

Valve Terminal Size 4, Model Tio with Field Bus Interface or Multi-Pin Plug Connector



Pressure port: G 1/4
Working port: G 1/8

Catalog Register
P 6

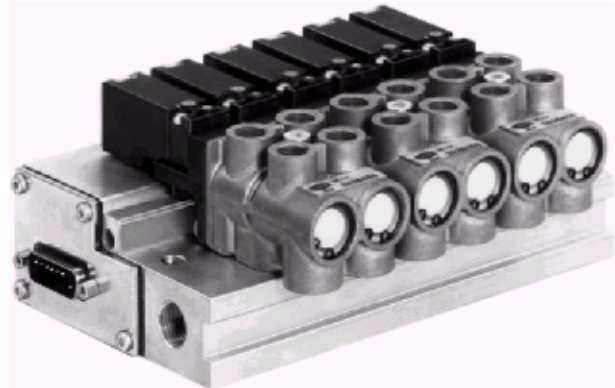
Publication 7503116.06.01.99

**OBSOLETE
DOCUMENT**
Technical
Reference
Only

Description

Valve terminal in manifold system. 4/2 directional double valves are mounted on a common base. The number of solenoids can be deliberately chosen between 4 and 32 units; it is limited, however, by the type of the multi-pin plug connector (see "Features" of valve terminal with multi-pin plug connectors IP 40/IP 65 on Page 3). Two valves each are located in one housing ("Two-in-one").

The terminal can be controlled via multi-pin plug connectors IP 40/IP 65 or an E-box (Interbus-S, Sinec L2 DP) which can be installed separately or directly attached to the terminal. Sensors or actuators can be integrated via I/O boxes or the ASI system.



Valve terminal Model Tio, with multi-pin plug connector IP 40, 6 x 4/2 directional control valves

Features

- Valve terminal in manifold system
- Multi-pin plug connector for min. 4 and max. 32 solenoids
- Field bus interface for min. 4 and max. 32 solenoids
- 4/2 directional control function, monostable and bistable, 5/3 directional control function, in closed position with external stop-valves möglich
- Simple connection system
- Mounting position optional

Technical data

Electrical data

- Different bus systems
 - Interbus-S
 - Profibus DP
- Multi-pin plug connector, degree of protection IP 40 or IP 65
- 24 VDC
- Current consumption less than 2 W per valve

Mechanical data

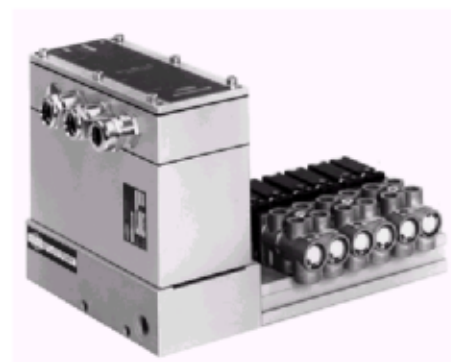
- Pressure port G 1/4
- Working port G 1/8
- Material: Valve: Zinc die casting, Zinc plated
- Manifolds: aluminium

Pneumatic data

- Flanged valve series, 19 mm wide
- 4/2 directional control functions, monostable or bistable, 5/3 directional control functions, in closed position with external stop-valves möglich
- Pressure range from 3 to 10 bar
- Flow rate at valve terminal approx. 600 l/min
- Temperature range from -10 to +50°C
- Solenoid valve for filtered, lubricated or non lubricated air

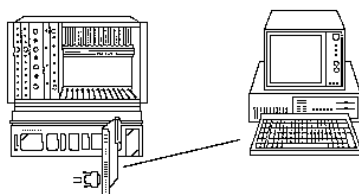


E-box installed separately







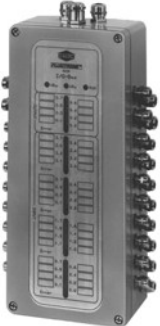


E-box for direct attachment to valve terminal

System summary



- Computer
- SPC

Valve terminals	Control	Sensory equipment
Size 4 Flow rate approx. 600 l/min Pressure range from 3 to 10 bar 	Multi-pin plug connectors – IP40  – IP65  – IP 65, 15- und 25polig  E-box for direct attachment to valve terminal  E-box mounted separately  – Interbus-S – Profibus DP – with or without inputs/outputs	I/O-box with conduit-thread connector or M 12 plug-in type connectors  – 8 outputs – 8 inputs – 16 inputs – 16 inputs, 8 outputs – 32 inputs, 8 outputs For connection of – cylinder sensors – light barriers – external valves, etc. barriers, etc.

Further technical information available on request	Publication No.
Modular valve terminals with field bus interface or multi-pin plug connector	7503034
ISO valve terminals with field bus interface	7502947
Input / output box	7503065
I / O box for valve terminal Interbus-S	7503088
Proportional valves with field bus interface	7502952
Valve terminal size 1, with multi-pin plug connector or field bus interface	7503114
ASI valve terminal with 2 to 4 units, with multi-pin plug connector or field bus interface	7503117

Valve terminal with multi-pin plug connector IP 40/IP 65

Features

- Valve terminal with at least 4 solenoids (4 monostable or 2 bistable valves)
Min. 4 solenoids
Standard:
D-Sub-connector IP 40) = max. 22 solenoids
D-Sub connector IP 65) = max. 22 solenoids
17 pin plug connector IP 65) = max. 16 solenoids
- Harting connector IP 65 = max. 32 solenoids
- Pressure port G 1/4, working port G 1/8
- Mounting position optional
- Pressure range from 3 to 10 bar
- Temperature range from -10 to +50°C



Note

Valve terminal with multi-pin plug connector can be equipped later with separately mounted E-box (see Page 10).

Valve terminal size 4, Model Tio, with multi-pin plug connector IP 40

Solenoid valves

- 2 each 4/2 directional control valves in double housing
- Size 4 mm
- Flow rate approx. 600 l/min
- Switching time approx. 15 ms
- Connection: 2 and 4 = G 1/8
1 = Flange
3 = Not ducted, with silencer of sintered metal
- Attachment by means of an M5 screw
- Manual override with push button with and without detent.

