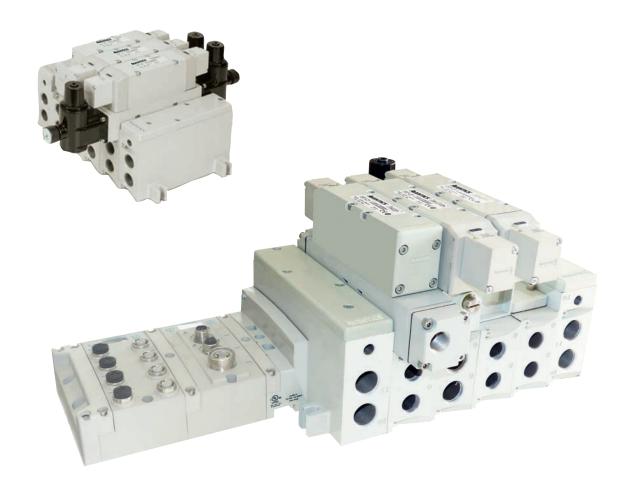
# 01457CB-2020/R01 Availability, design and specifications are subject to change without notice. All rights reserved.

# **Solenoid Pilot Actuated Valves**

Series 2035



#### **General Information**

Series 2035 Valve belong to the Valve Generation 2000.

With up to **224 outputs** and **96 inputs, depending on the protocols used,** they fulfill all requirements of automation. **Characteristics:** 

- Modular reality, true plug & play flexibility in design. 35 mm wide valves.
- Strong and light due to valve housing made of aluminium.
- Equipped with the famous lapped spool and sleeve assembly:
- Insensitive, self-cleaning spool made of stainless steel with "air bearing effect" by air entrained between spool and sleeve (1 μm air clearance), typical service life of more than 200 million cycles.
- Can operate with **different pressures at the same time** within one valve, **independent** of flow direction.
- Available as **5-port.**, **2- and 3-pos. valve.**
- **Exchange** of valves **without dismounting** valve manifold.
- Worldwide support by Numatics subsidiaries and distributors in almost all countries of the world.





#### Series 2035

5ported, 2 and 3 position valves single or double solenoid pilot actuated

Flow capacity: 3500 l/min ANR

- Individual base mount or manifold mount
- Low wattage solenoids polarity insensitive with surge suppression
- Plug-in manifolds with internal wiring by "Z-Board" plug-in system
- Integral recessed gaskets between base and valve as well as between the manifolds
- Interchangeable cartridge fittings to accommodate various tube sizes
- · Simple conversion from internal to external pilot air supply
- Modular plug-together fieldbus electronics
- Designed to meet IP65/NEMA4

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#### **Technical Data • Operating Data**

Manifolds of series 2035 valves are equipped with integral electrical plug-in allowing an easy exchange of single components without dismounting the manifold.

"Z-Board"™ eliminates internal wiring.

Manifolds are available either with threaded ports or with push-in fittings.

Bottom supply ports are only available threaded. Common air exhaust.

End plates are available with integral mufflers.

Easy conversion from internal to external pilot air supply.



#### **Technical Data**

5-port., 2- and 3-pos. valves	2035
Flow capacity [at 6 bar, ∆p 1 bar]	3500 l/min ANR
Operating pressure range:	Vacuum to 10 bar
Pilot pressure range:	1.8 to 8.2 bar
Ambient temperaturre range	-23°C to +46°C

 Material

 Body:
 Aluminium

 Other parts:
 Stainless steel, steel, aluminium alloy or plastic

 Static seals:
 NBR

 Finish:
 Anodised or varnished

#### **Operating Data**

5 port., 2- and 3-pos. valves		2035					
100% ED:	24 \	/DC	110 VAC-50 Hz	z/120 VAC-60Hz			
Power (Watt):	2	.5	4	1.2			
Response time [ms]	energise	de-energise	energise	de-energise			
5-port., 2-pos., single actuated, spring return:	21	67	15	70			
5-port., 2-pos., double actuated, detented:	17	N/A	15	N/A			
5-port., 3-pos., double actuated, spring centered:	21	72	15	80			

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#### Sandwich Pressure Regulators • General Information

For Series 2035 single as well as double sandwich pressure regulators are available.

With single sandwich pressure regulators, pressure supply is regulated via port 1. This is carried out independently of other valves on the manifold.

