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
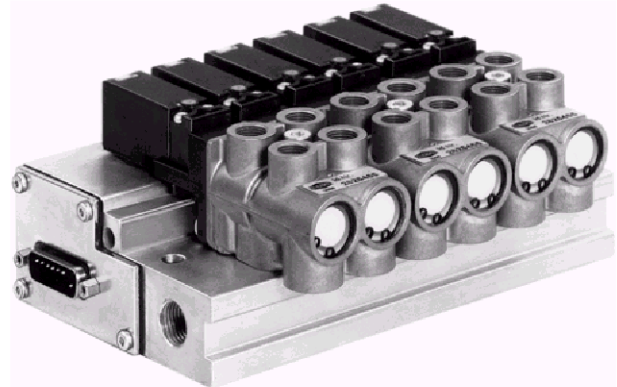
Description

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.

Features

- Valve terminal in manifold system
- Multi-pin plug connector for min. 4 and max. 32 solenoids
- Field bus inerface 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 positiom 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
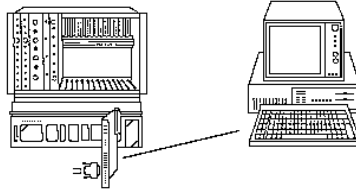

Valve terminal Model Tio, with multi-pin plug connector IP 40, 6 x 4/2 directional control valves
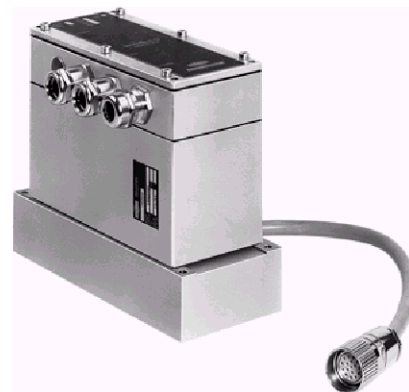
E-box installed separately
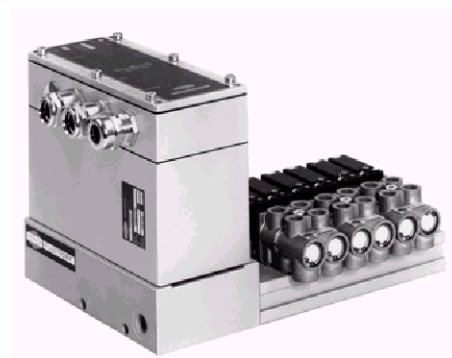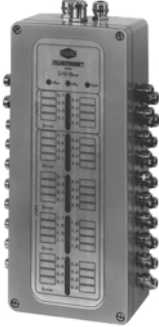
E-box for direct attachment to valve terminal

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 separtely** – 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

7503116.06.01.99

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 detend.

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
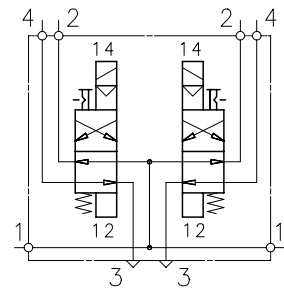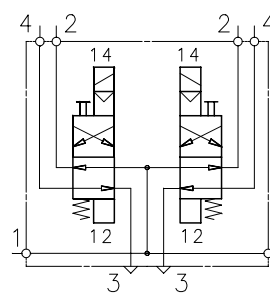
Wiring of solenoid coils
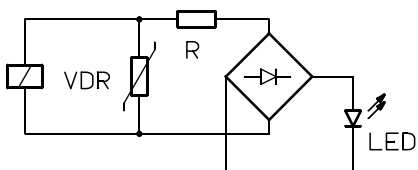
Connection diagram of multi-pin version IP 40/IP 65

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
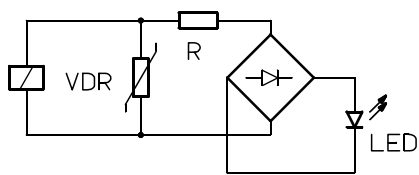
Plug arrangement

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
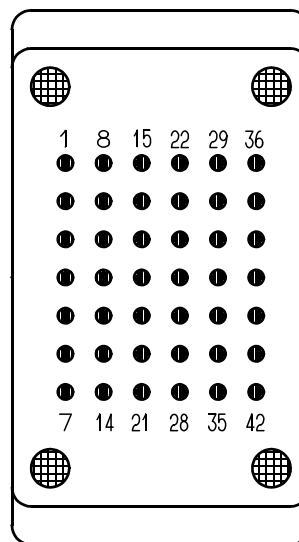
View of terminal pins of plug connector installed on valve terminal

Recommended connecting cable:
oilflex 110 41 x 0.75 mm^2

[1] The plug terminals on the valve terminal are counted from left to right
[2] Pay alteration whe you connect it.

