Fluid Control and Instrumentation
Since the development of the principle of automatic manufacture in the early 1800s, and the subsequent dramatic advances in machine tooling and manufacturing methods over the past two hundred years, today’s machine builders now have a vast array of standard and specialist products to help ensure accurate and efficient automated assembly line manufacturing.

This unabated strive for improved mass production methods, plus the development of improved measuring and analytical instruments and advanced computer technology for control applications has created a unique engineering sector which is now known as the Process Control Industry (PCI).

As the leading expert in pneumatics, our organisation has been at the forefront of innovative factory automation solutions for over 50 years, and our impressive knowledge and portfolio of process control products is second to none.

Demonstrating this expertise, our new Fluid Control and Instrumentation Leaflet has been specifically designed to provide you with an easy-to-reference overview of our key products for use in PCI applications.

“SMC – the world leader in pneumatic technology is firmly committed to helping you, our customers, gain superiority over your competitors by providing cutting-edge services in industrial automation”.

If you would like to know more about our Process and Instrumentation products including customised options, please contact your nearest SMC office using the address, phone and e-mail details shown on this leaflet back page.

With 320 sales offices in 76 countries and with around 4,300 fully trained sales engineers - the largest in our industry - supported by more than 1,300 R&D engineers, we are never far away and always on-hand ready to help you find the perfect PCI solution.
Contents - Fluid Control

1. Process valves and fluid pumps
   - Process valves
   - Fluid pumps

2. Pressure, vacuum and flow switches
   - Digital pressure switches
   - Mechanical pressure switches
   - Pressure gauges
   - Digital flow switches
   - Mechanical flow switches

3. Ionizers
   - Ionizer
   - Electrostatic sensor, meter and monitor

4. Proportional valves and pressure regulators
   - Electro-pneumatic regulators
   - Precision regulators
   - Clean regulators
   - Booster regulator and air tank
   - Proportional valves

5. Industrial filters
   - Low maintenance filter
   - Vessel series

6. Fittings and tubing
   - Fittings for general purposes, special environments
   - Tubing
   - Nozzles for blowing

Contents - Instrumentation

7. Positioners and instrumentation equipment
   - Pneumatic positioners
   - Electro-pneumatic positioners
   - NAMUR interface valves
   - Instrumentation equipment
Fluid Control

SMC’s impressive product range can offer nearly any product for controlling various fluids in lines up to 2” like the following:

Compressed Air Line

Application examples: air tools (drills, screwdrivers, and wrenches), paint-spraying systems, powder coating, packing, grinding, wire brushing, polishing, sanding, shot blasting, general pneumatic system control.

Fluid Control Line

General use fluids: water, oil, gas/vacuum, steam.
Application examples: steriliser, car washing machine, air conditioning unit, ice storage machine, humidifier, dish washer, leakage inspection machine, crop watering system, packaging machine, laser unit.
**Inert Gas Line**

Application examples: noble gases (helium, argon) are used in research laboratories, chemical/pharmaceutical production, with medical purposes or welding. Inert gases are also used to create inert atmospheres for food packaging (nitrogen) or electronic device manufacturing.

**Deionised Water/Chemicals Line**

Application examples: production of electronic chips and devices, lab research, pharmaceutical production, drug dosing and medical appliance.

**Coolant Line**

Application examples: drilling, milling, cutting, machining in general.
**VX2**
- **General purpose**
- 2 port solenoid valve for air, vacuum, water, oil, steam
- Reduced power consumption, built-in full-wave rectifier
- Valve type: NC, NO; Port size: 1/8” to 1/2”; Orifice size: 2 to 10 mm

**VX3**
- 3 port solenoid valve for air, vacuum, water, oil, steam
- Reduced power consumption, built-in full-wave rectifier
- Valve type: NC, NO, CO; Port size: 1/8” to 3/8”; Orifice size: 1.5 to 4 mm

