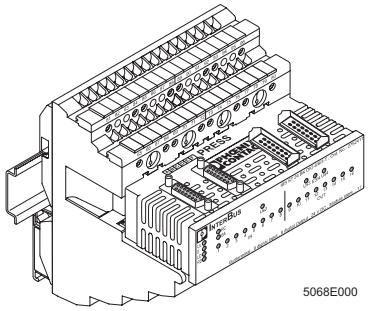
IBS ST (ZF) 24 BK DIO 8/8/3-T

Bus Terminal Block With Eight Digital Inputs and Eight Digital Outputs



Data Sheet 5068F 10/2001

Information which generally applies to ST modules can be found in the IBS SYS PRO INST UM E user manual.

Function

Via the bus terminal block IBS ST (ZF) 24 BK DIO 8/8/3-T an INTERBUS ST compact station can be coupled to the remote bus. In addition the bus terminal block has an input/output function.

Features

- Remote bus connections using copper technology
- Electrical isolation of the remote bus segments
- No electrical isolation of communications power and I/O voltage
- Connections for eight digital inputs and eight digital outputs
- Two FLK interfaces for I/O modules
- Diagnostic and status indicators
- Rail mountable

Ground the mounting rail. The module is grounded by snapping it onto the mounting rail.

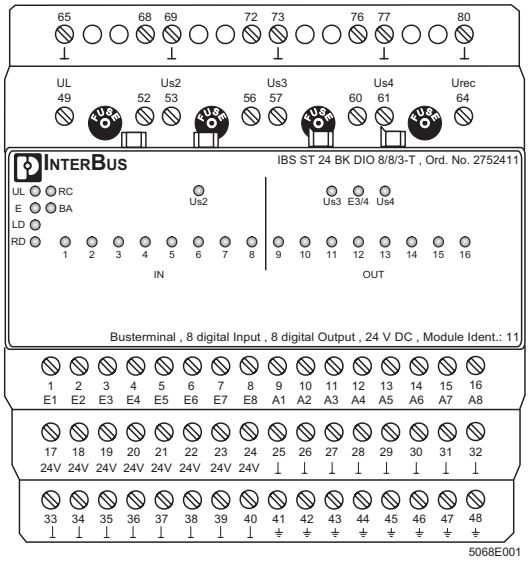


Figure 1 IBS ST 24 BK DIO 8/8/3-T module

Terminal Assignment

Terminals	Assignment
U_L	24 V supply voltage of the module electronics
⊥ (65)	Ground of the supply for the module electronics
U_{S2}	24 V supply voltage of the inputs
⊥ (69)	Ground of the supply for the inputs
U_{S3}	24 V supply voltage of outputs O1 through O4
⊥ (73)	Ground of the supply for outputs O1 through O4
U_{S4}	24 V supply voltage of outputs O5 through O8
⊥ (77)	Ground of the supply for outputs O5 through O8
U_{REC}	Connection of the reconfiguration voltage (via external button)
⊥ (80)	Reference ground of the reconfiguration voltage
I1 - I8	Digital inputs
O1 - O8	Digital outputs
17 - 24	24 V sensor supply voltage
25 - 40	Ground
41 - 48	Functional earth ground

Local Diagnostic and Status Indicators

Des.	Color	Meaning
UL	Green	Supply voltage for the module electronics
E	Red	Local bus error
LD	Red	Local bus disconnected
RD	Red	Remote bus disconnected
RC	Green	Remote bus connection established
BA	Green	Remote bus active
US2	Green	Supply voltage of the inputs
US3/4	Green	Supply voltage of the outputs
E3/4	Red	Module error
1 - 16	Yellow	Status of the inputs/outputs

The numbering of the yellow status indicators corresponds to terminal block numbering and not to the channel number.