Valve functions

5-way/3-position

Valve pressurized in mid-position

5-way/3-position

Valve exhausted in mid-position

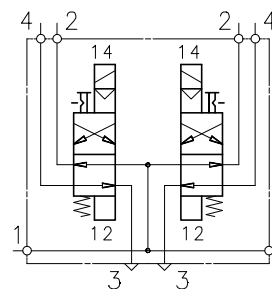
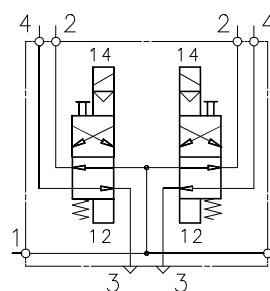
5-way/3-position

Valve closed in mid-position (possible with external stop valves)

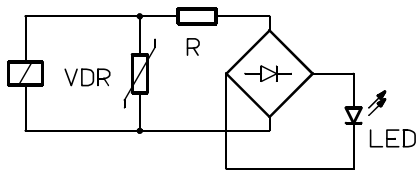
4/2 directional control valve, bistable

2 each 4/2 directional control valves, monostable

2 each 4/2 directional control valve, monostable, Manual override with and without detent

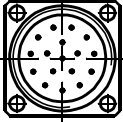
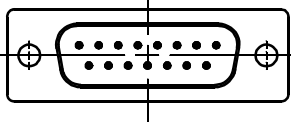
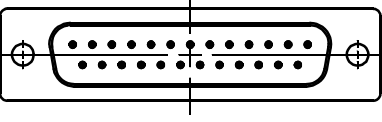


Wiring of solenoid coils



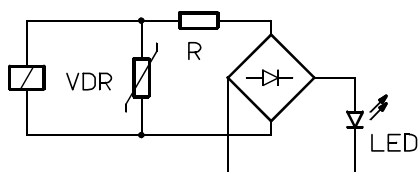
Connection diagram of multi-pin version IP 40/IP 65

Plug arrangement

	M		J1		J2	
Symbol						
	Multi-pin connection IP 65 for 17-pin plug connector		Multi-pin connection IP 40 for 15-pin D-SUB		Multi-pin connection IP 40 for 25-pin D-SUB	
Plug terminal	Terminal pin	Color code for cables with plug G03	Terminal pin	Color code for cables with plug H03 (L03)	Terminal pin	Color code for cables with plug K03 (P03)
1	1	white	1	white	1	white
2	2	brown	2	brown	2	brown
3	3	green	3	green	3	green
4	4	yellow	4	yellow	4	yellow
5	5	grey	5	grey	5	grey
6	6	pink	6	pink	6	pink
7	7	blue	7	blue	7	blue
8	8	red	8	red	8	red
9	9	black	9	black	9	black
10	10	violet	10	violet	10	violet
11	11	grey-pink	11	grey-pink	11	grey-pink
12	12	red-blue	12	red-blue	12	red-blue
13	13	white-green	13	white-green	13	white-green
14	14	brown-green	14	brown-green	14	brown-green
15	15	white-yellow			15	white-yellow
16	16	yellow-brown			16	yellow-brown
17					17	white-grey
18					18	grey-brown
19					19	white-pink
20					20	pink-brown
21					21	white-blue
22					22	brown-blue
23					23 unloaded	white-blue
0 Volt	17	white-grey	15	white-grey	24 PIN 1 ... 12	brown-red
					25 PIN 13 ... 22	white-black

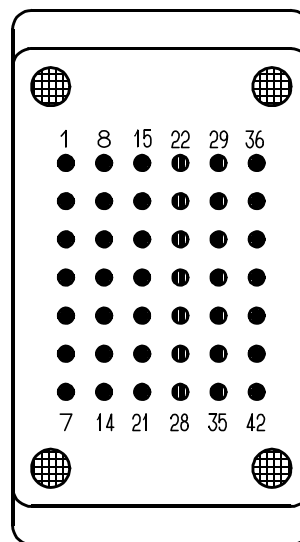
Connection diagram for multi-pin version, IP 65

Harting plug



Plug arrangement

Plug terminal for solenoid coil ¹⁾	Terminal pin	Core No.
1	8	8
2	1	1
3	36	36
4	29	29
5	9	9
6	2	2
7	37	37
8	30	30
9	10	10
10	3	3
11	38	38
12	31	31
13	11	11
14	4	4
15	39	39
16	32	32
17	12	12
18	5	5
19	40	40
20	33	33
21	13	13
22	6	6
23	27	27
24	20	20
25	41	16 ²⁾
26	34	34
27	14	14
28	7	7
29	28	28
30	21	21
31	42	17 ²⁾
32	35	35
Signal	Terminal pin	
0 volt	22, 23, 24, 25, 26	
PE	15 + housing	



View of terminal pins of plug connector installed on valve terminal

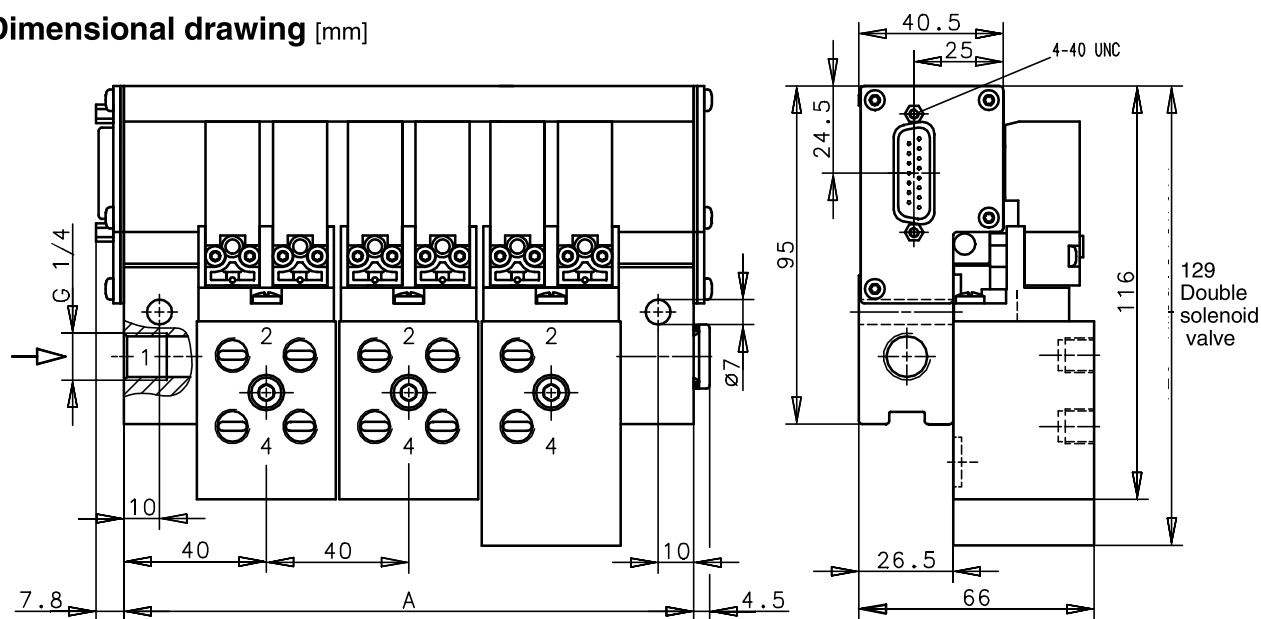
Recommended connecting cable:
oilflex 110 41 x 0.75 mm²

¹⁾ The plug terminals on the valve terminal are counted from left to right

²⁾ Pay attention when you connect it.

