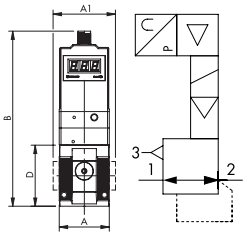
Proportional precision pressure regulators »SYNTRONIC«

»SYNTESI« series

PLUS

Art. No. 146655

Type No. 5613G113



Exemplary illustration

The proportional regulators in the SYNTRONIC series are used to precisely control the pressure in a system, with varying values depending on the input command. The regulators can be controlled remotely via a cable connection and an M12x1 connector accepting commands in Volts or mA.
Pressure is controlled in a 'closed loop' via a precision electronic sensor that detects the downstream pressure value, a control system that matches it to the desired pressure and two miniature solenoid valves that adjust the pressure to the target value.

Advantages:
- The connection sockets can be easily replaced, as with other products in the »SYNTESI« series.
- The presence of two rolling diaphragms offers several advantages, including increased stroke, which provides greater valve opening and consequently increased flow rate, thereby reducing dynamic and inrush friction.
- Syntronic is designed in such a way as to cause the downstream pressure to be relieved when the upstream pressure is set to zero.
- It is ideally suited for use between a valve and a cylinder because air can flow in both directions, towards the cylinder with regulated pressure and back to the relieving valve.
- The version with display can show a wide range of information and diagnostics. The user interface with the display and LEDs is entirely on one side.

ATEX version on request!

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Technical data

Series	Syntesi
Size	1
Min. input pressure	Pressure to be regulated +1 bar
Max. input pressure	11 bar
Temperature range	0 to 50 °C
Control range	0,2 - 10 bar
Input	G 3/8
Output	G 3/8
Front and back port thread	G 1/8
Flow rate measurement 1	at P_1 = 10 bar, P_2 = 6,3 bar and pressure drop Δ_p = 0,5 bar
Flow rate 1	2200 Nl/min
Flow rate measurement 2	at P_1 = 10 bar, P_2 = 6,3 bar and pressure drop Δ_p = 1 bar
Flow rate 2	2800 Nl/min
Medium	filtered, unlubricated compressed air, max. particle size 10µm, free of condensate
Housing	Technopolymer
Sealant	NBR
Diaphragms	NBR 60 Shore (hardness) with polyester fabric insert
Piloting	4 … 20 mA
Power input	max. 220 mA at 12 VDC
Protection IP	IP65
Operating voltage min.	10.8 V
Operating voltage max.	31.2 V
Hysteresis	< ±0.4 % (from final value)
Repeatability	< ±0.2 % (from final value)
Sensitivity/dead-band	0.1 bar
Display - accuracy	< ±0.1 % (from final value)
Display - unit of measurement	bar
Display - minimum resolution	0.01 bar
Analog output accuracy	< ±0.1 % (from final value)
Temperature characteristics	max. 2 mbar/°C
A	42.0 mm
A1	44 mm
B	147.5 mm
D	51.5 mm

Commercial data

Customs tariff number	84811099
Country of origin	IT
eCl@ss 5.1.4	27292301
eCl@ss 9.0	27292301
UNSPSC_Code_v190501	40141603
UNSPSC_CodeDesc_v190501	Pneumatic valves

PROPORTIONAL PRECISION PRESSURE REGULATOR SYNTRONIC SERIES

The proportional regulators in the SYNTRONIC series are used to precisely control the pressure in a system, with varying values depending on the input command. The regulators can be controlled remotely via a cable connection and an M12x1 connector accepting commands in Volts or mA. The main casing is made of techno-polymer, the display (when present) is the 3-digit type and the pneumatic connections are obtained with inset and easily replaceable metal bushings, as with other products in the Syntesi series.
The presence of two rolling diaphragms offers several advantages, including increased stroke, which provides greater valve opening and consequently increased flow rate, thereby reducing dynamic and inrush friction.
Syntronic is designed in such a way as to cause the downstream pressure to be relieved when the upstream pressure is set to zero. This makes it possible, for example, to arrange the regulator between a valve and a cylinder because air can flow in both directions, towards the cylinder with regulated pressure and back to the relieving valve.
The pressure value and a range of information and diagnostics are displayed at all times on the 7 segments display.
The user interface with the display and LEDs is entirely on one side.
Pressure is controlled in a 'closed loop' via a precision electronic sensor that detects the downstream pressure value, a control system that matches it to the desired pressure and two miniature solenoid valves that adjust the pressure to the target value.

