

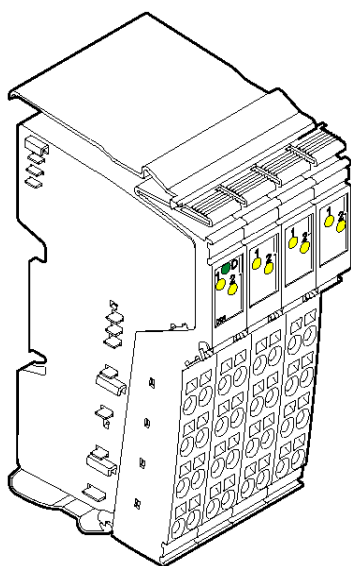
VersaPoint I/O Module

Output 24VDC Positive Logic 0.5A 8 Points IC220MDL753

GFK-2004

November 2001

Module IC220MDL753 is used to output 24VDC digital signals.



Module with the connectors plugged in

Module IC220MDL753 requires four (4) I/O Terminal Strips, IC220TBK081, ordered separately. See the ordering information below.

Features

- Connections for eight 24V discrete actuators
- Connection of 2-, 3-, and 4-wire actuators
- Nominal current per output: 0.5A
- Total current of the module: 4A
- Short-circuit and overload protected outputs
- Diagnostic and status indicators

Ordering Information

IC220MDL753 Output 24VDC Positive Logic
0.5A, 8 Points

IC220TBK082 I/O Terminal Strip, Spring Style,
Quantity 10

Module Specifications

Housing dimensions (width x height x depth)	48.8mm x 120mm x 71.5mm (1.921 in. x 4.724in. x 2.815in.)
Connection style	2-, 3-, and 4-wire
Operating temperature	-25°C to +55°C (-13°F to +131°F)
Storage temperature	-25°C to +85°C (-13°F to +185°F)
Operating humidity	75% on average, 85% occasionally. Appropriate measures against increased humidity (>85%) must be taken.
Storage humidity	75% on average, 85% occasionally.
Degree of protection	IP 20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536

Power Consumption

Communications power U_L	7.5V
Current consumption from the local bus U_L	60mA, maximum
Power consumption from the local bus U_L	0.45W, maximum
Segment supply voltage U_S	24VDC (nominal value)
Nominal current consumption of U_S	4.0A (4 x 0.5A), maximum

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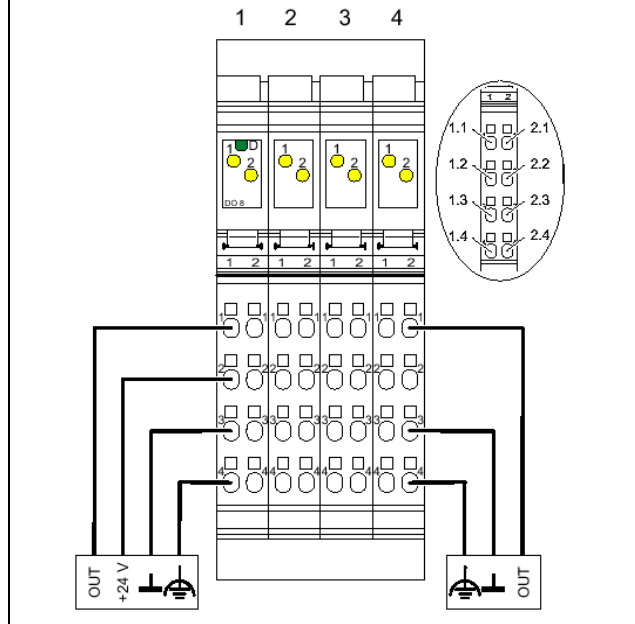
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Connection Examples

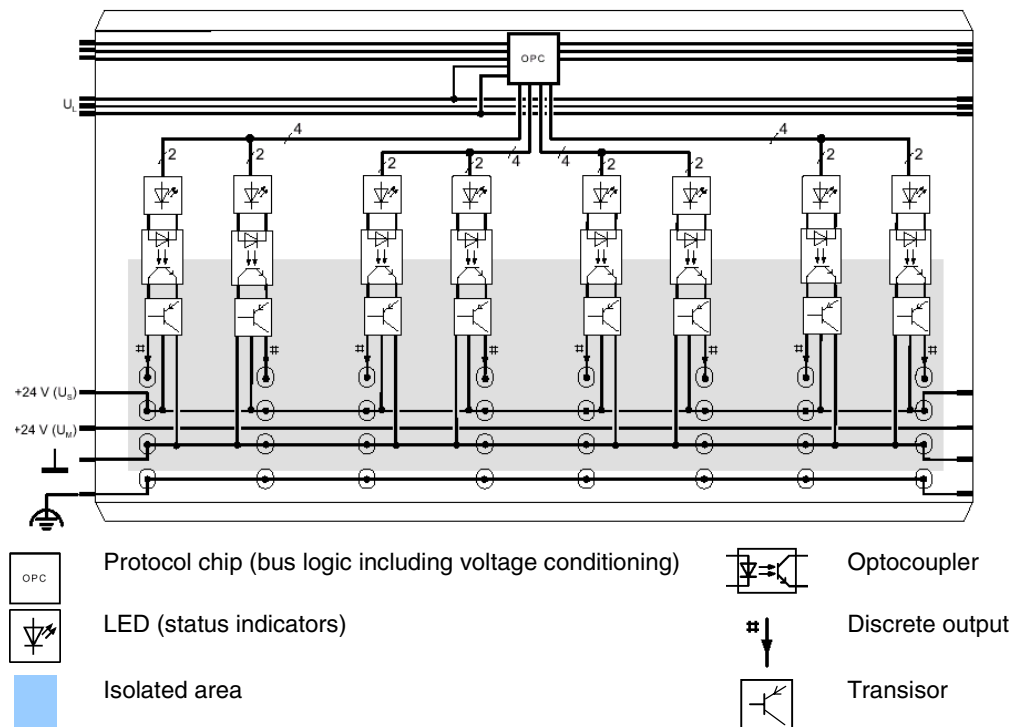
The diagram below shows example connections for 4-wire (left) and 3-wire (right) sensors.



