to many thousands of m<sup>3</sup>/h.

Historically, 'wet' vacuum technologies have dominated this sector but attitudes and decision-making processes are changing, largely because of the trend towards tighter environmental regulation.

With green issues now at the forefront, vacuum technology must not only enable the process, it must also reduce energy usage, cope with process upsets, maximise uptime, minimise utilities consumption and abate any effluent or process by-products. Dry vacuum pump technology ticks all those boxes.

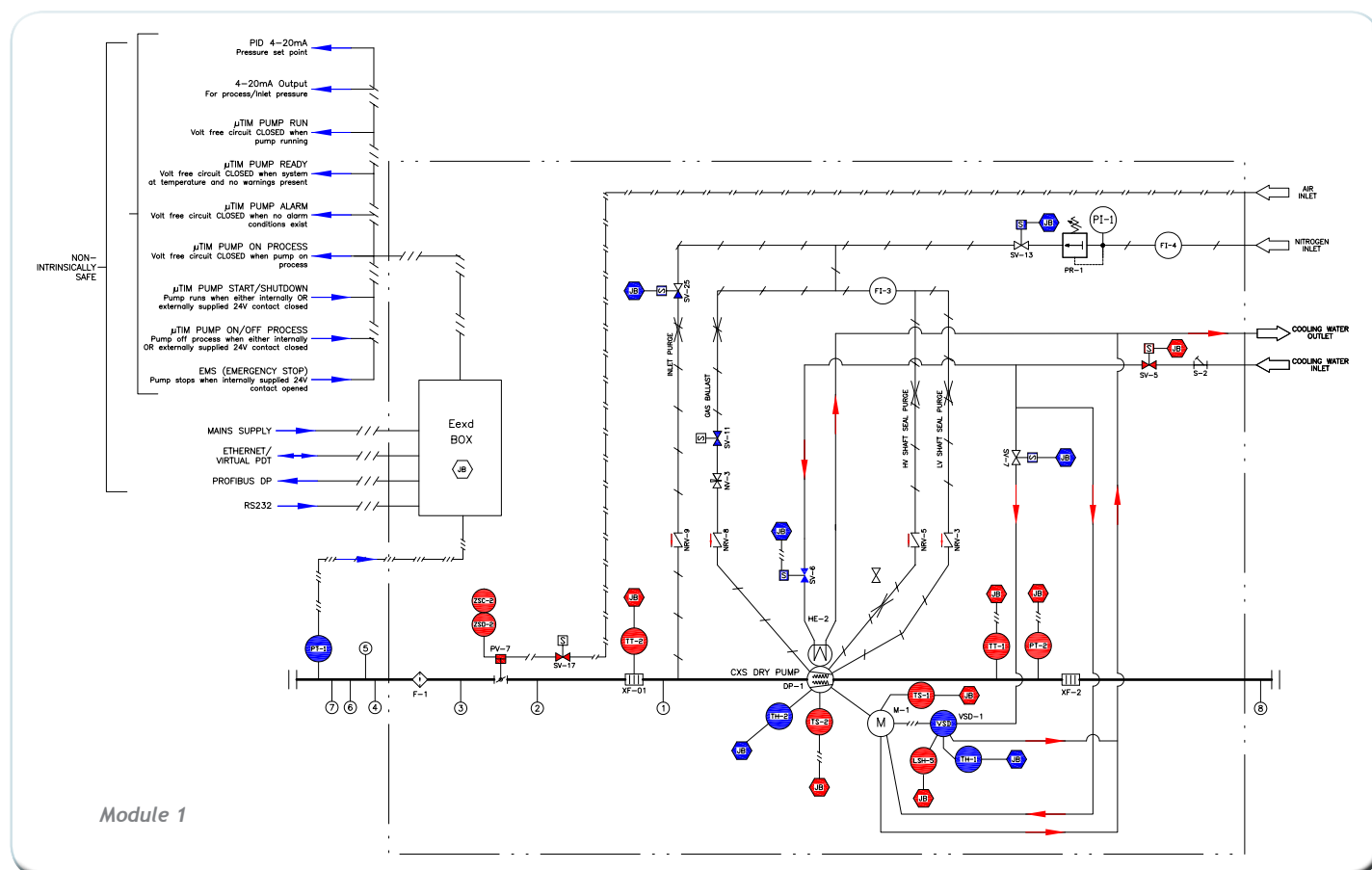
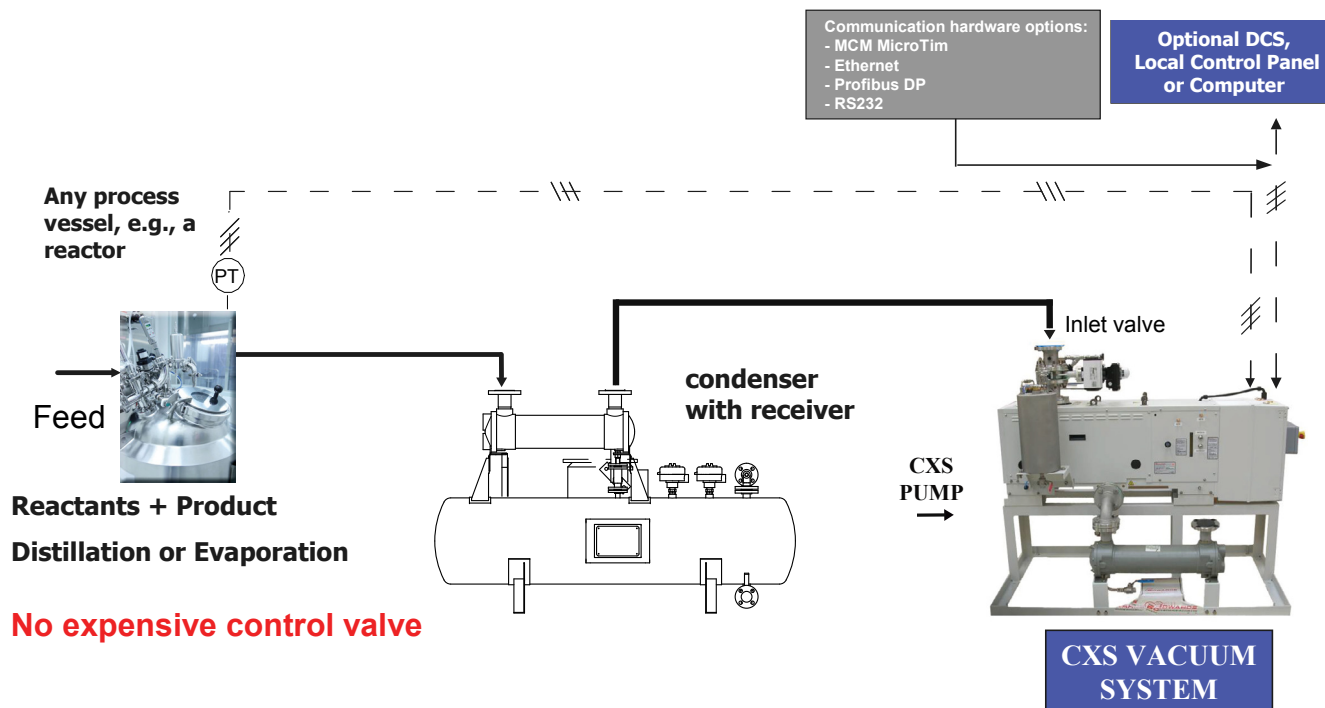
Edwards CXS pumps take the technology to a new level. Ideally suited to even the harshest chemical processes, they deliver optimum performance with lower running costs and minimal environmental impact. In brief, they're simply reliable.