TECHNICAL DATA

Threaded port		1/8"	1/4"	3/8"
Fluid		Filtered, unlubricated air.		
		The air must be filtered at least 10 µm and without condensation.		
MIN inlet pressure	bar	Regulation pressure + 1 bar		
MAX inlet pressure	bar	11		
Temperature range	°C	0 ÷ 50		
Pressure regulation range	bar	0.2 ÷ 10		
Flow rate at 6.3 bar ΔP 0.5 inlet pressure 10 bar	Nl/min	1100	1800	2200
	scfm	39	64	78
Flow rate at 6.3 bar ΔP 1 inlet pressure 10 bar	Nl/min	1500	2200	2800
	scfm	53	78	99
Weight	g	378	373	364
Class of protection		IP65		
Full outlow with zero inlet pressure		Included		
Supply voltage range	VDC	12 -10% 24 +30%		
Minimum operating voltage	VDC	10.8		
Maximum operating voltage	VDC	31.2		
Maximum admissible voltage	VDC	32*		
Current absorption		max 220 mA a 12VDC		
Hysteresis		< ± 0.4% (Full scale)		
Repeatability		< ± 0.2% (Full scale)		
Sensitivity/Dead-band	bar	0.1		
Output pressure (display version)	Accuracy	< ± 0.1% (Full scale)		
	Unit of measurement	bar		
	Minimum resolution	0.01 bar		
Analog output accuracy		< ± 0.1% (Full scale)		
Temperature characteristics		max 2 mbar/°C		
Installation position		In any position		
Wall fixing screws		No. 2 M4 screws		
Notes		The features shown refer to the static condition only. With air consumption on the output side, the pressure may vary.		

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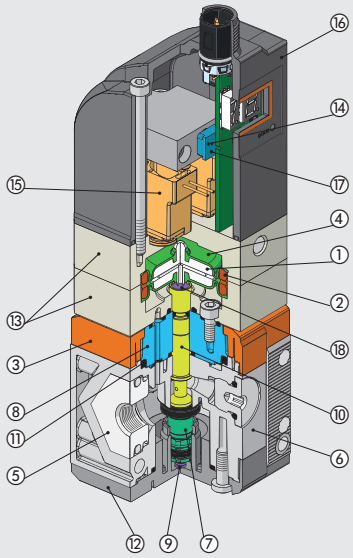
COMPONENTS

① Anodized aluminium plate
② Anodized aluminium diaphragm washer
③ Technopolymer flange
④ NBR rolling diaphragm
⑤ IN/OUT bushing made of OT58 nickel-plated brass
⑥ Technopolymer regulator body
⑦ OT58 brass valve, with NBR vulcanized gasket
⑧ Passivated aluminium upper cap
⑨ Stainless steel valve spring
⑩ OT58 brass rod
⑪ O-rings in NBR
⑫ Technopolymer cap
⑬ Painted aluminum bodies
⑭ Pressure sensor
⑮ 10 mm solenoid valves PLT-10 series
⑯ Technopolymer cover
⑰ Electronic board
⑱ Exhaust gasket in NBR



WIRING DIAGRAM

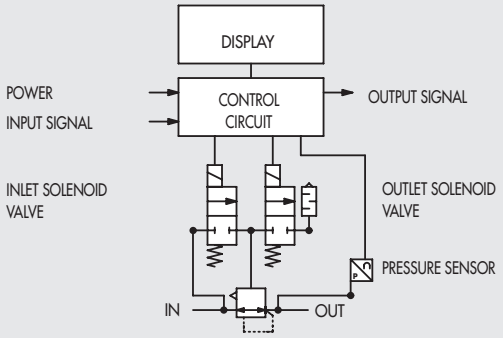
Analogue version 0-10 V

Pin	Function description	Lead colour
1	+12÷24 VDC power supply	Brown
2	IN + analogue input 0-10V	White
3	0VDC (GND) power supply	Blue
4	IN - analogue input 0-10V	Black
5	Analogue output 0-10V	Gray

Analogue version 4-20 mA

Pin	Function description	Lead colour
1	+12÷24 VDC power supply	Brown
2	IN + analogue input 4-20 mA	White
3	0VDC (GND) power supply	Blue
4	IN - analogue input 4-20 mA	Black
5	Analogue output 4-20 mA	Gray