With double sandwich pressure regulators, pressure supply is regulated via ports 2 and 4, i. e. each cylinder port can be regulated individually. The selected pressure can be read via a gauge, either mounted inline or on a 90° swivel elbow.

# **Sandwich Pressure Regulators**

Series 2035:Type RS / RD / RC / RQ / RE / RT

When ordering a valve with regulator mounted on a manifold, list the valve unit model number only and include the mounting requirements with the regulator. Specify "Assembled"

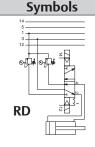
**EXAMPLE ORDERS:** Type RS

Valve unit only: Regulator and mounting: 353BA400K000030 353RS1Z1JN00000 ASSEMBLED



RQ

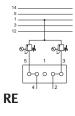
RS

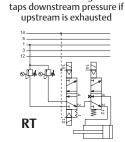


**RC** 

Non-relieving:

Single pressure Dual pressure from a single supply from a single supply



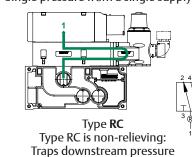


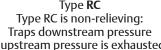
Relieving: exhausts pressure in cylinder if upstream pressure is exhausted

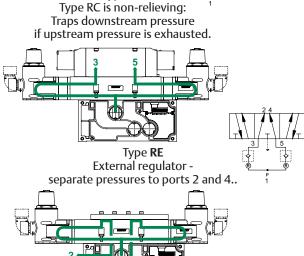
External regulator separate pressures to ports 2

Two-pressure selector used for multi-pressure applications

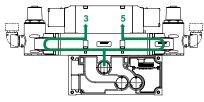
Type RS Single pressure from a single supply.



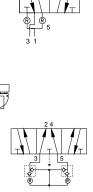


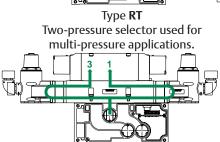


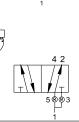
#### Type RD Dual pressure from a single supply.



Type **RQ** Type RQ is relieving: Exhausts pressure in cylinder if upstream pressure is exhausted.

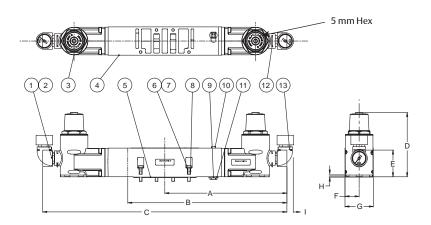








#### Dimensions: mm - Sandwitch Pressure Regulators



Туре	Α	В	С	D	E	F	G	Н	I	Weight (kg)
Single regulator	177.1	230.7	_	93.1	38.6	20.5	41.0	0.46	_	0.720
Double regulator	177.1	_	354.1	93.1	38.6	20.5	41.0	0.46	373.1	0.995

#### **General Information on Multipole Systems**

#### **Features**

- Solenoid air operated valve manifolds for connection to a control system (PLC) with a multiwire cable for simple wiring.
- Electrical connection with a 25 or 37 pin Sub-D connector or a 12, 19 or 26 pin round connector. Harting on request.
- Internal wiring by "Z-Board" plug-in system.
- Plug-together flexibility due to different assembly and wiring options.
- Designed to meet IP65 / NEMA 4 with round connector or terminal strip. These
  protection classes allow direct incorporation of the series 2000 manifold into a
  machine, close to the actuators and enable an increased number of production
  cycles.
- Manifold delivered assembled according to customer specifications.



