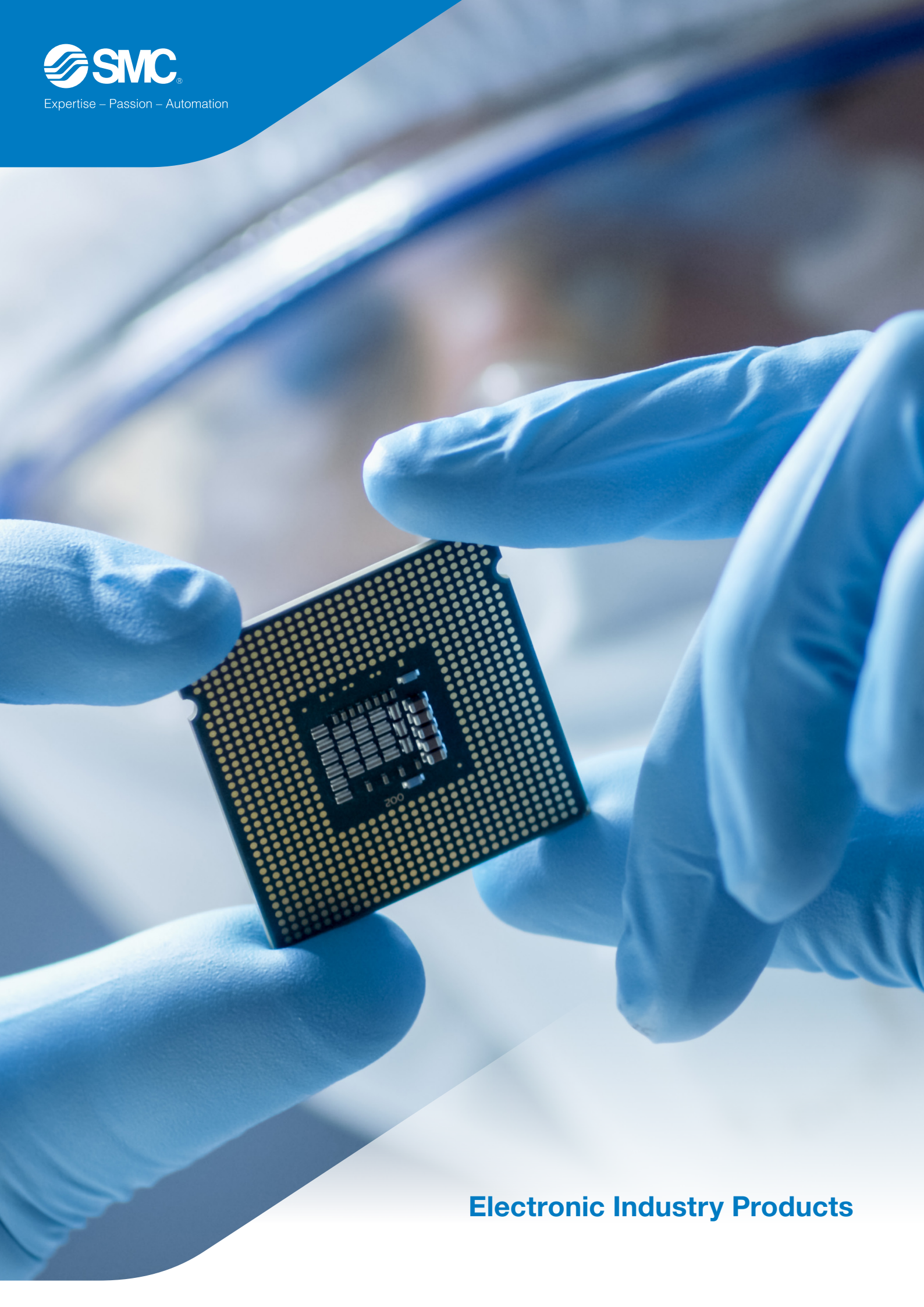




Expertise – Passion – Automation



Electronic Industry Products

> **Your Semiconductor Partner in all areas**5

> **Components for Manufacturing Processes**6

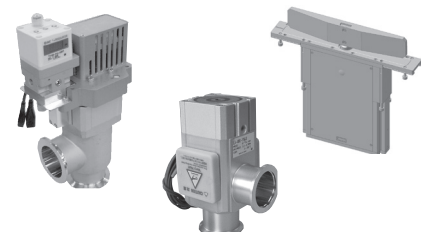
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SMC – Your Semiconductor Partner in all areas

Established in 1959 in Tokyo, Japan, SMC has achieved an excellent reputation in industrial automation solutions. Continuously investing in product development, SMC strives to meet its customers' needs through innovative and high quality products. SMC has pursued a strategy of sustainable global growth which has resulted in a sales presence in 83 countries and worldwide customer satisfaction.