FUNCTION DIAGRAM



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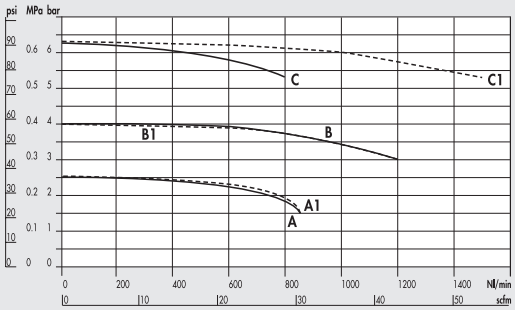
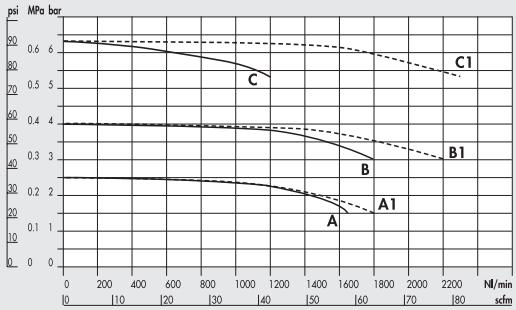
FLOW CHARTS

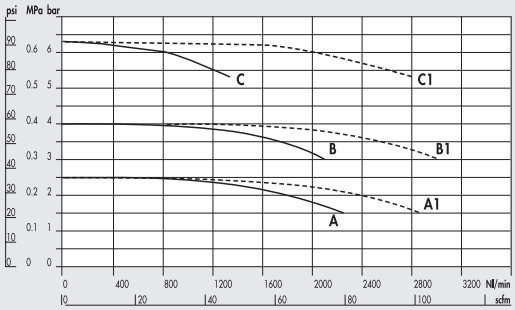
Syntronic **SY1** 1/8"



Syntronic **SY1** 1/4"



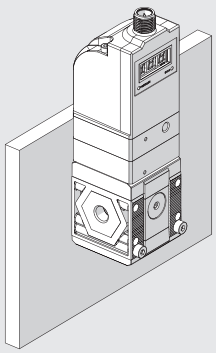
Syntronic **SY1** 3/8"



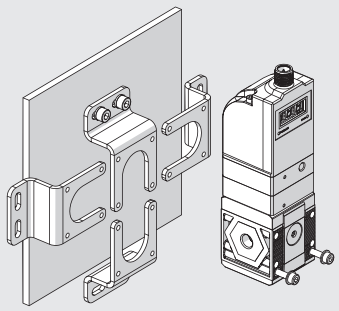
A = P In 7 bar - P Out 2.5 bar
B = P In 7 bar - P Out 4 bar
C = P In 7 bar - P Out 6.3 bar
A1 = P In 10 bar - P Out 2.5 bar
B1 = P In 10 bar - P Out 4 bar
C1 = P In 10 bar - P Out 6.3 bar

MOUNTING OPTIONS

On the wall, using two screws

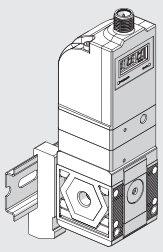


Using a bracket



The bracket can be secured in any position

On a DIN EN50022 bar with the apposite adaptator



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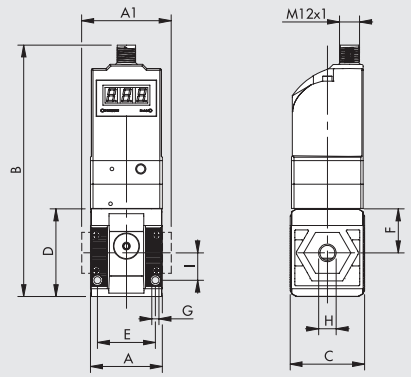
DIMENSIONS



	SIZE 1		
H (threaded port)	1/8″	1/4″	3/8″
A		42	
A1	-	-	44
B		147.5	
C		44	
D		51.5	
E		33.5	
F		25.8	
G		Hole for M4 screws	
I		16	

KEY TO CODES

56	1	1	G	00	1
SYNTESI	**SIZE**	**THREADED INPUT CONNECTION**	**ELEMENT**	**TYPE**	**THREADED OUTPUT CONNECTION**
56 Syntesi	**1** Size 1	**0** Without bushing **1** 1/8″ port **2** 1/4″ port **3** 3/8″ port	**G** Syntronic	**00** Remote control 0-10V **01** Remote control 4-20 mA **10** With display 0-10V **11** With display 4-20 mA	**0** Without bushing **1** 1/8″ port **2** 1/4″ port **3** 3/8″ port

PURCHASE ORDER CODES HAVING A MORE FREQUENT USE

N.B. Besides the below mentioned codes, you can order elements composed at your will according to the key to codes.