#### **Combinations**

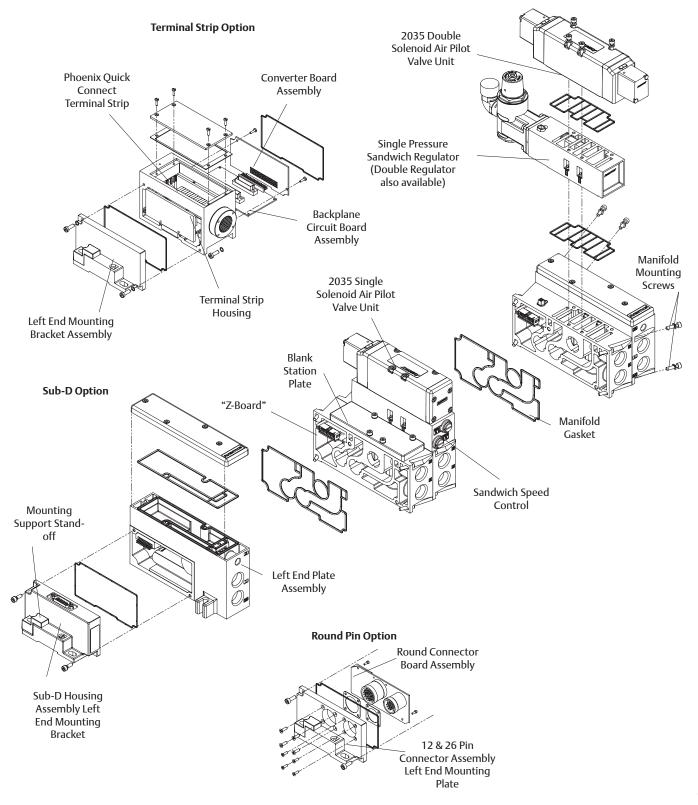
- Modules of up to 32 valves can be grouped together.
   The maximum number of valves depends on the type of electrical connection chosen:
- 25 pin Sub-D connector: max. 22 solenoids
- 37 pin Sub-D connector: max. 32 solenoids
- Terminal strip: max. 32 solenoids
- 12 pin round connector: max. 8 solenoids
- 19 pin round connector: max. 15 solenoids
- 26 pin round connector: max. 22 solenoids
- · Optional mixing of:
  - All functions of dual 2-position, 5-ported, 2-position single or double actuated and 5-ported, 3-position valves.
- Pressure separation plate and intermediate pressure supply module.
- The valve manifolds are intended for frame.

#### **Technical Data**

	Electrical data
Node power:	Voltage: 24 V DC ±10%
	Operating data
Temperature range:	-23°C to +46°C
Humidity:	air or inert gas ISO 8573 Level 7.4.4
Protection:	IP 65 or NEMA 4
	Configuration data
Solenoid coil outputs:	Max. 32

#### **Manifold and Wiring Architecture**

#### Terminal Strip. Sub-D, and Round Connector Options



#### **Multipole Systems • Accessories**

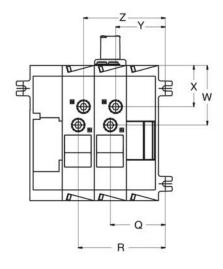
Accessory	Description			Catalog number
			2m	88100453
	25 pin female SUB-D connector, according to DIN 47100, straight cable outlet (IP 40) (Series 2000)	w/ cable	5 m	88100456
	(30103 2000)		10 m	88100461
1	25 pin female SUB-D connector, elbow cable outlet	w/ cable	2 m	88100901
	(Series 2000)	W/ Cabic	5 m	88157644
			2 m	88100473
	37 pin female SUB-D connector, according to DIN 47100, straight cable outlet (IP 40) (Series 2000)	w/ cable	5 m	88100476
	(SCIICS 2000)		10 m	88100481
	10 pin formala M22 connector etraint	w/o cable		88164102
	19 pin female M23 connector, straight	w/ cable	5 m	88164106
	10 pin formala M22 composter 00° albaur	w/o cable		88164105
	19 pin female M23 connector, 90° elbow	w/ cable	5 m	88164107
		w/o cable		230-879-K
	12 pin female M23 connector (IP 65)		2 m	230-960-02m
	12 pin temate m25 connector (ii 65)	w/ cable	5 m	230-960-05m
			10 m	230-960-10m
	26 pin female M27 connector (IP 65)	w/ cable	10 m	230-742E-10m

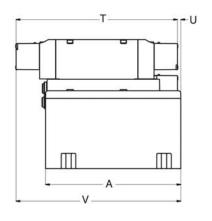
#### **Multipole Systems • Accessories**