**VXD**
- **General purpose**
- 2 port solenoid valve with built-in strainer for air, water, oil, steam
- Built-in strainer enabling the removal of contaminants
- Valve type: NC, NO; Port size: 1/8” to 3/8”; Orifice size: 2 to 8 mm

**VXZ**
- **Zero differential pressure**
- 2 port solenoid valve for air, vacuum, water, oil, steam
- Reduced power consumption, built-in full-wave rectifier
- Valve type: NC, NO; Port size: 1/4” to 1”; Orifice size: 10 to 25 mm

**VXS**
- **Zero differential pressure**
- Operation: 2 port solenoid valve for steam
- Compact and lightweight (compared to VX series)
- Improved durability, high flow rate
- Valve type: NC; Port size: 1/4” to 1”; Orifice size: 10 to 25 mm

**VXE**
- **Energy saving type**
- of the VX2, VXD2 and VXZ2 2 port solenoid valve series
- Power consumption is reduced down to 1/3 of the original
- Coil heat reduction
- Valve type: NC; Port size: 1/8” to 1”; Orifice size: 10 to 25 mm

**VXR**
- **Water hammer relief**
- 2 port solenoid valve for water, oil
- Valve type: NC, NO; Port size: 1/2” to 2”; Orifice size: 20 to 50 mm

**VXH**
- 2 port solenoid valve for high pressure (2 MPa) air, water, oil
- Valve type: NC; Port size: 1/4” to 1/2”; Orifice size: 10 mm

**VXFA**
- 2 port valve for dust collector
- Port size: 3/4” to 13/4”; Orifice size: 20 to 40 mm

**VC/L52408**
- 2 port solenoid valve for specialised use
- VCA: air
- VCB: heated water (≤ 99ºC)
- VCL: oil
- VCS: steam (≤ 184ºC)
- VCW: water
- Port size: 1/8” to 3/4”, 6A to 20A; Orifice size: 2 to 10 mm

**VN/L52408**
- 2 port valve for general purpose
- VNA: air, gas, air-hydro
- VNB: air, inert gas, low vacuum, water, heated water, oil
- VNC: coolant (0.5MPa, 1MPa)
- VND: steam. PTFE seal adopted
- VNH: high pressure coolant (3.5MPa, 7MPa)
VQ20/30
- 2 port solenoid valve pilot operated, for dry air
- High frequency operation: high speed response 5 ms or less (VQ20), 20 ms or less (VQ30)
- Compact and lightweight with large flow capacity: VQ20: 46 g, 9 Nl/min; VQ30: 80 g, 17.5 Nl/min

SGC [renewal VNC series]
- 2 port, air operated/external pilot solenoid valve for controlling cutting oils and coolant used in machine tools
- Low power consumption: 0.35 W
- Operating pressure range: 0 to 0.5 MPa / 0 to 1 MPa / 0 to 1.6 MPa
- Service life: 5 million cycles or more

SGH [renewal VNH series]
- 2 and 3-port coolant valve for high pressure applications (3 MPa / 7 MPa)
- Low power consumption: 0.35 W
- Service life: 3 million cycles
- Water hammer reduced by 20%
- Higher flow rate: 10% (2 port), 100% (3 port)

VCH
- 5.0 MPa Pneumatic Equipment Series
- VCH40/400: pilot operated 2/3 port solenoid valve - Response time variation within ±2 ms, service life: 10 million cycles
- VCHC40: check valve - service life: 10 million cycles
- VCHR30/40: direct operated regulator (relieving type)
- VCHN3/4: silencer - 35 dB(A) noise reduction

High Purity Chemical Valves - Clean Wet Series

LVA
- Air operated, threaded type. Diaphragm material PTFE, EPR, NBR is selectable. Body material: new PFA/stainless steel PPS

LVC
- Air operated, integral fitting type (hyper fittings). Compatible with 100°C fluid temperature. Body material: new PFA

