



**SMC working in the European mineral processing and quarrying industry**





### SMC working in the European mineral processing and quarrying industry:

As the leading experts in pneumatics, SMC products are used in many mineral processing and quarrying applications around the world.

With a **focus on component quality and long life-cycle performance**, our products are now recognised as simply the **best in their field** by many of the leading organisations in this industry sector.

However, this success has not gone to our heads.

We recognise that by fully **understanding the needs of our mineral processing and quarrying customers**, we can develop even more cost effective component solutions to help increase both output and operational profit.

By selecting an SMC product, **excellent performance is guaranteed** and peace of mind is ensured.



### Mineral processing and quarrying in Europe:

The traditions of the European mineral processing and quarrying industry can be traced back hundreds of years.

But in Europe, unlike some other regions of the world, we now import most of our metal and metallic ore needs from other countries.

However, we are fortunate in having a rich natural source of minerals which make us virtually self-sufficient in mining and quarrying non-energy producing materials, many of which we use in our everyday lives.

Crushed rock, sand and gravel used to construct roads and buildings, and the extraction of metals, lime, kaolin, silica sand and talc used in many manufacturing, medical, food, and agricultural applications, are just a few of the key materials which are mined or quarried from European soil each year.

In addition, Europe is also home to a globally recognised secondary mineral processing industry - with many of the world's leading mineral conversion experts, supported by a network of specialist engineering companies, developing new processes and machinery for use throughout the world.





SMC R&D Centre – Japan



European Centre Warehouse – Belgium

### Understanding the needs of European mineral processing and quarrying operators:

By **working closely** with some of the leading mineral processing and quarrying operators in Europe, plus many of the top European machine builders in this important industry sector, SMC have **designed and developed a range of high performance products to combat the harsh working conditions** often encountered in both mineral extraction and mineral processing.

We recognise that **increased profitability is inextricably linked to efficient mineral processing and quarrying** methods, and that improved component reliability, efficiency and productivity are three important ways we can help you to **gain the maximum return on your investment**.

As environmentally aware manufacturers, with manufacturing plants throughout the world, we are particularly **focused on both energy efficiency and reduced energy consumption** as a part of our corporate social responsibility activities. Since the formation of our energy saving project nearly a decade ago, our R&D experts have developed numerous innovative, energy efficient components which can dramatically reduce your operational energy costs **to help improve your bottom line**.

If you are looking for a comprehensive range of high quality machine components which meet all the necessary health and safety requirements and which have been built especially for many mineral processing and quarrying applications, then **simply look no further**.

By selecting components from SMC – the world leaders in pneumatics – you will also have access to some of the **best technical experts around, supported by a truly global network** of SMC offices, technical centres and manufacturing facilities.

If you like the sound of this **“peace of mind”** service and would like to know more, why not check out this latest European Mineral Processing and Quarrying Leaflet or contact your nearest SMC office.



A selection of SMC products developed and used in the mineral processing and quarrying industry:

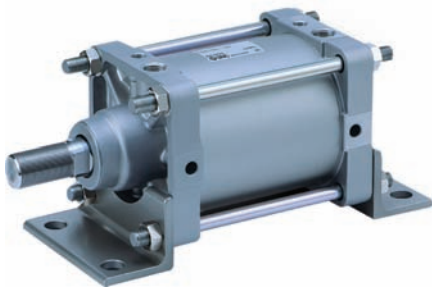
#### ■ Actuators:

SMC have an extensive range of both standard and specialist actuators which are particularly suitable for mineral extraction, mineral processing and aggregate industry applications.



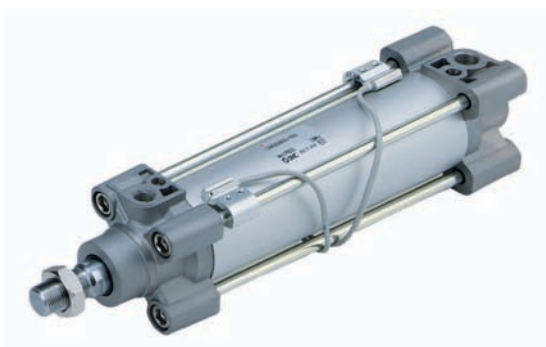
#### Series CS1 – heavy duty cylinders

- Double acting single rod air cylinder
- Available in 125, 140, 160, 180, 200, 250, 300mm bore sizes
- 7 Mounting options
- Through rod type available
- Air cushioning as standard
- 125-200mm bore size can accommodate autoswitch
- Low friction (CS1Q) and Air-hydro (CS1Q) options upon request
- 19 made-to-order specifications including heat resistant (-10 to 150°C) and heavy duty scraper models