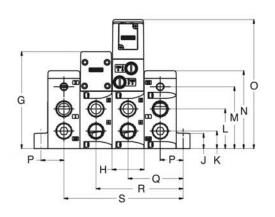
Pin no.	37 PIN SUB-D according to DIN 47100 Catalog number: 88100473 88100476/88100481	SUB-D 25 Catalog number: 88100901 88157644	25 PIN SUB-D according to DIN 47100 Catalog number: 88100453 88100456/88100461	12 PIN ROUND M23 Catalog number: 230-960-xxm	19 PIN ROUND M23 Catalog number: 88164106 88164107	26 PIN ROUND M27 Catalog number: 230-742E-10m
1	white	white-green	white	white	purple	white
2	brown	white-yellow	brown	brown	red	brown
3	green	white-grey	green	green	grey	green
4	yellow	green	yellow	yellowt	red-blue	yellow
5	grey	yellow	grey	grey	green	grey
6	pink	yellow-black	pink	pink	blue	pink
7	blue	grey	blue	blue	grey-pink	blue
8	red	yellow-red	red	red	white-green	red
9	black	pink	black	black	white-yellow	black
10	purple	yellow-blue	purple	purple	white-grey	purple
11	grey-pink	orange	grey-pink	grey-pink	black	pink-brown
12	red-blue	khaki	red-blue	green-yellow	yellow-green	white-pink
13	white-green	blue	white-green		yellow-brown	white-green
14	brown-green	white-brown	brown-green		brown-green	brown-green
15	white-yellow	white-black	white-yellow		white	white-yellow
16	yellow-brown	purple	yellow-brown		yellow	yellow-brown
17	white-grey	white-pink	white-grey		pink	white-grey
18	grey-brown	white-red	grey-brown		grey-brown	grey-brown
19	white-pink	white-purple	white-pink		brown	red-blue
20	pink-brown	white-blue	pink-brown			grey-pink
21	white-blue	blue	white-blue			white-blue
22	brown-blue	white	brown-blue			brown-blue
23	white-red	red	white-red			white-red
24	brown-red	brown	brown-red			brown-red
25	white-black	black	white-black			white-black
26	brown-black					yellow-green
27	grey-green					, , ,
28	yellow-grey					
29	pink-green					
30	yellow-pink					
31	green-blue					
32	yellow-blue					
33	green-red					
34	yellow-red					
35	green-black					
36	yellow-black					
37	grey-blue					
	19	13	(a) -24 ON	Pin 12 PE Pin 11 COMMON Pins 1 10	View from solder side    10	Pin 26 PE Pins 24-25 COMMON Disc 1 22
	Coils	Pins 1- Coils	<b>22</b>	Pins 1-10 Coils	Pin 6 COMMON	Pins 1-22 Coils

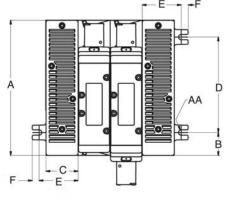
60

#### Dimensions: mm - Manifold Assembly











#### Note:

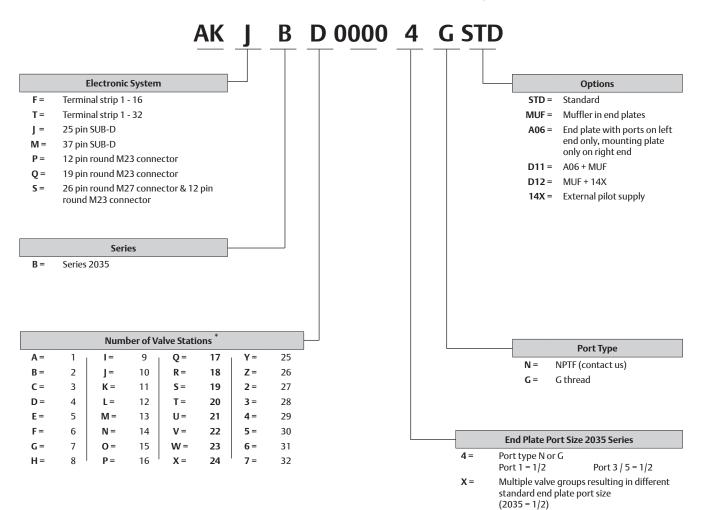
For Fieldbus Electronics dimensions. see page:  ${f 108}$ 

Α	В	С	D	E	F	G	Н	J	K	L	M	N	0	Р	Q	R
177.0	30.0	42.0	125.0	51.0	9.0	127.0	42.0	20.0	23.0	52.0	81.0	102.0	169.0	30.0	72.0	114.0

S	Т	U	V	W	X	Υ	Z	AA	Weight (0 stations)	+ kg
									(kg)	per station
156.0	211.3	4.4	215.6	78.0	54.0	65.0	72.0	3.5	2.050	0.640