Valve terminal with multi-pin plug connector IP 40

Dimensional drawing [mm]

Dimensional table [mm]
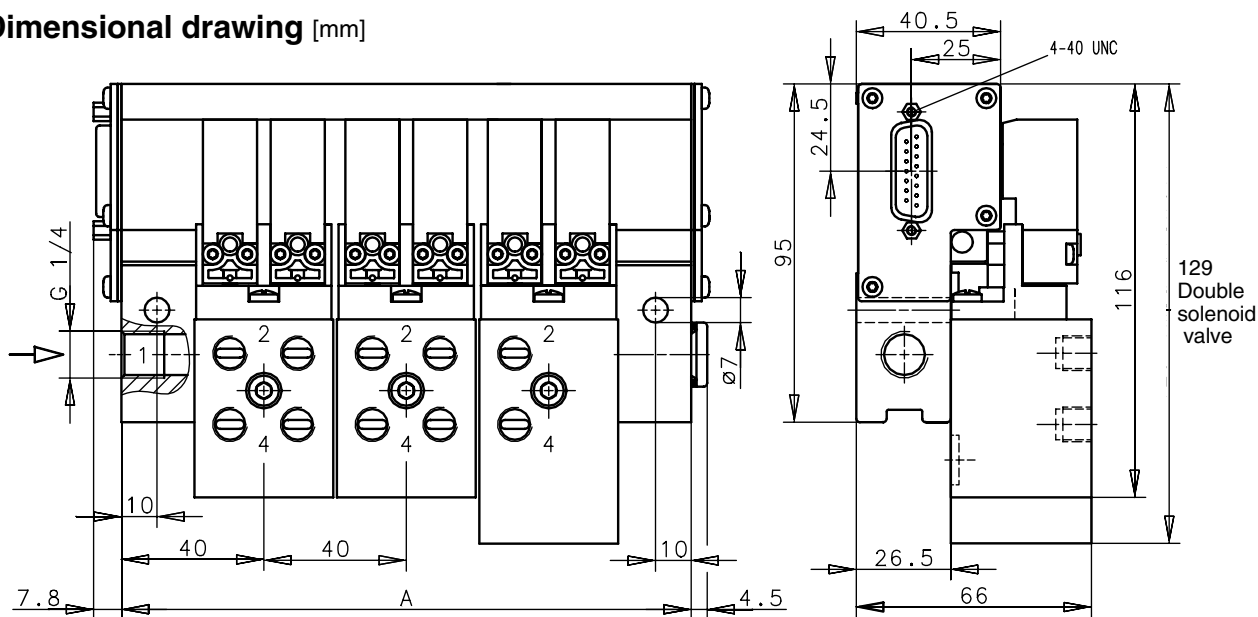
Number of plug terminals	A	D-SUB connector	Number of plug terminals	A	D-SUB connector
4	120	15-pin	14	320	15-pin
6	160	15-pin	16	360	25-pin
8	200	15-pin	18	400	25-pin
10	240	15-pin	20	440	25-pin
12	280	15-pin	22	480	25-pin

Valve terminal with multi-pin plug connector IP 65

Dimensional drawing [mm]