#### Series CS2 – lightweight, large bore cylinders

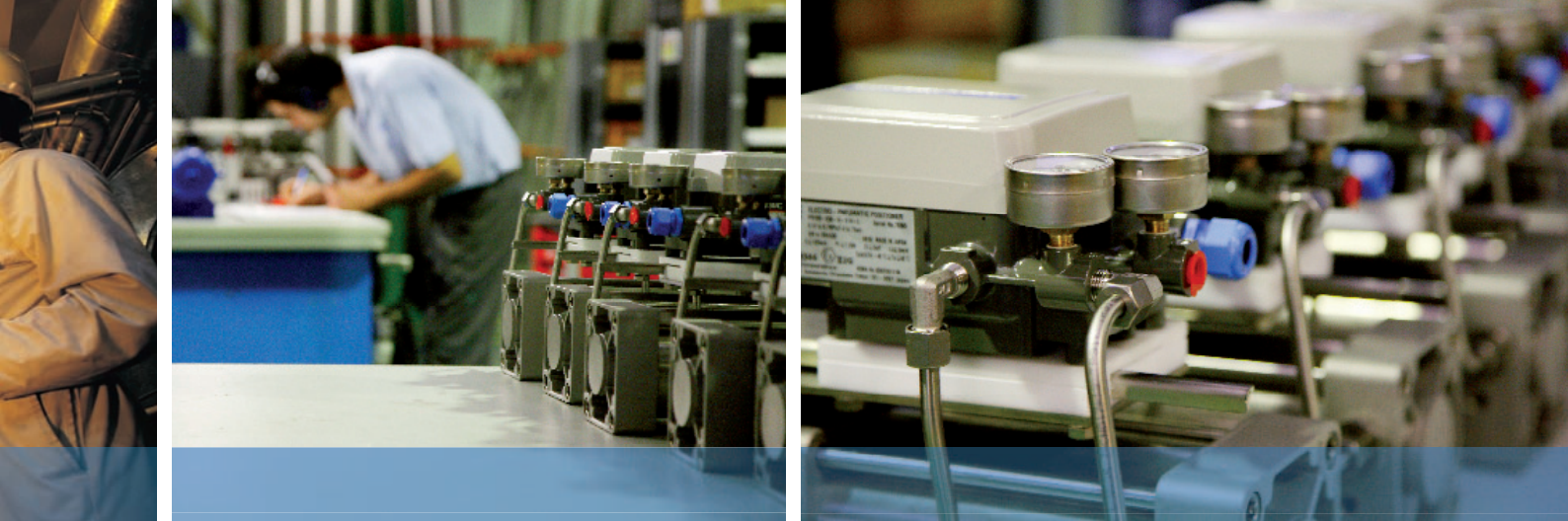
- Double acting single rod air cylinder
- Aluminium rod and head covers reduce weight by up to 50% compared to the CS1 range
- Available in 125, 140, 160mm bore sizes
- 7 Mounting options
- Air cushioning with fine adjustment
- Cushion valve and port on the same face
- 125-160mm bore size can accommodate auto-switch



#### Series C96 – Standard ISO cylinders (round tube type)

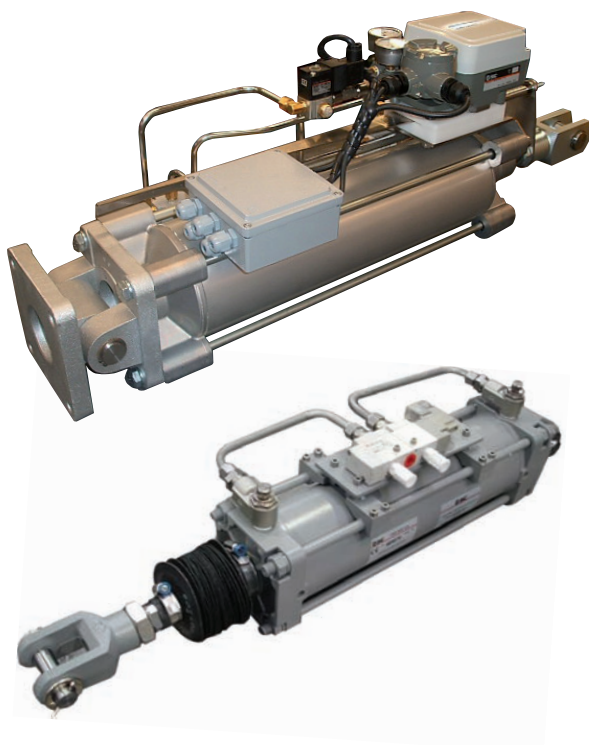
- ISO 15552 standard cylinders – tie rod design
- Available in 32 to 125mm bores sizes
- Easy adjustment of the cushion valve
- End of stroke cushion provides smooth operation
- Minimum piston rod deflection
- Improved mounting accuracy
- Maximum flexibility for auto-switch mounting
- Numerous made-to-order (standard) options including dual stroke cylinders and heat and cold resistant models