#### **Manifold Assembly**

Configurator - CAD Files



Maximum Solenoid Outputs								
AK "F"	AK "T"	AK "J"	AK "M"	AK "P"	AK "S"			
16	32	22	32	8	32			

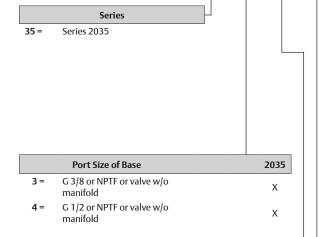
<sup>\*</sup> Note: Maximum number of valve stations is determined by:

- The electrical connection type.
- The valve type: Single solenoid valves up to the maximum solenoid outputs allowed by the electrical connection type (see chart above) or a combination of single and/or double solenoid valves not to exceed the maximum number of solenoid outputs allowed. Example: 6 single and 5 double solenoid actuated valves have in total 16 solenoid outputs.

  This is the maximum amount permitted for the terminal strip version. ("AKF").
- Combination of all stations cannot exceed 32.







		_
	Actuator	
=	Single actuated and spring return	

BB = Double actuated, flush non-locking manual override

On = Manifold w/o valve

flush non-locking manual override

**00** = Manifold w/o valve (blank station)

BA =

	Function	2035
4 =	5-port 2-pos. valve	Х
5 =	5-port 3-pos. valve. open center. dual pressure	X
6=	5-port 3-pos. valve. closed center	X
P =	Indicates blank station plate	Χ

_0	IVI	400	<i>5</i> 0 0 i			
				-	Voltage	
				00 =	Blank station plate	
				60 =	12 V DC	
				61 =	24 V DC	
					Options	
				000 =	Without option	
				11B =	Locking override	
				11M =	Without manual override	
				Further o	ptions on request	
				Por	t Type of Bases	
			O = W	ithout ba	se	
			<b>G</b> = G	thread		
			<b>N</b> = N	PTF thread	d	
				W	iring Options	
			K = Pl	Plug-in. AC with LED		
			M = Pl	Plug-in. DC with LED		
			O = Bl	ank statio	n plate	
					Mounting	
			00 = Va	alve unit o	nly	

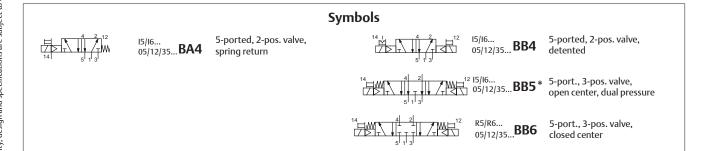
01 =	With sandwich speed control
Z1 =	Manifold block with side and bottom ports, single solenoid, "Z-Board" $^{\text{TM}}$
Z2 =	Manifold block with side and bottom ports. double solenoid. "Z-Board"™

	•
<b>Z6</b> =	Z2 with speed control
R1 =	Z1 with ribbon cable connector
R2 =	Z2 with ribbon cable connector
R5 =	Z5 with ribbon cable connector
R6 =	Z6 with ribbon cable connector
N2 =	M12 separation 24 V DC

Z1 with speed control

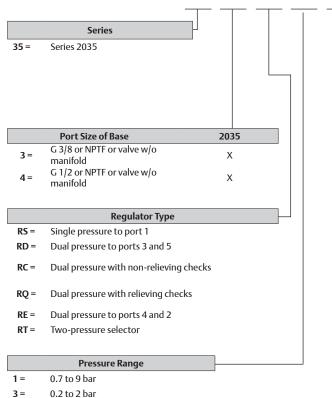


Ribbon cable option must be used for manifold assemblies that exceed 16 solenoids. (7th and 8th digit of valve order code)



#### Regulator





$\top$	 	
	_	Special Options
	000 =	Standard
	12H =	Without gauge
	16N =	Jumper on 14 end
	16P =	Jumper on 12 end
	Further o	ptions on request
		Port Type of Bases
	O =	Without base
	Q =	G thread
	K =	Plug-in fittings
	P =	NPTF thread
	<b>P</b> =	NPTF thread
	P =	
		Wiring Option
	P =	

