E-Box for Valve Terminal

Interbus-S

NORGREN HERION

Catalog Register
P 6

Publication 7503088.06.02.95

Description of E-box Interbus-S

Within the valve terminal system, the E-box represents the actual interface to the remote Interbus-S and remote installation bus.
The E-box includes power drivers used 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. By means of the I/O box it is possible to interrogate proximity switches and control external actuators..

All lines are electrically connected by conduit-thread connectors and plug clamps.
The conduit-thread connectors are installed in a frame which can be removed from the housing. The electrical connection between E-box and the actual valve terminal is made by means of a plug connector.
In order to exchange the E-box, the electrical lines do not have to be disconnected.

Note:

In choosing an E-box, the following decision must be made:
- E-box with or without connection for I/O box
- E-box for remote bus or remote installation bus
- Possible subsequent expansion of valve terminal
  Expansion: – Min. 1 valve
  – Max. 4 valves

Summary of equipment

Interbus-S remote bus

Number of outputs for control of solenoid valves	Possibility of expansion for I/O box	Cat. No.
16	No	**5980200**
32	No	**5980201**
16	Yes	**5980202**
32	Yes	**5980203**

Interbus-S remote installation bus

Number of outputs for control of solenoid valves	Possibility of expansion for I/O box	Cat. No.
16	No	**5980204**
32	No	**5980205**
16	Yes	**5980206**
32	Yes	**5980207**

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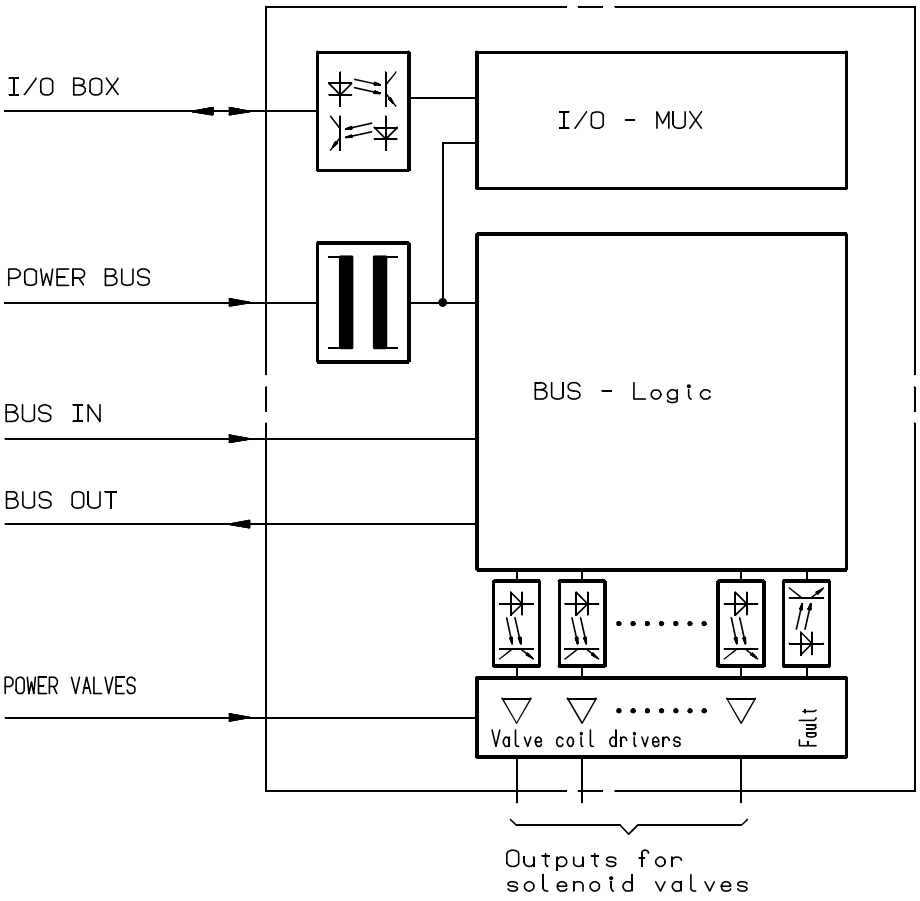
Technical data

Ambient temperature range	0 ... 50 °C
Degree of protection acc. to DIN 40050 (in installed state)	IP 65
Electromagnetic compatibility	Conforms to IEC 801.1 to 801.4 Degree of severity 3
Power supply for bus logic	18 ... 32 VDC
Residual ripple	Max. 10%
Current consumption	Max. 100 mA
Power supply for solenoid valves	24 VDC ± 10%
Residual ripple	Max. 10%
Current consumption (without solenoid coils)	Max. 30 mA
Solenoid valve output voltage	Power supply – 0.6 V
Solenoid valve output current per solenoid coil	150 mA