#### Series CP96 – Standard ISO cylinders (profile tube type)

- ISO 15552 standard cylinders – tie rod design with integrated tie rods
- Available in 32 to 125mm bores sizes
- Easy adjustment of the cushion valve
- End of stroke cushion provides smooth operation
- Minimum piston rod deflection
- Improved mounting accuracy
- Maximum flexibility for auto-switch mounting
- Numerous made-to-order (standard) options including dual stroke cylinders and heat and cold resistant models



#### Special Assemblies

With factories throughout the world, supported by local manufacturing facilities at the majority of our European subsidiaries, we have the design and production capabilities to manufacture both Special and Simple Special products to meet the needs of our mineral processing and aggregate industry customers.

Whether a simple assembly combining a number of related SMC components in one easy to purchase unit, or a specialist product designed for your specific application, our experts are on-hand to provide you with fast and efficient service to meet all your needs.

#### ■ Related specialist cylinder



#### Series XT316 – air shocker cylinders

Designed to remove plugging due to bridging or adhesion of bulk material inside a hopper or chute, these epoxy coated, non lubricated, piston type cylinders offer both strong and stable impact force performance with a range variable impact force options.



## ■ Specialist cylinders developed for aluminium industry

With a commitment to develop products that meet our customers' needs, during the last few years we have been working closely with the aluminium industry to help design a pneumatic cylinder which can withstand the most arduous of environmental conditions encountered in the smelting process.

Aluminium smelters consist of one or more potlines often using around 300 pots and pneumatic cylinders are used to break the crust which forms on the surface of the molten aluminium inside the pot.

However, the very high temperatures reached in this process are extremely damaging to pneumatic cylinders.

Typical problems include:

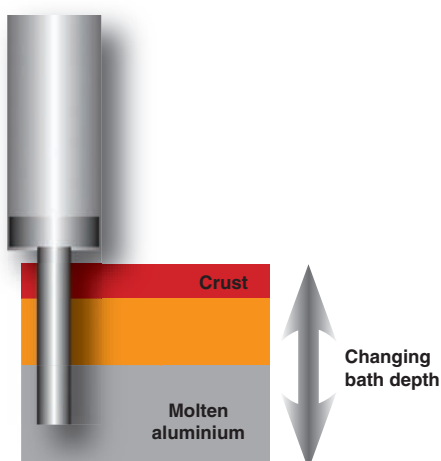
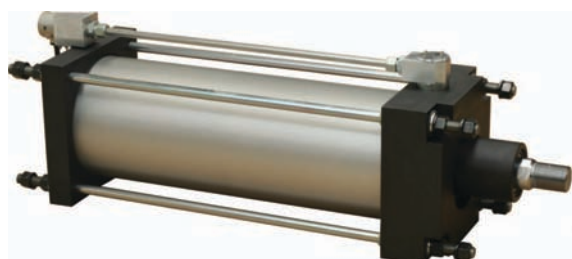
- Erosion of the piston rod plating
- Short operational life of the nose seal/wiper/bush
- Breakdown of the cylinders lubricant
- High piston seal wear
- Build-up of frozen bath on the chisel
- Iron contamination of the bath as the chisel deteriorates
- Short actuator life with high running costs