	Mounting	2035
00=	Regulator unit only	Х
01 =	With sandwich speed control	X
Z1 =	Manifold block with side and bottom ports. single solenoid. "Z-Board"™	Χ
Z2 =	Manifold block with side and bottom ports. double solenoid. "Z-Board"™	Χ
<b>Z5</b> =	Z1 with speed control	X
<b>Z6</b> =	Z2 with speed control	X
R1 =	Z1 with ribbon cable connector	X
R2 =	Z2 with ribbon cable connector	X
R5 =	Z5 with ribbon cable connector	X
R6 =	Z6 with ribbon cable connector	Χ



4=

0.5 to 4 bar

Ribbon cable option must be used for manifold assemblies that exceed 16 solenoids. (7th and 8th digit of valve order code)

Symbols					
RS 2 5	RD 32	RC RC			
Single pressure from a single supply	Dual pressure from a single supply	Non-relieving: taps downstream pressure if upstream is exhausted			
RQ	14	11			
Relieving: exhausts pressure in cylinder if upstream pressure is exhausted	External outlet regulator used with jumper plate for single or dual pressure	Two-pressure selector used for multi-pressure applications			

#### Valve Regulator / Speed Control Plug-in Assembly

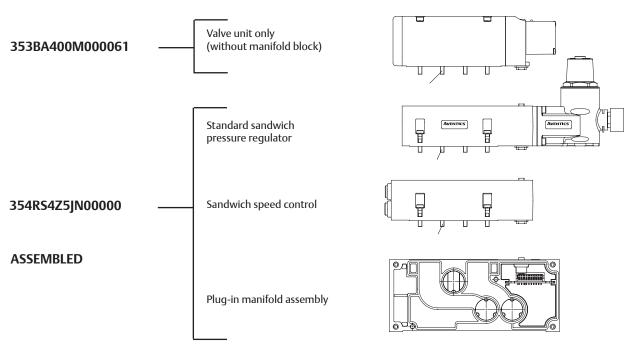
Type: RS / RD / RE / RT

When ordering a valve with regulator mounted on a manifold and sandwich speed control, list the valve unit model number only and include the mounting requirements with the regulator and the speed control.

Specify "Assembled" EXAMPLE ORDERS:

Valve unit only: 353BA400M000061 Regulator with speed control and mounting: 354RS4Z5JN00000

**ASSEMBLED** 



Note: Sandwich speed controls can only be used with single sandwich pressure regulators.

#### Manifold assembly • Multipole connection

Shaded components are included in assembly kit (AK).

Each valve station is listed in sequential order from left to right when facing the port side of the manifold as indicated. For valves and sandwich pressure regulators, see model number selection on pages X021-09-13 and 14).

Example order: (25 Pin Sub-D)

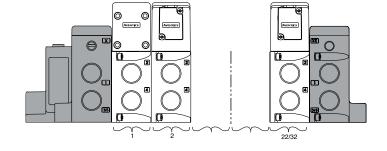
 1. Assembly kit
 AKJBD00004NSTD

 2. Valve
 Station 1 =

 353BA4Z1MN00061

Station 2 = **353BA4Z1MN00061** Station 3 = **353BB4Z2MN00061** Station 4 = **353BB5Z2MN00061** 

ASSEMBLED



## **Regulator kits & Service Parts**

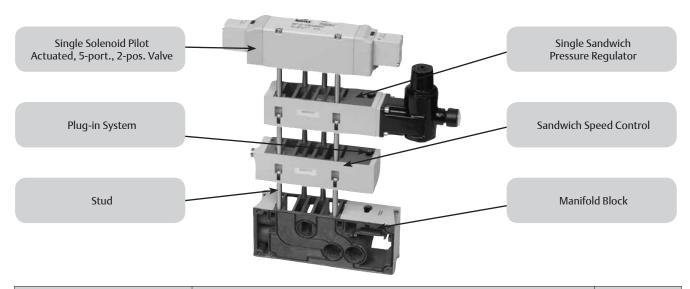
Accessory	Description		Catalog number
		0.2 to 2 bar	239-2220
	Regulator repair kit	0.3 to 4 bar	239-2221
(3)		0.7 to 9 bar	239-2222
	Gauge to max. 11 bar		214-215
	Gauge to max. 4 bar		214-220
	Adapter, port G1/8		239-2048
	Retaining clip		131-236

#### **Spare Parts • Sandwich Components**

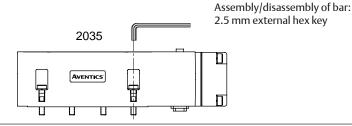
#### **Sandwich Speed Control**

**Sandwich speed control** for valves and regulators is equipped with an integral plug-in system. Sandwich speed control provide a variable restriction in ports 3 and 5 in order to control the cylinders' extend and retract speed. To facilitate easy adjustment both screws are on the same side of the speed control.