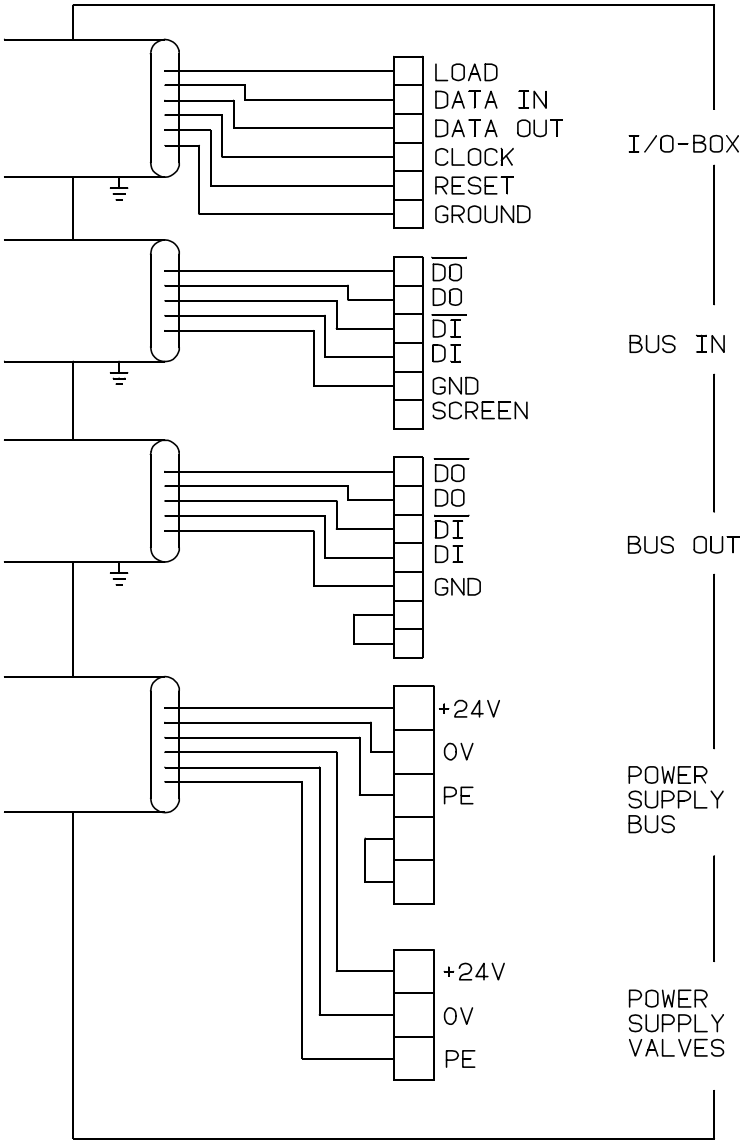
Electrical isolation	Between bus power supply and bus logic
	Between bus logic and peripherals
	Insulation voltage 500 VAC
Bus protocol	Interbus-S 2-wire remote bus
Transmission rate	500 kbit/s
Transmission medium	2 x RS 485

Block diagram



[1] Electrical isolation I/O box to bus logic
[2] Electrical isolation bus power supply to bus logic
[3] Electrical isolation bus logic to valve drivers

Connection diagram E-box Interbus-S remote bus



[1] The screen is to be grounded via the screen sleeve of the conduit-thread connector.
[2] As a rule, the screen is to be grounded via the screen sleeve of the conduit-thread connector. With long lines and large differences of potential, the screen can also be connected to the terminal SCREEN. The screen is then connected to PE via an RC network.
[3] Jumper only in case a further bus user is connected.
[4] The jumper activates the monitoring of the power supply for the valve.

Color code of bus line

Signal	Color
$\overline{DO}$	Green
DO	Yellow
$\overline{DI}$	Pink
DI	Grey
GND	Brown

