

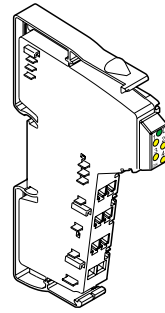
VARIO DI 4/24

I/O Extension Module With Four Digital Inputs

User Manual

02/2003

5550A001



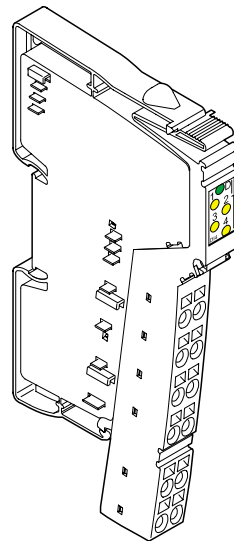
This data sheet is only valid in association with the documents of the used fieldbus coupler

Function

This terminal is used to accept 24 V digital input signals from sourcing devices. It is designed for use within an VARIO station.

Features

- Four digital sensors can be connected
- Connection of 2- and 3-wire sensors
- Maximum permissible load current per sensor: 250 mA.
- Maximum permissible load current from the terminal: 1.0 A.
- Diagnostic and status indicators

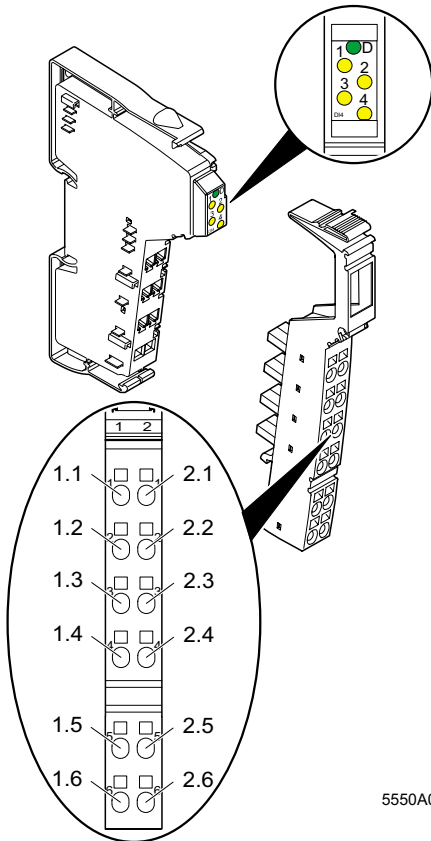


5550A006

Figure 1 VARIO DI 4/24 terminal with the connector plugged in



All modules will be delivered including connectors and labeling fields



5550A002

Figure 2 VARIO DI 4/24 terminal with the appropriate connector

Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicators of the inputs

Terminal Assignment

Terminal Point	Assignment
1.1	Signal input 1 (IN 1)
2.1	Signal input 2 (IN 2)
1.2, 2.2	Segment voltage U_S for 2- and 3-wire termination
1.3, 2.3	Ground contact (GND) for 3-wire termination
1.4	Signal input 3 (IN 3)
2.4	Signal input 4 (IN 4)
1.5, 2.5	Segment voltage U_S for 2- and 3-wire termination
1.6, 2.6	Ground contact (GND) for 3-wire termination