Internal Circuit Diagram

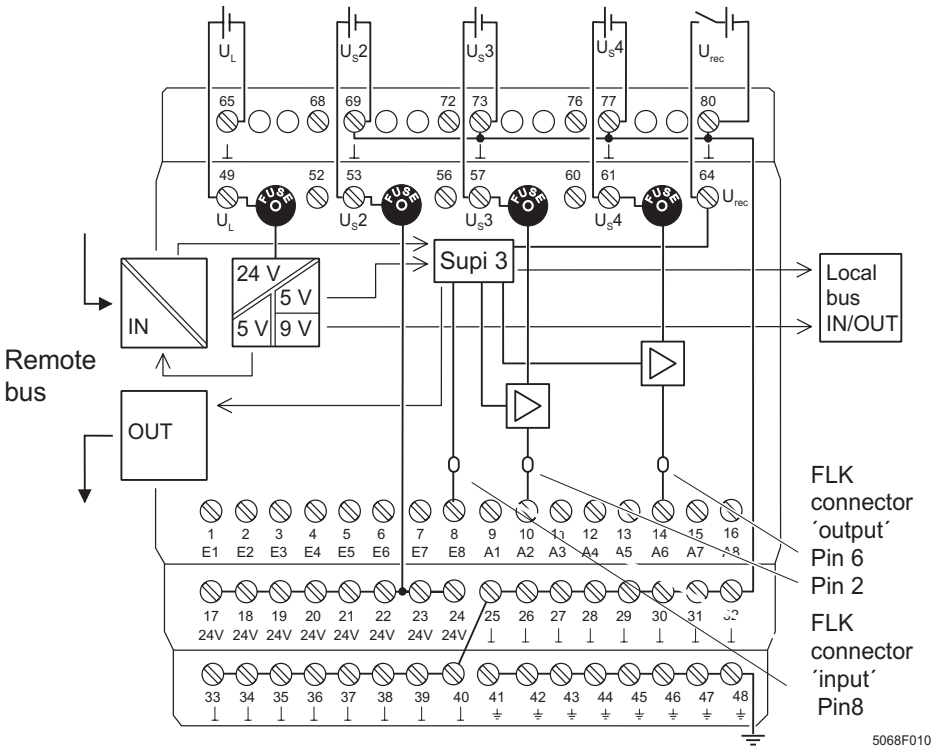


Figure 2 Internal circuit diagram

Note that in Figure 2 one input/output per group is illustrated.

Maintaining Electrical Isolation

To prevent eliminating the electrical isolation between module electronics and I/O devices at local bus devices with opto-electrically isolated inputs and outputs, electrically isolate their voltage supplies from the supply voltage of the bus terminal block. You can achieve safe isolation by using, for example, several power supply units (see Figure 3).