Code	Description	Code	Description
5610G000	SYNTRONIC SY1 remote control 0-10V without bushings	**5612G002**	SYNTRONIC SY1 1/4 remote control 0-10V
5610G010	SYNTRONIC SY1 remote control 4-20 mA without bushings	**5612G012**	SYNTRONIC SY1 1/4 remote control 4-20 mA
5610G100	SYNTRONIC SY1 with display 0-10V without bushings	**5612G102**	SYNTRONIC SY1 1/4 with display 0-10V
5610G110	SYNTRONIC SY1 with display 4-20 mA without bushings	**5612G112**	SYNTRONIC SY1 1/4 with display 4-20 mA
5611G001	SYNTRONIC SY1 1/8 remote control 0-10V	**5613G003**	SYNTRONIC SY1 3/8 remote control 0-10V
5611G011	SYNTRONIC SY1 1/8 remote control 4-20 mA	**5613G013**	SYNTRONIC SY1 3/8 remote control 4-20 mA
5611G101	SYNTRONIC SY1 1/8 with display 0-10V	**5613G103**	SYNTRONIC SY1 3/8 with display 0-10V
5611G111	SYNTRONIC SY1 1/8 with display 4-20 mA	**5613G113**	SYNTRONIC SY1 3/8 with display 4-20 mA

NOTES

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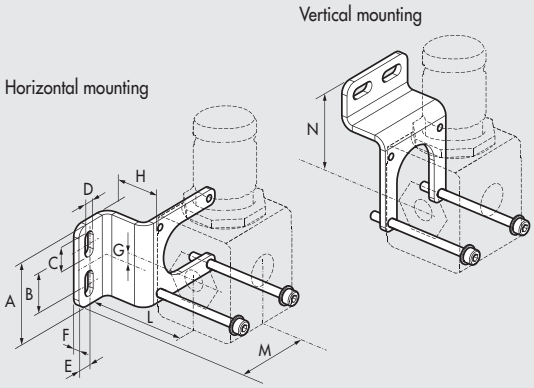
ACCESSORIES

MOUNTING BRACKET

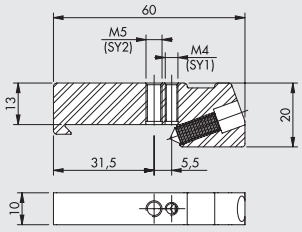


Code	Description
9200716X	Mounting bracket SY1

Note: Supplie complete with screws and washers.
Max torque 0.8 Nm for SY1

Code	A	B	C	D	E	F	G	H	L	M	N
9200716X	41.5	20	12.7	5.5	7	3	0.8	25	43.8	46.5	47

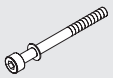
CONNECTION BRACKETS ON THE BAR (DIN EN50022)



Code	Description
9200718X	Connection brackets on DIN bar, SY1 - SY2

Note: 2 pieces per pack complete with screws and washers.
Max torque 0.8 Nm for SY1

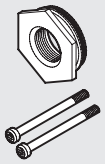
WALL-FIXING SCREW



Code	Description
9210030	M4 x 55 fixing screw SY1

Max torque 0.8 Nm for SY1

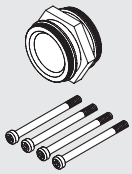
THREADED PORT



Code	Description
9210001	Kit IN OUT 1/8 SY1
9210002	Kit IN OUT 1/4 SY1
9210003	Kit IN OUT 3/8 SY1