Dimensional table [mm]
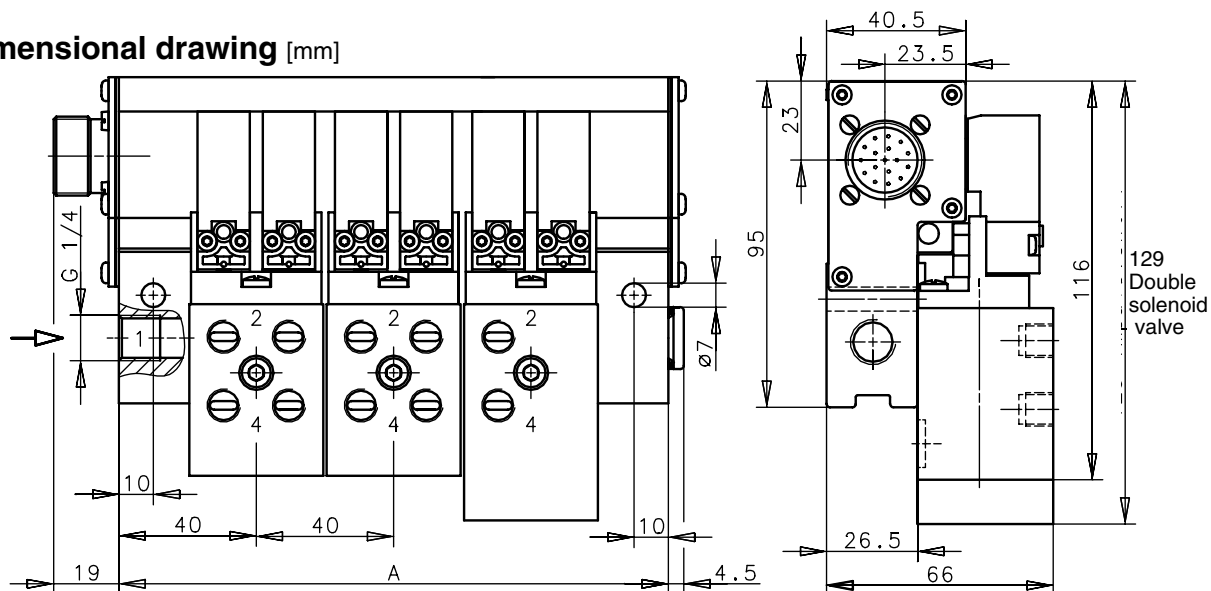
Number of plug terminals	A	Connector	Number of plug terminals	A	Connector
4	120	17-pin	12	280	17-pin
6	160	17-pin	14	320	17-pin
8	200	17-pin	16	360	17-pin
10	240	17-pin			

Valve terminal with multi-pin plug connector IP 65

Dimensional drawing [mm]
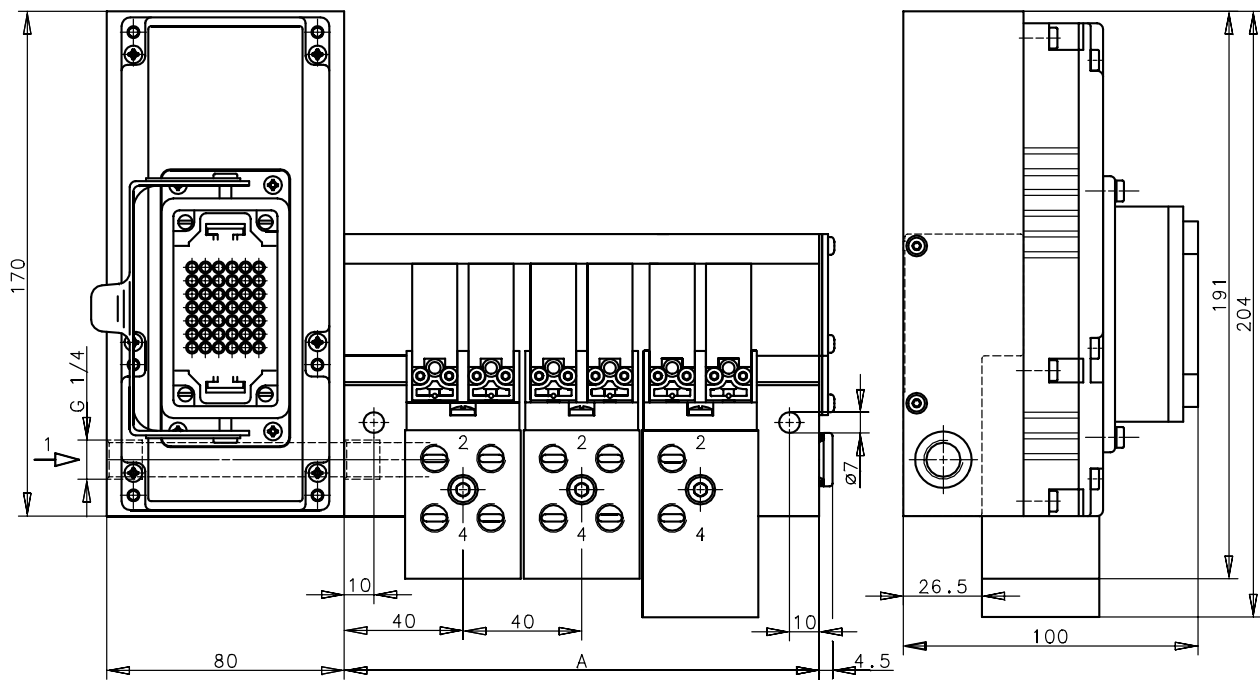
Dimensional table [mm]