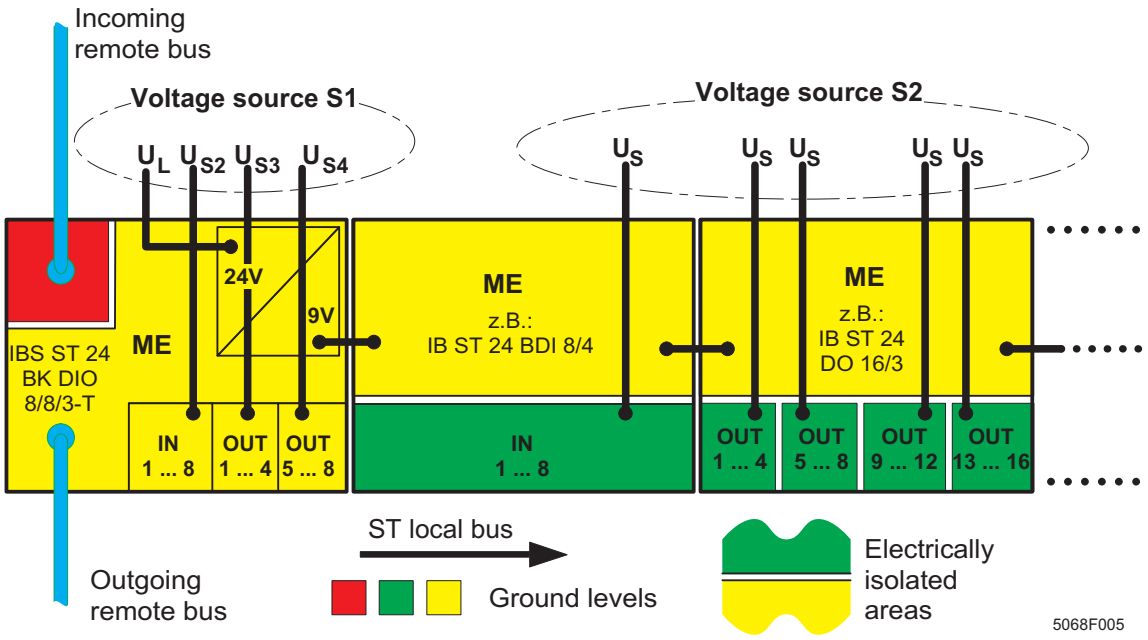


Figure 3 Position of the ground levels

The supply voltage (U_L) of the module electronics of the bus terminal block, as well as the module electronics of the following local bus device is not electrically isolated from the I/O voltages U_{S2}, U_{S3} and U_{S4} of the bus terminal block.

Internal Wiring of the Terminal Points

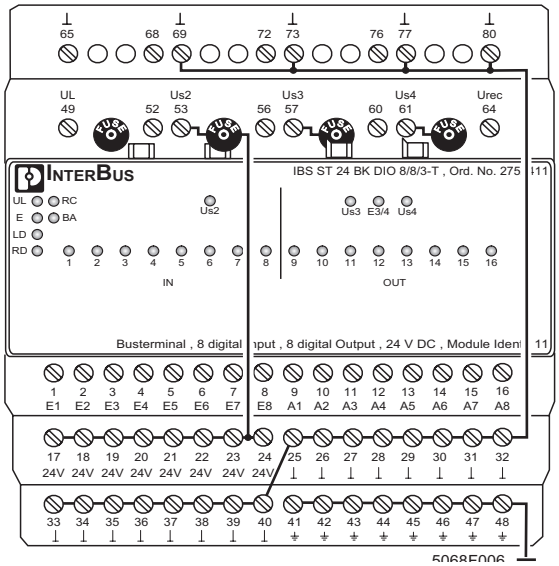


Figure 4 Internal wiring of terminal points

Ground the mounting rail. The grounding of terminals 41 to 48 is ensured by snapping the module onto the mounting rail.

Connecting the Supply Voltages and Potential Jumpering

Key for Figure 5 and Figure 6:

Internal jumper
Current carrying capacity 6 A, maximum

Internal jumper
Current carrying capacity 10 A, maximum

External jumper

A potential jumpering of up to a specified maximum current of 6 A or 10 A can be achieved using the internal jumpers. If a higher current capacity is required, external jumpers should be used.