## An SMC solution – our standard crust breaker cylinder range:

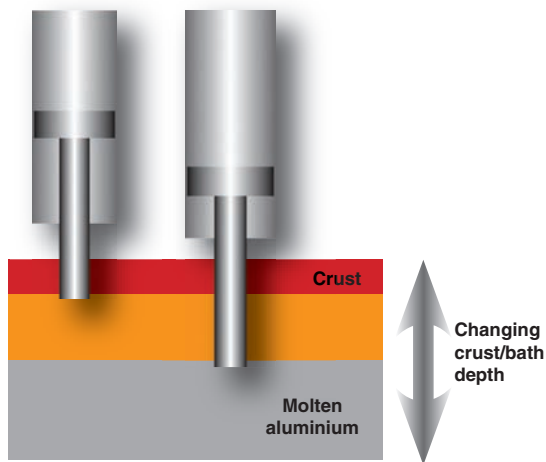
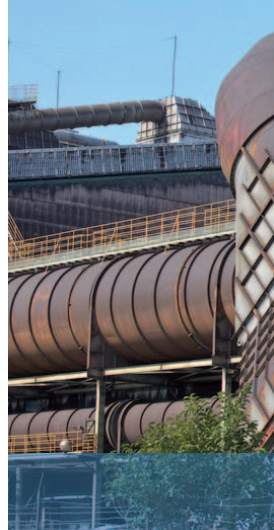
Our high quality, crust breaker cylinders are recognised, by many in the smelter industry, for their excellent operational life cycle performance and also their value for money. These steel bodied cylinders operate at a fixed air pressure, delivering a fixed stroke using a fixed dwell time, but they do offer variable crust strength and crust depth performance.

### Standard solution

- Fixed stroke
- Fixed air pressure
- Fixed dwell time
- Variable crust strength
- Variable crust depth







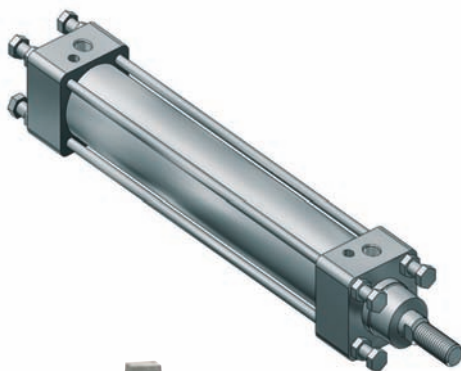
**However, we now have a more advanced solution.**

Designed and developed specifically for the aluminium smelting industry, with the help and co-operation of the world's largest aluminium producer, we can now offer our customers a crust breaker cylinder that has a life expectancy exceeding that of the pot.

#### **Our high performance – Contact Sensing Crust Breaker Cylinder**

##### **Contact sensing solution**

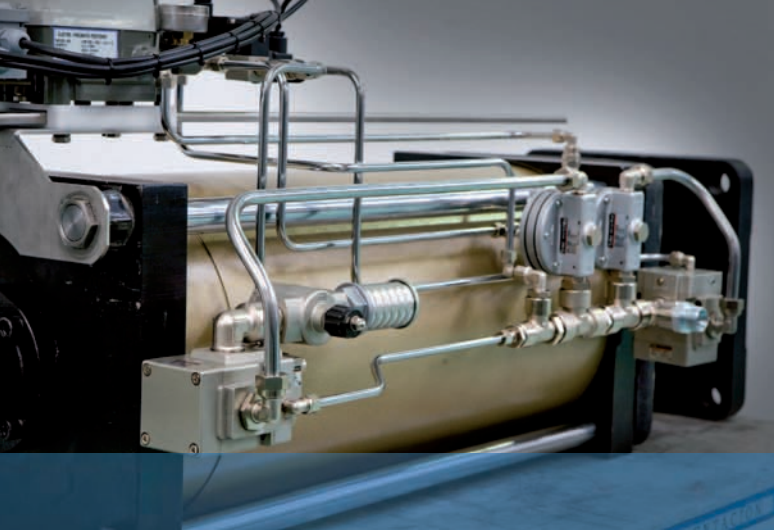
- Variable stroke
- Variable air pressure
- Variable crust strength
- Variable crust depth



Extensively tested in various smelter operations, with reduced deterioration of seals, air leaks or the need for repairs, these contact sensing cylinders are now operating in a growing number of pot lines throughout the world and have been proven to help reduce the costs of aluminium production.

Money saving benefits include:

- reduction of consumed compressed air by 50%
- reduced downtime for actuator repairs/replacement
- reduction in inventory – replacement/spare parts
- lower incidence of anode effect
- less iron contamination
- reduced chisel replacement



## ■ Smart/Pneumatic positioners

For optimum cylinder performance and cost effective operation, we have developed a range of high quality smart/pneumatic positioners.

Extremely robust and perfect for use in harsh environments, these positioners can be used in combination with other SMC components as complete assemblies to effectively maintain and monitor the position of our pneumatic cylinders.