The evolution from basic pneumatics to more sophisticated automation solutions has granted SMC a global market share of more than 30%. With 12,000 basic products and over 700,000 variations SMC offers solutions from air preparation, instrumentation, through to valves, and actuators covering practically every single step in the automation process. To date there are 36 manufacturing plants worldwide, all having ISO 9001 and ISO 14001 accreditation. This ensures

consistency of manufacture and ultimately a long and reliable operating life.

Semiconductor industry

One of SMC's key markets is the electronic semiconductor industry. This sector is rapidly developing new technologies to produce ever smaller and better microchips. Therefore, the production in the semiconductor industry requires the highest purity.

SMC has been working closely with leading companies in the semiconductor industry for many years. We know what is important. We carry everything from heat exchangers to valves for explosive and toxic gases. We have systems that make it possible to mix chemicals accurately resulting in products with a very low contamination in high vacuum applications.

Broad portfolio

Our broad portfolio includes virtually all products for this industry:

- ▶ Components for Ultra High Purity Fluids and Gases
- ▶ Cooling Equipment: Thermo Chiller and Thermocons
- ▶ Valves for high vacuum
- ▶ Products for the removal of static electricity

- ▶ Products for the cleanroom
- ▶ PFA products

We give you the decisive advantage

Our experts know this industry very well and are able to offer the right solution. We are constantly researching new products and developing technologies that become the standard for the entire industry. As your partner we accept every challenge. Get the decisive edge: our products lead you to success.