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

Code	Symbol	Description
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 lenght 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 Code	16	S	J2	4		4		5		1		7		8		4		0		**+** K03
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 plug terminals   Standard   Multi-pin connector IP 40   Valves stations   Accessories

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

Interbus-S/Sinec L2 DP

E-box installed separately

E-box attached to valve terminal

Interbus-S/Sinec L2 DP

I/O-box

 8 inputs
 8 outputs
16 inputs
16 inputs/8 outputs
32 inputs/8 outputs
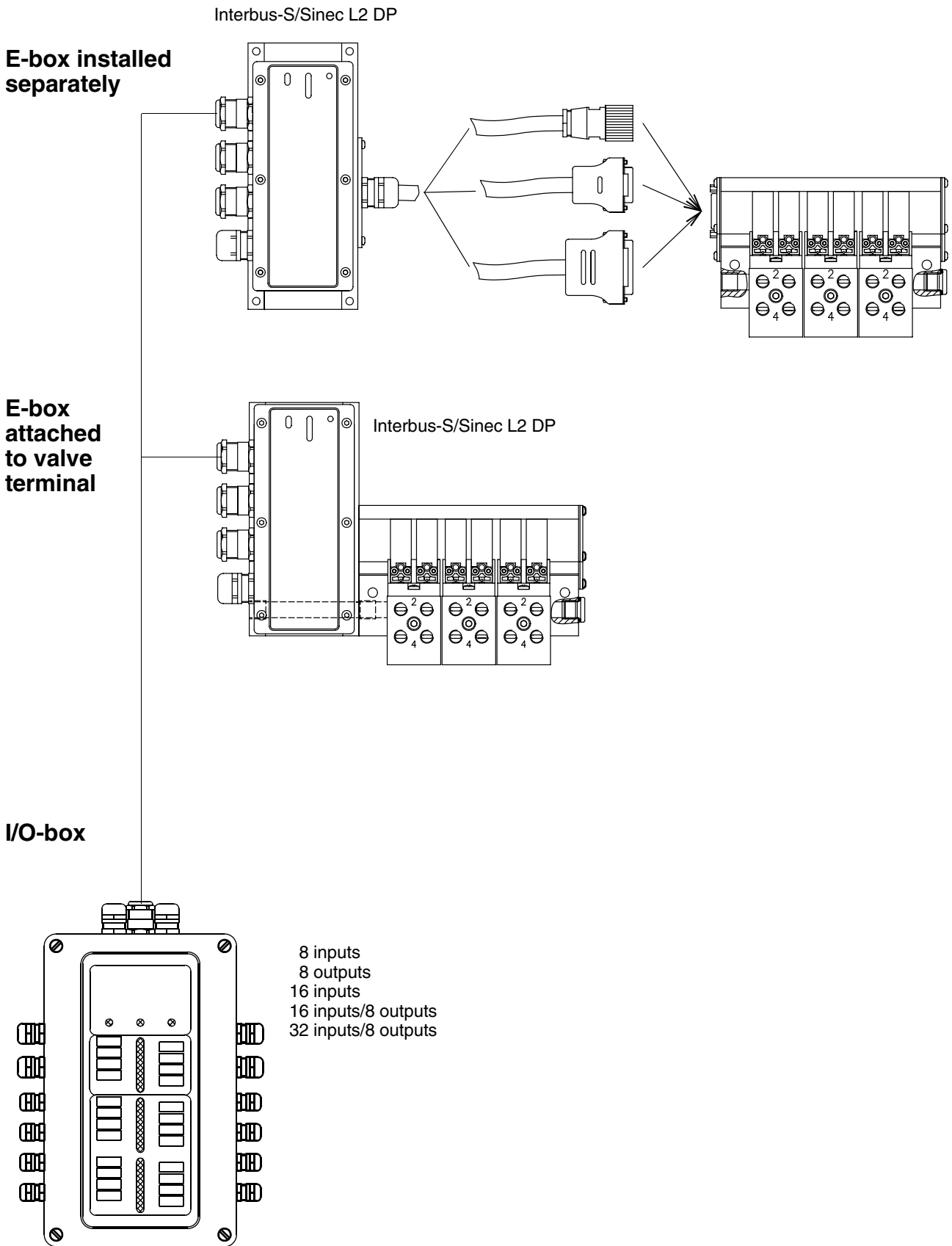
Valve terminal Model Tio, with field bus interface

Features

- Valve terminal with at least 4 solenoids and max.
  32 solenoids (except Field bus typ).
- Valves are shoun 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.