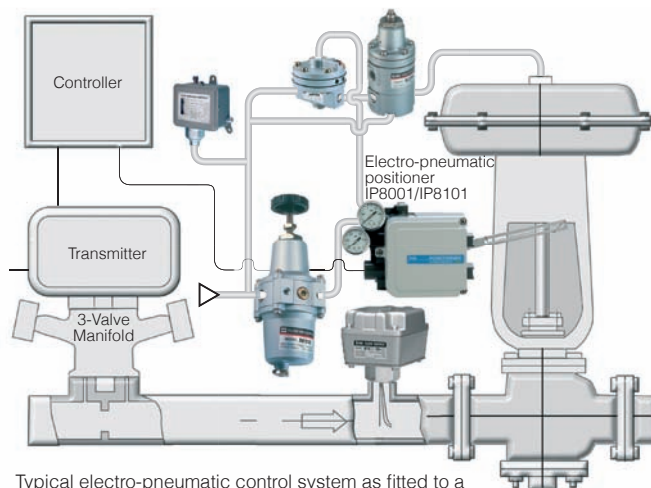
### IP200

- For mounting on pneumatic cylinders
- Max. Strokes 300 mm
- Pneumatic input: 0.02 to 0.1 MPa



### IP5000/5100

- For mounting on pneumatic cylinders, rotary actuators and diaphragm valves
- Lever or rotary type
- Pneumatic input: 0.02 to 0.1 MPa
- Option: high temperature (100°C)
- ATEX compliant



Typical electro-pneumatic control system as fitted to a diaphragm valve using SMC Pneumatic products.



### IP8000/IP8100

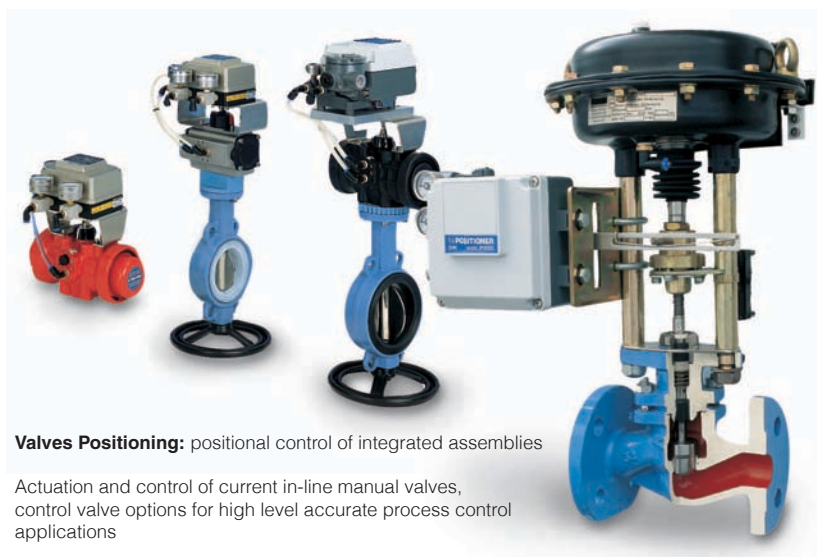
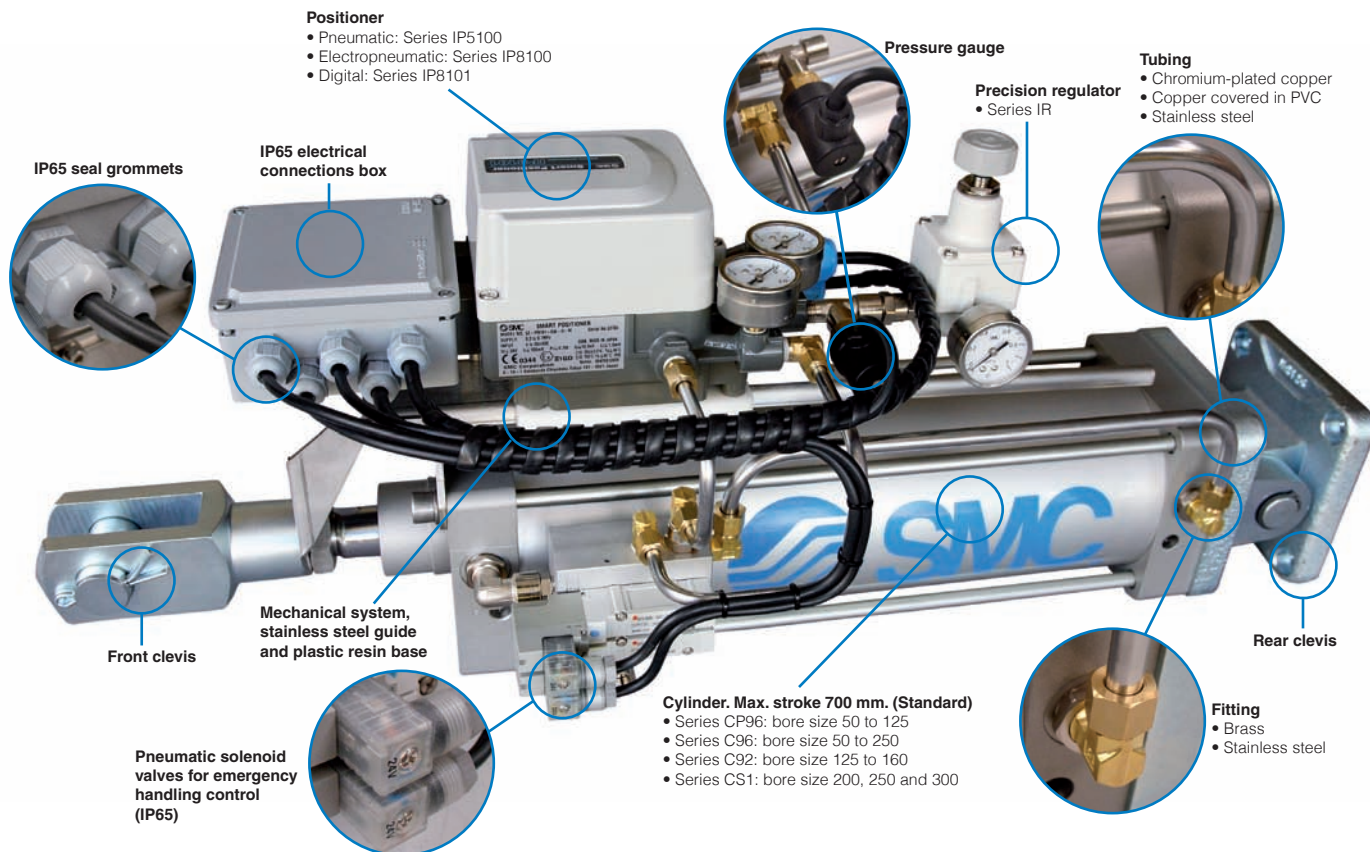
- For mounting on pneumatic cylinders, rotary actuators and diaphragm valves
- Lever or rotary type
- Input current 4-20 mA DC
- Option: continuous analogue output 4-20 mA DC
- ATEX compliant