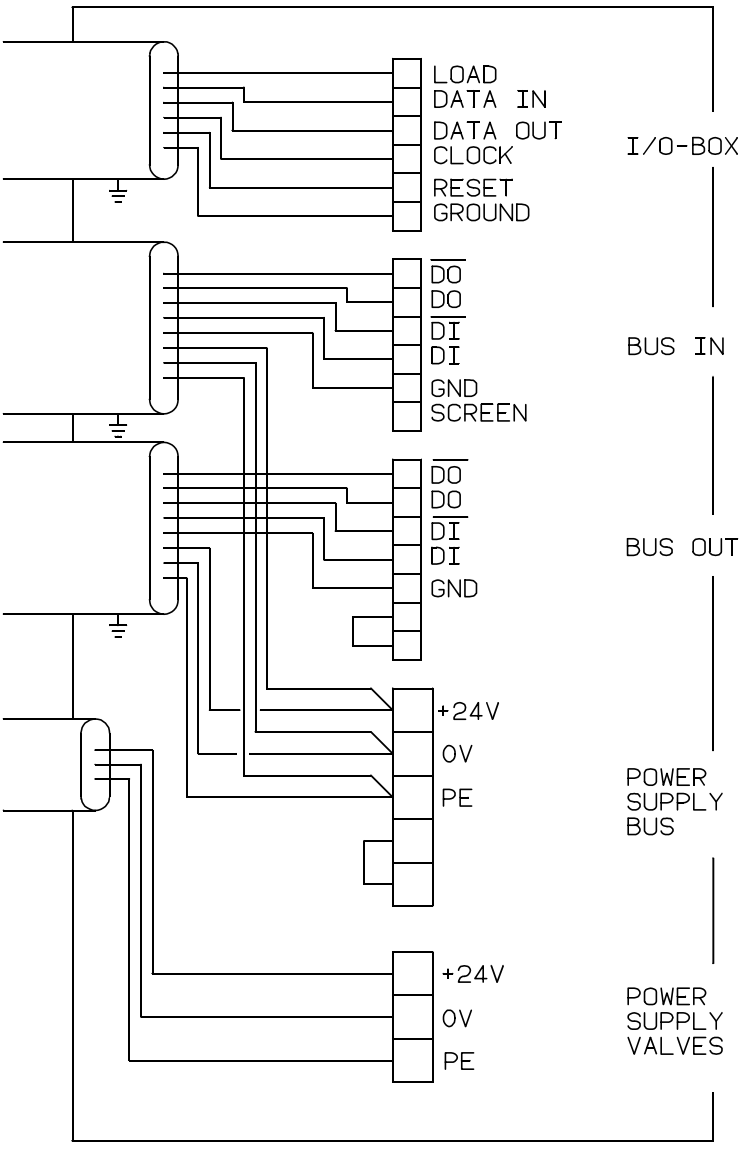
Recommended bus line: LIYCY 3 x 2 x 0.25

Color code of data line to I/O box

Signal	Color
LOAD	White
DATA IN	Green
DATA OUT	Yellow
CLOCK	Grey
RESET	Pink
GND	Brown

Recommended line: Li2YCY 8 x 0.25

Connection diagram E-box Interbus-S remote installation bus



[1] The screen is to be grounded via the screen sleeve of the conduit-thread connector.
[2] Jumper only in case a further bus user is connected to it.
[3] The jumper activates the monitoring of the power supply for the valve.

Color code of bus line

Signal	Color
$\overline{DO}$	Green
DO	Yellow
$\overline{DI}$	Pink
DI	Grey
GND	Brown
+ 24 V	Red
0 V	Blue
PE	Green/Yellow

Recommended bus line:
Hybrid cable 3 x 2 x 0.25 + 3 x 1.0

Color code of data line to I/O box

Signal	Color
LOAD	White
DATA IN	Green
DATA OUT	Yellow
CLOCK	Grey
RESET	Pink
GND	Brown

Recommended line: Li2YCY 8 x 0.25

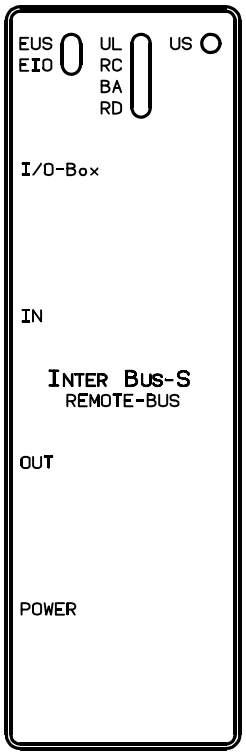
Diagnostic functions

LEDs

LED	State	Significance
EUS*)	RED	No power supply for digital outputs of I/O box
EIO*)	RED	Failures of I/O box: – Short circuit of digital output – Short circuit of power supply for sensors – Power supply for sensors and logic part missing – Failure of data transmission between E-box and I/O box
UL	GREEN	Power supply for bus logic available
RC	GREEN	Remote bus check display
BA	GREEN	Bus active display
RD	RED	Remote bus display
US	GREEN	Power supply for solenoid valves available

*) Available only, if E-box is provided with expansion facilities for connection of I/O box