Internal Circuit Diagram

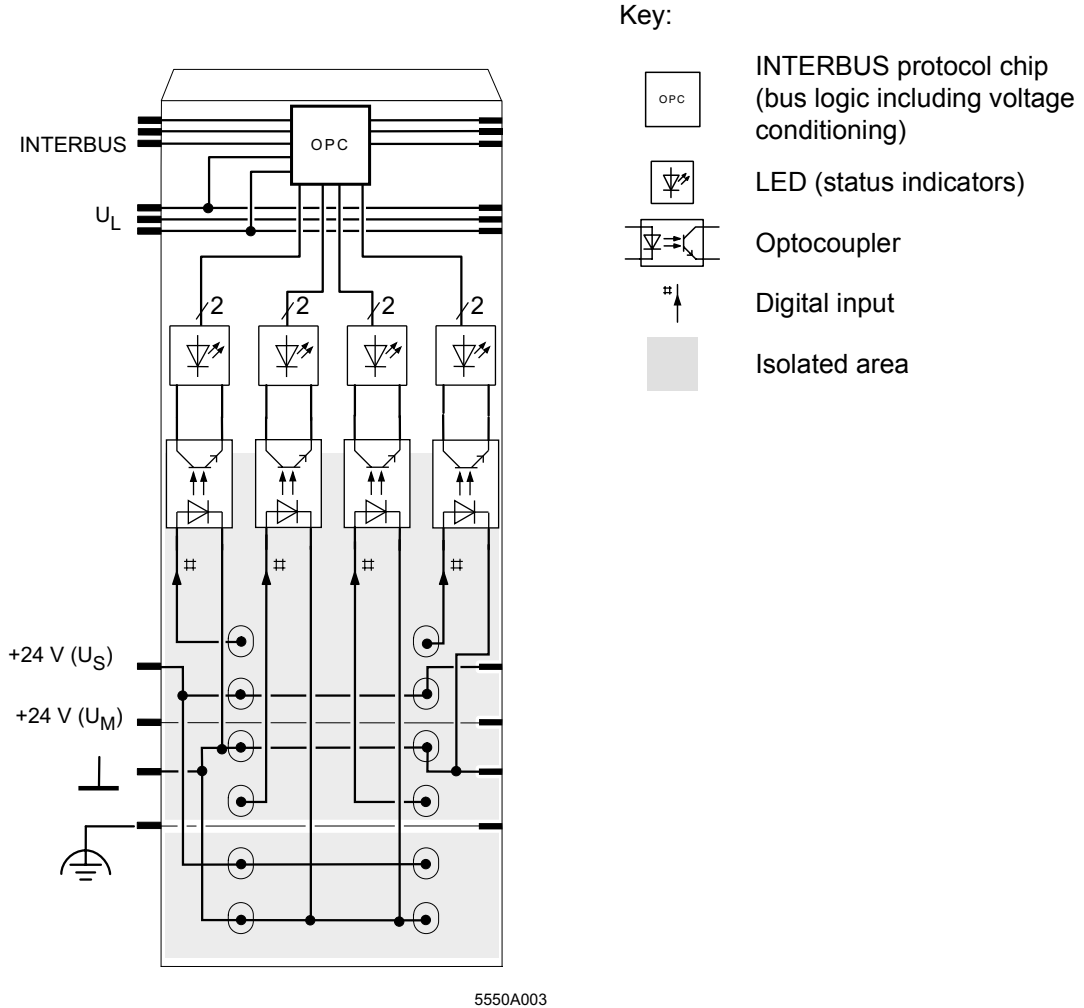


Figure 3 Internal wiring of the terminal points

Connection Example



When connecting the sensors, observe the assignment of the terminal points to the fieldbus reference (see page 5).

Programming Data

ID code	BE _{hex} (190 _{dec})
Length code	41 _{hex}
Input address area	4 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	4 bits

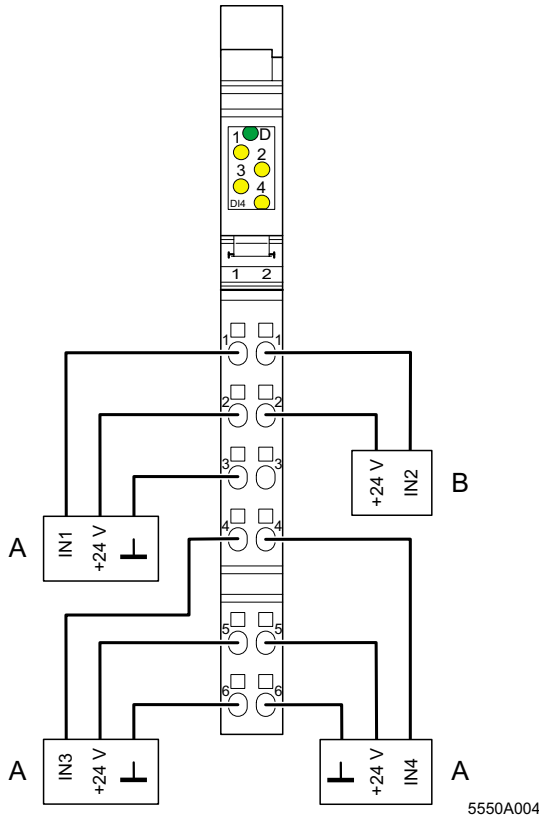


Figure 4 Typical sensor connections

- A 3-wire termination
- B 2-wire termination

Process Data Words



Assignment of the Terminal Points to the Process Data Input Word

(Word.bit) view	Word	Word 0															
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(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
Terminal	Terminal point (signal)	Not used				2.4	1.4	2.1	1.1	Not used							
	Terminal point (+24 V)					2.5	1.5	2.2	1.2								
	Terminal point (GND)					2.6	1.6	2.3	1.3								
Status indication	LED					4	3	2	1								



The process data output word is not used.