### IP8001/IP8101

- For mounting on pneumatic cylinders, rotary actuators and diaphragm valves
- Lever or rotary type
- High accuracy and stability
- Integrated self-calibration
- HART transmission mode
- Option: continuous analogue output 4-20 mA DC and alarms
- ATEX compliant









## ■ Control cabinets

With an on-going commitment to help our customers by providing them with **total engineering solutions**, we can also offer our customers a **complete design and build service for all their electro/pneumatic control panel needs**.

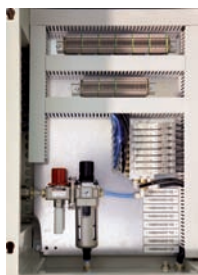
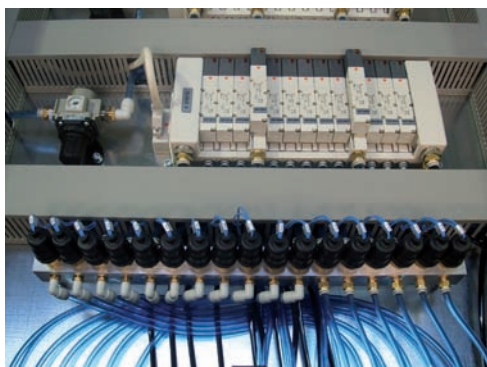
From a small simple assembly to a complex control system, our specialist teams of highly trained engineers have extensive experience of building electro/ pneumatic/control cabinets for many industrial applications.

Having worked extensively, for many years, in the electronics, food processing and food manufacturing, automotive, life science and mining industry sectors, we are particularly knowledgeable of these industries and their specific, individual requirements.