The E-box is provided with LEDs, enabling a simple system diagnosis



Remote diagnosis

Fault	Jumper[1] Yes	Jumper[1] No	ModErr
Absence or undervoltage of power supply for digital outputs of I/O box	x		Yes
		x	No
Failure of I/O box: – Short circuit of digital output – Short circuit of power supply for sensors	x		Yes
– Power supply for sensors and logic part missing – Data transmission between E-box and I/O box jammed		x	Yes
Absence or undervoltage of power supply for solenoid valves	x		Yes
		x	No

[1] See connection diagram

A remote diagnosis of the system is possible via ModErr function of the interbus protocol

Assignment of data bytes for outputs as demonstrated on the example of a Simatic S5-control

The table shows the data assignment at the base address AW 20 of the SPC

Version: 5980200 5980204 Ident code: 01 Word size to be projected: 1		Version: 5980201 5980205 Ident code: 01 Word size to be projected: 2		Version: 5980202 5980206 Ident code: 03 Word size to be projected: 3		Version: 5980203 5980207 Ident code: 03 Word size to be projected: 3			
14	Valve 4	14	Valve 4	14	Valve 4	14	Valve 4	20.7	AW 20
12		12		12		12		20.6	
14	Valve 3	14	Valve 3	14	Valve 3	14	Valve 3	20.5	
12		12		12		12		20.4	
14	Valve 2	14	Valve 2	14	Valve 2	14	Valve 2	20.3	
12		12		12		12		20.2	
14	Valve 1	14	Valve 1	14	Valve 1	14	Valve 1	20.1	
12		12		12		12		20.0	
14	Valve 8	14	Valve 8	14	Valve 8	14	Valve 8	21.7	
12		12		12		12		21.6	
14	Valve 7	14	Valve 7	14	Valve 7	14	Valve 7	21.5	
12		12		12		12		21.4	
14	Valve 6	14	Valve 6	14	Valve 6	14	Valve 6	21.3	
12		12		12		12		21.2	
14	Valve 5	14	Valve 5	14	Valve 5	14	Valve 5	21.1	
12		12		12		12		21.0	
		14	Valve 12		-	14	Valve 12	22.7	AW 22
		12			-	12		22.6	
		14	Valve 11		-	14	Valve 11	22.5	
		12			-	12		22.4	
		14	Valve 10		-	14	Valve 10	22.3	
		12			-	12		22.2	
		14	Valve 9		-	14	Valve 9	22.1	
		12			-	12		22.0	
		14	Valve 16		-	14	Valve 16	23.7	
		12			-	12		23.6	
		14	Valve 15		-	14	Valve 15	23.5	
		12			-	12		23.4	
		14	Valve 14		-	14	Valve 14	23.3	
		12			-	12		23.2	
		14	Valve 13		-	14	Valve 13	23.1	
		12			-	12		23.0	
				Output byte I/O box	0.7	Output byte I/O box	0.7	24.7	AW 24
					0.6		0.6	24.6	
					0.5		0.5	24.5	
					0.4		0.4	24.4	
					0.3		0.3	24.3	
					0.2		0.2	24.2	
					0.1		0.1	24.1	
					0.0		0.0	24.0	
					-		-	25.7	
					-		-	25.6	
					-		-	25.5	
					-		-	25.4	
					-		-	25.3	
					-		-	25.2	
					-		-	25.1	
					-		-	25.0	

Assignment of data bytes for inputs as demonstrated on the example of a Simatic S5-control

The table shows the data assignment at the base address EW 20 of the SPC

Version: 5980202 5980206		Version: 5980203 5980207			
Input byte I/O box	0.7	Input byte I/O box	0.7	22.7	EW 22
	0.6		0.6	22.6	
	0.5		0.5	22.5	
	0.4		0.4	22.4	
	0.3		0.3	22.3	
	0.2		0.2	22.2	
	0.1		0.1	22.1	
	0.0		0.0	22.0	
Input byte I/O box	1.7	Input byte I/O box	1.7	23.7	
	1.6		1.6	23.6	
	1.5		1.5	23.5	
	1.4		1.4	23.4	
	1.3		1.3	23.3	
	1.2		1.2	23.2	
	1.1		1.1	23.1	
	1.0		1.0	23.0	
Input byte I/O box	2.7	Input byte I/O box	2.7	24.7	EW 24
	2.6		2.6	24.6	
	2.5		2.5	24.5	
	2.4		2.4	24.4	
	2.3		2.3	24.3	
	2.2		2.2	24.2	
	2.1		2.1	24.1	
	2.0		2.0	24.0	
Input byte I/O box	3.7	Input byte I/O box	3.7	25.7	
	3.6		3.6	25.6	
	3.5		3.5	25.5	
	3.4		3.4	25.4	
	3.3		3.3	25.3	
	3.2		3.2	25.2	
	3.1		3.1	25.1	
	3.0		3.0	25.0	

Dimensional drawing (mm)