Valve terminal with multi-pin plug connector IP 40

Dimensional drawing [mm]



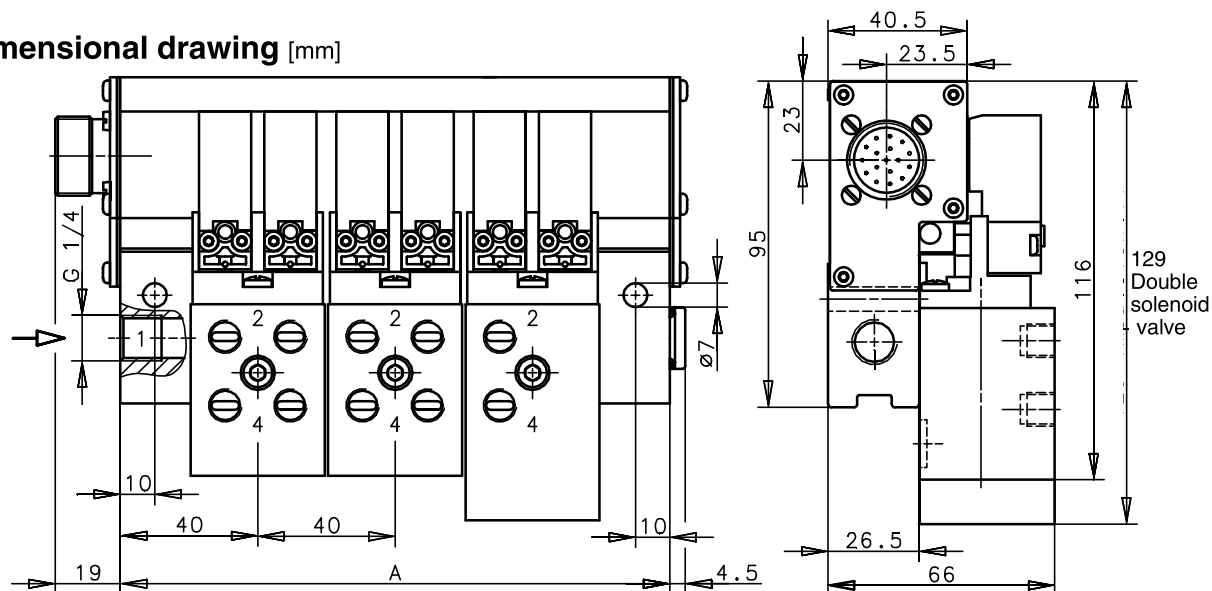
Dimensional table [mm]

Number of plug terminals	A	D-SUB connector
4	120	15-pin
6	160	15-pin
8	200	15-pin
10	240	15-pin
12	280	15-pin

Number of plug terminals	A	D-SUB connector
14	320	15-pin
16	360	25-pin
18	400	25-pin
20	440	25-pin
22	480	25-pin

Valve terminal with multi-pin plug connector IP 65

Dimensional drawing [mm]



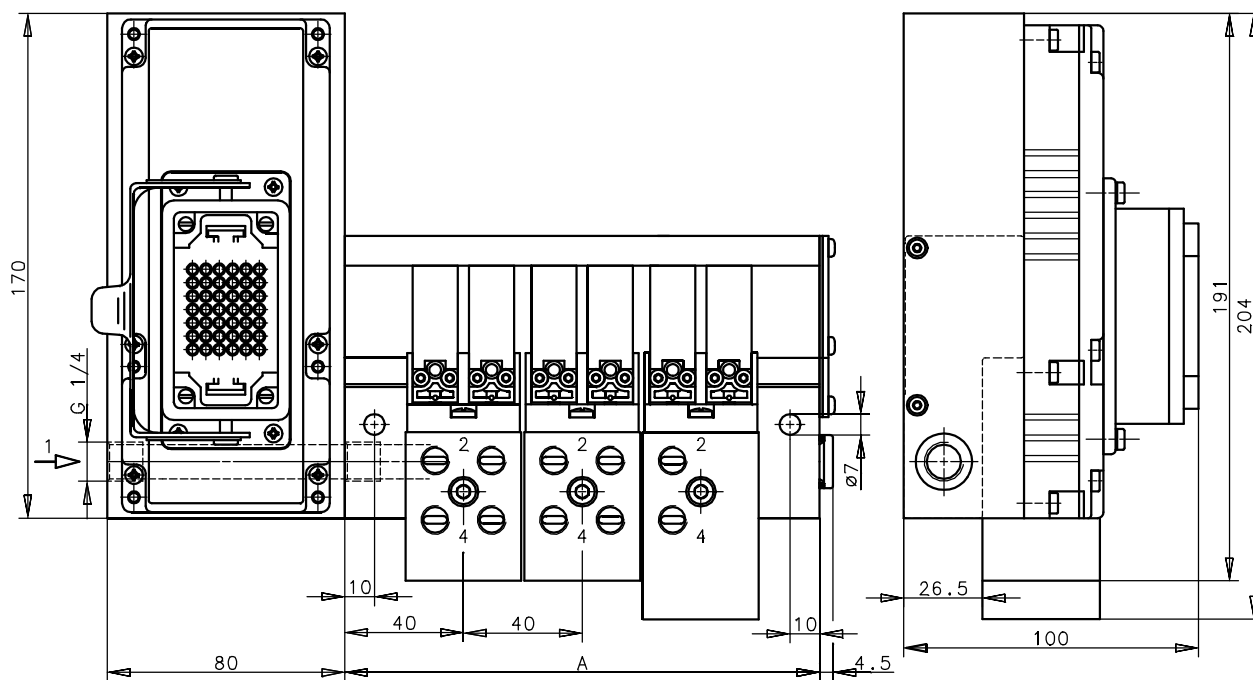
Dimensional table [mm]