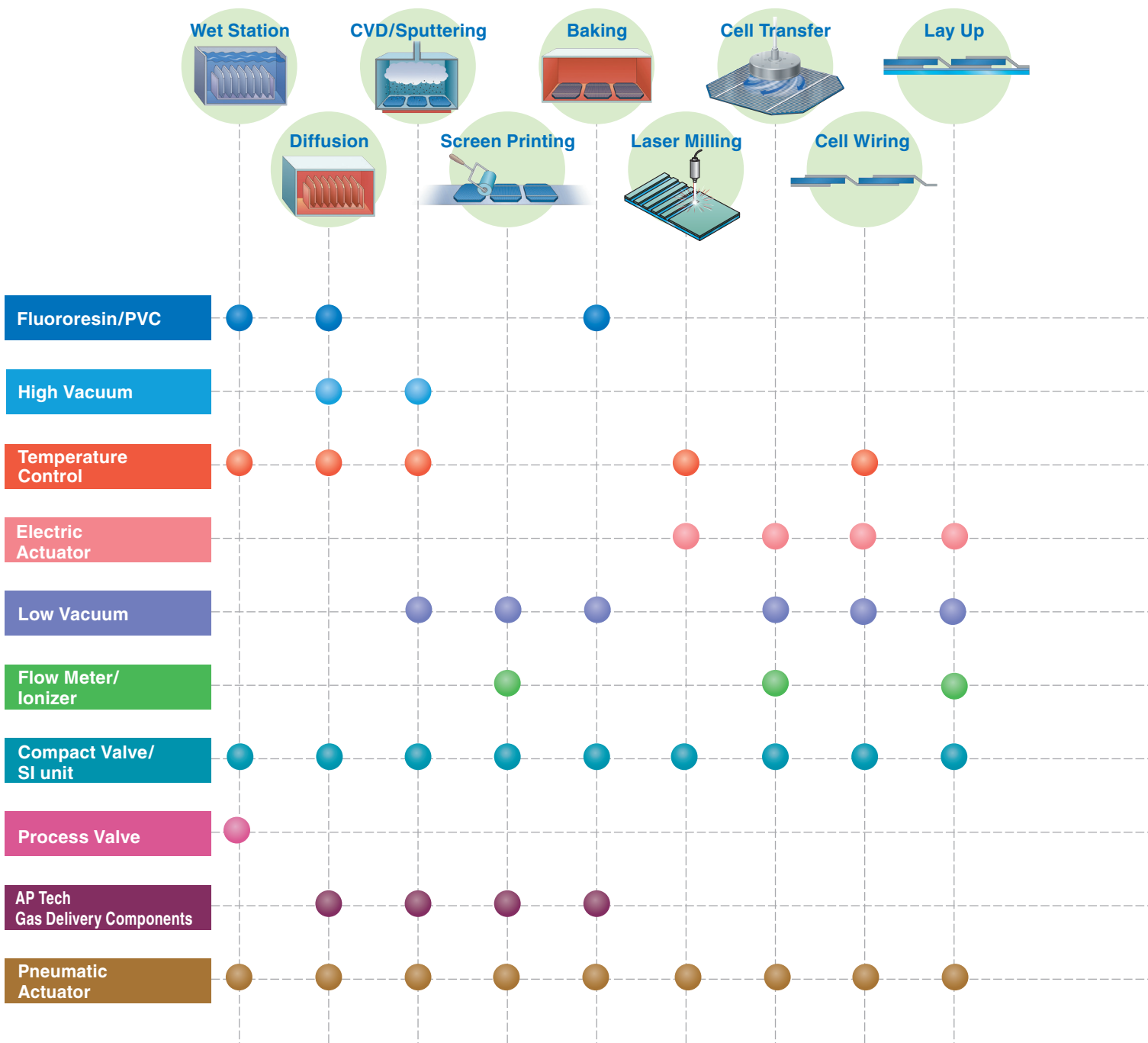
SMC German Technology Center

Close to the high-tech electronic business area of Frankfurt am Main SMC Germany operates a modern multifunctional technology center, offering customized industrial services. The German Technology Center provides subassemblies and product modifications. These future-oriented automation solutions are simulated and presented to customers in the Industrial Application Center (IAC).