Terminals	Assignment
1.1, 2.1	Signal input (OUT)
1.2, 2.2	Segment voltage U_S for 4-wire termination Measuring point for the supply voltage
1.3, 2.3	Ground contact (GND) for 2-, 3- and 4-wire termination
1.4, 2.4	FE connection for 3- and 4-wire termination

LED	Color	Meaning
D	Green	Bus diagnostics
1, 2	Yellow	Status indication of the outputs

Internal Circuit Diagram



Program Data

ID code	BD hex (189 decimal)
Length code	81 hex
Output address area	1 byte
Input address area	(not used)
Parameter channel (PCP)	0 bits
Register length (bus)	1 byte

Output Specifications

Discrete Outputs	
Number	8
Nominal output voltage U_{OUT}	24VDC
Differential voltage for I_{nom}	$\leq 1V$
Nominal current I_{nom} per channel	0.5A
Tolerance of the nominal current	+10%
Total current	4A
Protection	Short circuit; overload, per channel. Slots 1 & 2 and slots 3 & 4 are thermally coupled; an error in one channel can affect the other channels of the slot.
Nominal load	
Ohmic	48 Ω / 12W
Lamp	12W
Inductive	12VA (1.2H, 50 Ω)
Signal delay upon: OFF to ON	
Ohmic nominal load	100 μ s, typical
Lamp nominal load	100ms (with switching frequencies up to 8Hz; above this frequency the lamp load responds like an ohmic load), typical
Inductive nominal load	100ms (1.2H, 50 Ω), typical
Signal delay: ON to OFF	
Ohmic nominal load	1 ms, typical
Lamp nominal load	1 ms, typical
Inductive nominal load	50 ms (1.2H, 50 Ω), typical

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Discrete Outputs (continued)	
<i>Switching frequency with:</i>	
Ohmic nominal load	300Hz, maximum. This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software, and the control or computer system used.
Lamp nominal load	300Hz, maximum. This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software, and the control or computer system used.
Inductive nominal load	0.5Hz maximum (1.2H, 48Ω)
Overload response	Auto restart
Response time with ohmic overload (12Ω)	Approximately 3s
Restart frequency with ohmic overload	Approximately 400Hz
Restart frequency with lamp overload	Approximately 400Hz
Inductive overload response	Output can be damaged
Response time after short circuit	Approximately 400ms
Protection against permanently applied reverse voltages	Up to 2A DC
Protection against permanently applied surge voltage	No
Validity of output data after connection of 24V power supply (power up)	5ms, typical
Response upon power down	The output follows the power supply without delay.
Protective circuit type	Integrated 45V Zener diode in output chip
Overcurrent shutdown	At 0.7A, minimum
Output current when switched off	100μA, maximum
Output voltage when switched off	1V, maximum
Output current with ground connection interrupted	25mA, maximum
Switching power with ground connection interrupted	100mW at 1KΩ load resistance, typical

Output Characteristic When Switched On (Typical)	
<i>Output current (A)</i>	<i>Differential output voltage (V)</i>
0	0
0.1	0.04
0.2	0.08
0.3	0.12
0.4	0.16
0.5	0.20

Power Dissipation

Formula to calculate the power dissipation of the electronics

$$P_{\text{tot}} = 0.2 \text{ W} + \sum_{n=0}^8 (0.15 \text{ W} + I_{L_n}^2 \times 0.4 \Omega)$$

With

P_{tot} Typical power dissipation of the module
 n Index of the number of set outputs $n = 1$ to 4
 I_{L_n} Load current of the output n

Power dissipation of the housing P_{HOU}	2.2W max. (within the permissible operating temperature)
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Concurrent Channel Derating

No limitation. All outputs can be on at max current without exceeding housing maximum power dissipation

Safety Devices

Overload/short circuit in segment circuit	Electronic; with two 4-channel drivers
Surge voltage	Protective circuits of the power terminal; Protection up to 33VDC
Polarity reversal of power supply	Protective circuits of the power terminal; It is necessary to protect the power supply. The power supply unit should be able to supply 4- times (400%) the nominal current of the fuse.
Reverse voltage	Protection up to 2A DC

Electrical Isolation

To provide electrical isolation between the logic level and the I/O area it is necessary to supply the bus module and the digital output module using separate power supply units. Interconnection of the 24V power supplies is not allowed. (For detailed information, refer to the user manual.)

Common Potentials

24V main power, 24V segment voltage, and GND have the same potential. FE (functional earth ground) is a separate potential area.

Separate system potentials consisting of bus module/power terminal and I/O module

Test distance	Test voltage
5V supply incoming remote bus / 7.5V supply (bus logic)	500VAC, 50Hz, 1 min.
5V supply outgoing remote bus / 7.5V supply (bus logic)	500VAC, 50Hz, 1 min.
7.5V supply (bus logic) / 24V supply (I/O)	500VAC, 50Hz, 1 min.
24V supply (I/O) / functional earth ground	500VAC, 50Hz, 1 min.

Error Messages

Short circuit/overload of an output	An error message is generated when an output is shorted and switched on. Also, the diagnostic LED (D) flashes on the module at 2Hz under these conditions.
Operating voltage out of range	None