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

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

E-box installed separately
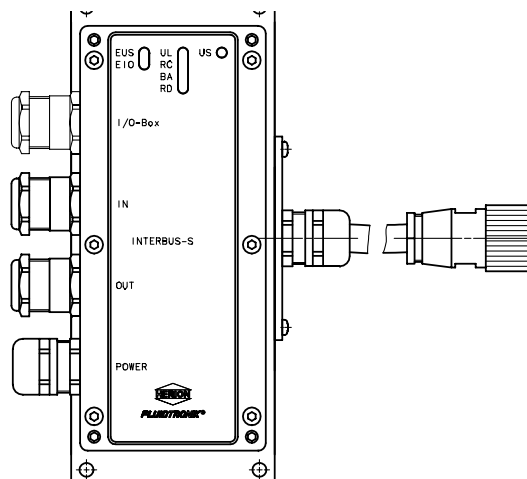
E-box attached to valve terminal
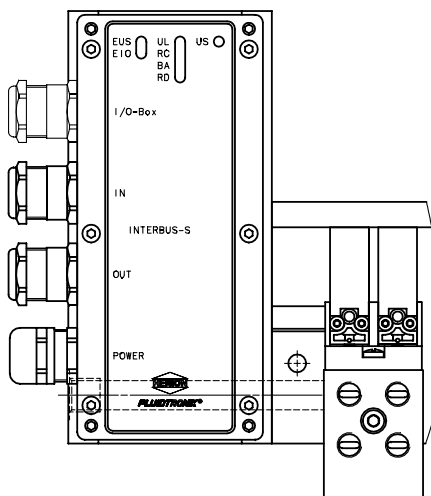
Technical description
Valve terminal system with DP - interface see publication 7503194

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]
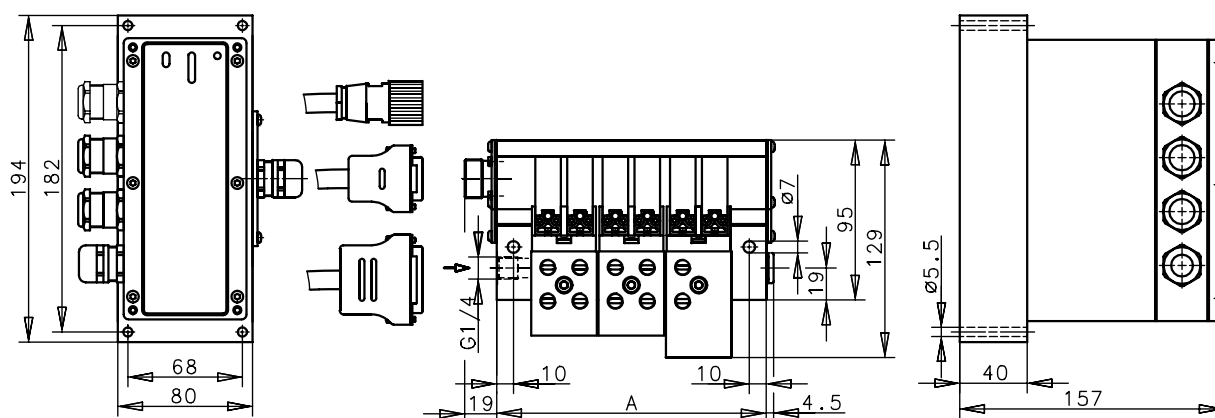
Dimensional table [mm]