LVH
- Manually operated, integral fitting type / threaded type. Locking and non-locking types available. Body material: new PFA/stainless steel PPS

LVD
- Air operated: Compact type, space saving: dimension across inlet/outlet ports: reduced by up to 29%. Body material: new PFA, diaphragm: PTFE, actuator section: PPS

LVO
- Non-metallic construction without using metal screws to fasten the body of the actuator
- Variation: air / manually operated; insert bushing / flare and integral fitting types

LVM
- Compact direct operated 2/3 port solenoid valve for chemicals
- Variation: orifice diameter 1.1, 1.4, 1.6 and 2 mm. Wetted part material: PEEK, EPDM, FKM, Kalrez®

Fluids Pumps

PA3000
- Double acting pump, automatically operated type/air operated type
- Compact, high capacity diaphragm pump to transfer and deliver a wide variety of fluids
- Discharge flow rate: max. 20 l/min

PB1000
- Single acting pump; built-in solenoid valve / air operated type
- Compact, high capacity diaphragm pump to transfer and deliver a wide variety of fluids
- Discharge flow rate: max. 2 l/min

PAF3000/5000
- Process pump
- Excellent corrosion resistance - Body material: new PFA; Diaphragm, seal material: PTFE
- Automatically operated (discharge flow rate max. 45 l/min) / air operated (discharge flow rate max. 38 l/min)
Pressure, Vacuum and Flow Switches

Digital Pressure Switches (Integrated Type)

**ZSE30A(F) / ISE30A**
- 2-colour display high-precision digital pressure switch
- Settings can be copied to up to 10 slave sensors at once
- Rated pressure range: vacuum/compound: 0.0 to –101.0 kPa, –100 to 100 kPa; positive: –0.1 to 1.0 MPa

**ZSE40A(F) / ISE40A**
- 2-colour display high-precision digital pressure switch
- Settings can be copied to up to 10 slave sensors at once
- Rated pressure range: vacuum/compound: 0.0 to –101.0 kPa, –100 to 100 kPa; positive: –0.1 to 1.0 MPa

**ZSE80 / ISE80**
- Digital pressure switch for accurate sensing of a variety of fluids
- Stainless steel construction
- Pressure range: vacuum: [-0.1, 0] MPa; compound: [-0.1, +0.1] MPa positive: [-0.1, 1] and [-0.1, 2] MPa

Digital Pressure Switches (Remote Type)

**PSE530**
- A single controller (PSE200) monitors up to 4 pressure sensors (PSE530)
- Space saving (76% reduction in installation space), simplified application
- Pressure range: high pressure [0, 1] MPa, low pressure [0, –101] kPa, compound pressure [-101, 101] kPa

**PSE540**
- Compact pressure sensor for pneumatics (controller: PSE300)
- Weight: 2.9 g
- Pressure range: vacuum [0, –101] kPa, compound pressure [-100, 100] kPa

**PSE560**
- Pressure sensor for general purpose fluids (controller: PSE300)
- Wetted material: SUS316L
- Pressure range: positive pressure [0, 500] kPa and [0, 1] MPa, vacuum [0, –101] kPa, compound pressure [-100, 100] kPa

Mechanical Pressure Switches

**IS100**
- Compact and lightweight mechanical pressure switch, reed type
- Set pressure: 0.1 to 0.4 MPa

**IS3000**
- Pneumatic pressure switch
- Can be used for small electrical loads (10mA) e.g. relays, programmable controllers, etc.
- Set pressure: 0.1 to 0.7 MPa

**ISG**
- General purpose pressure switch
- Pressure range: positive [0.02, 0.3] MPa, [0.05, 0.7] MPa, [0.1, 1] MPa; vacuum [-10, -100] kPa

Pressure Gauges

**G36/46-L**
- Pressure gauge with limit indicator, colour zone type: the indicator adjusts to highlight preferred range
- Pressure range: 0 to 0.2, 0 to 0.4 and 0 to 1.0 MPa

