PNEUMATIC LOGIC COMPONENTS

General characteristics

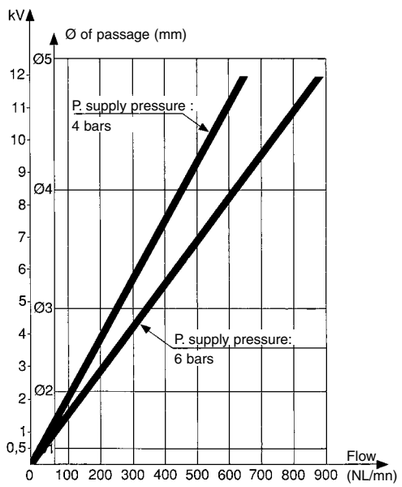
Operating fluid
- Compressed air or inert gas.

Conditions of use
- Operating pressure 2 at 8 bars (except for special conditions).
- Fluid: Filtered air to 50 microns - non lubricated.
- Operating temperature from - 5° C to + 50° C (under + 5° C the dew point must be below 10° C for the application).
- For optimum performance, the elements should be inter-connected by air supply tubing with an internal diameter ≥ at 2.5 mm.

Mounting recommendations
- The elements should be mounted and piped in a clean atmosphere in order to prevent any form of pollution entering the system.
- Minimum torque for element fixing screws: 5 cm/kg.
- maximum torque for element fixing screws: 10 cm/kg.

Characteristics common to all elements in the modular system
- The characteristics have been obtained with a supply pressure at 6 bars.
- The flow in Nl/min is the number of litres of air at normal atmospheric pressure obtained with the output open to atmophere and the supply pressure at 4 bars
- The consumption in Nl/min is the number of litres of free air necessary for the unit to function.
- kV = the flow coefficient of the equipment.
- Mechanical life > 10^7 operations.

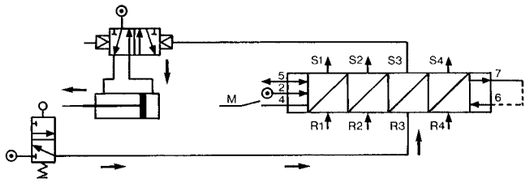
flow graphs



Sequencer modules

Operation results from the combination of a sequential cycle. A system comprises individual modules which are joined together by means of a sub-base. Each module has a memory which delivers an output signal and receives an input signal.

An indicator on each module allows the operator to monitor the progress of the cycle and identity quickly and easily any fault which may occur.

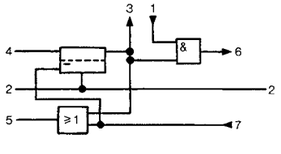


Operation results from the combination of three functions (memory, AND and OR) which constitute each module.

The memory activates the output and gives priority to the reset signal. The AND element ensures the transition to the next module but only if an input signal is present.

The OR element ensures the resetting of all previously operated modules

Function diagram

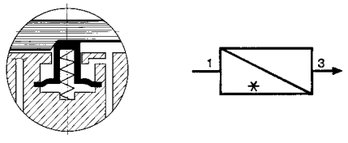


sequencer module with maintained reset

Brake

This maintains the memory spool in position only when the supply is lost.

Module with auto reset



Brake

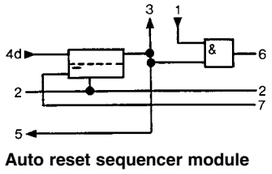
This returns the memory spool to the reset condition only when the supply is lost

Shift register

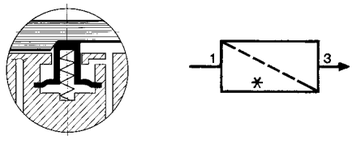
The general principle is to advance the sequencer step by command impulses to the inputs of the even steps, alternating with the command impulses to the inputs of the odd steps.

Used for example on a transfer machine to shift the information "bad component" collected at a test-test "n" steps further along the machine to a reject station.

Function diagram



Auto reset sequencer module

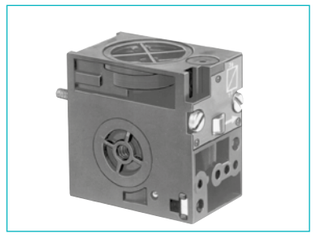


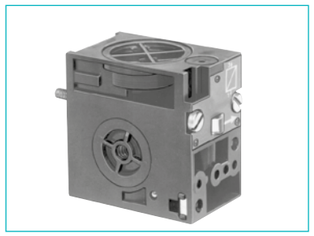
Sequencer modules

› **100 % pneumatic**

› **Ideal for a simple pneumatic sequence**

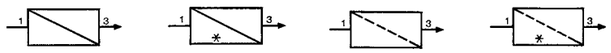
Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive





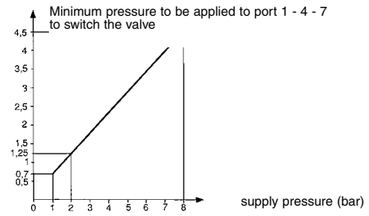
		81 550 001	81 550 201	81 550 401	81 550 601
Versions	sequencer	with 'maintain'	Reset to zero	—	—
	shift register	—	—	with 'maintain'	Reset to zero