Max torque 0.4 Nm for SY1

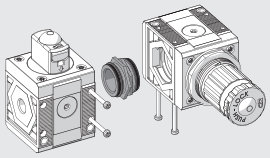
CONNECTING NIPPLE KIT



Code	Description
9210000	Connecting nipple kit SY1

Max torque 0.4 Nm for SY1

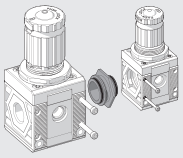
90° CONNECTING ELEMENT KIT



Code	Description
9210009	90° SY1 connection element kit

Max torque 0.4 Nm for SY1

SY1 - SY2 SIZE ADAPTER



Code	Description
9210006	SY1 - SY2 size adapter

Max torque 0.4 Nm for SY1

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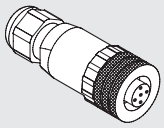
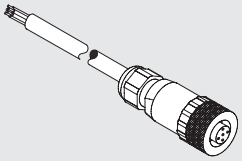
STRAIGHT CONNECTOR



Code	Description
W0970513001	5-PIN M12x1 straight connector

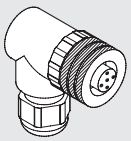
STRAIGHT CONNECTOR WITH WIRE



Pin	Cable color
1	Brown
2	White
3	Blue
4	Black
5	Grey

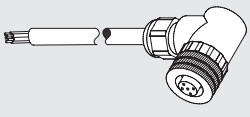
Code	Description
W0970513002	5-PIN M12x1 straight connector with wire L = 5 m

90° CONNECTOR



Code	Description
W0970513003	M12x1 5-PIN 90° connector

90° CONNECTOR WITH WIRE



Pin	Cable color
1	Brown
2	White
3	Blue
4	Black
5	Grey

Code	Description
W0970513004	M12x1 5-PIN 90° connector with wire L = 5 m

NOTES

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GENERAL TECHNICAL DATA SYNTESi®

Syntesi® is an important milestone achieved by Metal Work, the result of thirty years' experience producing air-treatment units. It has been studied in minute detail to obtain the best possible performance in a reduced space and with limited weight. The capacity is much higher than that of other units of the same size.
This modular unit features a very simple yet effective system that requires no brackets, stay bolts or yoke for assembling the elements.
The basic version of Syntesi® incorporates numerous functions that are not provided or are only optional with traditional units. Examples are padlockable knobs, additional pneumatic ports on the front and back, flow options from left to right or vice versa, regulators with compensation system - which are accurate even when the upstream pressure changes, with rapid downstream pressure relief - full indelible marking, automatic condensate drain even in size 1, and 360° visual inspection of oil and condensate levels. The basic materials, technopolymer and nickel-plated brass have excellent corrosion resistance. An anti-corrosion version is available with stainless steel components (screws, plates) or Geomet®-reated ones (regulator springs).

TECHNICAL DATA		SIZE 1			SIZE 2			
Threaded port		1/8"	1/4"	3/8"	3/8"	1/2"	3/4"	1"
Max. input pressure	bar	15			13			
	MPa	1.5			1.3			
	psi	217			188			
Flow rate		See catalogue of the various elements						
Min/max temperature at 10 bar; 1 MPa; 145 psi	°C	from -10 to +50			from -10 to +50			
Padlockable knob		The knobs of the regulators, filter regulators and standard sectioning valves can all be padlocked						
Fluid		Compressed air or other inert gases						
Mounting position		See catalogue of the various elements						
Direction of flow		Flow options right to left or vice versa						
Additional air take-off, for pressure gauges or fittings		1/8", front and rear, on all modules			1/4", front and rear, on all modules			
Wall fixing screws		No. 2 M4 screws			No. 2 M5 screws			
Certification for potentially explosive atmosphere according to Atex 2014/34/EU rule		Ⓔx II 3G Ex h IIC T5 Gc -10°C < Ta < 50°C II 3D Ex h IIIC T100 °C Dc						

ANTI-CORROSION VERSION

Differences compared to the standard version:
- stainless steel screws
- stainless steel plate for R, FR, V3V knobs
- Geomet®-treated regulator spring and filter-regulator

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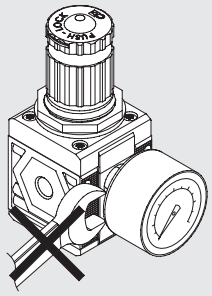
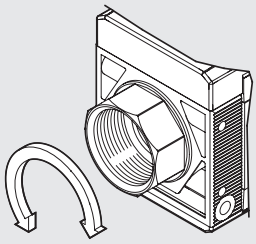
FIXING TO FRONT PORTS



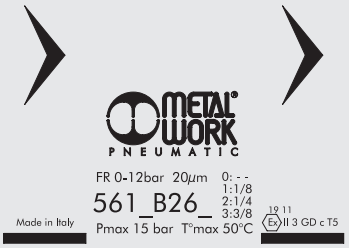
Do not use a spanner for fixing taper threaded elements to the front ports. Mount by hand and apply a liquid sealant (not teflon®).