**GD40-2-01**
- Differential pressure gauge: ideal for the maintenance control of filters
- Compact and lightweight
- Accuracy: ±0.006 MPa
Digital Flow Switches

PFM
- 2-colour display digital flow switch
- Variation: PFM7 = Integrated display; PFM5 = Remote sensor unit; PFM3 = Flow sensor monitor
- Compact size: the use of MEMS technology makes possible to achieve a small dimensional space and additionally a lightweight product
- Flow rate range: 10, 25, 50, 100 l/min
- Applicable fluids: dry air, N2, Ar, CO2

PFMV
- Variation: PFMV5 = Flow Sensor; PFMV3 = Voltage Monitor for PFMV5
- Precise suction confirmation of very small work pieces
- Flow rate range (PFMV5): [0, 0.5], [0, 1.0], [0, 3.0], [-0.5, 0.5], [-1.0, 1.0], [-3.0, 3.0] l/min
- Applicable fluids: dry air, N2

PF2
- Variation: PF2A = for air; PF2W = for water; PF2D = for deionised water and chemicals; PF2/L52408 = 4-channel flow monitor
- Flow rate setting and monitoring are possible with the digital display
- Flow rate range _ PF2A: from 1 up to 12000 l/min; PF2W: from 0.5 up to 100 l/min; PF2D: from 0.4 up to 40 l/min

Mechanical Flow Switches

IFW5
- Diaphragm type flow switch
- Low flow setting possible: 1 l/min
- Flow range: 1 to 10 l/min, 10 to 20 l/min, 20 to 50 l/min

IF3
- Paddle type flow switch
- Wide range of applicable fluids
- Flow range: 14 to 60 l/min, 20 to 1500 l/min, 36 to 2600 l/min

Ionizers

IZS31
- Bar type ionizer
- Controlled ion balance with sensors: feedback, autobalance (high precision type) and autobalance (body mounting type)
- Electrode cartridges: high speed static removal type and low maintenance type

IZD10
- Electrostatic sensor
- Potential measurement: ±20 kV (detected at a 50 mm distance), ±0.4 kV (detected at a 25 mm distance)
- Analogue output: The measured electrostatic potential is converted into a 1 to 5 V output that can be used with the IZE11

IZN10
- Nozzle type and high frequency AC type ionizer
- With built-in power supply substrate: 16 mm thickness
- Nozzle selectable: energy saving and large flow types
- ±10 V ion balance
- Contaminated electrode needle detection function

IZH10
- Handheld electrostatic meter: a portable sensor that detects the electrostatic potential of an object and outputs a digital readout
- Rated charge amount range: ±20.0 kV
- Compact and lightweight

IZE11
- Electrostatic Sensor (IZD10) Monitor
- Supports two types of sensors: ±0.4 kV and ±20 kV
- Minimum unit setting: 0.001 kV (at ±0.4 kV), 0.1 kV (at ±20 kV)
- Display accuracy: ±0.5%
5 Industrial Filters

**FN1/FN4**
- Low maintenance filter: environmentally-friendly filter for coolants and detergents with back-flushing performance that allows normal operation with no need to replace the element
- Flow rate: FN1: 40 and 80 l/min; FN4: 250 l/min
- Nominal filtration rating: 5, 20 µm

**FG**
- Industrial filters: vessel series [FGD, FGE, FGG, FGA, FGB, FGC, FGF, FGH]
- Nominal filtration rating: 0.5 to 105 µm
- Flow rate: 60 to 3800 l/min

**FO1**
- Filter for cleaning solvent
- Quick change filter: no tools required
- Nominal filtration rating: 0.5 to 105 µm
- Port size: 1/2” to 1”
Fittings and Tubing

Fittings (for General Purposes)

KQ2 • One-touch fittings
  • Port size: M5 to 1/2"
  • Applicable tubing O.D.:
    Metric: ø3.2 mm to ø16 mm
    Inch: ø1/8" to ø1/2"