Symbol



Characteristics

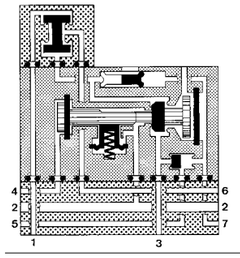
Operating pressure	bar	2 → 8	2 → 8	2 → 8	2 → 8
Orifice diameter	mm	2.7	2.7	2.7	2.7
Flow at 6 bars	Nl/min	150	150	150	150
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Mechanical life 5 x 10^6 at 6 bars		●	●	●	●
Connection - Sub-base page 26		●	●	●	●
Weight	g	70	70	70	70



Principle of operation

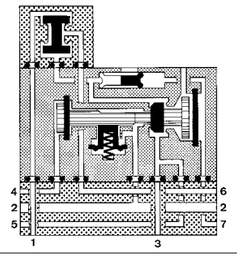
(supplied without logic element. For choice of units see pages 46/47)

Sequencer module with maintained reset



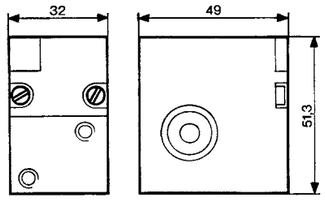
1 - Input signal
2 - Supply
3 - Output signal
4 - Start signal
5 - In cycle signal
6 - End of cycle signal
7 - Reset to zero signal

Shif register with maintained reset

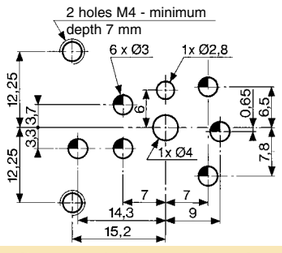


1 - Input signal
2 - Supply
3 - Output signal
4 - Start signal
5 - In cycle signal
6 - End of cycle signal
7 - Reset to zero signal

Dimensions



Mounting plan for sequencer



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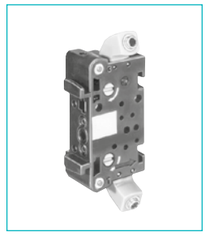
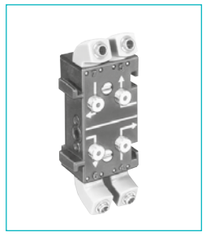
Sequencer sub-bases

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive





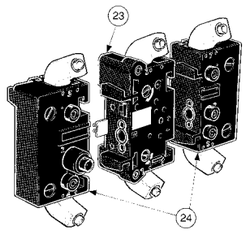
		81 551 101	81 552 101	81 552 601
Versions	Front connecting (DIN-omega)	Sub-base (DIN oméga)	End bases - one pair	Diversion base
	Rear connecting (with clips)	—	—	—

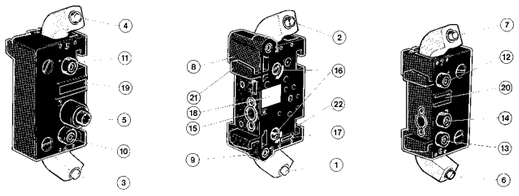
Characteristics

Sub-bases (fitted)	Rotatable connectors		●	●	●
	Pressure indicators		●	●	●
Operating temperature		°C	-5 → +50	-5 → +50	-5 → +50
Weight		g	55	135	60

Sequencer connections

Front connecting

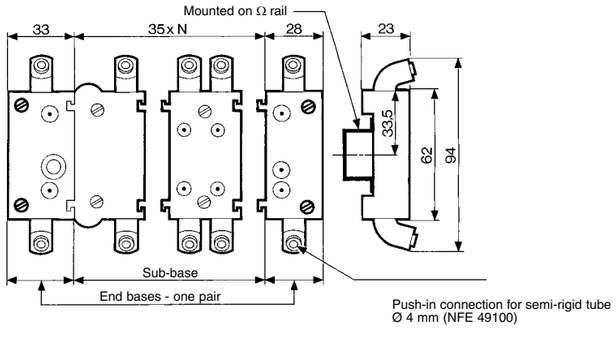


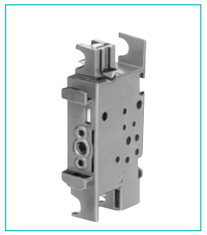


1 - Input port (green port 1) Ø 4
2 - Output port (red port 1) Ø 4
3 - Input port, cycle start (green port 1) Ø 4
4 - Output port, in-cycle signal (red port 1) Ø 4
5 - Output port, cycle end (red port 6) Ø 4
6 - Output port, cycle end (red port 6) Ø 4
7 - Input port, reset to zero (green port 7) Ø 4
8 - Output indicator (red)
9 - Input indicator (green)
10 - Cycle start indicator at port 4 (green)
11 - In-cycle indicator at port 5 (red)
12 - Input indicator at port 7 (green)
13 - End of cycle indicator at port 6 (red)
14 - Supply indicator at port 2 (yellow)
15 - Interconnecting ports
16 - Fixing screws
17 - Engraved arrow to indicate direction of sequence
18 - Marking tag
19 - Marking tag position
20 - Marking tag position
21 - Mounting tongue
22 - Mounting groove
23 - Sub-base
24 - End bases