ROTARY BUSHINGS



3/4" and 1" bushings in Size 2 rotate freely to facilitate assembly operations.

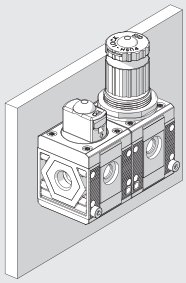
LASER MARKING



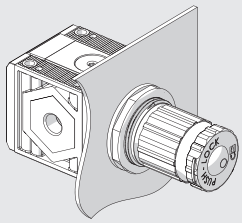
The following is marked indelibly on the body:
- Metal Work trademark
- Code
- Maximum pressure and temperature
- Degree of filtration or pressure range, where relevant
- Week and year of manufacture
- Atex category
- Made in Italy

MOUNTING OPTIONS

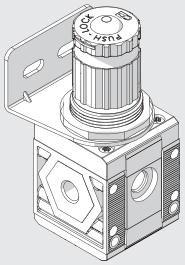
On the wall, using two screws



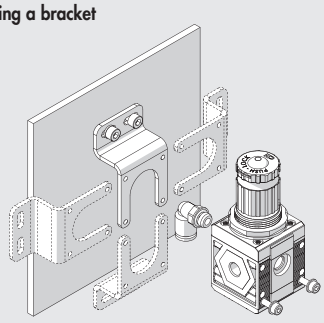
On a panel

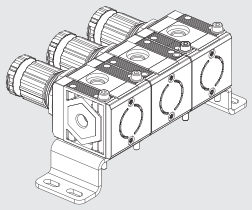


Using knob bracket



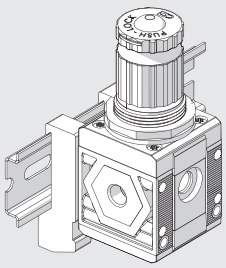
Using a bracket





The bracket can be secured in any position, and the fittings can be mounted on the pressure gauge air intake at the back of the unit.

On a DIN EN50022 bar with the apposite adaptator



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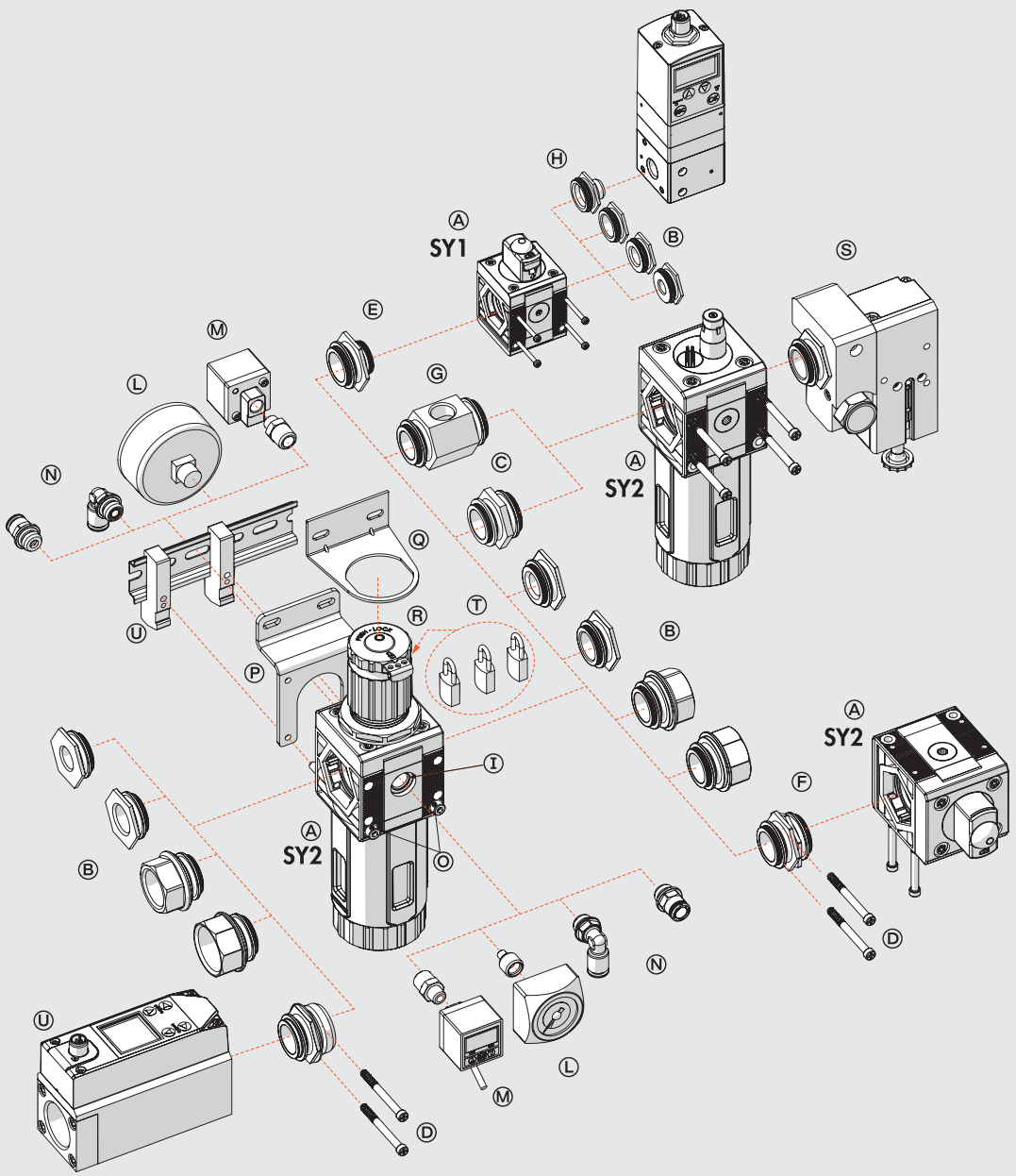
MODULARITY AND FLEXIBILITY



