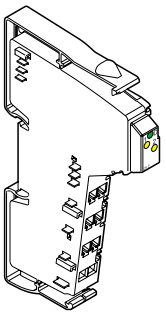
VARIO DI 2/24

I/O Extension Module
With Two Digital Inputs



55491001

User Manual 02/2003

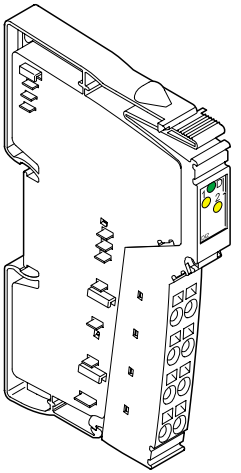
This data sheet is only valid in association with the documents of the used fieldbus coupler

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

- Connections for two digital sensors
- Connection of sensors in 2-, 3-, and 4-wire technology
- Maximum permissible load current per sensor: 250 mA
- Maximum permissible load current from the terminal: 0.5 A
- Diagnostic and status indicators



5549A006

Figure 1 VARIO DI 2/24 terminal with the connector plugged in

All modules will be delivered including connectors and labeling fields

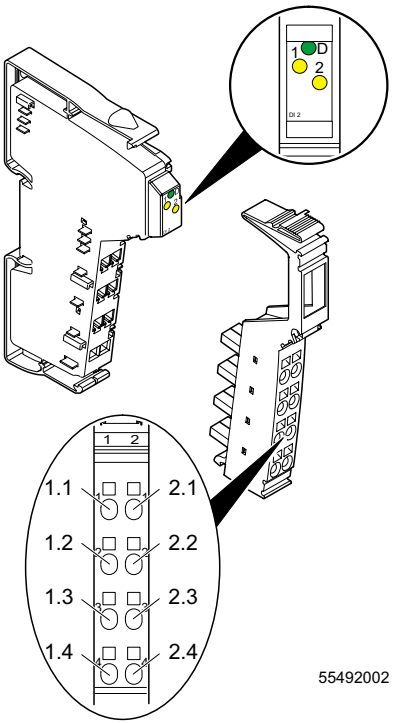


Figure 2 VARIO DI 2/24 terminal with the appropriate connector

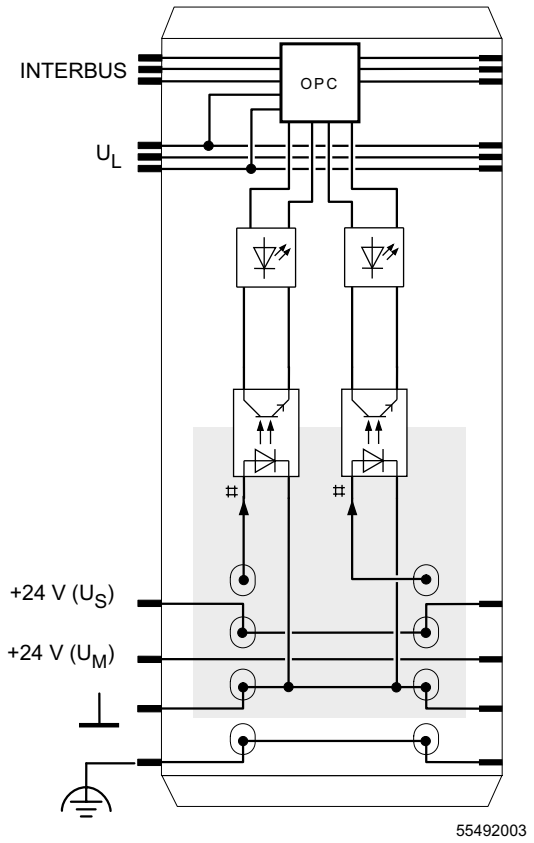
Local Diagnostic and Status Indicators

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

Terminal Assignment

Terminal Point	Assignment
1.1, 2.1	Signal input (IN)
1.2, 2.2	Segment voltage U_S for 2-, 3-, and 4-wire termination
1.3, 2.3	Ground contact (GND) for 3- and 4-wire termination
1.4, 2.4	FE (functional earth ground) connection for 4-wire termination

Internal Circuit Diagram



Key:

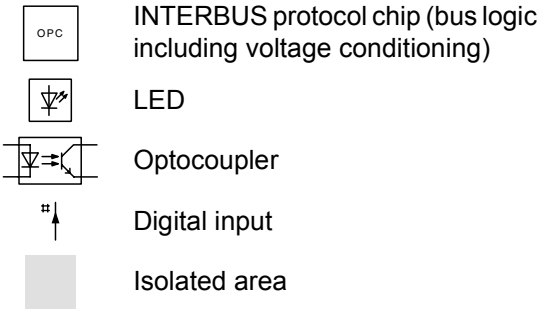


Figure 3 Internal wiring of the terminal points

Connection Example

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

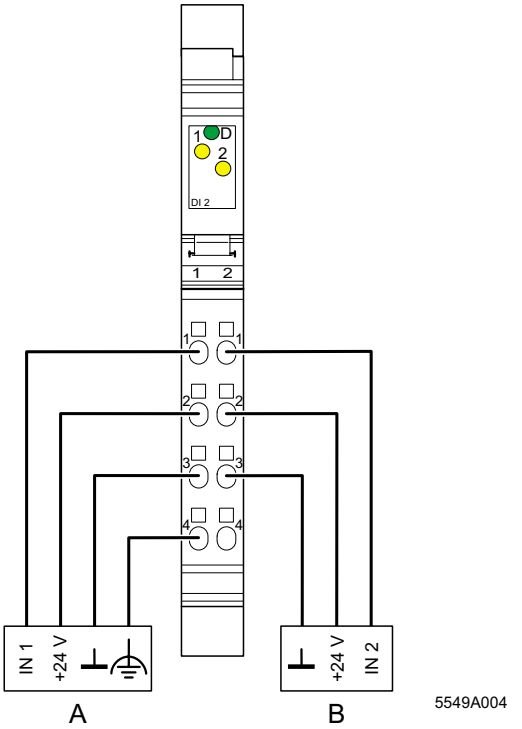


Figure 4 Typical sensor connections

A 4-wire termination

B 3-wire termination

Programming Data

ID code	BE_{hex} (190_{dec})
Length code	$C2_{hex}$
Input address area	2 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

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
Module	Terminal point (signal)	Not used						2.1	1.1	Not used							
	Terminal point (+24 V)							2.2	1.2								
	Terminal point (GND)							2.3	1.3								
	Terminal point (FE)							2.4	1.4								
Status indication	LED							2	1								

The process data output word is not used.

Technical Data

General	
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	38 g (without connector)
Operating mode	Process data operation with 2 bits
Connection type of the sensors	2-, 3-, and 4-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)	5% to 90%, condensation is not permissible
Permissible humidity (storage/transport)	5% to 95%, condensation is not permissible

General (continued)	
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	35 mA, maximum
Power consumption from the local bus	0.27 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption from sensor supply US	0.5 A (2 x 0.25 A), maximum

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

Digital Inputs	
Number	2
Input design	According to EN 61131-2 Type 1
Definition of operating points/switching thresholds	
Maximum low level voltage	U_{Lmax} < 5 V
Minimum high level voltage	U_{Hmin} > 15 V
Common potentials	Segment supply, ground
Nominal input voltage U_{IN}	24 V DC
Permissible range	-30 V < U_{IN} < +30 V DC
Nominal input current U_{IN}	5 mA
Characteristic curve of the current	Linear in the area 1 V < U_{IN} < 30 V
Delay time	None

Digital Inputs (continued)	
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. (The signal levels of the AC sensors must correspond with EN 61131-2, Type 1).

Input Characteristic Curve	
Input voltage (V)	**Typical input current (mA)**
-30 < U_{IN} < 0.7	0
3	0.4
6	1.0
9	1.7
12	2.3
15	3.0
18	3.7
21	4.4
24	5.0
27	5.7
30	6.4

Power Dissipation

Formula to calculate the power dissipation of the electronics

$$P_{tot} = 0.21\ W + \sum_{n=0}^{2} \left[U_{INn} \times \frac{U_{INn} - 1.8\ V}{4400\ \Omega} \right]$$

With

P_{tot}	Total power dissipation of the terminal
n	Index of the number of set inputs n = 0 to 2
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 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 power supply units in the 24 V range 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 system potentials 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 two digital inputs with Connectors and Labeling Field	VARIO DI 2/24	KSVC-102-00121

PMA Prozess- und Maschinen-Automation GmbH
Miramstrasse 87
34123 Kassel
Germany


+49 - (0)561 505 - 1307


+49 - (0)561 505 - 1710


www.pma-online.de