Connection Example With Five Voltage Sources

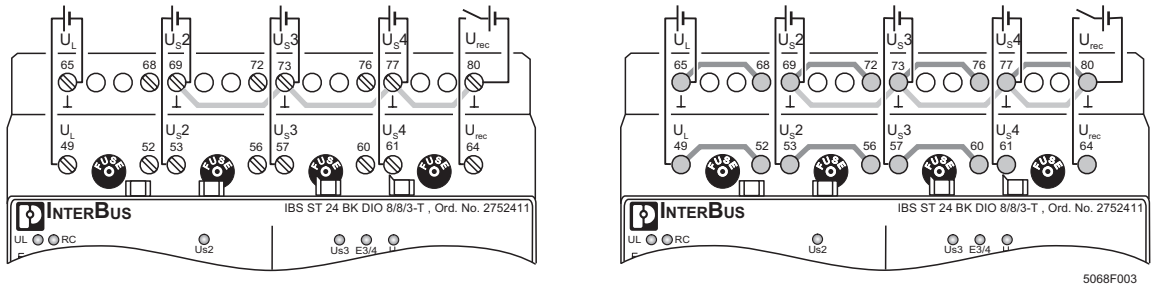


Figure 5 Connection example with five voltage sources

Connection Example With two Voltage Sources

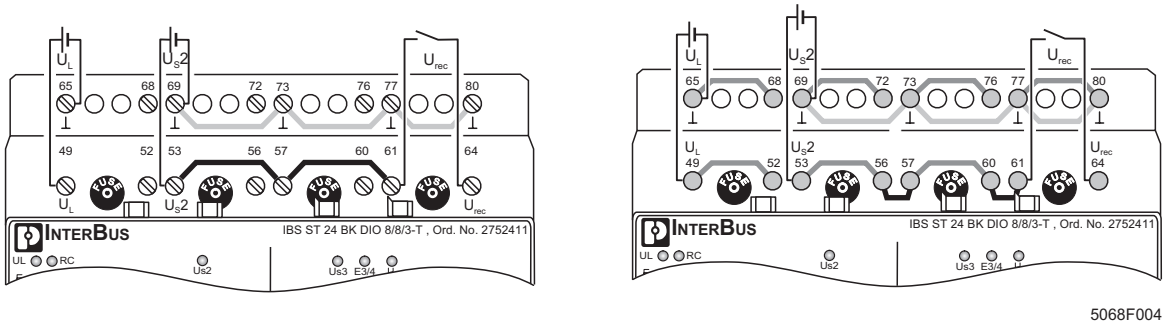


Figure 6 Connection example with two voltage sources

For the module with spring-clamp technology (left figure in Figure 6) this means that up to a maximum current carrying capacity of 6 A no additional wiring is needed except for the external jumpers between the terminal points 56-57 and 60-61.

The connection between the terminal points 69 (-73) and 73 (-77) is created via the internal jumpers.

You can supply the inputs and outputs with voltage independently of each other.

Connection of the Remote bus and the I/O

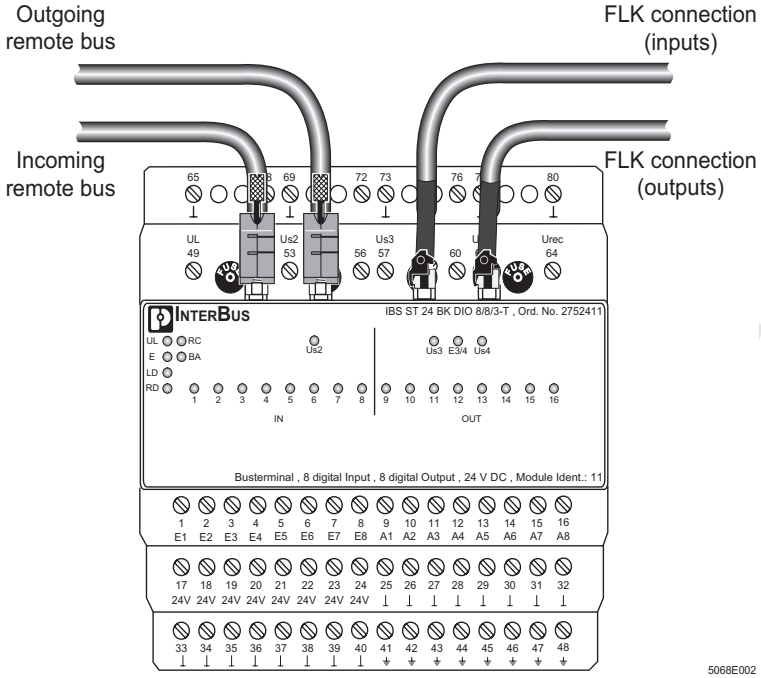


Figure 7 Positions of remote bus and FLK connections

In addition to the VARIOFACE I/O module, you can connect up to 4 other ST I/O modules to the bus terminal block using the ST cable. A maximum local bus current of 500mA must not be exceeded.

You can connect the I/O terminal block and the optional FLK relays simultaneously. Please note the maximum permissible current carrying capacity.

