PNEUMATIC LOGIC COMPONENTS

43

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.

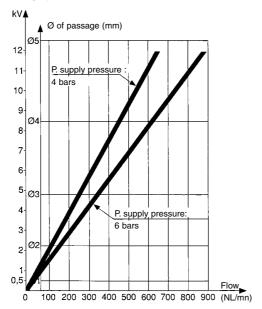
Mounting recommendations

- 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/ka.
- 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
- The flow in NI/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 NI/min is the number of litres of free air necessary for the unit to function.
- kV = the flow coefficient of the equipment.
- Mechanical life > 107 operations.

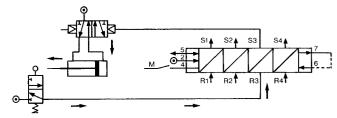
flow graphs



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

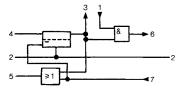


Operation results from the combination of three functions (memory, AND and OR) which constitute each module.

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



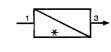
sequencer module with maintained reset

Brake

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

Module with auto reset





Brake

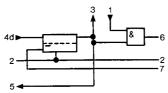
This returns the memory spool to the reset condition only when the supply is lost

Shift register

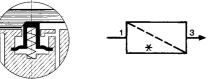
The general principle is to advance the sequencer step by command impulses to the inputs of the even steps, alternating with the command impulses to the inputs of the odd steps.

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 40
sequencer	with 'maintain'	Reset to zero	_
shift register	_	_	with 'main

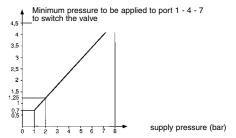
Reset to zero

Symbol

Versions



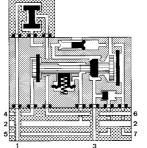
Operating pressure	bar	2 → 8	2 → 8	2 → 8	2 → 8
Orifice diameter	mm	2.7	2.7	2.7	2.7
Flow at 6 bars	NI/min	150	150	150	150
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Mechanical life 5 x 106 at 6 bars		•	•	•	•
Connection - Sub-base page 26		•	•	•	•
Weight	g	70	70	70	70



Principle of operation

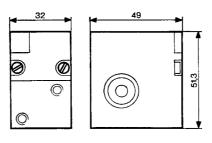
(supplied without logic element. For choice of units see pages 46/47)

Sequencer module with maintained reset

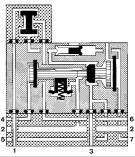


- 1 Input signal
- 2 Supply
- 3 Output signal
- 4 Start signal
- 5 In cycle signal 6 - End of cycle signal
- 7 Reset to zero signal

Dimensions

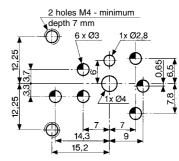


Shif register with maintained reset



- 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

Mounting plan for sequencer



44 PNEUMATICS PRODUCTS 45

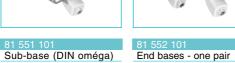
Sequencer sub-bases

Versions

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

Front connecting (DIN-omega)





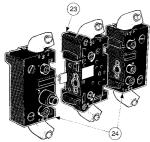


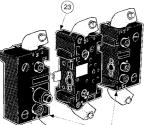
81 552 601	
Diversion base	
_	

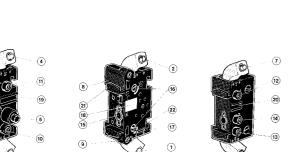
Characteristics				
Sub-bases Rotatable connectors		•	•	•
(fitted) Pressure indicators		•	•	•
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50
Weight	a	55	135	60

Sequencer connections





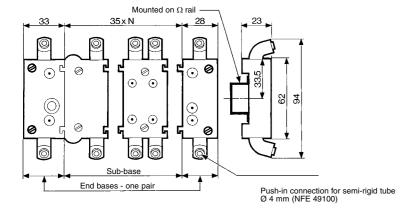




- 1 Input port (green port 1) Ø 4
- 2 Output port (red port 1) Ø 4
- 3 Input port, cycle start (green port 1) Ø 4
- 4 Output port, in-cycle signal (red port 1) Ø 4
- 5 Output port, cycle end (red port 6) Ø 4
- 6 Output port, cycle end (red port 6) Ø 4
- 7 Input port, reset to zero (green port 7) Ø 4
- 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