Dimensions

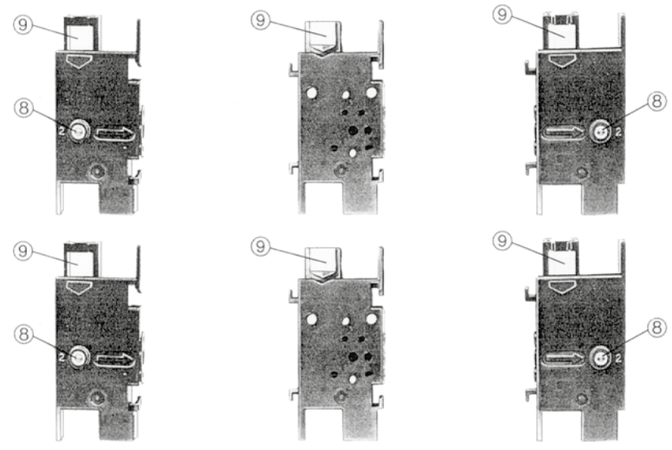
Front connecting





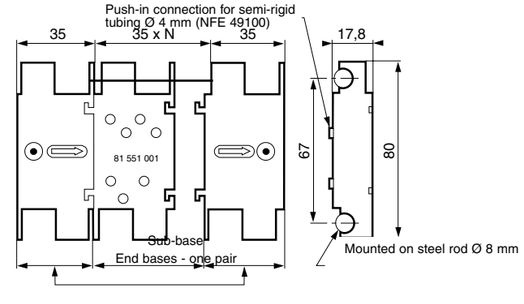
	81 551 001	81 552 001
	—	—
	Sub-base (with clips)	End bases - one pair
	—	—
	—	—
	—	●
	-5 → +50	-5 → +50
	40	120

Rear connecting



1 - Input port (marked port 1)
2 - Supply port (Port 2)
3 - Output port (Port 3)
4 - Cycle start signal port (Port 4)
5 - In-cycle signal port (Port 5)
6 - End of cycle signal port (Port 6)
7 - Reset to zero signal port (Port 7)
8 - Indicator at supply port
9 - Marking area

Rear connecting



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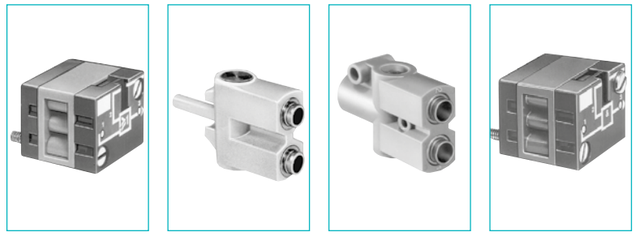
Logic elements

› **Performs "combined" Pneumatic**
› **Easy to use**

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive



Functions	OR	81 521 501	81 540 001	81 540 005	
	AND	—	—	—	81 522 501
	YES	—	—	—	—
	NO	—	—	—	—
Version		On Sub-base page 4/14-4/15	Plug-in Ø 4	Plug-in Ø 6	On Sub-base page 4/14-4/15

Symbol

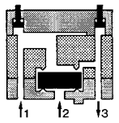
Characteristics

Push-in connection for semi-rigid tubing (NFE 49100)	Male/Female/Female	—	Ø 4 mm	—	—
	Female/Female/Female	—	—	Ø 6 mm	—
Colour		Blue	Blue	Blue	Green
Operating pressure	bar	2 → 8	2 → 8	2 → 8	2 → 8
Orifice diameter	mm	2.7	2.7	4	2.7
Flow at 6 bars	Nl/min	170	170	200	170
Pressure indicator		●	—	—	●
Switching time	ms	—	—	—	—
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Mechanical life	operations	$>10^7$	$>10^7$	$>10^7$	$>10^7$
Weight	g	25	12	25	25

Pilot/pressure curves

P.p : Pilot pressure
P.a : Supply pressure

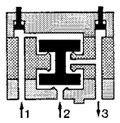
Principle of operation



Cellule OR

The output signal "S" is present when a signal at "a" OR "b" is present:

S = a OR b S = a + b



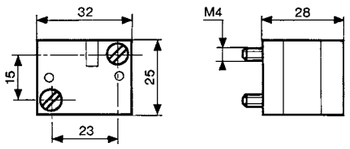
Cellule AND

The output signal "S" is present only when signals "a" AND "b" are present simultaneously:

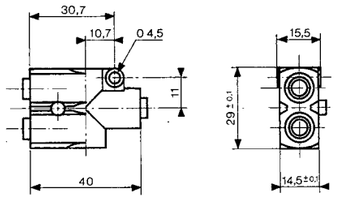
S = a AND b S = a . b

Dimensions

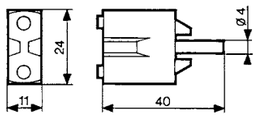
81 521 501 - 81 522 501



81 540 005 - 81 541 005

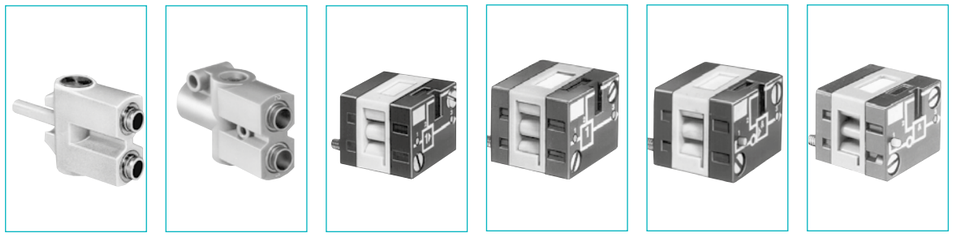


81 540 001 - 81 541 001

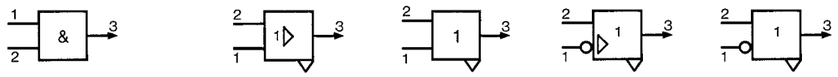


Other information

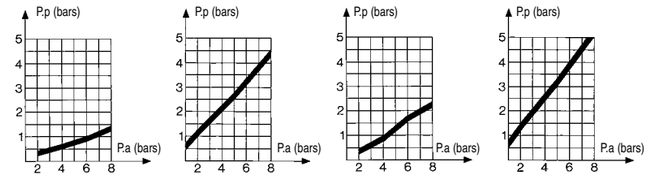
See pages 54/55 for mounting plan for logic elements.

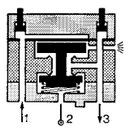


OR	—	—	—	—	—	—
AND	81 541 001	81 541 005	—	—	—	—
YES	—	—	81 501 025	—	—	—
NO	—	—	—	81 503 025	81 504 025	81 506 025
Version	Plug-in Ø 4	Plug-in Ø 6	On sub-base page 36-37	Threshold On sub-base page 4/14-4/15	Threshold On sub-base page 4/14-4/15	Threshold On sub-base page 4/14-4/15



Ø 4 mm	—	—	—	—	—
—	Ø 6 mm	—	—	—	—
Green	Green	Yellow	Orange	Light grey	Dark grey
2 → 8	2 → 8	2 → 8	2 → 8	2 → 8	2 → 8
2.7	4	2.7	2.7	2.7	2.7
150	200	170	170	170	170
—	●	●	●	●	●
—	—	< 4	< 4	< 4	< 4
-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50
$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$
13	25	30	30	30	30

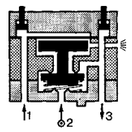




YES element

The output signal "S" is only present when the pilot is present "a" is present:

S = a YES b S = a



NOT element

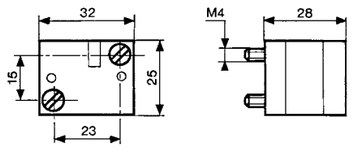
The output signal "s" is present only if the input signal "a" is NOT present. The output signal is therefore the inverse of the pilot signal:

S= NOT a S = $\overline{a}$

If the supply port is connected to a 2nd input "b", the function obtained is called inhibition:

S = NOT a AND b S = $\overline{a}$. b

81 501 025 - 81 503 025
81 504 025 - 81 506 025



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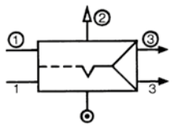
Memory element

› **100 % pneumatic**
› **Bistable pneumatic**

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive

Version		81 523 201 With pressure indicator	81 523 601 With pressure indicator and manual override

Symbol



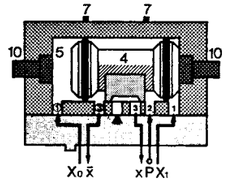
Characteristics

Colour		Black	Black
Operating pressure	bar	2 → 8	2 → 8
Orifice diameter	mm	2.7	2.7
Minimum memory pilot pressure	bar	2.5	2.5
Operating temperature	°C	-5 → +50	-5 → +50
Flow at 6 bars	Nl/min	200	200
Connection - On sub-base page 4/14-4/15		●	●
Weight	g	90	90

Principle of operation

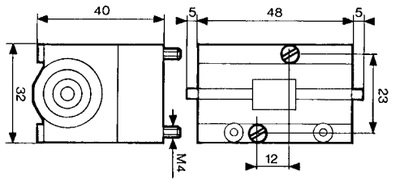
The function is that of a 4/2 valves. The appearence of signal "X1" causes the displacement of the slide valve. The output port "x" is then put under pressure. This state is remembered until the arrival of signal "X0". This signal reverses the slide valve, the output "x" is put under pressure. This state is likewise remembered. The output:

- "x" under pressure indicates that the information in the MEMORY is "X1",
- "x" under pressure indicates that the information in the MEMORY is "X0".