Connection of Sensors/Actuators (Example)

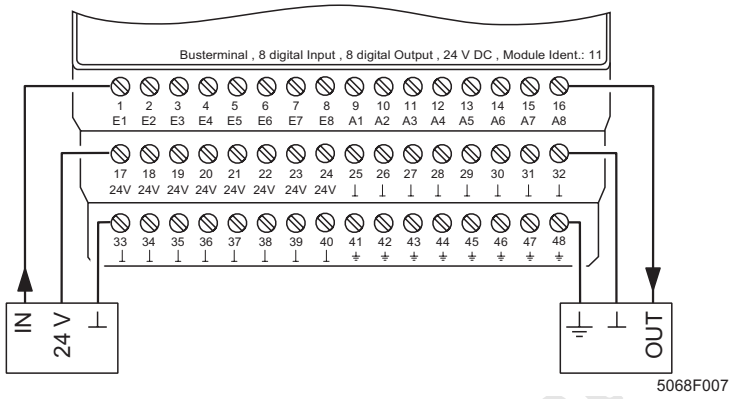


Figure 8 Connection of sensors/actuators (example)

Connecting VARIOFACE Modules

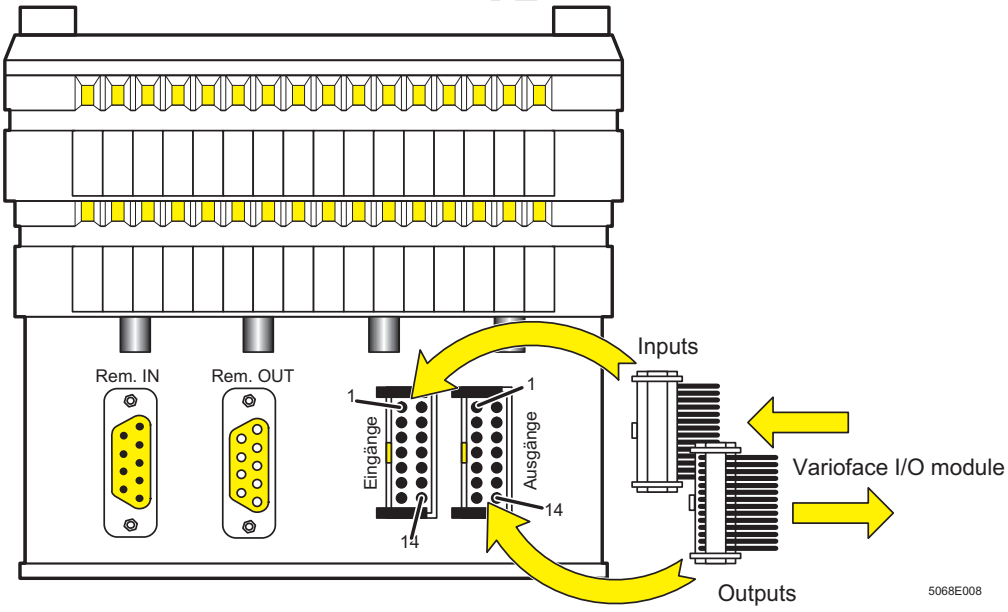


Figure 9 Connection of VARIOFACE modules via FLK connectors

Pin Assignment of the FLK Connectors

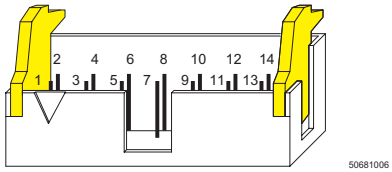


Figure 10 Pin assignment of the 14-pos. FLK connectors

Pin assignment/bit assignment of inputs/outputs

FLK pin	Inputs			Outputs		
	Terminal	Bit	Signal	Terminal	Bit	Signal
1	1	7	I1	9	7	O1
2	2	6	I2	10	6	O2
3	3	5	I3	11	5	O3
4	4	4	I4	12	4	O4
5	5	3	I5	13	3	O5
6	6	2	I6	14	2	O6
7	7	1	I7	15	1	O7
8	8	0	I8	16	0	O8
9	53		24 V DC (+) U_{S2}	57		24 V DC (+) U_{S3}
10	69		GND	73		GND
11	53		24 V DC (+) U_{S2}	57		24 V DC (+) U_{S3}
12	69		GND	73		GND
13	53		24 V DC (+) U_{S2}	57		24 V DC (+) U_{S3}
14	69		GND	-*		Error message load relay

* The "Error message load relay" signal is not available on the terminal points.