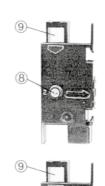


81 551 001
Sub-base (with clips)

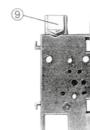
End bases - one pair

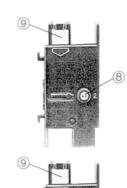
_	_
_	•
-5 → +50	-5 → +50
40	120

Rear connecting





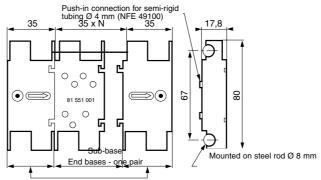




PNEUMATICS PRODUCTS

- 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





46 PNEUMATICS PRODUCTS 47 PNEUMATICS PRODUCTS

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

	OR
Functions	AND
	YES
	NO

Version



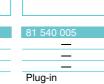
On Sub-base

page 4/14-4/15

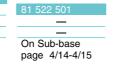








Ø6







Plug-in

Ø4



Characteristics					
Push-in connection for semi-rigid	Male/Female/Female	_	Ø 4 mm	_	_
tubing (NFE 49100)	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	NI/min	170	170	200	170
Pressure indicator		•	_	_	•
Switching time	ms	_	_	_	_
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50	-5 → +50
Mechanical life	operations	>107	>107	>107	>107
Weight	g	25	12	25	25

Pilot/pressure curves

P.p : Pilot pressure

P.a : Supply pressure

Principle of operation



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

S = a OR b

Cellule OR

S = a + b



Cellule AND

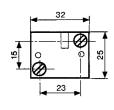
The output signal "S" is present only when signals "a" AND "b" are present simultaneously:

S = a AND b

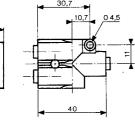
 $S = a \cdot b$

Dimensions

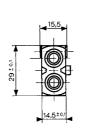
81 521 501 - 81 522 501

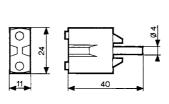






81 540 005 - 81 541 005





81 540 001 - 81 541 001

Other information

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













81 541	001
	_
	_
Plug-in	

Ø 4

Ø 4 mm

Plug-in Ø6

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



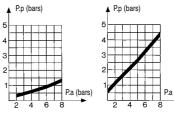


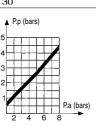


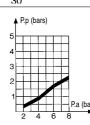


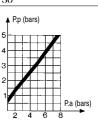


_	Ø 6 mm	_		<u> </u>	<u> </u>
Green	Green	Yellow	Orange	Light grey	Dark grey
2 → 8	2 → 8	2 → 8	2 → 8	2 → 8	2 → 8
2.7	4	2.7	2.7	2.7	2.7
150	200	170	170	170	170
_	•	•	•	•	•
_	_	< 4	< 4	< 4	< 4
-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50	-5 → +50
>10 ⁷	>107	>107	>10 ⁷	>10 ⁷	>10 ⁷
13	25	30	30	30	30
		P.p (bars)	▲ P.p (bars)	P.p (bars)	P.p (bars)











YES element

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

S = a YES b



NOT element

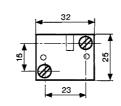
The output signal "s" is present only if the input signal "a" is NOT present. The output signal is therefore the inverse of the pilot signal:

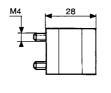
S= NOT a

If the supply port is connected to a 2nd input "b", the function obtained is called inhibition: $S = \overline{a} \cdot b$

S = NOT a AND b

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





48 PNEUMATICS PRODUCTS

Memory element

- > 100 % pneumatic
- Bistable pneumatic



Version

tially explosive atmospheres in accordance with

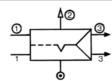
Also available in ATEX version for use in poten-94/9/EC Directive