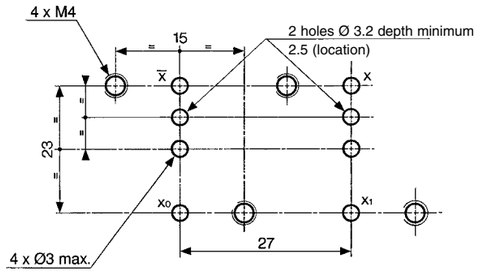


Dimensions

81 523 201 - 81 523 601



Dimensions of logic and memory elements



Viewed from above

ATEX version products are available in the following catologues: **Pneumatic products for explosive atmospheres** or on our website
www.crouzet.com

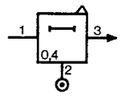
Timers fixed timing

› **Fixed 0.4 s**

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive

Version	81 503 540 Positive output

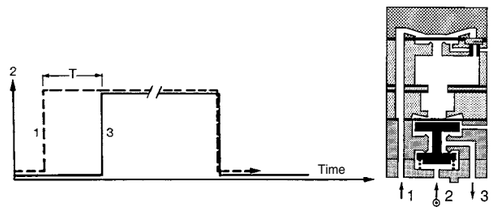
Symbol



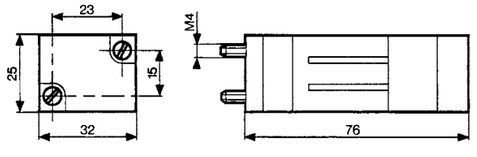
Characteristics

Timing	s	0.4
Operating pressure	bar	2 → 8
Flow at 6 bars	Nl/min	170
Orifice diameter	mm	2.7
Accuracy	%	± 5
Min. reset time	s	<0.1
Connection - On sub-base page 36-37		●
Operating temperature	°C	-5 → +50
Mechanical life	operations	$>10^7$
Weight	g	106

Principle of operation
with positive output



Dimensions
81 503 540



ATEX version products are available in the following catologues: **Pneumatic products for explosive atmospheres** or on our website
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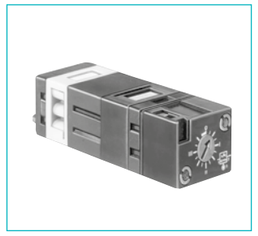
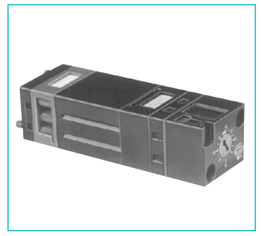
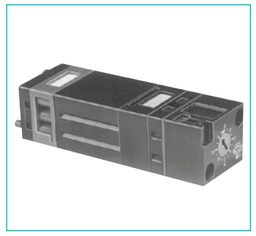
Timers (with adjustable timing)

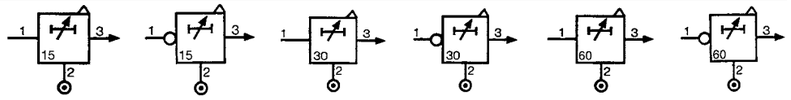
› 60 s adjustable (60 s max.)

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive

		81 503 710	81 506 710	81 503 720	81 506 720	81 503 725	81 506 725
Function	positive	●	—	●	—	●	—
	negative	—	●	—	●	—	●

Symbol



Characteristics

Timing	s	0.1 → 15	0.1 → 15	0.1 → 30	0.1 → 30	0.1 → 60	0.1 → 60
Operating pressure	bar	2 → 8	2 → 8	2 → 8	2 → 8	2 → 8	2 → 8
Flow at 6 bars	Nl/min	170	170	170	170	170	170
Orifice diameter	mm	2.7	2.7	2.7	2.7	2.7	2.7
Accuracy	%	± 5	± 5	± 5	± 5	± 5	± 5
Min. reset time	s	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Connection - On sub-base page 4/14-4/15		●	●	●	●	●	●
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Mechanical life	operations	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$	$>10^7$
Weight	g	90	90	100	100	120	120

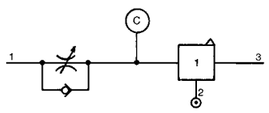
Accessories

Panel mounting adaptator		79 451 698	79 451 698	79 451 903	79 451 903	—	—
Weight	g	53	53	53	53	—	—

Principle

The operation of these pneumatic timers is similar to that of electronic timers (circuit with capacitor/resistor)

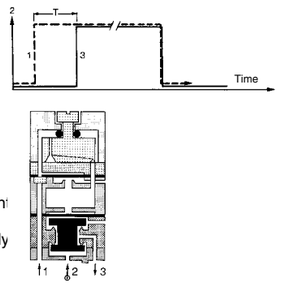
Timing by charging of reservoir



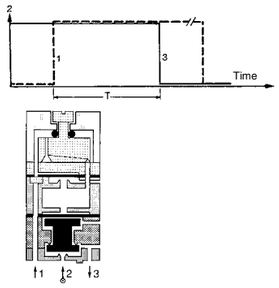
The reservoir fills via the flow restrictor until the switching point of the timer output is reached (positive or negative).
The non-return valve allows the reservoir to be emptied rapidly for the next timing.

Principle of operation

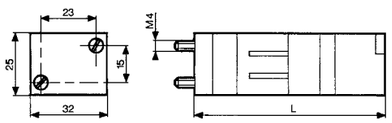
with positive output



with negative output

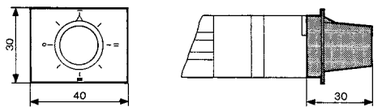


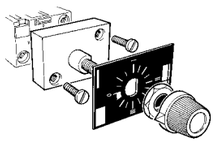
Dimensions



	L (mm)
81 503 710 - 81 506 710	78
81 503 720 - 81 506 720	92
81 503 725 - 81 506 725	125

Adaptator 79 451 . . .