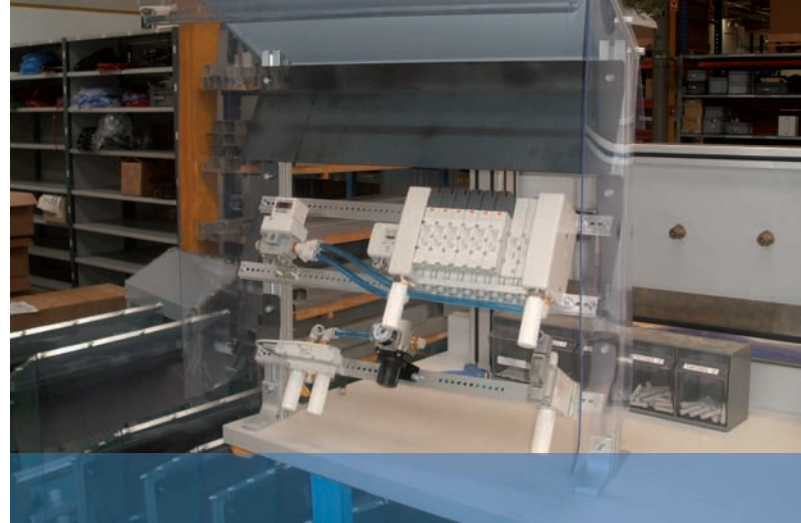
Whether it is **making your control cabinet design a reality**, or if you would like us to **design something especially for you**, our experts are on-hand to provide you with all the answers.

From a single, one-off special, or a multiple cabinet order, we have the resources and expertise to build high quality, fully tested, control cabinets that will deliver outstanding performance and will give you complete peace of mind.

For more information on our control panel design and build service, please contact your nearest SMC sales office.







## ■ Cylinder overview

With flexibility in mind, we offer a comprehensive range of standard made-to-order options as shown below.

-XB5	Oversized rod cylinder	-XC25	No fixed throttle of connection port
-XB6	Heat resistant cylinder (-10 to 150 °C)	-XC27	Double clevis and double knuckle joint pins made of stainless steel
-XB7	Cold resistant cylinder (-40 to 70 °C)	-XC28	Compact flange made of SS400
-XB9	Low speed cylinder (10 to 50 mm/s)	-XC29	Double knuckle joint with spring pin
-XB10	Intermediate stroke (Using exclusive body)	-XC30	Rod side trunnion
-XB11	Long stroke type	-XC34	Non-rotating plate with work piece mounting screw (No extended part on the rod end)
-XB12	External stainless steel cylinder	-XC35	With coil scraper
-XB13	Low speed cylinder (5 to 50 mm/s)	-XC36	With boss in rod side
-XB14	Cylinder with heat resistant auto switch	-XC37	Larger throttle diameter of connection port
-XB19	High speed type	-XC38	Vacuum (Rod through-hole)
-XB20	Stroke adjusting unit with adjusting bolt	-XC42	Built-in shock absorber in head cover side
-XC3	Special port location	-XC51	With hose nipple
-XC4	With heavy duty scraper	-XC52	Mounting nut with set screw
-XC5	Heat resistant cylinder (-10 to 110 °C)	-XC56	With knock pin holes
-XC6	Made of stainless steel	-XC57	Rodless cylinder with floating joint
-XC7	Tie-rod, cushion valve and tie-rod nut made of stainless steel	-XC67	Dust seal band NBR lining specifications
-XC8	Adjustable stroke cylinder/Adjustable extension type	-XC69	Series MGP with shock absorber
-XC9	Adjustable stroke cylinder/Adjustable retraction type	-XC71	Helical insert thread specifications
-XC10	Dual stroke cylinder/Double rod type	-XC72	Without built-in auto switch magnet
-XC11	Dual stroke cylinder/Single rod type	-XC73	Built-in cylinder with lock (CDNG)
-XC12	Tandem cylinder	-XC74	With front plate for MGG cylinder
-XC13	Auto switch rail mounting style	-XC78	Auto switch mounting special dimensions at stroke end
-XC17	Pin cylinder with rod quenched	-XC82	Bottom mounting styl
-XC19	Intermediate stroke (Spacer type)	-XC83	Built-in cylinder with lock (MDNB)
-XC20	Head cover axial port		
-XC22	Fluororubber seals		
-XC24	With magnet shielding plate		



-XC6 CG5 series



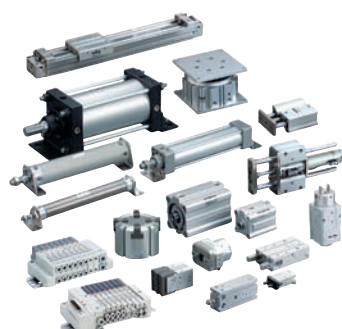
-XB6 MGP series



-XC4 C85 series



-XC7 CA2 series



## ATEX compliant products

Since 1st July 2003, all equipment used in potentially explosive atmosphere within the European Union (EU) is required to comply with the ATEX Directive.

Classified in a number of potentially explosive zones, in accordance with Directive 1999/92/EC, we now have a large selection of ATEX compliant products suitable for many applications. For more information on our ATEX range please contact your nearest SMC office.