Number of plug terminals	A	Connector
4	120	17-pin
6	160	17-pin
8	200	17-pin
10	240	17-pin

Number of plug terminals	A	Connector
12	280	17-pin
14	320	17-pin
16	360	17-pin

Valve terminal with multi-pin plug connector IP 65

Dimensional drawing [mm]

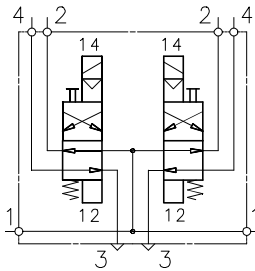
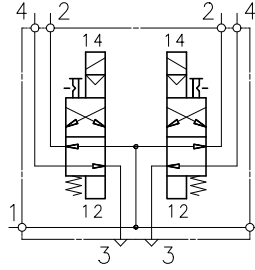
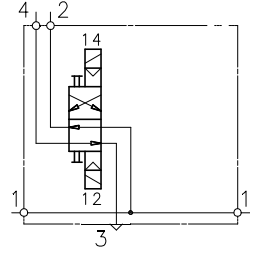
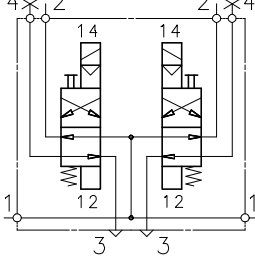
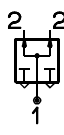
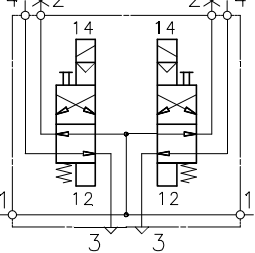
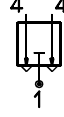


Dimensional table [mm]

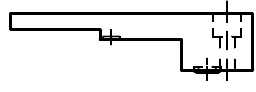

Number of plug terminals	A	Harting plug	Weight [kg]
18	400	42-pin	5,6
20	440	42-pin	6,2
22	480	42-pin	6,8
24	520	42-pin	7,5
26	560	42-pin	8,1
28	600	42-pin	8,7
30	640	42-pin	9,3
32	680	42-pin	10

Valve terminal Model Tio, with multi-pin plug connector, IP 40/IP 65

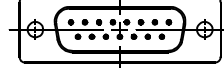


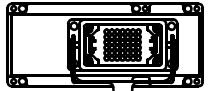
Range of available functions

Valves		
Code	Symbol	Description
4		Two pilot operated solenoid valves in one double housing
5		Two pilot operated solenoid valves in one double housing Manual override with detent
1		Double solenoid valve in one double housing
7	 	Solenoid valve pressurized in neutral position, in one double housing
8	 	Solenoid valve exhausted in neutral position, in one double housing

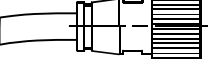
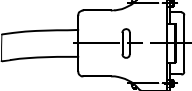
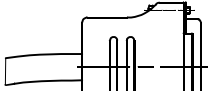
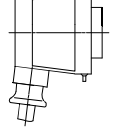
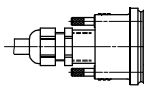
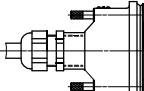
Valve components

Code	Symbol	Description
0		Blind plate
W		Separator stud separating two different pressure ranges

Multipol-Anschluß

J1		Multi-pin plug connector IP 40 connection 15 pin max. number of solenoids 14
J2		Multi-pin plug connector IP 40 connection 25 pin max. number of solenoids 22
M		Multi-pin plug connection Degree of protection IP 65, max. number of solenoids: 16
M1		42-pin plug connection Degree of protection IP 65, max. number of solenoids: 32

Zubehör

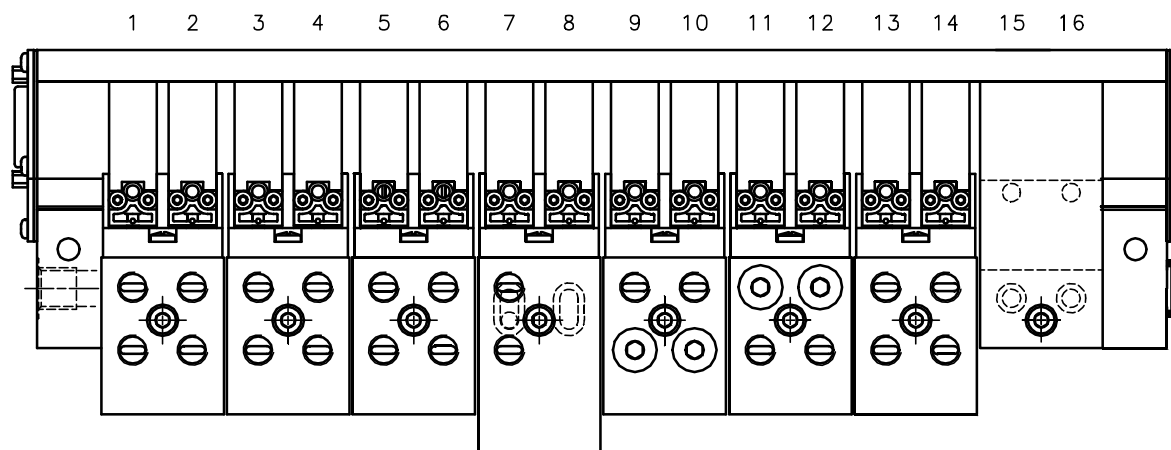
Code	Symbol	Description
G03		17-pin-plug connector with cable 3 m long Cat. No. 0681443.0000.003.00
H03		15-pin D-SUB IP 65 with cable 3 m long Cat. No. 0681445.0000.003.00
K03		25-pin D-SUB IP 40 with cable 3 m long Cat. No. 0681447.0000.003.00
N03		Multi-pin connector IP 65 with cable 3 m long Cat. No. 0681917.0000.003.00
L03		15-pin D-SUB IP 65 with cable 3 m long Cat. No. 0660960.0000.003.00
P03		25-pin D-SUB IP 65 with cable 3 m long Cat. No. 0660961.0000.003.00

03 corresponds to cable length 3 m, other versions on request.