For panel mounting, a pre-drilled hole Ø 10.5 mm si required

ATEX version products are available in the following catologues: **Pneumatic products for explosive atmospheres** or on our website
www.crouzet.com

Timers

› Fixed and adjustable

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive

Single impulse generator	Fixed	81 507 540	—	—
	Adjustable	—	81 507 720	—
Adjustable frequency generator		—	—	81 506 940

Symbol

Characteristics

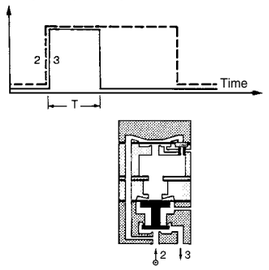
Timing	s	0.4	0.1 → 30	—
Frequency	Hz	—	—	0.02 → 8
Operating pressure	bar	2 → 8	2 → 8	2 → 8
Flow at 6 bars	Nl/min	170	170	170
Orifice diameter	mm	2.7	2.7	2.7
Accuracy	%	± 5	± 5	± 5
Min. reset time	s	<0.1	<0.1	<0.1
Connection - On sub-base page 4/14-4/15		●	●	●
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50
Mechanical life	operations	$>10^7$	$>10^7$	$>10^7$
Weight	g	106	180	85

Accessories

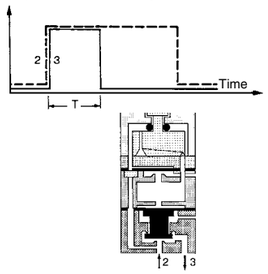
Panel mounting adaptators	—	79 451 904	79 451 905
Weight (g)	—	53	53

Principle of operation

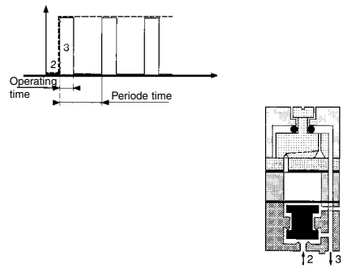
Single impulse generator



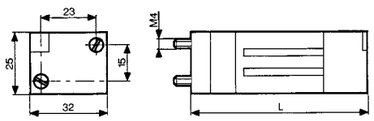
Adjustable impulse generator



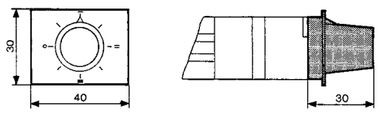
Frequency generator



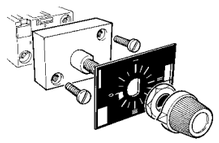
Dimensions



79 451



Part numbers	L (mm)
81 507 540	73
81 507 720	99
81 506 940	72



For panel mounting, a pre-drilled hole Ø 10.5 mm si required

ATEX version products are available in the following catologues: **Pneumatic products for explosive atmospheres** or on our website
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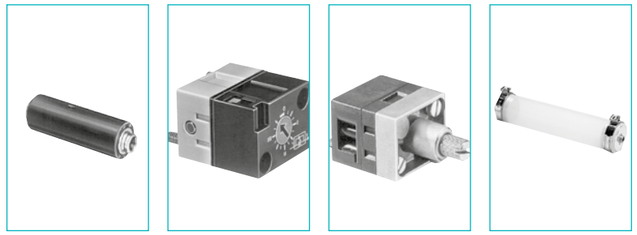
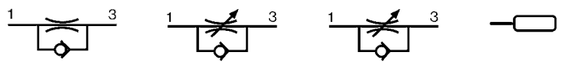
Timing Accessories

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive



One-way in-line fixed flow restritors	Flow at 4 bars Nm³/h	Ø orifice (mm)					
	0.18 → 0.30	0.3	white	81 529 003	—	—	—
	0.35 → 0.50	0.4	yellow	81 529 004	—	—	—
	0.58 → 0.77	0.5	red	81 529 005	—	—	—
	0.80 → 1.06	0.6	green	81 529 006	—	—	—
	1.10 → 1.39	0.7	blue	81 529 007	—	—	—
	1.45 → 1.65	0.8	grey	81 529 008	—	—	—
	2.30 → 2.80	1	black	81 529 010	—	—	—
	0.08 → 0.12	0.25	white	81 529 025	—	—	—
One-way adjustable flow restritor				—	81 525 101	81 526 001	—
Capacity for timing	10 • 60 s			—	—	—	79 458 808

Symbol



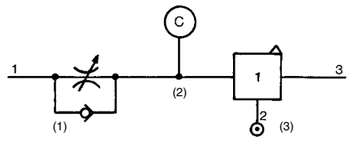
Characteristics

Free flow		Nl/min	Depending on orifice	30	200	—
Orifice diameter		mm	Depending on orifice	0 → 0.5	0 → 1.7	—
Operating pressure		bars	1 → 8	1 → 8	2 → 8	—
Timing		s	—	—	—	10 → 60
Capacity		cm³	—	—	—	30
Connection	Sub-base page 4/14-4/15		—	•	•	—
	Push-in connection for semi-rigid tubing (NFE 49100)	mm	Ø 4	—	—	Ø 4
Operating temperature		°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Weight		g	8	60	70	40

Connections

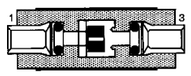
For timing circuit
- One-way flow restrictor 81 525 1 - 81 529 0 (1)
- Reservoir 79 458 018 (2)
- Relay element 81 503 0 - 81 506 0 (3) page 4/6-4/7