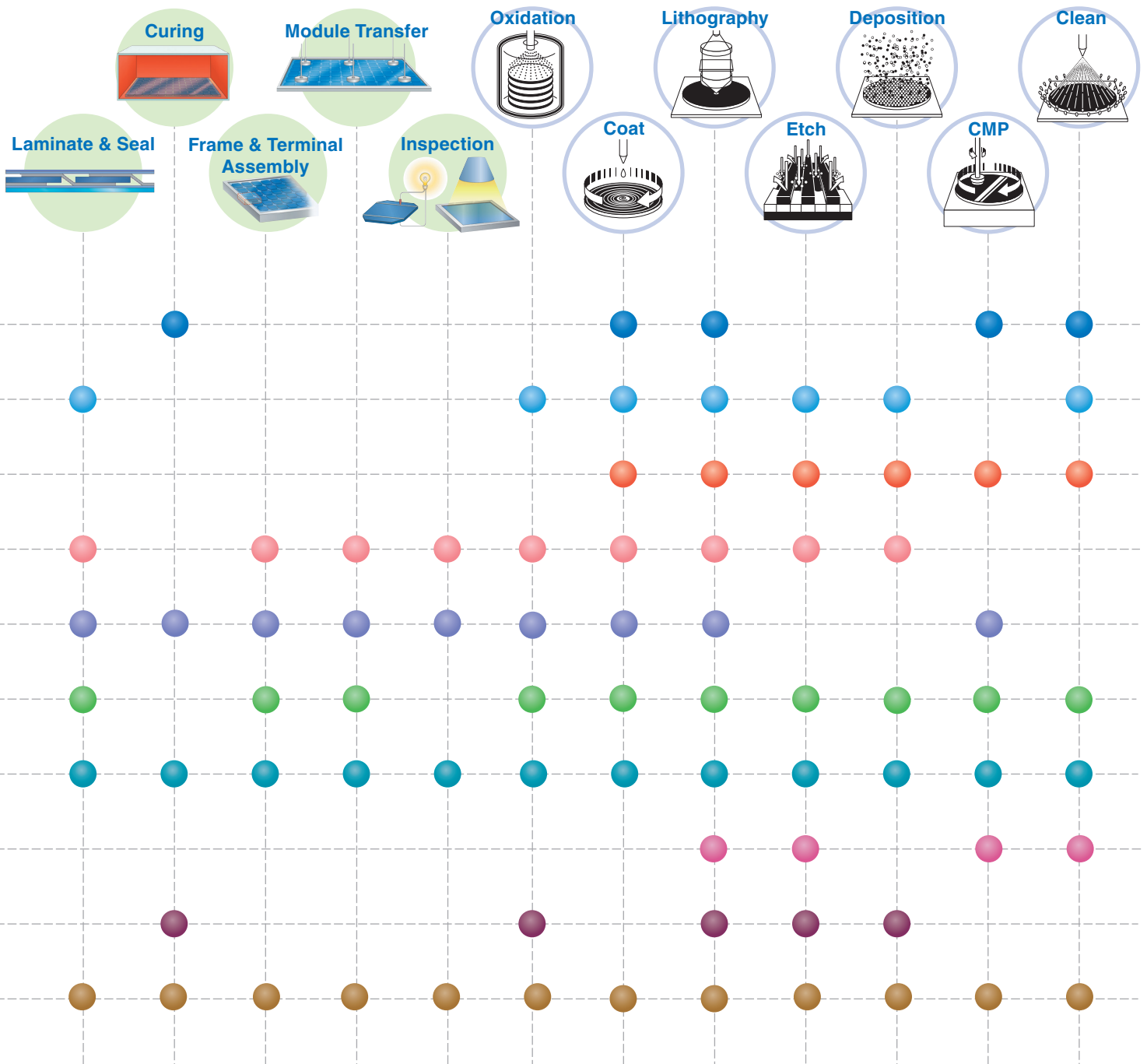
Components for Manufacturing Processes

Photovoltaic Cell Manufacturing Process



Equipment

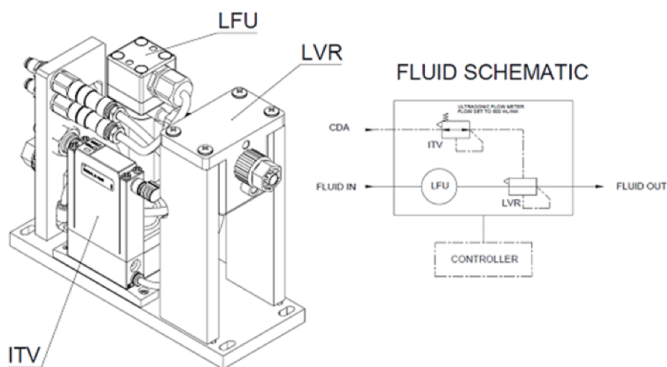
IC Manufacturing Process



High Purity Liquid Flow Sensing and Control

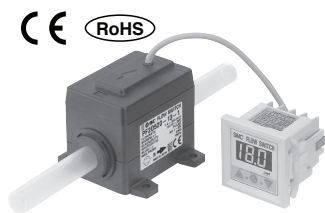
Closed Loop Liquid Flow Control / Series LFU

Series LFU Ultrasonic Flow Sensor Liquid Flow Controller



- ▶ Ultrasonic Time of Flight method of flow detection
- ▶ Minimum controlled flow 2 ml/min
- ▶ Maximum controlled flow 8 LPM
- ▶ Control accuracy +/-2% of reading
- ▶ Response time <3 seconds to reach 97% of setpoint

Flow Switch / Sensor / Series PF2D



Body and Sensor
New PFA
Tube
Tube Super PFA

A single controller can monitor the flow rate of 4 different sensors.



**4-channel Flow Monitor
PF2D200 series**

Three types of flow range

- 0.4 to 4 L/min (PF2D504)
- 1.8 to 20 L/min (PF2D520)
- 4.0 to 40 L/min (PF2D540)

- ▶ Technology: Karman Vortex
- ▶ Flow ranges:
0.4 - 4 LPM
1.8 - 20 LPM
4 - 40 LPM
- ▶ PFA tube stubs connections (3/8", 1/2", 3/4")
- ▶ Can be used with PF2D300-A for flow switch function

Proportional Control Valve / Series LTV



- ▶ 0-10 VDC analog input signal
- ▶ Proportional pneumatic output drives dome loaded regulator
- ▶ Up to 2.5 LPM max flow out
- ▶ LQ3 series improved flare style connections

Integrated type available by special request

Ultrasonic Flowsensor / Series LFU

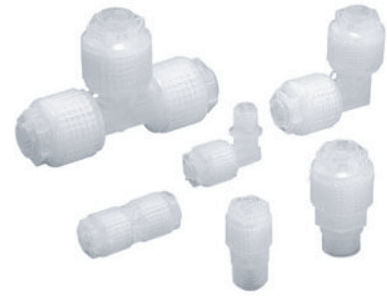


- ▶ High accuracy: ±1% of reading
- ▶ Cross Correlation, contra-propagating time of flight method
- ▶ 1/4" & 3/8" LQ3 Hyperflare connections
- ▶ User configured: same sound pipe transducer is used for full flow range of the instrument

High Purity Fluoropolymer Fittings and Tubing

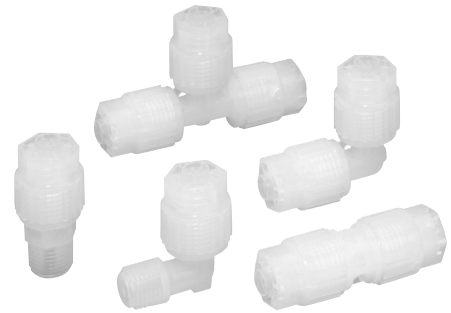
Fluoropolymer Fittings/Series LQ1

- ▶ Insert style fitting design
- ▶ 200°C compatible
- ▶ Quadruple seal construction
- ▶ Tubing strain relief
- ▶ Tube sizes are interchangeable within the same fitting body size
- ▶ Size range from 1/8" to 1"



Fluoropolymer Fittings/Series LQ3

- ▶ Improved flare fitting design
- ▶ 200°C compatible
- ▶ Leak-grip seal construction
- ▶ No special torque tool or position gauge required
- ▶ Outstanding swept-flow, flush-up performance
- ▶ Size range from 1/8" to 1", 1-1/4" and 1-1/2"



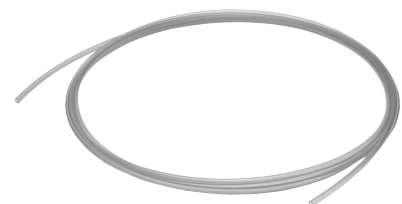
High Purity Fluoropolymer Tubing / Series TL/TIL