Programming Data

ID code	$0B_{hex}$ (11_{dec})
Length code	01_{hex}
Process data channel	16 bits
Input address area	2 bytes
Output address area	2 bytes
Parameter channel (PCP)	0 bytes

INTERBUS Process Data

Assignment of the Terminal Points of the *Inputs* to the INTERBUS Input Data

(Byte.Bit) View	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Terminal (input signal)	1	2	3	4	5	6	7	8	Not used							
	Terminal point (24 V)	17	18	19	20	21	22	23	24								
	Terminal (ground)	33	34	35	36	37	38	39	40								

Assignment of the Terminal Points of the *Outputs* to the INTERBUS Output Data

(Byte.Bit) View	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Terminal (output signal)	9	10	11	12	13	14	15	16	Not used							
	Terminal (ground)	25	26	27	28	29	30	31	32								
	Terminal (PE)	41	42	43	44	45	46	47	48								

Technical Data

General Data	
Housing dimensions (width x height x depth)	118 mm x 116 mm x 117 mm (4.646 in. x 4.567 in. x 4.606 in.)
Total power dissipation	7.4 W
Permissible operating temperature	0°C to 55°C (32°F to 131 °F)
Permissible storage temperature	-25°C to +70°C (-13°F to 158°F)
Degree of protection	IP 20, DIN 40050, IEC 60529
Class of protection	Class 3 VDE 0106, IEC 60536
Humidity	75% on average, 85% occasionally, no condensation
Air pressure (operation)	From 80 kPa to 106 kPa, 2.000 m (6561.68 ft.) above sea level
Electrical isolation	Test voltage
Incoming/outgoing remote bus	500 V AC, 1 min., 50 Hz
Incoming remote bus/local bus	500 V AC, 1 min., 50 Hz
Incoming remote bus/I/O interface	500 V AC, 1 min., 50 Hz
Preferred installation position	Panel mounting
Protective ground connection	Via DIN rail
Weight	690 g, typical

Interfaces	
INTERBUS	
Incoming remote bus	9-pos. D-SUB male connector
Outgoing remote bus	9-pos. D-SUB female connector
Maximum distance to the next remote bus device	400 m
INTERBUS ST interface	ST cable
Number of ST modules that can be connected	Four, maximum (taking current load into account)
Maximum supply current from the bus terminal blcok	500 mA
Reconfiguration input	
Nominal voltage U_{REC}	24 V DC

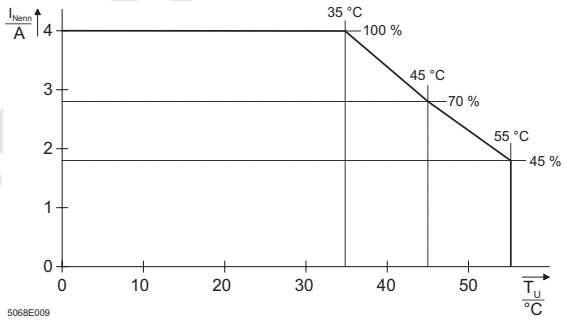
Interfaces	
Permissible voltage range	-30 V DC to +30 V DC
Voltage range logic 0	-30 V DC to +5 V DC
Voltage range logic 1	+13 V DC to +30 V DC
Current consumption (input ON)	2 mA, typical

Power Consumption	
Local bus voltage	9 V
Maximum permissible total current consumption of all I/O modules	500 mA, typical
Bus terminal block supply voltage U_L	24 V DC (nominal value)
Current consumption without connected ST modules	150 mA, typical
Current consumption with maximum station structure	450 mA, typical
Typical power consumption on U_L	3.6 W, typical (without ST local bus)
Supply voltage U_{S2}	24 V DC
Sensor supply voltage U_{S2}	24 V DC (nominal value)
Current consumption (base load)	4 mA
Current consumption (eight inputs set)	8 x 5 mA = 40 mA
Maximum module power loss on U_{S2}	1.1 W
Supply voltage U_{S2}	24 V DC
Minimum output voltage U_{S3}	24 V DC (nominal value) minus 0.4 V
Current consumption (base load)	10 mA
Current consumption (outputs set, without load)	12 mA
Maximum power dissipation by load	0.8 W
Maximum module power dissipation on U_{S3}	1.35 W
Supply voltage U_{S2}	See supply voltage U_{S3}
Total power dissipation	7.4 W