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]
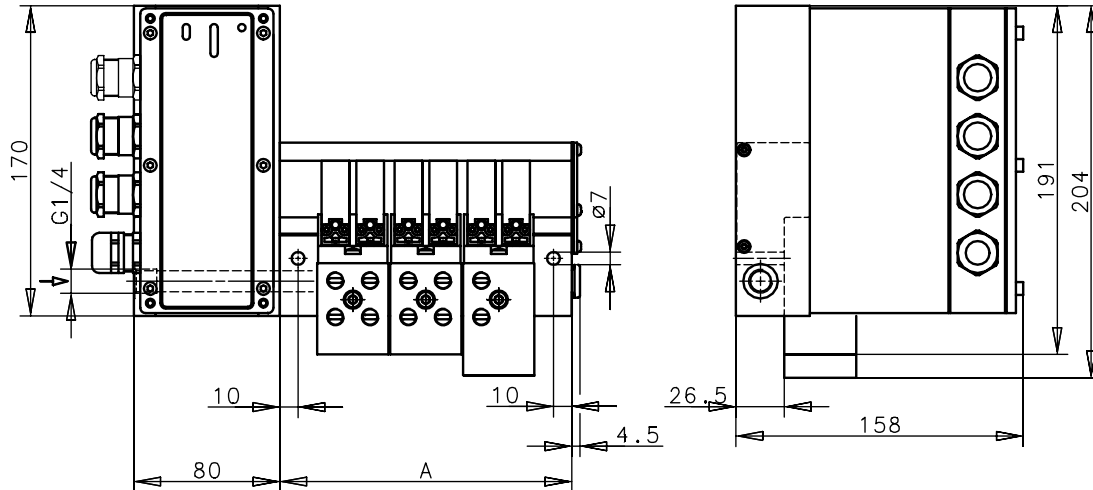
Dimensional table [mm]

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

Code	Symbol	Description
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

Plug of terminals (valves)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Order code

Terminal size										Min. 4 valves								

Terminal type	Plug termi-nals	Stan-dard	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 termi-nals	Stan-dard	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 termi-nals	Stan-dard	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	16	S	IA	X1	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- 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

7503116.06.01.99

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

	Symbol	
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)

Code	Max. number of solenoids	I/O box possible or not
ID	16	No
IE	32	No
IF	16	Yes
IG	32	Yes

Sinec L2 DP

Code	Max. number of solenoids	I/O box possible or not
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 inptuts	**5980210**
Input / Output-box for 8 outputs, 32 inptuts	**5980211**

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

Plug of terminals (valves)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Order code

Terminal size										Min. 4 valves									

Terminal type	Plug termi-nals	Stan-dard	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 termi-nals	Stan-dard	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 termi-nals	Stan-dard	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	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 overriede 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
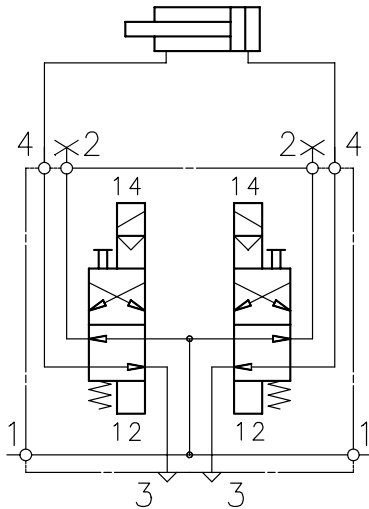
Pressurized in neutral position, in **one** double housing
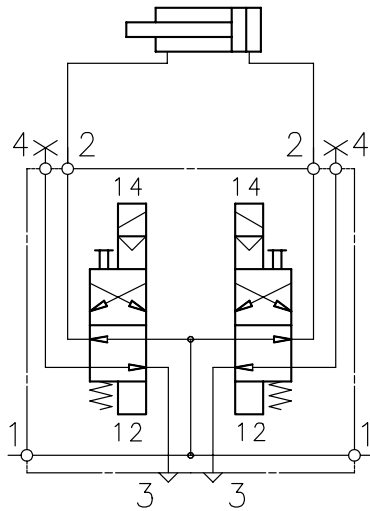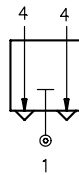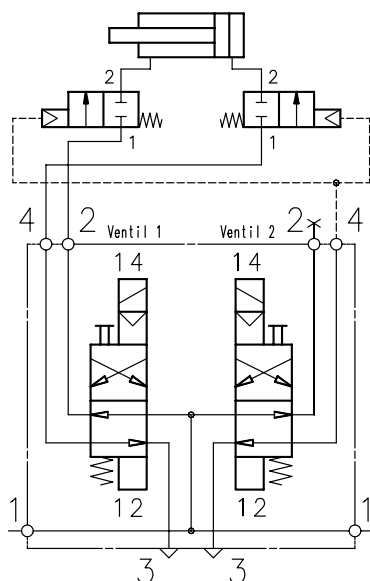

Valve in rest position
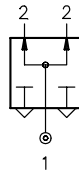
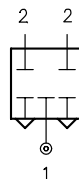Exhausted in neutral position, in **one** double housing

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