- ▶ Material: Super PFA
- ▶ Max operating temp: 500°F (260°C)
- ▶ Inch sizes: 1/8" through 1", 1-1/4", and 1-1/2"
standard lengths: 50', 100', 20 meter, 50 meter
500' and 1000' long reels available in 1/8" through 1/2"
- ▶ Metric sizes: 4mm, 6mm, 8mm, 10mm, 12mm, 19mm
- ▶ Fluid: chemicals, deionized water
- ▶ Applicable fitting series: fluoropolymer fittings LQ1, LQ3



High Purity Fluoropolymer Tubing / Series TLM

- ▶ Material: PFA
- ▶ Max operating temp: 500°F (260°C)
- ▶ Inch sizes: 1/8" through 1", 1-1/4", and 1-1/2" standard lengths: 20, 50, 100 meter
- ▶ Metric sizes: 2mm, 3mm, 4mm, 6mm, 8mm, 10mm, 12mm, 16mm, 19mm en 25mm
- ▶ Fluid: chemicals, deionized water
- ▶ Applicable fitting series:
 - One-touch fittings KQ2, KJ, KQG2, KP, KP
 - Miniature fittings M, MS (Hose nipple type)
 - Insert fittings KF, KFG2
 - Fluoropolymer fittings LQ1, LQ3



High Purity Fluoropolymer Valves and Additional Series Variations

Viper® Series Air Operated Valves / Series LVQ

- ▶ Metal free construction
- ▶ Innovative pilot port ring design allows for 360 degree rotation
- ▶ LQ1, LQ3, and PFA tube stub connections available
- ▶ Sizes 1/8" through 1" available
- ▶ 2 way and 3 way functionality
- ▶ Standard flare connections available



Viper® Series Manually Operated Valves / Series LVQH

- ▶ Metal free construction
- ▶ ¼ turn isolation type available with LOTO handle
- ▶ Multi-turn type available with torque limiting handle to prevent over tightening and valve seat damage
- ▶ LQ1, LQ3, and PFA tube stub connections available
- ▶ 2 way functionality
- ▶ Standard flare connection



Manually Operated Chemical Valve / Integral Fitting / Threaded Type / Series LVH

Series	Actuation	Applicable tubing O.D.		Orifice diameter (mmø)
		Metric size	Inch size	
Manual type (Integral fitting/ Threaded type)	N.C.	3 to 12	1/8 to 1/2	4 to 12
Features	<ul style="list-style-type: none"> ▶ Body material : New PFA/Stainless steel/PPS ▶ Compatible with locking and non-locking typesS 			



Air Operated Valves / Threaded Type / Series LVA, LVC

- ▶ Body materials: PFA, PPS, Stainless 316
- ▶ Threaded ports Rc, NPT, G
- ▶ Integral fitting LQ1
- ▶ Sizes available: ¼" through 1"
- ▶ Up to 5 station manifolds available as standard



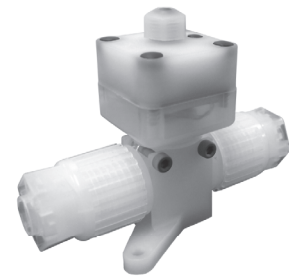
Needle Valve / Series LVN

- ▶ Integral insert style fitting
- ▶ LVN20 (1/4") max flow rate 4 LPM
- ▶ LVN30 (3/8") max flow rate 7 LPM
- ▶ LVN40 (1/2") max flow rate 12 LPM
- ▶ Max fluid temperature 90 °C



Digital Flow Switch / Sensor for DI Water and Chemical / Series LFK

- ▶ Technology: Karman Vortex
- ▶ Accuracy: $\pm 2\%$ F.S.
- ▶ Flow Ranges
 - 0.3 – 4 LPM
 - 0.4 – 4 LPM
 - 1.8 – 20 LPM
 - 4.0 – 40 LPM
- ▶ Max Fluid Temperature: 90°C
- ▶ Electrical wiring connector options
- ▶ Male LQ3, Space Saver LQ3, and Straight PFA tube connections available



Liquid Pressure Regulator/Pulsation Dampener / Series LVR

- ▶ High Purity Flow Path: PFA Body and PTFE Diaphragms
- ▶ Air Pilot Dome Regulator
- ▶ LQ3 Connection Sizes Available
 - 1/4"
 - 3/8"
 - 1/2"
 - 3/4"
 - 1"
- ▶ Low Cost, Small Footprint Pressure Pulsation Dampener



Double Diaphragm Chemical Transfer Pump, Air Operated / Series PAF

- ▶ Discharge flow rate
 - 1 ~ 20l/min PAF3410
 - 5 ~ 45l/min PAF5410 (Metal-free)
- ▶ Assembled with chemically resistant engineered plastics compatible with acids and bases
- ▶ Double layer of PPS and PFA improves resistance to pressure and temperature cycling.
- ▶ Light weight: 1.6kg PAF3410 6kg PAF5410
- ▶ Compact: W152 x D139 x H119 (mm) PAF3410
W250 x D255 x H195 (mm) PAF5410
- ▶ Stroke sensor for fault detection can be added at any time.
- ▶ Leak sensor can be added at any time.
- ▶ LQ3 HyperFlare® fittings standard