Supply Voltage of the Bus Terminal Block (U_L)	
Nominal value	24 V DC
Permissible ripple	3.6 V_{pp} within the permissible voltage range
Permissible voltage range (including ripple)	Operation 18.5 V DC to 30.5 V DC
Current consumption	150 mA, typical
Power consumption	3.6 W, typical (without ST local bus) 10.8 W, typical (with local bus, 9 V DC, 500 mA)
Protection against polarity reversal	Through diode and fuse connected in series
Surge voltage protection	Fuse in the terminal block base (IBS TR5 1 AT)

Supply Voltage of the I/O Devices ($U_{S2/3/4}$)	
Nominal value	24 V DC
Permissible ripple	3.6 V_{pp} within the permissible voltage range
Permissible voltage range (including ripple)	Operation 18.5 V DC to 30.5 V DC
Overvoltage protection	Up to 35 V (t = 0.5 s)
Number of isolated groups	1
Permissible total current	1 x 2 A (for sensors) 2 x 2 A (for actuators)
Protection against polarity reversal	Through diode and fuse connected in series

Digital Inputs	
Number	8
Connection type	Screw-clamp terminals/spring-clamp terminals or FLK connectors
Input voltage	
Voltage range logic 0	-30 V DC to +5 V DC
Voltage range logic 1	+13 V DC to +30 V DC
Nominal current per channel	5 mA, typical
Signal change delay	≥ 1 ms, typical
Maximum permissible sensor supply current	2 A
Surge voltage protection	Fuse IBS TR5; 3.15 AF

Digital Outputs	
Number	8 (in 2 groups)
Connection type	Screw-clamp terminals/spring-clamp terminals or FLK connectors
Minimum output voltage at nominal current	$U_{S3/4}$ minus 0.4 V
Nominal output current	
Per output	500 mA
Per group	2 A
Per module	4 A
Permissible range per output	5 mA to 500 mA
Derating curve of the output current per module: Up to 35°C (95°F): 100% from $I_{nominal}$ Up to 45°C (113°F): 70% from $I_{nominal}$ Up to 45°C (113°F): 45% from $I_{nominal}$	
Permissible load per output	
Ohmic/lamp load	12 W
Permissible switching frequency	
Ohmic load (48 Ω)	150 Hz, maximum
Inductive load (48 Ω; 1.3 H)	0.5 Hz, maximum
Short circuit protection	Electronic
Surge voltage protection	Fuse IBS TR5; 3.15 AF

Programmable Functions	
Disconnection of the ST compact station	Yes
Reset of the ST compact station	Yes
Disconnection of the outgoing remote bus	Yes
Reset of the outgoing remote bus	Yes
Monitoring the remote bus cable	Yes

Error Messages	
Short circuit of an output	Yes
Failure of the voltage supply for the inputs or the F2 fuse	Yes
Failure of the voltage supply for the outputs or the F3/4 fuses	Yes
Error message of a load relay (via FLK connectors)	Yes

Ordering Data

Description	Order Designation	Order No.
BK modules (screw-clamp terminals)	IBS ST 24 BK DIO 8/8/3-T	27 52 41 1
BK modules (spring-clamp terminals)	IBS ST ZF 24 BK DIO 8/8/3-T	27 50 79 8
Module electronics	IB STME 24 BK DIO 8/8/3-T	27 52 96 1
Terminal block (screw-clamp terminals)	IB STTB 24 BK DIO 8/8/3-T	27 52 78 3
Terminal block (spring-clamp terminals)	IB STTB ZF 24 BK DIO 8/8/3-T	27 50 84 0

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