## Airline equipment

Our portfolio of airline equipment is extensive. Using our range of **high quality air preparation products**, we can monitor, regulate and maintain the highest quality of clean, dry air in your compressed air system (CAS) to **extend the life and to ensure peak the performance** of all your pneumatic components. With numerous variations and sizes to suit almost any application, our airline equipment is both simple and fast to install, especially using our innovative one-touch fittings – just one option in our comprehensive fittings, connectors and piping accessory ranges. Suitable for use with electronic pressure and flow switches including various control valve options, by selecting SMC products for your compressed air system it really is a case of **being in complete control**.

## Series AFF/AM - mainline filters and mist separators

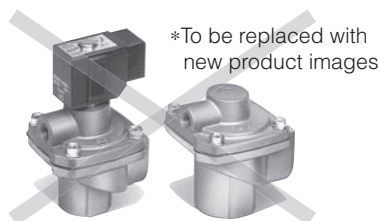


**To improve the operational performance** of an air dryer and to also improve and extend the working life of all downstream pneumatic components, we have developed a comprehensive range of main line filters and mist separators. Designed to remove impurities such as oil, water, foreign matter and oil mist from compressed air, both before and after the air dryer, our Series AFF and AM are **particularly suitable for both mineral processing and aggregate industry applications** and offer the ideal solution when used in conjunction with our expanding Series IDFA air dryer range.

## Series VX□ – 2 port solenoid valves



During the last few years, we have developed a **comprehensive selection of direct operated or pilot operated 2 port solenoid valves**. Often used as shut off valves, for use with air, our Series VX□ ranges offer many of the same operational performance features including improved corrosion resistance, easy maintenance, energy saving options with a **vast selection of body types and seal materials**.



\*To be replaced with new product images

## Series VXF – 2 port solenoid valves for dust collector systems

Recently improved and **offering long life performance**, this range of L shaped 2 port valves have been specially developed for dust collector applications. Available in solenoid or air operated type options, these valves **deliver the high flow and fast opening speed** required for efficient dust collector systems.



## SMC CORPORATION (Europe)

Austria	☎ +43 (0)2262622800	www.smc.at
Belgium	☎ +32 (0)33551464	www.smc-pneumatics.be
Bulgaria	☎ +359 (0)2807670	www.smc.bg
Croatia	☎ +385 (0)13707288	www.smc.hr
Czech Republic	☎ +420 541424611	www.smc.cz
Denmark	☎ +45 70252900	www.smc.dk
Estonia	☎ +372 6510370	www.smc-pneumatics.ee
Finland	☎ +358 207513513	www.smc.fi
France	☎ +33 (0)164761000	www.smc-france.fr
Germany	☎ +49 (0)61034020	www.smc-pneumatik.de
Greece	☎ +30 210 2717265	www.smc-hellas.gr
Hungary	☎ +36 23511390	www.smc.hu
Ireland	☎ +353 (0)14039000	www.smc-pneumatics.ie
Italy	☎ +39 0292711	www.smc-italia.it
Latvia	☎ +371 67817700	www.smc.lv

office@smc.at
info@smc-pneumatics.be
office@smc.bg
office@smc.hr
office@smc.cz
smc@smc.dk
smc@smc-pneumatics.ee
smc@smc.fi
promotion@smc-france.fr
info@smc-pneumatik.de
sales@smc-hellas.gr
office@smc.hu
sales@smc-pneumatics.ie
mail@smc-italia.it
info@smc.lv

Lithuania	☎ +370 5 2308118	www.smc.lt
Netherlands	☎ +31 (0)205318888	www.smc-pneumatics.nl
Norway	☎ +47 67129020	www.smc-norge.no
Poland	☎ +48 (0)222119616	www.smc.pl
Portugal	☎ +351 226166570	www.smc.eu
Romania	☎ +40 213205111	www.smc-romania.ro
Russia	☎ +7 8127185445	www.smc-pneumatik.ru
Slovakia	☎ +421 (0)413213212	www.smc.sk
Slovenia	☎ +386 (0)73885412	www.smc.si
Spain	☎ +34 945184100	www.smc.eu
Sweden	☎ +46 (0)86031200	www.smc.nu
Switzerland	☎ +41 (0)523963131	www.smc.ch
Turkey	☎ +90 212 489 0 440	info@smc-pneumatik.com.tr
UK	☎ +44 (0)845 121 5122	www.smc-pneumatics.co.uk

info@smc.lt
info@smc-pneumatics.nl
post@smc-norge.no
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sales@smc-pneumatics.co.uk

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