PAF3410



PAF5410

Process Pump/Series PB

- ▶ Smaller, lighter, 25%* reduction in volume
 - * PB1013A/Air-operated type without foot (Comparison with current PB series)
- ▶ Long service life 1.5 times (Comparison with current PB series)
- ▶ Discharge 8 to 2000 mL/min*
 - * PB1013A and PB1313A are available up to 1000 mL/min.
- ▶ Weight 0.11kg
 - * PB1013A/Air-operated type without foot
- ▶ LQ3 HyperFlare® fittings standard



Aluminum High Vacuum Angle Valves /Series XL

- ▶ With heater (optional)
- ▶ Inner body surface: Oxalic acid anodized (optional)

One-touch serviceable poppet/XLAQ•XLDQ

- ▶ One-touch connection and release (No tool required)
- ▶ 2-stage soft exhaust



Stainless Steel Body, High Vacuum Angle Type / In-line Type Series XM•XY

- ▶ Body material : SCS13 (Equivalent SUS 304)
- ▶ Precision casting with unified composition prevents porosity
- ▶ Series XM and XL have the same flange geometries and are interchangeable with most manufacturers



Solenoid Operated Vent Valve / Series XSA

- ▶ Reduced particle generation
- ▶ Improved sealing performance
- ▶ 2 types of fittings and female thread available



2-Stage Soft Vent Valve /Series XVD

- ▶ Metal diaphragm seal minimizes particles
- ▶ Both initial flow and main flow rates are independently adjustable.



High Vacuum Transfer Valves

Parallel Seal Slit Valve / Series XGTP

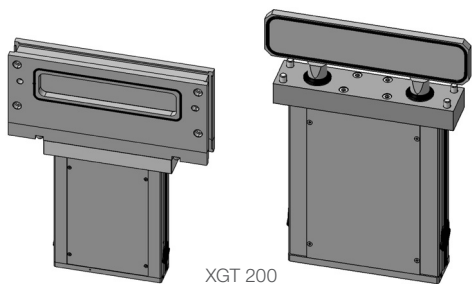
- ▶ Long service life: 3 million cycles
- ▶ Low particle generation: Reduced by 1/5 or more
- ▶ Parallel sealing motion
- ▶ Replaceable bellows
- ▶ Mechanical end lock
- ▶ Air consumption reduced by 22%



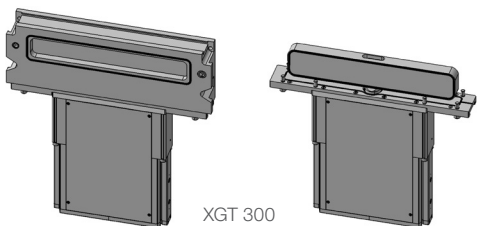
Slit Valve / Series XGT

- ▶ Innovative design for minimum particle generation
- ▶ J sealing motion
- ▶ End lock mechanism for XGT
- ▶ Long service life
- ▶ Series XGT valves are suitable as partition valves between the load lock chamber and the transfer chamber or between the transfer chamber and the process chamber.