Sub-base page 4/14-4/15

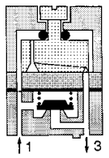


Principle of operation

One-way
with fixed flow

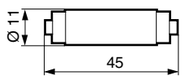


One-way
with adjustable flow

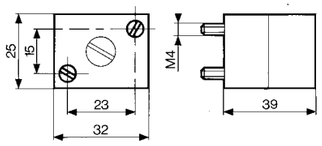


Dimensions

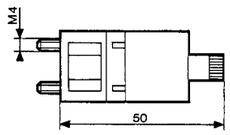
81 529



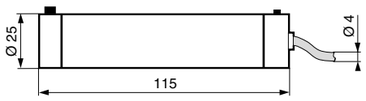
81 525 101



81 526 001



79 452 808



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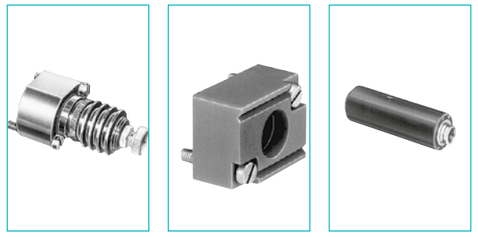
www.crouzet.com

Regulator accessories

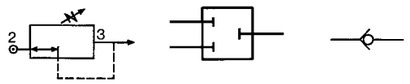
Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive



Part numbers

Mini-détenteur	81 527 001	—	—
Plug element	—	81 520 601	—
In-line non-return	—	—	81 529 901

Symbol

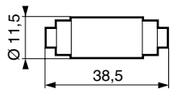


Characteristics

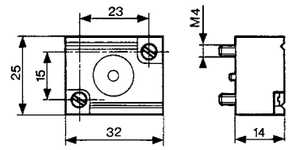
Operating pressure		bars	2 → 8	—	2 → 8
Flow at 6 bars		Nl/min	200	—	200
Adjustable output pressure		bar	0,1 → 8	—	—
Connection	Sub-base		•	•	
	Push-in connection for semi-rigid tubing (NFE 49100)	mm			Ø 4
Weight		g	150	70	70

Dimensions

81 529 901



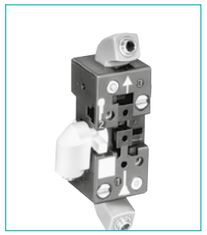
81 520 601

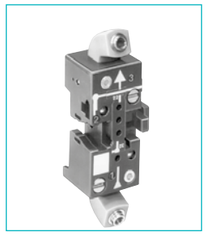


ATEX version products are available in the following catologues: **Pneumatic products for explosive atmospheres** or on our website
www.crouzet.com

Sub-bases for logic elements

Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive





	81 532 104	81 532 102
Two-hand start module	● 1	● 1
Manostats - vacuostats	● 1	● 1
Leak sensor and amplifier relays	● 1	● 1
Logic elements AND Timers	● 1	● 1
Regulator accessories	● 1	● 1
Memory element	—	—
Operating temperature °C	-5 → +50	-5 → +50
Electro-pneumatic miniature solenoid	● 1	● 1

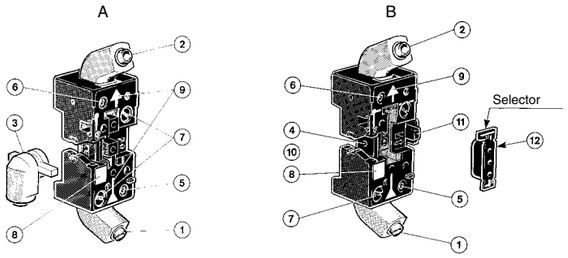
NB: The number indicates the number of components mounted on the sub-base ↑

Characteristics

Push-in connection for semi-rigid tubing Ø 4 mm (NFE 49100)	rotatable	rotatable
Fixation	DIN rail 35 mm	DIN rail 35 mm
Weight g	56	52

Connections elements and relays

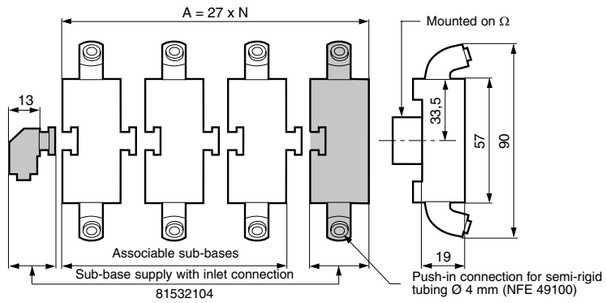
Front connecting



A - Single sub-base or end base
B - Associable sub-base
1 - Input port (green port 1)
2 - Output port (red port 3)
3 - Input/supply port (yellow port 2) Ø 4
4 - Input port integral to sub-base
5 - Input indicator (green)
6 - Output indicator (red)
7 - 1/4 turn screws
8 - Marking tag
9 - Arrow indicating flow direction
10 - Mounting tongue
11 - Mounting groove
12 - Selector