With pressure indicator

With pressure indicator and manual

Symbol

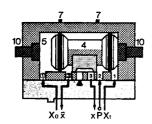


Characteristics Colour Operating pressure Orifice diameter mm Minimum memory pilot pressure 2.5 Operating temperature -5 → +50 -5 **→** +50 Flow at 6 bars NI/min 200 200 Connection - On sub-base page 4/14-4/15

Principle of operation

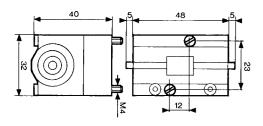
The function is that of a 4/2 valves. The appearence of signal "X1" causes the displacement of the slide valve. The output port "x" is then put under pressure. This state is remembered until the arrival of signal "X0". This signal reverses the slide valve, the output "x" is put under pressure. This state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

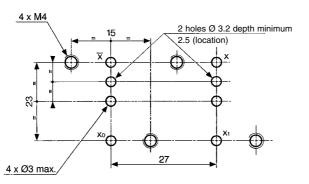


Dimensions

81 523 201 - 81 523 601



Dimensions of logic and memory elements



Viewed from above

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

49



Version

81 503 540 Positive output

PNEUMATICS PRODUCTS

Symbol

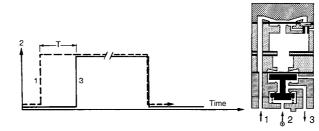


Characteristics

Timing	S	0.4
Operating pressure	bar	2 → 8
Flow at 6 bars	NI/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

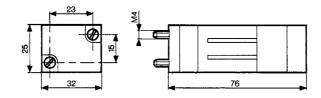
Principle of operation

with positive output



Dimensions

81 503 540



Adjustable

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







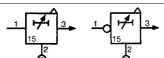
		81 5	03
Function	positive		
	negative		

_	•
•	_
03 710	81 506 710



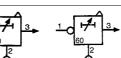
81 503 725	81 506 725
•	_
	•

Symbol









O I
Characteristics
• · · · · · · · · · · · · · · · · · · ·

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	NI/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	>107	>10 ⁷	>107	>107	>10 ⁷	>107
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

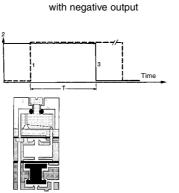
Timing by charging of reservoir

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

Principle of operation

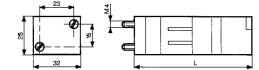






Dimensions

for the next timing.

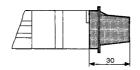


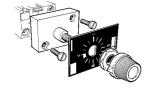
The reservoir fills via the flow restrictor until the switching point of the timer output is reached (positive or negative). The non-return valve allows the reservoir to be emptied rapidly

	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

Timers

> Fixed and adjustable

Adjustable frequency generator



Also available in ATEX version for use in potentially explosive atmospheres in accordance with







94/9/EO Directive		
Single impulse generator	Fixed	

Symbol



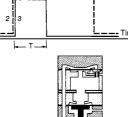


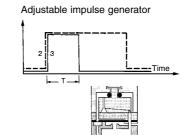


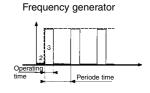
		0,4		
Characteristics				
Timing	S	0.4	0.1 → 30	
Frequency	Hz	_	_	0.02 → 8
Operating pressure	bar	2 → 8	2 → 8	2 → 8
Flow at 6 bars	NI/min	170	170	170
Orifice diameter	mm	2.7	2.7	2.7
Accuracy	%	± 5	± 5	± 5
Min. reset time	S	<0.1	<0.1	<0.1
Connection - On sub-base page 4/14-4/1	5	•	•	•
Operating temperature	°C	-5 → +50	-5 → +50	-5 → +50
Mechanical life	operations	>10 ⁷	>10 ⁷	>107
Weight	g	106	180	85
Accessories	·			
Panel mounting adaptators		_	79 451 904	79 451 905
Weight (g)		_	53	53