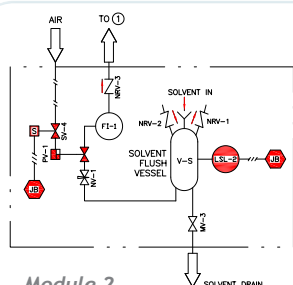


## CXS benefits

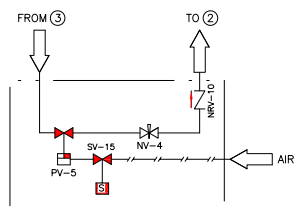
- Simply reliable even in harsh environments, with excellent liquid and solids handling
- Easy to install, simple to operate, quiet running, minimum maintenance
- Consistent repeatable performance, unaffected by seal water temperature
- No effluent – contaminated water/oil generated by 'wet' vacuum systems is eliminated
- Process integrity – no risk of oil or water in the swept volume
- Safety assured – ATEX certified for use in hazardous environments
- Explosion-proof, ensuring safe pumping of flammable gases
- Pumps corrosive vapours without corroding
- Low cost of ownership, with low energy usage and utility costs

# Pressure Control with a CXS and Pressure Transmitter (PT)

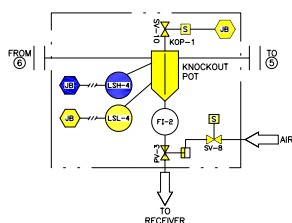




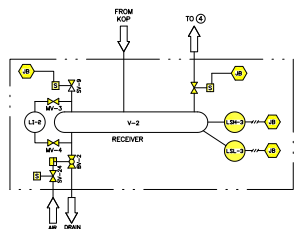
Module 2



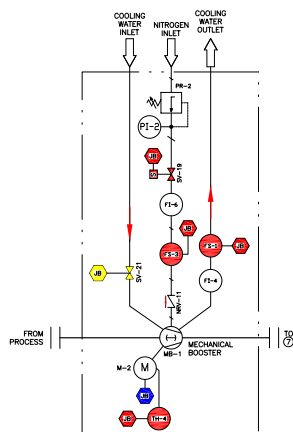
Module 3



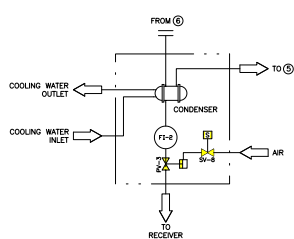
Module 4



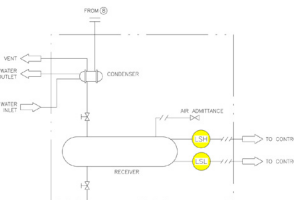
Module 5



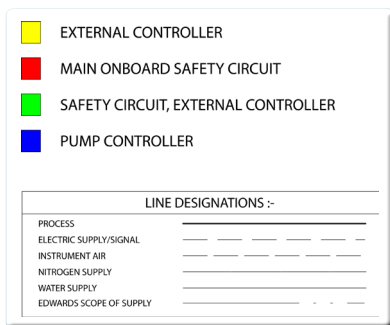
Module 6



Module 7



Module 8



## CXS Module options:

- Module 1: CXS Pump with Purges, Inlet and Outlet Flame Arresters, Inlet Valve, Inverter, Controller & Safety Interlocks
- Module 2: Solvent Flush Package
- Module 3: Inlet Valve By-pass Line
- Module 4: Inlet KOP with Level Control
- Module 5: Inlet Receiver with Auto-drain
- Module 6: EH Mechanical Booster
- Module 7: Inlet Condenser
- Module 8: Exhaust Condenser & Receiver

## Additional Module Options:

- Exhaust Silencer
- Particle Filter
- Pressure Control Valve
- Other Control Options
- Local Control Panel
- Additional Mechanical Boosters
- Documentation Packages
- System Skid

## Processes

CXS pumps should be considered for reactor duties when you want:

- The lowest cost of ownership
- Increased reaction speed
- Reactants or products removed from the system
- Low product temperatures to prevent degradation and improve product viability
- Low final pressures
- Extremely low levels of residual liquids
- No risk of oxidation or explosion
- Recovery of toxic constituents, valuable solvents or fragrances
- Handling of tricky materials, especially particulates, sticky substances and process upsets
- Good pressure controls during the drying cycle
- Fast recovery of equipment cost
- Clean, reliable, safe vacuum

## Markets

- Pharmaceuticals manufacturers
- Fine chemicals industry
- General chemical and petrochemical industries
- Fragrance manufacturers
- Paint and glue manufacturers
- Resin and plastic industries

## CXS features

- CXS chemical dry pumps feature cutting-edge tapered screw technology. Smooth, gradual compression along the length of the rotor results in improved thermal control and optimised performance at all inlet pressures.
- An advanced temperature management system maintains the pump temperature at programmable levels for optimal, repeatable process performance.
- The innovative design uses flooded air-gap potted, high efficiency motors. Integral drive and control systems further help to lower the cost of ownership.
- Quiet running – noise levels typically as low as 64 dB(A).
- CXS chemical dry pumps are designed to be good at handling solids and easy to restart. They can handle at least one litre of liquid per minute continuously and slugs of up to 25 litres without stopping.
- An integral controller, PID pressure control and safety systems allow for 'plug and pump' operation. Pumps can be linked to any external control system via a variety of interfaces including Ethernet and Profibus DP.
- CXS chemical dry pumps have a long service interval of up to five years and require minimal maintenance over their life expectancy of more than 25 years.

## Reactor applications

- Synthesis of new chemical and petrochemical compounds
- Polymerisation of fatty acids
- Pyrolysis of fragrances
- Hydrocarbon and chemical cracking
- Liquid/solid reaction of fine chemicals into intermediates
- Organo-metallic reaction and processes
- Combustion, neutralisation and adsorption reactions

## Global contacts

### EUROPE

UK Crawley +44 1293 528844  
UK (local rate) 08459 212223  
Belgium Brussels +32 2 300 0730  
France Paris +33 1 4121 1256  
Germany Munich 0800 000 1456  
Italy Milan +39 02 48 4471

### USA

Niagara (toll free) +1 800 848 9800  
BRAZIL  
Sao Paulo +55 11 3952 5000  
ISRAEL  
Qiryat-Gat +972 8 681 0633

### ASIA PACIFIC

China (toll free) +86 400 111 9618  
India, Pune +91 20 4075 2222  
Japan, Yachiyo +81 47 458 8831  
Korea, Bundang +82 31 716 7070  
Singapore +65 6546 8408  
Taiwan R.O.C. Jhunan Town +886 3758 1000



WWW.EDWARDSVACUUM.COM

info@edwardsvacuum.com

Publication Number: P41100310, Issue A

© Edwards Limited 2013. All rights reserved.

Edwards and the Edwards logo are trade marks of Edwards Limited.