Valve terminal Model Tio, with multi-pin plug connector IP 40/IP 65

Specification of functions

Plug of terminals (valves)



Order code

Terminal size

Min. 4 valves

Terminal type	Multi-pin connector	Valve stations															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Model Tio	Code																
Separator stud for 2 pressures (max. 1 piece)																	

Terminal size

Max. 32 valves

Terminal type	Multi-pin connector	Valve stations																Accessories
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
Model Tio	Code																	
Separator stud for 2 pressures (max. 1 piece)																		

Example of order

Terminal type

min. 4 valves

16 valves

Terminal type	Valve stations	Standard	Multi-pin connector	Valve stations																Accessories
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Mod.Tio	16	S	J2	4	4	5	1	7	8	4	0					K03				
Code																				
Separator stud for 2 pressures (max. 1 piece)							W													

Example for order: **Mod.Tio- 16- S - J2: 4,4,W,5,1,7,8,4, 0 + K03**

Terminal type

Number of Standard plug terminals

Multi-pin connector IP 40

Valves stations

The data enclosed by commas represent the function of one double valve station

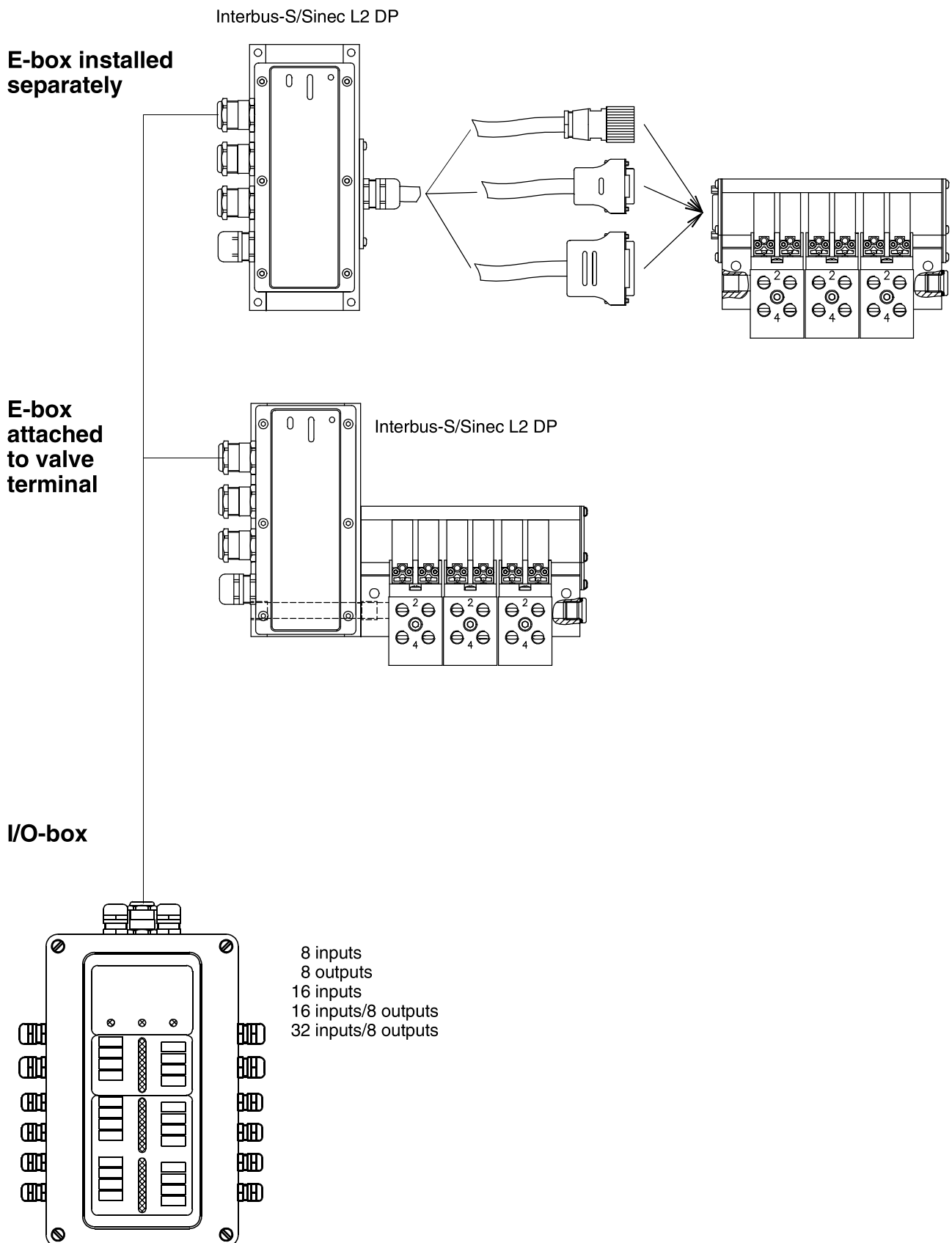
Valve terminal Model Tio, 16 valve stations

Code	Description
16	Number of plug terminals
S	Standard
J2	Multi-pin connector IP 40, D-SUB 25-pin
4	Two solenoid valves in one double housing
4	Two solenoid valves in one double housing
W	Separator stud for two different pressure ranges
5	Manual override detent

Code	Description
1	One impulse valve in one double housing
7	valve exhausted in neutral position
8	valve exhausted in neutral position
4	Two solenoids in one double housing
0	Blind plate
K03	25-pin D-SUB, with cable, 3 m long

Valve terminal Model Tio, with field bus interface

System summary



Valve terminal Model Tio, with field bus interface

Features

- Valve terminal with at least 4 solenoids and max. 32 solenoids (except Field bus typ).
- Valves are shown on page 3.
- Typ of Terminal E-Box external, E-Box attached to terminal see page 10.
- Reports for Interbus-S and Profibus DP available others on request.

Description of E-box for Interbus-S

Within the valve terminal system, the E-box represents the actual interface to the remote Interbus-S bus and remote installations bus.

The E-box includes power drivers to control the solenoid valves on the valve terminal.

The E-box can be connected to the HERION I/O-box via an additional built-in interface. The I/O-box makes it possible to interrogate proximity switches and control external actuators.