Technical Data

General Data	
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm (0.480 in. x 4.724 in. x 2.795 in.)
Weight	44 g (without connector)
Operating mode	Process data operation with 4 bits (1 nibble)
Connection type of the sensors	2- and 3-wire technology
Permissible temperature (operation)	-25°C to +55°C (-13°F to +131°F)
Permissible temperature (storage/transport)	-25°C to +85°C (-13°F to +185°F)
Permissible humidity (operation)	75% on average, 85% occasionally
 Ranging from -25°C to +55°C (-13°F to +131°F) appropriate measures against increased humidity (> 85%) must be taken.	
Permissible humidity (storage/transport)	75% on average, 85% occasionally
 For a short period, slight condensation may appear on the housing if, for example, the terminal is brought into a closed room from a vehicle.	
Permissible air pressure (operation)	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
Permissible air pressure (storage/transport)	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536

Interface	
local bus interface	Through data routing

Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	40 mA, maximum
Power consumption from the local bus	0.3 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption of U_S	1.0 A, maximum


Supply of the Module Electronics and I/O Through Bus Terminal / Power Terminal	
Connection method	Through potential routing

Digital Inputs	
Number	4
Input design	According to EN 61131-2, Type 1
Definition of switching thresholds	
Maximum low level voltage	$U_{Lmax} < 5 \text{ V}$
Minimum high level voltage	$U_{Hmin} > 15 \text{ V}$
Common potentials	Segment supply, ground
Nominal input voltage U_{IN}	24 V DC
Permissible range	$-30 \text{ V} < U_{IN} < +30 \text{ V DC}$
Nominal input current U_{IN}	3 mA, minimum
Delay time	None
Permissible cable length to the sensor	30 m (98.4 ft.) (to ensure conformance with EMC directive 89/336/EEC)
Use of AC sensors	AC sensors in the voltage range $< U_{IN}$ are limited in application. (corresponding to the input design)

Characteristic Curve: Current Depending on the Input Voltage and the Ambient Temperature T_U			
Supply voltage	Input current	Input current according to $t \geq 20 \text{ s}$	
		At $T_U = 25^\circ\text{C} (77^\circ\text{F})$	At $T_U = 55^\circ\text{C} (131^\circ\text{F})$
18 V	3.0 mA	2.9 mA	2.5 mA
24 V	3.9 mA	3.8 mA	3.5 mA
30 V	4.5 mA	4.2 mA	3.0 mA

The current is reduced depending on the ambient temperature T_U and the number of inputs that are switched on (module internal temperature).

Power Dissipation	
Formula to calculate the power dissipation of the electronics	
$P_{\text{tot}} = 0,24 \text{ W} + \sum_{n=0}^4 [U_{\text{INn}} \times 0,003 \text{ A}]$	
With	
P_{tot}	Total power dissipation of the terminal
n	Index of the number of set inputs $n = 0$ to 4
U_{INn}	Input voltage of the input n
Power dissipation of the housing P_{HOU}	0.6 W, maximum (within the permissible operating temperature)
Concurrent Channel Derating	
Derating	No limitation of the channel simultaneity, No derating
Safety Devices	
Overload in segment circuit	No
Surge voltage	Protective circuits of the power terminal
Polarity reversal	Protective circuits of the power terminal

Electrical Isolation	
	To provide electrical isolation between the logic level and the I/O area it is necessary to supply the bus terminal and the digital input terminal using the bus terminal or a power terminal from separate power supply units. Interconnection of the 24 V power supplies is not allowed! (For detailed information refer to the user manual.)
Common potentials	
24 V main power, 24 V segment voltage, and GND have the same potential. FE (functional earth ground) is a separate potential area.	
Separate potentials in the system consisting of bus terminal/power terminal and I/O terminal	
- Test distance	- Test voltage
5 V supply incoming remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
5 V supply outgoing remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
7.5 V supply (bus logic) / 24 V supply (I/O)	500 V AC, 50 Hz, 1 min.
24 V supply (I/O) / functional earth ground	500 V AC, 50 Hz, 1 min.
Error Messages to the Higher-Level Control or Computer System	
None	

Ordering Data

Description	Order Designation	Order No.
Terminal with four digital inputs	VARIO DI 4/24	KSVC-102-00131

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