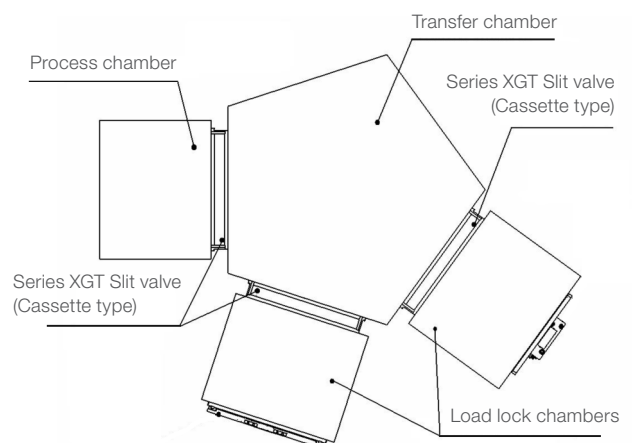
Also available for 450mm wafer



XGT 200

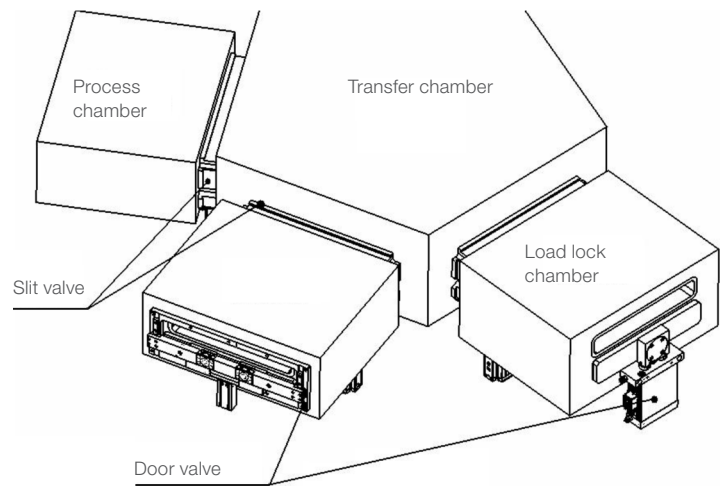


XGT 300



Door Valve / Series XGD

- ▶ Long service life
- ▶ Series XGD valves are suitable as atmospheric door valves to isolate the load lock chambers from atmospheric pressure.



Temperature Control Equipment

Refrigerated, Water to Water and Thermo-electric Designs



Thermo-chiller / Series HRS

- ▶ Air-cooled or water cooled refrigeration
- ▶ Cooling capacity: 1300W~50kW
- ▶ All models: CE marking and UL compliant
- ▶ Temperature stability $\pm 0.1^{\circ}\text{C}$
- ▶ Temperature range setting 5 to 40°C



Space Saving

Installation close to a wall is possible on both side

Light weight: 40 kg



HRS050

Power supply available all over the world

- ▶ Single-phase 200 to 230 VAC (50/60 Hz) available on all models
- ▶ Single-phase 100 VAC (50/60 Hz), 115 VAC (60 Hz) available on 1300, 1900 W models

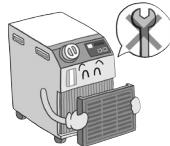
Environmental compliance

- RoHS directive
- R407C as refrigerant / R410A



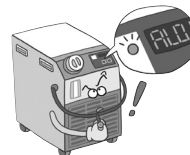
Convenient functions

- Timer operation function
- Low tank level detecting function
- Power failure auto-restart function
- Anti-freezing operation function



Easy maintenance

- Tool-less maintenance of filter



Self diagnosis function and check display

- 31 types of alarm codes



Communication function

- Equipped with serial communication (RS232C, RS485) and contact I/Os (2 inputs and 3 outputs) as standard.

Thermo-electric Chiller, Rack Mount Type, Air/Water Cooled / Series HRR

- ▶ Air/Water Cooled
- ▶ Cooling capacity: 1.0/1.6/2.0/2.5 kW (50 Hz)
- ▶ Temperature stability: $\pm 0.1^{\circ}\text{C}$
- ▶ Global power supply: Single-phase 200 to 230 VAC (50/60 Hz)
- ▶ Space Saving



Thermo-con (Peltier type)

International standards **CE** UL standards **(E)** standard

Thermo-electric bath / Series HEB

- ▶ Temperature stability: $\pm 0.01^{\circ}\text{C}$
- ▶ Temperature variation across bath: $\pm 0.02^{\circ}\text{C}$
- ▶ Temperature set point range: $-15 \sim 60^{\circ}\text{C}$



Air-cooled Thermo-con / Series HEC

- ▶ Temperature stability: $\pm 0.01 \sim 0.03^{\circ}\text{C}$
- ▶ Temperature set point range: $10 \sim 60^{\circ}\text{C}$
- ▶ Cooling capacity: 230W, 600W



Water-cooled Thermo-con / Series HEC

- ▶ Temperature stability: $\pm 0.01^{\circ}\text{C} \sim 0.03^{\circ}\text{C}$
- ▶ Temperature set point range: $10 \sim 60^{\circ}\text{C}$
- ▶ Cooling capacity: 140, 320, 600, 1200W



HEC100

Thermo-con Rack Mount Type, Air Cooled / Series HECR

- ▶ Cooling capacity: 200 W, 400 W, 510 W, 800 W, 1 kW
- ▶ Heating capacity: 600 W, 1 kW, 1.2 kW, 1.4 kW, 2 kW
- ▶ Communication function provided with serial communication (RS232C / RS485)
- ▶ Low power consumption: 440 W (100 V input, 4.6 A), 850 W, 900 W, 1500 W
- ▶ Single-phase 100 to 240 VAC $\pm 10\%$, 50/60 Hz



Chemical Thermo-con / Series HED

- ▶ Temperature stability: $\pm 0.1^{\circ}\text{C}$
- ▶ Temperature set point range: $10 \sim 60^{\circ}\text{C}$
- ▶ Cooling capacity: 300, 500, 750W



Clean Gas Components

AP Tech

Series: AP3625S, AP4625S, AP3627

- ▶ Type: manually operated
- ▶ Body material: SS 316L / VAR
- ▶ Connection: VCR, Tube weld, compressed fitting, NPT threaded ports
- ▶ Connection size: 1/4" – 1/2"
- ▶ Operating pressures from 125 psig (9 bar) to 3,000 psig (310bar)
- ▶ Multi-port options available