**Note:** Sandwich speed control can only be used with single sandwich pressure regulators.



Accessory	Description		Catalog number
	Sandwich speed control		239-2223
According to the state of the s	Sandwich pressure block  - Used to supply a separate pressure to a single valve station without needing blocking disks.	EB B P A EA XE (3) (2) (1) (4) (5) X XE (3) (2) (1) (4) (5) X EB B P A EA	239-2228
ES (3)	Sandwich exhaust block  - Used to isolate the exhaust of a single valve station from the manifold.  - Allows faster exhaust response by re-routing.  - Exhaust externally to the manifold.	EB B P A EA XE (3) (2) (1) (4) (5) X EB (3) (2) (1) (4) (5) X EB B P A EA	239-2230



#### **Spare Parts**

Kit	Description		Part No.
	Blank station plate (screw, washer, blank station plate, gasket)		239-2218
0.87 (22.0 mm)	Blocking disk	for port 1, 3/5	239-2219
		screw	127-396
	Cover for end plate	cover	105-456
		screw	127-396
	Cover for end plate with muffler	cover	105-457
	Gasket for end plate cover		113-621
	Muffler for end plate cover		125-1098
	Plug for conversion of pilot supply		213-590

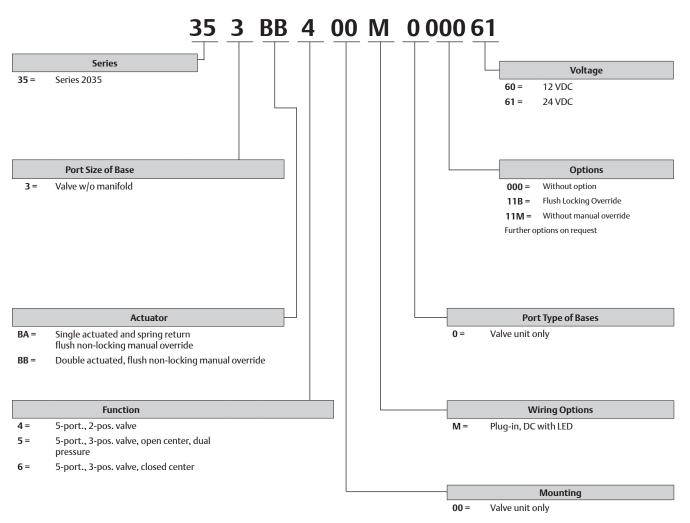
#### **Spare Parts • End Plate Kits**

#### End plate kit



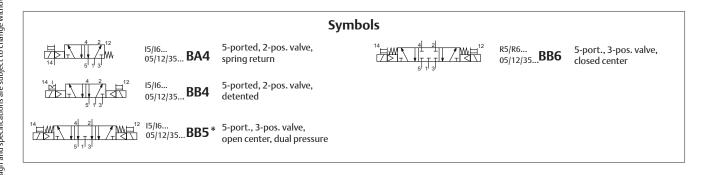
		P	art No.	
Weight	Port	1	3/5	X/XE
(kg)	Size 1/2	1/2	1/8	
2.050		2	239-220	)7
2.050		-	239-220	)8
2.050		-	239-221	15
2.050		-	239-221	16
	(kg) 2.050 2.050 2.050	(kg) Size 1/2 2.050 2.050 2.050	Weight         Port         1           (kg)         Size         1/2         1/2           2.050         2         2           2.050         2         2           2.050         2         2	(kg) Size 1/2 1/2 1/8 2.050 239-220 2.050 239-220 2.050 239-221

#### **Valve Model Number**

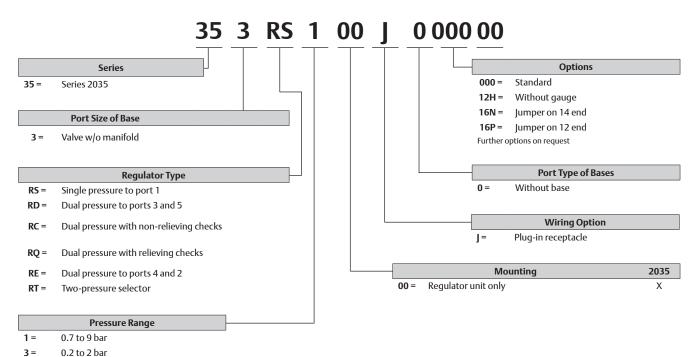




Ribbon cable option must be used for manifold assemblies that exceed 16 solenoids. (7th and 8th digit of valve order code)