KQB • Brass one-touch fittings
  • Port size: M5 to 1/2"
  • Applicable tubing O.D.:
    ø4 mm to ø12 mm

KK130 • Energy saving S coupler
  • Port size [thread type (male and female)]: 1/8" to 1/2"
  • Applicable hose O.D. [barb and one-touch fitting types]:
    6 to 12 mm / 1/4" to 1/2"
  • Applicable hose I.D./O.D. [nut fitting type]: 5/8 mm to 11/16 mm

KQG • Stainless steel 316 one-touch fittings
  • Port size: M5 to 1/2"
  • Applicable tubing O.D.:
    Metric: ø4 mm to ø12 mm
    Inch: ø1/8" to ø1/2"

KFG • Stainless steel 316 insert fittings
  • Port size: 1/8" to 1/2"
  • Applicable tubing O.D.:
    ø4 mm to ø12 mm

KP • Clean one-touch fittings
  • Port size: 1/8" to 1/2"
  • Applicable tubing O.D.:
    ø4 mm to ø12 mm

LQ1, LQ3 • Fluoropolymer fittings (new PFA): hyper fittings
  • Variation: LQ1, LQ3 (flare type)

KKA • S couplers stainless steel type
  • Port size [thread type (male and female)]: 1/8" to 11/2"

Fittings (for Special Environments)

KGG • Stainless steel 316 one-touch fittings
  • Port size: M5 to 1/2"
  • Applicable tubing O.D.:
    Metric: ø4 mm to ø12 mm
    Inch: ø1/8" to ø1/2"

KFG • Stainless steel 316 insert fittings
  • Port size: 1/8" to 1/2"
  • Applicable tubing O.D.:
    ø4 mm to ø12 mm

KP • Clean one-touch fittings
  • Port size: 1/8" to 1/2"
  • Applicable tubing O.D.:
    ø4 mm to ø12 mm

LQ1, LQ3 • Fluoropolymer fittings (new PFA): hyper fittings
  • Variation: LQ1, LQ3 (flare type)

KKA • S couplers stainless steel type
  • Port size [thread type (male and female)]: 1/8" to 11/2"

Nozzles for Blowing

KN • Male thread nozzle: nozzle size ø1 to ø2.5, connection thread 1/4"

KNH • High efficiency nozzle (air blow thrust: +10%): nozzle size ø1 to ø2, connection thread 1/4"

KNS • Low noise nozzle with male thread: nozzle size ø0.75 x 4 to ø1.1 x 8, connection thread 1/4"

KNL • Copper extension nozzle: nozzle size ø1.5 to ø2, outside diameter ø6

Tubing

TU • Polyurethane tubing
  • 23 colour variations
  • Tubing O.D. [mm]: 2 to 16 (metric) / 3.18 to 12.7 [inch]
  • Tubing I.D. [mm]: 1.2 to 10 (metric) / 8 to 1.5 [inch]
  • Minimum bending radius [mm]: 4 to 45 (metric) / 10 to 35 [inch]

TCU • Polyurethane coil tubing
  • Number of cores: 1, 2, 3
  • Tubing O.D. [mm]: 4, 6, 8
  • Tubing I.D. [mm]: 2.5, 4, 5

TPH • Clean tubing: polyolefin tubing
  • Tubing O.D. [mm]: 4 to 12
  • Tubing I.D. [mm]: 2.5 to 9
  • Minimum bending radius [mm]: 10 to 55

TPS • Clean tubing: soft polyolefin tubing
  • Tubing O.D. [mm]: 4 to 12
  • Tubing I.D. [mm]: 2.5 to 9
  • Minimum bending radius [mm]: 10 to 55

TD/TID • Soft fluoropolymer tubing (denatured PTFE)
  • Tubing O.D. [mm]: 4 to 12
  • Tubing I.D. [mm]: 2.5 to 9
  • Minimum bending radius [mm]: 10 to 55