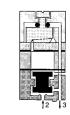
Principle of operation

Single impulse generator

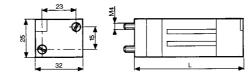






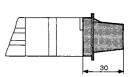


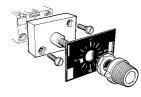
Dimensions



art numbers	L (mm)
1 507 540	73
1 507 720	99
1 506 940	72







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

52 PNEUMATICS PRODUCTS

Timing Accessories

Also available in ATEX version for use in poten-



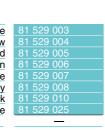






tially explosive atmospheres in accordance with 94/9/EC Directive One-way in-line fixed flow restritors

One-way in-line fixed flow restritors	Flow at 4 bars Nm ³ /h	Ø orifice	e (mm)
	$0.18 \rightarrow 0.30$	0.3	white
	$0.35 \rightarrow 0.50$	0.4	yellow
	$0.58 \rightarrow 0.77$	0.5	red
	$0.80 \rightarrow 1.06$	0.6	green
	$1.10 \rightarrow 1.39$	0.7	blue
	$1.45 \rightarrow 1.65$	8.0	grey
	$2.30 \rightarrow 2.80$	1	black
	$0.08 \rightarrow 0.12$	0.25	white
One-way adjustable flow restritor	•		
Capacity for timing	10 • 60 s		



е	81 529 003
Ν	81 529 004
d	81 529 005
n	81 529 006
е	81 529 007
У	81 529 008
k	81 529 010
е	81 529 025
	_
	_

Ν	81 529 004
d	81 529 005
n	81 529 006
е	81 529 007
У	81 529 008
k	81 529 010
е	81 529 025
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81 525 101	
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	_		
	81 526 001		
		79)

Symbol









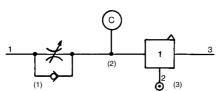
			-y -	_		
Characteris	tics					
Free flow		NI/min	Depending on orifice	30	200	_
Orifice diamete	er	mm	Depending on orifice	$0 \to 0.5$	0 → 1.7	<u> </u>
Operating pres	sure	bars	1 → 8	1 → 8	2 → 8	_
Timing		S	-	_	_	10 → 60
Capacity		cm ³	<u> </u>	_	_	30
Connection	Sub-base page 4/14-4/15		_	•	•	<u> </u>
Connection	Push-in connection for semi- rigid tubing (NFE 49100)	mm	Ø 4	_	-	Ø 4
Operating temp	perature	°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

81 525 101

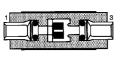


81 526 001

Principle of operation

One-way

with fixed flow



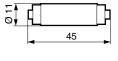
One-way with adjustable flow

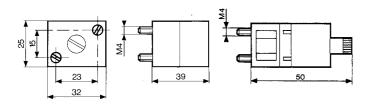


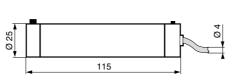
79 452 808

Dimensions

81 529







53 PNEUMATICS PRODUCTS

Regulator accessories







Part numbers

94/9/EC Directive

Mini-détenteur

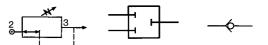
Also available in ATEX version for use in poten-

tially explosive atmospheres in accordance with

Plug element In-line non-return

81 529 901

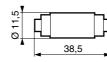
Symbol

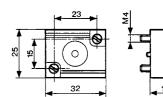


Characteris	stics				
Operating pres	ssure	bars	2 → 8	_	2 → 8
Flow at 6 bars	8	NI/min	200	_	200
Adjustable out	tput pressure	bar	0,1 → 8	_	<u> </u>
Connection	Sub-base		•	•	
Connection	Push-in connection for semi- rigid tubing (NFE 49100)	mm			Ø 4
Weight		g	150	70	70

Dimensions

81 529 901





81 520 601

Sub-bases for logic elements



PNEUMATICS PRODUCTS



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

	8
Two-hand start module	
Manostats - vacuostats	
Leak sensor and amplifier relays	
Logic elements AND Timers	
Regulator accessories	
Memory element	
Operating temperature °C	-!
Electro-pneumatic miniature solenoid	