#### **Spare Parts • Sandwich Pressure Regulators**

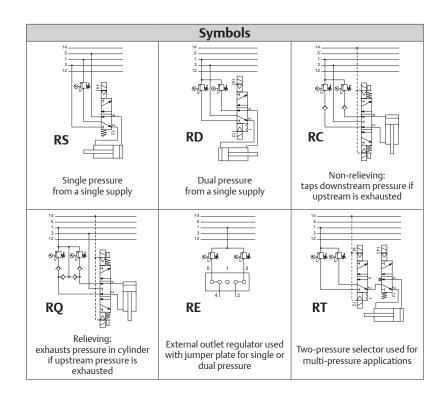




4 =

0.5 to 4 bar

Ribbon cable option must be used for manifold assemblies that exceed 16 solenoids. (7th and 8th digit of valve order code)



#### Spare Parts • Manifold Assembly Kits "Z-Boards"

#### "Z-Boards"

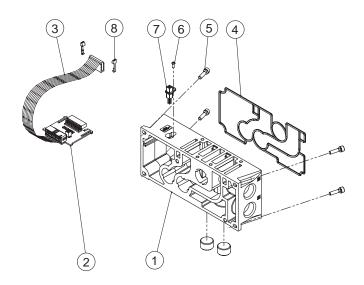
Series 2035 includes 4 different "Z-Boards"™ for driving up to 32 solenoids of single and double solenoid actuated valves. Ribbon cable feature must be used for manifold assemblies that exceed 16 solenoids.

In order to allow the full capacity of 32 solenoids, the assembly must be configured so that an even number of solenoids is utilised prior to the station using the ribbon cable feature.

**Note:** The 16th and 17th solenoid cannot be on the same valve.

(See valve model number selection for 7th and 8th digit for valve with 17th solenoid).

#### **Manifold Assemblies**

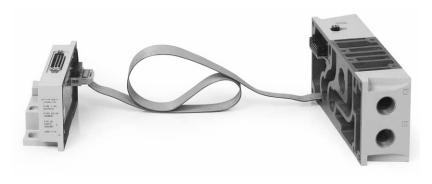




Manifold assemblies Kits with side ports with bottom ports	Part No. G 1/2" G 3/8"	Part No. NPTF 1/2" NPTF 3/8"	Part No. 3/8" G 3/8"	Part No. NPTF 3/8" NPTF 3/8"	Weight (kg)
With single "Z-Board"™	206-1610	206-1608	206-1611	206-1609	0.640
With double "Z-Board"™	206-1614	206-1612	206-1615	206-1613	0.645
With single "Z-Board"™ and ribbon cable	206-1622	206-1620	206-1623	206-1621	0.690
With double "Z-Board"™ and ribbon cable	206-1618	206-1616	206-1619	206-1617	0.695

#### Ribbon cable for Valve Station with 17th Solenoid

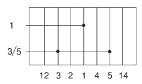
Description		Part No.
Ribbon cable	2035	239-2226

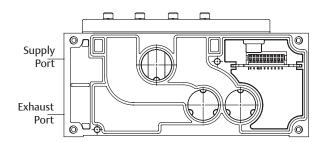


#### Spare Parts • Mid-Station Supply & Exhaust Block

#### **Mid-Station Supply and Exhaust Block**

- Add additional supply and exhaust capacity to large manifold assemblies
- Add different pressure to manifold section with use of blocking disks
- Same size as standard manifold block with blank station plate





Port Type	Part. No.	Weight (kg)
G 1/2	239-2225	0.77

On request: Threaded ports in NPTF

#### **Spare Parts • Conversion of Pilot Air Supply**

#### **Conversion of Pilot Air Supply**

Manifolds can easily be converted from internal to external pilot supply.



When converting from internal to external pilot supply, please ensure that the manifold is not pressurised, as pressure is applied to the end plate covers.