Dimensions

81 532 104 **3 x 81532102**



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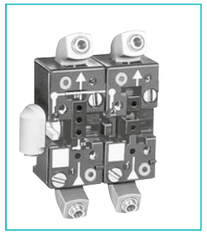
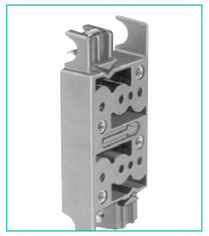


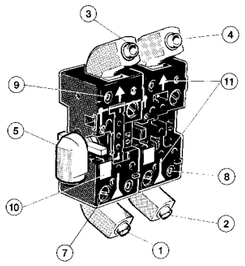


	81 542 002	81 532 001	81 531 001
Two-hand start module	—	● 1	● 2
Manostats - vacuostats	—	● 1	● 2
Leak sensor and amplifier relays	—	● 1	● 2
Logic elements AND Timers	—	● 1	● 2
Regulator accessories	—	● 1	● 2
Memory element	● 1	—	● 1
Operating temperature °C	-5 → +50	-5 → +50	-5 → +50
Electro-pneumatic miniature solenoid	—	● 1	● 2

Caractéristiques

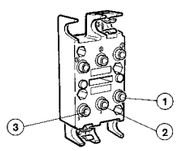
Push-in connection for semi-rigid tubing Ø 4 mm (NFE 49100)	rotatable	rear	rear
Fixation	DIN rail 35 mm	2 M4 screws	Clips for rails Ø 8 mm
Weight g	95	10	35

Memory element sub-base, front and rear connecting



1 - Input port X1 (green port 1)
2 - Input port X0 (green port 1)
3 - Output port X (red port 3)
4 - Output port X (red port 3)
5 - Supply port (brass port 2)
7 - 1/4 turn screws
8 - Input indicator
9 - Output indicator
10 - Marking tag
11 - Arrow indicating the flow direction

Rear connection



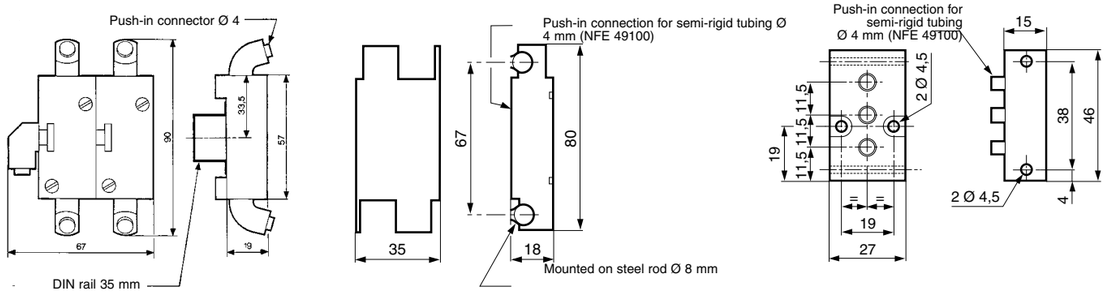
The modular system elements are fixed with two screws on the sub-base.

A locating device on each logic element prevents incorrect assembly.

The logic element is connected via the sub-base. This sub-base has 3 instant connections for connecting semi-rigid tubes with outer Ø 4.

1 - Input signal
2 - Signal port for passive logic elements, air supply for active logic elements.
3 - Output signal

81 542 002 (for memory 81523201/601) **81 531 001** **81 532 001**



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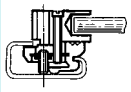
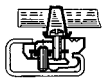
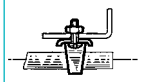
Mounting accessories

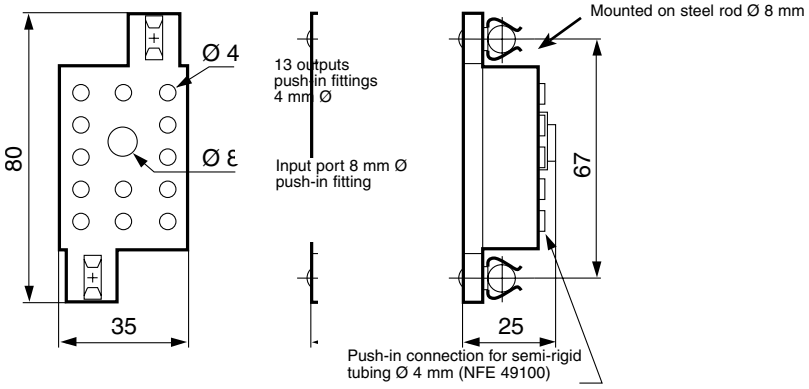
Also available in **ATEX** version for use in potentially explosive atmospheres in accordance with 94/9/EC Directive

					
Mounting equipment	81 533 501 Hole domino	81 533 001 Clip domino	79 450 609 Bar clips Ø 8		— —
Supply manifold 13 outputs	—	—	—		81 536 801

Characteristics

Weight (g)		8	4	80		80
		For mounting on the end of a zinc-coated mild steel rod Ø 8 mm on an asymmetrical DIN rail	For adjustable mounting on a zinc-coated mild steel rod Ø 8 mm on an asymmetrical DIN rail	Packet of 100 pieces		
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50		-5 → +50

Dimensions
81 536 804



Other information

Use Weidmuller plastic labels for marking components part number FW 4734-6.

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