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The various elements of Syntesi® Ⓐ can be connected to the air feed and delivery circuit using pneumatic nickel brass or passivated aluminium ports Ⓑ and can be fixed together using nipples Ⓒ.
The nipples and ports are easy to remove by unscrewing the two front screws Ⓓ. This solution has numerous advantages:
- Reduced overall dimensions.
- Free composition of multiple elements, without the need for brackets, stay bolts or yoke.
- The threads for the fittings are metallic, allowing high tightening torques, also for tapered threads.
- Maximum flexibility: a unit can be transformed at any time by adding an element or replacing a port with another one, e.g. 1/4" instead of 1/8".
- The air intake port can be the same or different from the outlet port, as desired.

Standard Syntesi® ports are: 1/8", 1/4", 3/8" for size 1; 3/8", 1/2", 3/4", 1" for size 2.
It may be necessary to use a vice to insert the bushes into size 2.
The nipples have different functions:
- Nipple Ⓒ joins two elements of the same size together.
- Size adaptor Ⓔ can be used to connect an element in the Syntesi® 2 series with one in the Syntesi® 1 series.
- The 90° adaptor Ⓕ can be used to connect two 90° angled elements. For example, it can help directing the regulator knob or the control knob of a sectioning valve towards the user.
- The two-way air intake Ⓖ is a simple and cost-effective system which, besides connecting two elements together, has 2 opposing threaded air intakes.
- The adaptor for Regtronic Ⓗ can be used to fix the Regtronic 1/4" proportional valve to a Syntesi® size 1 element.

Additional ports Ⓘ. On the front and back of ALL Syntesi® elements there is a port (1/8" for size 1, 1/4" for size 2) that can be used for pressure gauges Ⓛ, pressure switches Ⓜ or, given the high flow rate, as additional air take-off Ⓝ. These ports are downstream of the element, so, for example, a regulator port can supply air at a set pressure or a filter port can supply filtered air (not valid for activated carbon filter and depurator).
Wall fixing. Only two through screws Ⓞ are needed. No bulky brackets or additional flanges are required. The bracket Ⓟ can be used to separate the unit from the fixing wall, e.g. to mount a fitting to the rear port.
Fixing on a DIN EN50022 bar. Can be done using the bracket kit Ⓤ.
Regulator fixing bracket Ⓠ. Regulators and filter-regulators can also be fixed using a steel bracket Ⓠ that embraces the bell.
Padlockable knob Ⓡ. The knobs of regulators, filter-regulator and sectioning valves can all be padlocked. The steel plate is included in the supply. You can insert up to two 3 mm diameter padlocks Ⓣ on size 1 and three padlocks on size 2. As an alternative, the sectioning valve can have a steel plate suitable for a single 6 mm diameter padlock.
Safety valve Ⓢ. The unit can incorporate a series 70 SAFE AIR® safety valve.
Flowmeter series FLUX 1-2 Ⓤ. The unit can incorporate a series FLUX 1 or FLUX 2 flow meter.