Series: AP3550S, AP4550S, AP3007S

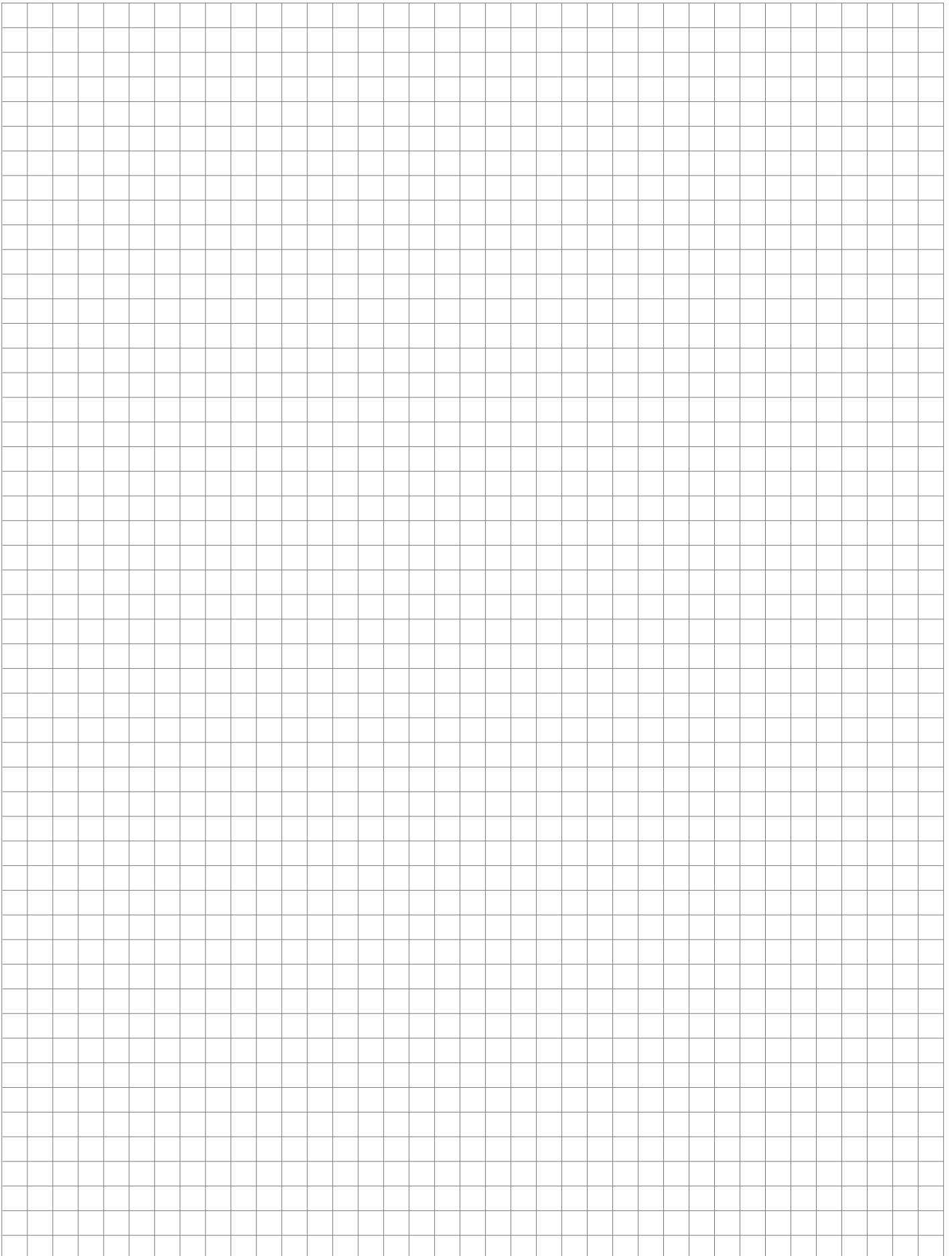
- ▶ Type: air operated
- ▶ Body material: SS 316L / VAR
- ▶ Connection: VCR, Tube weld, compressed fitting, NPT threaded ports
- ▶ Connection size: 1/4" – 1/2"
- ▶ Operating pressures from 125 psig (9 bar) to 3,000 psig (310 bar)
- ▶ Multi-port options available



Series: AP1000S, AP1200S, KT10

- ▶ Type: Single Stage Regulator, Tied Diaphragm Regulator, High Pressure Regulator
- ▶ Body material: SS 316L / VAR
- ▶ Connection: VCR, Tube weld, compressed fitting, NPT threaded ports
- ▶ Connection size: 1/4" – 1"
- ▶ Operating pressures from vacuum to 3,500 psig (690 bar)
- ▶ Multi-port options available







Expertise – Passion – Automation

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