Technical data for Interbus-S

Ambient temperature range	0 ... 50 [°C]
Degree of protection to DIN 40050 (in installed state)	IP 65
Electromagnetic compatibility	Acc. to IEC 801.1 up to IEC 801.4 Severity degree 3
Supply voltage for bus logic	18 ... 32 VDC
Residual ripple	Max. 10%
Current consumption	Max. 100 mA
Supply voltage for solenoids	24 VDC ± 10%
Residual ripple	Max. 10%
Current consumption (without solenoid coils)	Max. 30 mA
Solenoid valve output voltage	Supply voltage - 0.6 V
Solenoid valve output current per solenoid coil	150 mA
Electric isolation	Between bus power supply and bus logic
	Between bus logic and periphery
	Isolating voltage 500 VAC
Bus protocol	Interbus-S 2-wire remote bus
Transmission rate	500 kbit/s
Transmission medium	2 x RS 485

Technical description

Valve terminal system with DP - interface see publication 7503194

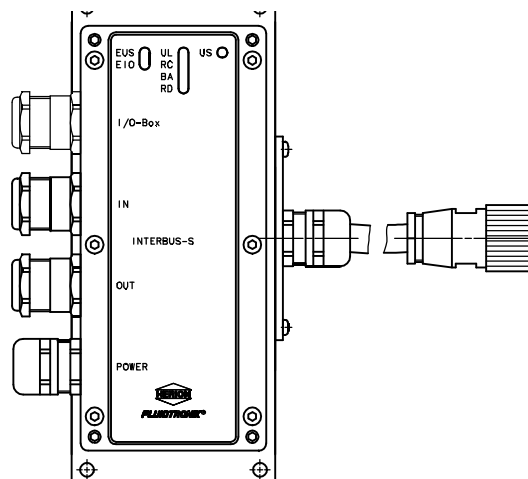


Note

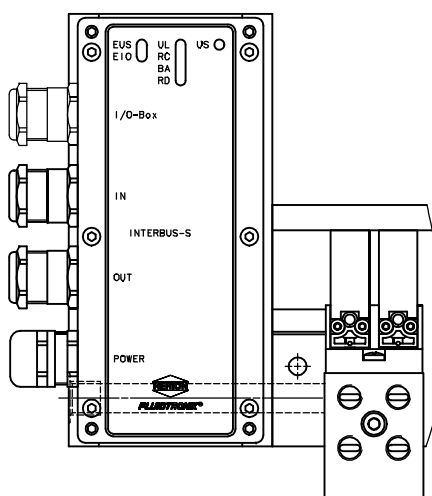
In choosing an E-box, you must take the following decisions:

- E-box with or without connection for I/O-box
- E-box for remote bus or remote installation bus
- E-box, installed separately or attached to valve terminal
- BUS-report

E-box installed separately



E-box attached to valve terminal



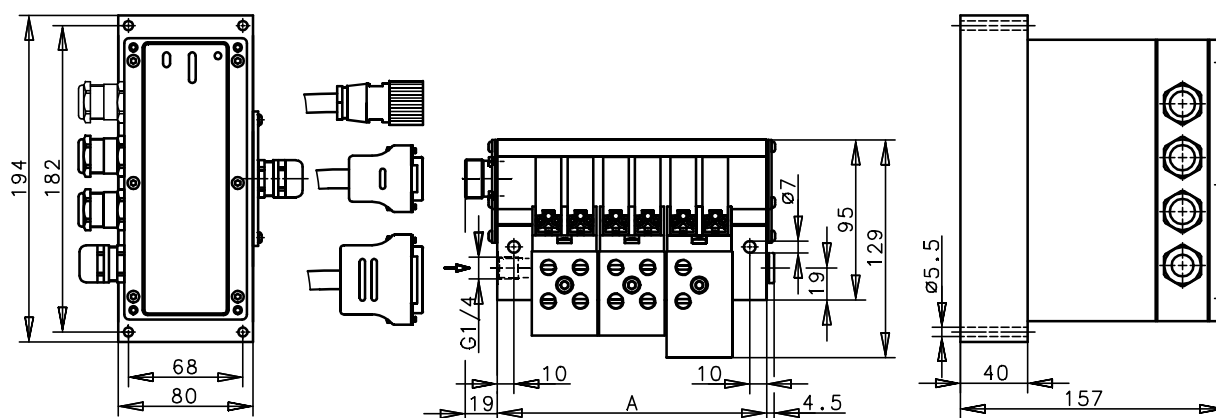
Valve terminal Model Tio, with field bus interface

Features

- Designs:
 - With E-box installed separately
Connection to valve terminal by cable plug connector
 - With E-box attached to valve terminal
with or without connection for I/O-box
- Valve unit with max. 32 outputs
(32 solenoid pilot operated valves)
- Cable length approx. 0.25 m between separately
installed E-box and valve terminal

Valve terminal with separately installed E-box

Dimensional drawing [mm]



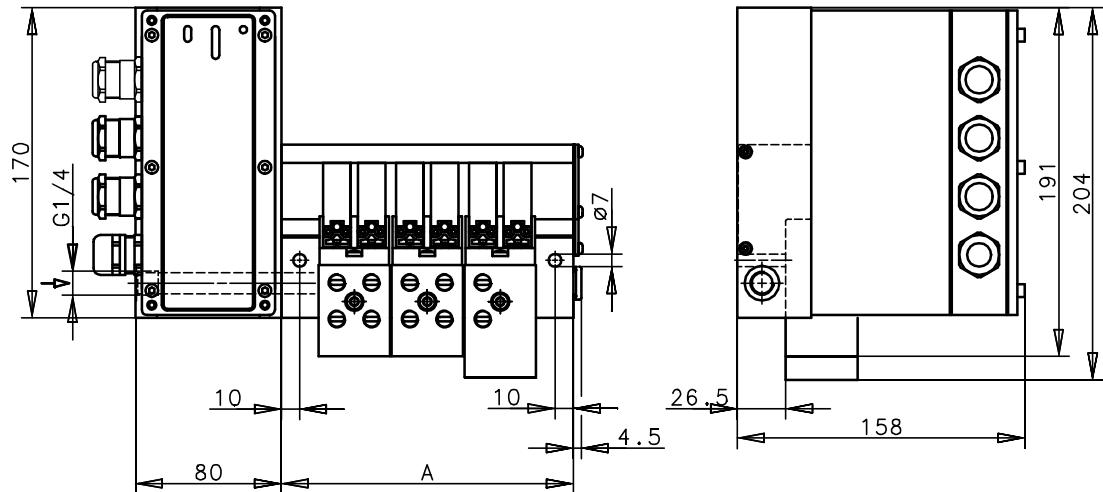
Dimensional table [mm]