TL/TIL • High purity fluoropolymer tubing (high purity PFA)
  • Tubing O.D.: 4 to 19 mm (metric) / 3.18 to 25.4 [inch]
  • Tubing I.D.: 3 to 16 mm (metric) / 2.18 to 22.2 [inch]
  • Minimum bending radius [mm]: 20 to 160 (metric) / 12 to 250 [inch]
Instrumentation

Instrumentation Equipment

Control of throttle, damper and screw down valves to be used for cogeneration, desulfurisation, cooling and environmental processes.

Typical pneumatic control system as fitted to a diaphragm valve using SMC Pneumatic products.
Positioners and Instrumentation Equipment

Pneumatic Positioners

IP200
- Cylinder positioner
- Double action
- Pneumatic input: 0.02 to 0.1 MPa

IP5000 / IP5100
- Pneumatic positioner - lever type (IP5000) and rotary type (IP5100)
- Single and double action
- Pneumatic input: 0.02 to 0.1 MPa
- Option: high temperature (100°C)
- ATEX compliant

Option: high temperature (100°C)
- ATEX compliant

Introduction to high-temperature operation

ATEX compliant

Electropneumatic Positioners

IP8000 / IP8100
- Electropneumatic positioner lever type (IP8000) and rotary type (IP8100)
- Single and double action
- Input current: 4 to 20 mA DC
- Option: continuous analogue output 4 to 20 mA DC
- ATEX compliant

IP8001 / IP8101
- Smart positioner lever type (IP8001) and rotary type (IP8101)
- Single and double action
- Input current: 4 to 20 mA DC
- High accuracy and stability (no aparece traducido en el catálogo)
- Calibration function integrated
- HART transmission mode
- ATEX compliant

ATEX compliant

Electro-pneumatic Positioners

VFN
- 5/2 solenoid valve for air and inert gas
- Conforms to the NAMUR directive
- Single and double acting
- Flow rate: 1379 Nl/min

NAMUR interface

Solenoid Valve

IF3
- Paddle style flow switch
- Piping sizes range from 3/4B to 6B
- Wide range of applicable fluids
- Various enclosures

Mechanical Flow Switches

IF3
- Paddle style flow switch
- Piping sizes range from 3/4B to 6B
- Wide range of applicable fluids
- Various enclosures

Instrumentation Equipment

IW212
- Filter regulator
- Filtration degree: 5 µm
- Flow rate: up to 400 Nl/min
- Regulation range: 0.02 to 0.7 MPa

IL100
- Booster relay
- Pilot pressure: 0.7 MPa
- Flow rate: 1080 Nl/min

IL201
- Lock-up valve
- Pilot pressure: 0.14 to 0.7 MPa
- Flow rate: 900 Nl/min
**Damper control**: emergency fail open/closed options

What ever your size or demand, we can supply you with a fully bespoke control unit to fit all your damper control requirements. Whether it’s for controlling large duct dampers as used in the power industry or in large kiln operations, or even those small, short applications, which are often required in HVAC applications, we can offer you a range of excellent products to meet all your damper control needs.

**Positioning Cylinders**: bulk solids handling

Our application specific positioning cylinders are ideal for use in dusty or dirty locations. Typically these conditions are found in environment such as concrete, limestone, silo, grain, cocoa, coffee and pulp and paper plants. As each application is often specific to your process, our experts can design an individual solution, just for you.
Valves Positioning: positional control of integrated assemblies

Actuation and control of current in-line manual valves, control valve options for high level accurate process control applications

If you’re managing a one-off project, which is not part of your normal day-to-day business, we can offer you even more purchasing advantages.

With SMC you can rely on:

- Our in-house design experts - with many years of experience
- Risk free, system designs - using proven techniques
- Fully tested systems - ensuring fast integration into your machine/lines
Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.

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