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SYNTESI® KEY TO CODES

KEY TO CODES SINGLE ELEMENT

56	1	1	F	10	1
SYNTESI	**SIZE**	**THREADED INPUT CONNECTION**	**ELEMENT**	**TYPE**	**THREADED OUTPUT CONNECTION**
56 Syntesi **5X** Syntesi anti-corrosion	**1** Size 1 **2** Size 2	**0** Without bushing **1** 1/8" port **2** 1/4" port **3** 3/8" port **0** Without bushing **3** 3/8" port **4** 1/2" port **5** 3/4" port **6** 1" port	**F** Filter **D** Depurator **C** Active carbon filter **R** Pressure regulator **B** Filter-regulator **L** Lubricator ● **V** Shut off valve ▲ **A** Progressive starter ▲ **S** Pressure switches **P** Air take-off	Varies from element to element	**0** Without bushing **1** 1/8" port **2** 1/4" port **3** 3/8" port **0** Without bushing **3** 3/8" port **4** 1/2" port **5** 3/4" port **6** 1" port

● The anti-corrosion version of this element is only available with manual actuation.
▲ Not available in the anti-corrosion version.

KEY TO CODES UNIT COMPOSED OF TWO OR THREE ELEMENTS

56	1	1	V	10	B	24	L	10	1
SYNTESI	**SIZE**	**THREADED INPUT CONNECTION**	**ELEMENT 1**	**TYPE**	**ELEMENT 2**	**TYPE**	**ELEMENT 3**	**TYPE**	**THREADED OUTPUT CONNECTION**
56 Syntesi **5X** Syntesi anti-corrosion	**1** Size 1 **2** Size 2	**1** 1/8" port **2** 1/4" port **3** 3/8" port **3** 3/8" port **4** 1/2" port **5** 3/4" port **6** 1" port	**F** Filter **D** Depurator **C** Active carbon filter **R** Pressure regulator **B** Filter-regulator **L** Lubricator ● **V** Shut off valve ▲ **A** Progressive starter ▲ **S** Pressure switches **P** Air Take-off	Varies from element to element	**F** Filter **D** Depurator **C** Active carbon filter **R** Pressure regulator **B** Filter-regulator **L** Lubricator ● **V** Shut off valve ▲ **A** Progressive starter ▲ **S** Pressure switches **P** Air Take-off	Varies from element to element	**F** Filter **D** Depurator **C** Active carbon filter **R** Pressure regulator **B** Filter-regulator **L** Lubricator ● **V** Shut off valve ▲ **A** Progressive starter ▲ **S** Pressure switches **P** Air Take-of	Varies from element to element	**1** 1/8" port **2** 1/4" port **3** 3/8" port **3** 3/8" port **4** 1/2" port **5** 3/4" port **6** 1" port

● The anti-corrosion version of this element is only available with manual actuation.
▲ Not available in the anti-corrosion version.

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Accessories

	Art. No.	Type No.
Threaded port bushing, size 1, G 1/8	144688	9210001
Threaded port bushing, size 1, G 1/4,	144689	9210002
Connecting nipple kit, size 1	144695	9210000
Mounting bracket, size 1, standard and anti-corr.	145658	9200716X
Connecting element 90°,, size 1	145502	9210009
Size adapter, size 1 - size 2, incl. 4 screws	145504	9210006
Fastening screw, size 1	145507	9210030
Adapter for DIN rail, size 1 and size 2	145660	9200718X
Electric connection cable, straight wall outlet, 5 m cable	101132	533.901
Electric connection cable, 90° elbow wall outlet, 5 m cable	101133	533.902

Spareparts

	Art. No.	Type No.
Locking screw, Hexagonal socket 3 mm, G 1/8, nickel-plated brass	111409	233.02-N
Threaded port bushing, size 1, G 3/8	144690	9210003

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