Number of valve stations	A	Weight [kg]
4	120	2,35
6	160	2,85
8	200	3,35
10	240	3,75
12	280	4,15
14	320	4,55
16	360	5,00
18	400	5,45
20	440	6,10
22	480	6,70

Valve terminal Model Tio, with field bus interface

Valve terminal with attached E-box

Dimensional drawing [mm]



Dimensional table [mm]

Number of valve stations	A	Weight [kg]
4	120	2,35
6	160	2,85
8	200	3,35
10	240	3,75
12	280	4,15
14	320	4,55
16	360	5,00
18	400	5,45

Number of valve stations	A	Weight [kg]
20	440	6,1
22	480	6,7
24	520	7,4
26	560	7,9
28	600	8,5
30	640	9,0
32	680	9,5

Valve terminal Model Tio, with field bus interface and separately installed E-Box Range of available functions

Valves

Code	Symbol	Description
4		Two pilot operated solenoid valves in one double housing
5		Two pilot operated solenoid valves in one double housing manual override with detent
1		Double solenoid valve in one double housing
7		Solenoid valve pressurized in neutral position, in one double housing
8		Solenoid valve exhausted in neutral position, in one double housing

Valve components

Code	Symbol	Description
0		Blind plate
W		Separator stud separating two different pressure ranges

Valve terminal version

X1		Separate bus module with 17-pin plug connector Max. number of solenoids: 16
X2		Separate bus module with 15-pin D-SUB Max. number of solenoids: 14
X3		Separate bus module with 25-pin D-SUB Max. number of solenoids: 22

Interbus-S (remote bus)

Code	Max. number of solenoids	I/O box possible or not
I	16 by Code X1 14 by Code X2	No
IA	22 by Code X3	No
IB	16 by Code X1 14 by Code X2	Yes
IC	22 by Code X3	Yes

Interbus-S (Installation remote bus)

ID	16 by Code X1 14 by Code X2	No
IE	22 by Code X3	No
IF	16 by Code X1 14 by Code X2	Yes
IG	22 by Code X3	Yes

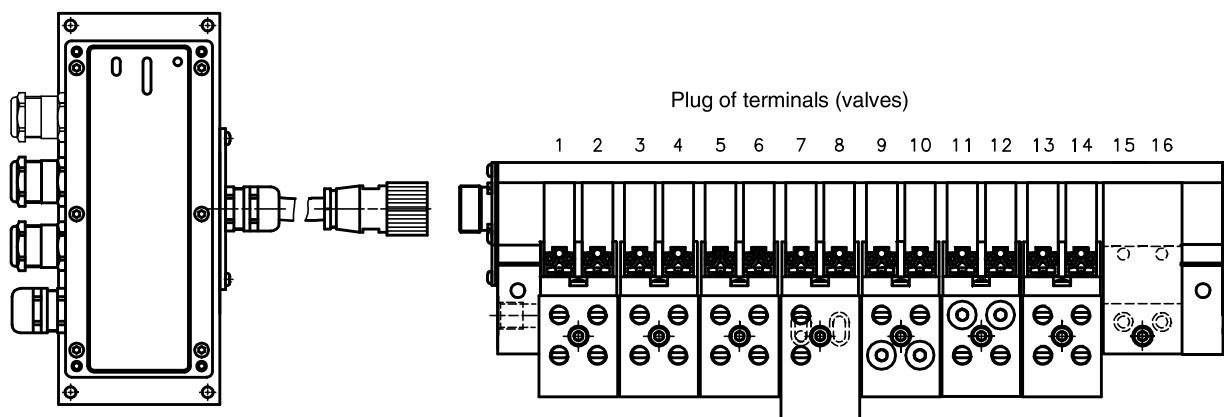
Sinec L2 DP

S	16 by Code X1 14 by Code X2 22 by Code X3	No
SA	16 by Code X1 14 by Code X2 22 by Code X3	Yes except Cat. No. 5980211 ¹⁾

¹⁾ Part-No. for Input box see page 16

Valve terminal Model Tio, with field bus interface and separately installed E-box

Specification of functions



Order code

Terminal size					Min. 4 valves															
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Model Tio																				
Code																				
Separator stud for two pressures (max. 1 piece)																				
Terminal size					Max. 22 valves															
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations															
					17	18	19	20	21	22										
Model Tio																				
Code																				
Separator stud for two pressures (max. 1 piece)																				

Example of order

Terminal size					Min. 4 valves										16 valves										
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations																				
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16					
Model Tio	16	S	IA	X1	4		4		5		1		7		8		4		0						
Code																									
Separator stud for two pressures (max. 1 piece)											W														

Example of order: Mod.Tio- 16- S-IA- X1: 4,4,5,W,1,7,8,4,0

Insel type Terminal model Standard Field bus type Valve Terminal version Valve stations

The data enclosed by commas represent the function of one double valve

Valve terminal Model Tio, 16 valve stations

Code	Description
16	Number of plug terminals
S	Standard
IA	Remote bus Interbus-S
X1	Bus-Modul extern mit Rundsteckverbinder 17polig
4	Two solenoid valves in one double housing
4	Two solenoid valves in one double housing
5	Manual override with detent

Code	Description
W	Separator stud for two different pressure ranges
1	Impulse valve in one double housing
7	Valve pressurized in neutral position, in one double housing
8	Valve exhausted in neutral position, in one double housing
4	Two solenoid valves in one double housing
0	Blind plate

Valve terminal Model Tio, with field bus interface and attached E-box

Range of available functions

Valves

Code	Symbol	Description
4		Two pilot operated solenoid valves in one double housing
5		Two pilot operated solenoid valves in one double housing manual override with detent
1		Double solenoid valve in one double housing
7		Solenoid valve pressurized in neutral position, in one double housing
8		Solenoid valve exhausted in neutral position, in one double housing

Valve components

Code	Symbol	Description
0		Blind plate
W		Separator stud separating two different pressure ranges

Valve terminal version

Code	Symbol	Description
Y		Bus module attached Max. number of valves: 32 (restriction for Field bus type)

Interbus-S (remote bus)

Code	Max. number of solenoids	I/O box possible or not
I	16	No
IA	32	No
IB	16	Yes
IC	32	Yes

Interbus-S (Installation remote bus)