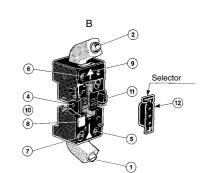
81 532 104	81 532 102
• 1	•
• 1	•
● 1	•
• 1	•
• 1	•
_	_
-5 → +50	-5 → +50
• 1	•

NB: The number indicates the number of components mounted on the sub-base 1

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

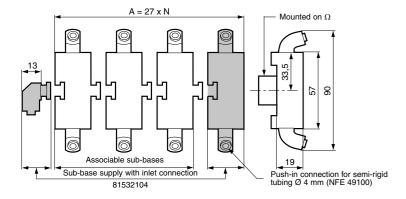


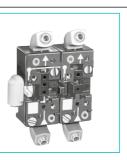
- A Single sub-base or end base
- B Associable sub-base
- 1 Input port (green port 1)
- 2 Output port (red port 3)
- 3 Input/supply port (yellow port 2) Ø 4
- 4 Input port integral to sub-base5 Input indicator (green)
- 6 Output indicator (red)
- 7 1/4 turn screws 8 - Marking tag
- 9 Arrow indicating flow direction
- 10 Mounting tongue
- 11 Mounting groove
- 12 Selector

Dimensions

81 532 104

3 x 81532102





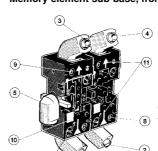




	81 542 002	81 532 001	81 531 001
Two-hand start module	_	● 1	● 2
Manostats - vacuostats	<u> </u>	● 1	● 2
Leak sensor and amplifier relays	<u> </u>	● 1	● 2
Logic elements AND Timers	<u> </u>	● 1	● 2
Regulator accessories		● 1	● 2
Memory element	● 1	_	● 1
Operating temperature °C	-5 → +50	-5 → +50	-5 →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

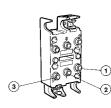
Caractéristiques				
Push-in connection for semi-rigid tubing Ø 4 mm (NFE 49100)		rotatable	rear	rear
Fixation		DIN rail 35 mm	2 M4 screws	Clips for rails Ø 8 mm
Weight	g	95	10	35

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 8 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 pre-

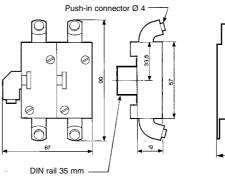
The logic element is connected via the sub-base. This sub-base has 3 instant connections for connecting semi-rigid tubes with outer \emptyset 4.

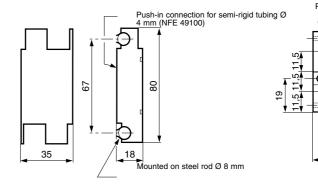
- 1 Input signal
- 2 Signal port for passive logic elements, air supply for active logic elements.
- 3 Output signal

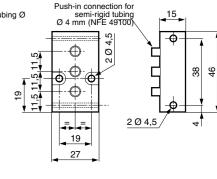
81 542 002 (for memory 81523201/601)

81 531 001

81 532 001

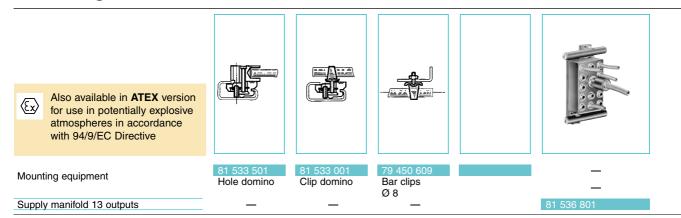






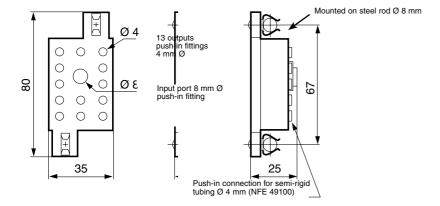
56

Mounting accessories



Characteristics					
Weight (g)		8 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	80 Packet of 100 pieces	80
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.