ID	16	No
IE	32	No
IF	16	Yes
IG	32	Yes

Sinec L2 DP

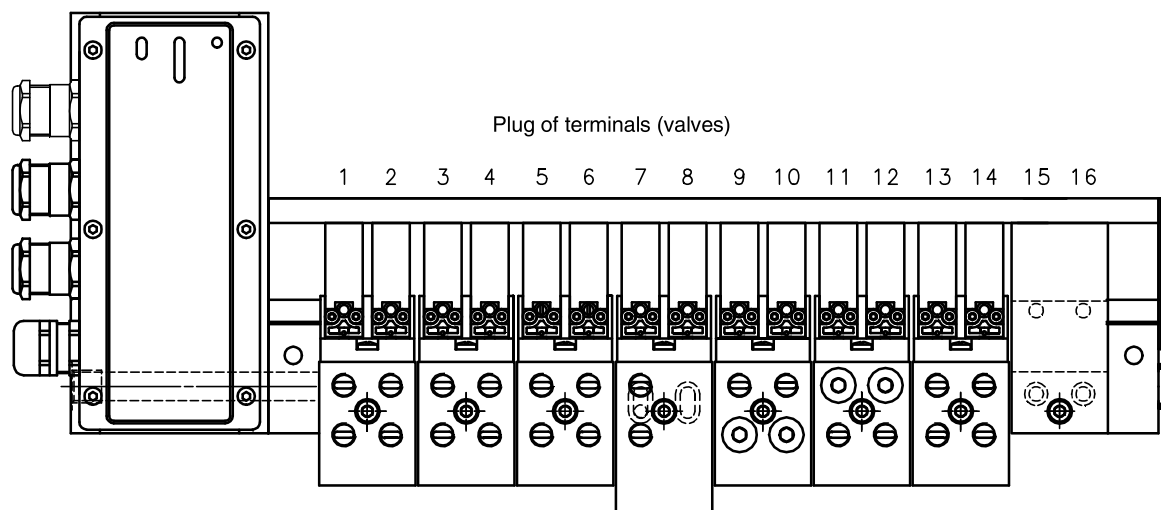
S	32	No
SA	24	Yes except Cat. No. 5980211

Input / Output-Box

Input / Output-Box	Cat. No.
Input box for 8 inputs	5980209
Input box for 16 inputs	5980212
Input / Output-box for 8 outputs (Valves)	5980208
Input / Output-box for 8 outputs, 16 inputs	5980210
Input / Output-box for 8 outputs, 32 inputs	5980211

Valve terminal Model Tio, with field bus interface and attached E-box

Specification of functions



Order code

Terminal size					Min. 4 valves															
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Model Tio																				
Code																				
Separator stud for two pressures (max. 1 piece)																				

Terminal size					Max. 32 Valves															
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations															
					17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Model Tio																				
Code																				
Separator stud for two pressures (max. 1 piece)																				

Example of order

Terminal size					Min. 4 valves								16 valves							
Terminal type	Plug terminals	Standard	Field bus type	Valve Termin. version	Valve stations															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<div>Model Tio</div> <div>Code</div>	16	S	IA	Y	4		4		5		1		7		8		4		0	
Separator stud for two pressures (max. 1 piece)											W									

Example of order: Mod.Tio- 16- S-IA- Y: 4,4,5,W,1,7,8,4,0

Insel type Terminal model Standard Field bus type Valve Terminal version Valve stations

The data enclosed by commas represent the function of one double valve

Valve terminal Model Tio, 16 valve stations

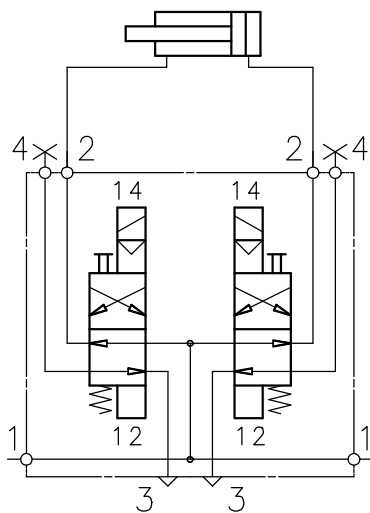
Code	Description
16	Number of plug terminals
S	Standard
IA	Remote bus Interbus-S
Y	Bus module attached
4	Two solenoid valves in one double housing
4	Two solenoid valves in one double housing
5	Manual override detent

Code	Description
W	Separator stud for two different pressure ranges
1	Impulse valve in one double housing
7	Valve pressurized in neutral position, in one double housing
8	Valve exhausted in neutral position, in one double housing
4	Two solenoid valves in one double housing
0	Blind plate

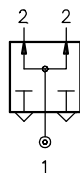
Valve terminal Model Tio

Range of available functions (valve selection) Example of application

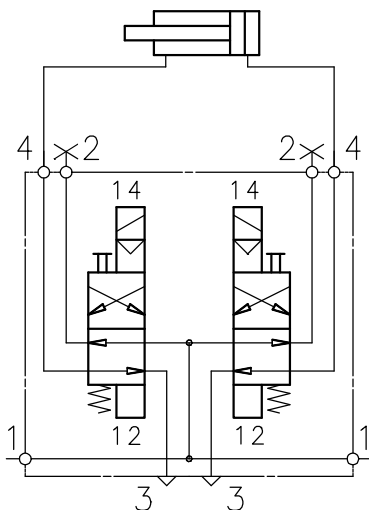
Pressurized in neutral position, in **one** double housing



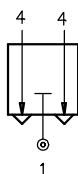
Valve in rest position



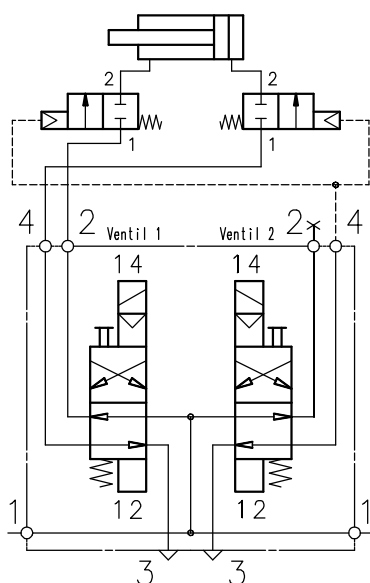
Exhausted in neutral position, in **one** double housing



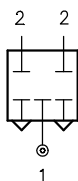
Valve in rest position



Closed in neutral position, in **one** double housing, with external stop valves



Valve in rest position



Logic:

Cylinder	a	b
Adv. (1-4)	1	1
Retr. (1-2)	0	1
Stop	0	0