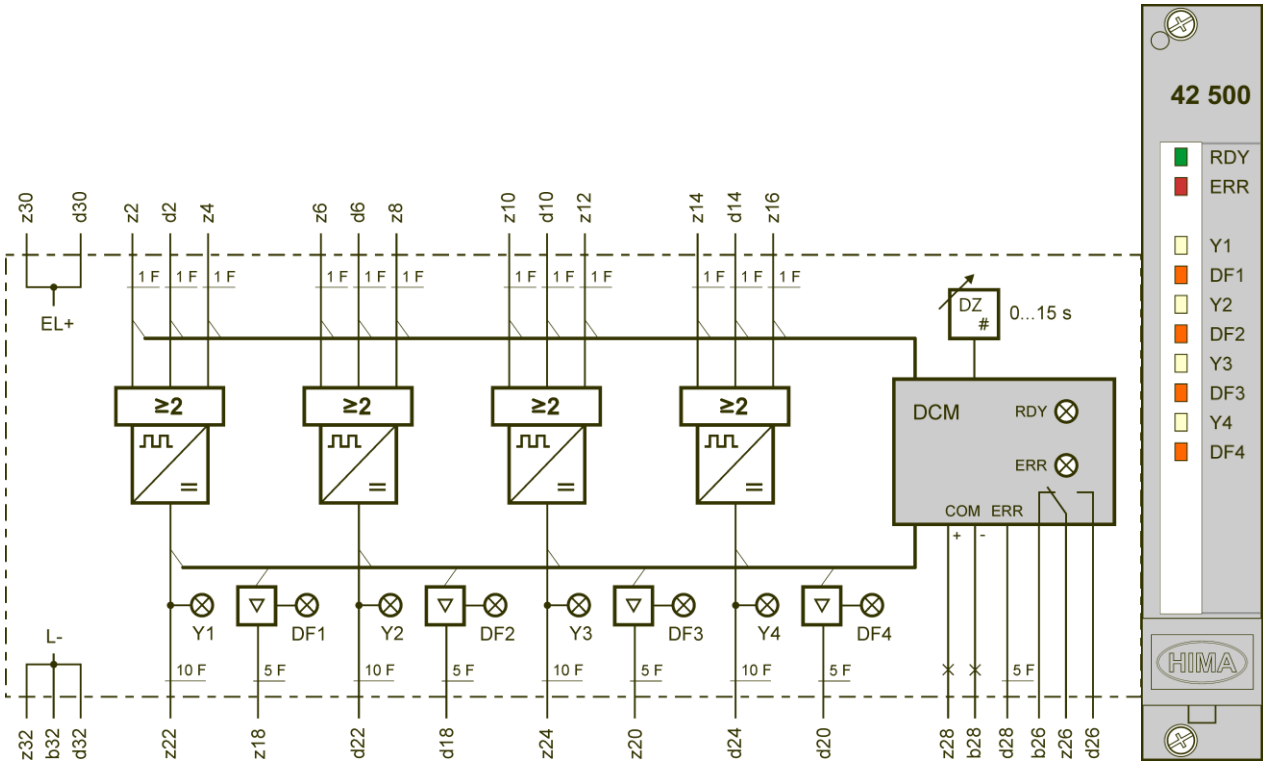
# 42 500: 2oo3 Selection Module

- **Safety-related**
- 4 2oo3 selection functions

The module is TÜV-tested for SIL 4 in accordance with IEC 61508.




Outputs are short-circuit-proof

Figure 1: Block Diagram

If a 1-signal is present on at least two of three inputs z2, d2, z4 (z6, d6, z8, etc.), a 1-signal is also present on output z22 (d22, etc.). The outputs are decoupled by diodes; they can be connected in parallel for OR functions (wired OR).

The DZ switch on the PCB is used to set the tolerance time for signal discrepancies in 15 stages. If this time is exceeded, a 1-signal is present at output z18 (d18 etc.) and the DF1 (DF2 etc.) LED is lit. The outputs DF are not safety-related, but they can be grouped on a a signal bar.

All the module functions are monitored by a microcontroller.

If a malfunction occurs, the ERR LED is lit, output d28 is on 1-signal and relay contact z26-d26 opens.

Output z28-b28 is intended for connecting to the communication module, e.g., for transferring data to a distributed control system (DCS).



HIMA Paul Hildebrandt GmbH, P.O. Box 1261, 68777 Brühl
English translation of the German original document: HI 804 021 D, 42 500 (1516)

RDY (Ready) indicates the applied voltage (≥ 20 V).

| | |
|---|---|
| Switching time (Y1…Y4) | Approx. 2 ms |
| Reset time (Y1…Y4) | Approx. 5 ms |
| Switching time (DF1…DF4) | 3 ms (if DZ = 0)…15 s, in 15 stages |
| Reset time (DF1…DF4) | Approx. 3 ms |
| Operating data EL+ | 24 VDC / 90 mA |
| Space requirement | 3 RU, 4 HP |

## Communication via Modbus

### Reading of Variables

Type BOOL: Function code 1
Type WORD: Function code 3
Events: Function codes 65, 66, 67

| Relative address | Data type | Value | Description | Relative event no. |
|---|---|---|---|---|
| 0 | WORD | 45 H | Module type 42 500 | |
| 1 | BOOL | 0 | None | |
| 2 | BOOL | 1 | Module removed | |
| 3 | BOOL | 1 | Communication with module not ok | |
| 4 | BOOL | 1 | Module in slot, communication ok | |
| 5 | BOOL | 1 | Operating voltage too low, no RDY | |
| 6 | BOOL | 1 | Module fault, ERR | |
| 7…8 | BOOL | 0 | None | |
| 9 | BOOL | 1 | 1-signal at input z2 | 0 |
| 10 | BOOL | 1 | 1-signal at input d2 | 1 |
| 11 | BOOL | 1 | 1-signal at input z4 | 2 |
| 12 | BOOL | 1 | 1-signal at input z6 | 3 |
| 13 | BOOL | 1 | 1-signal at input d6 | 4 |
| 14 | BOOL | 1 | 1-signal at input z8 | 5 |
| 15 | BOOL | 1 | 1-signal at input z10 | 6 |
| 16 | BOOL | 1 | 1-signal at input d10 | 7 |
| 17 | BOOL | 1 | 1-signal at input z12 | 8 |
| 18 | BOOL | 1 | 1-signal at input z14 | 9 |
| 19 | BOOL | 1 | 1-signal at input d14 | 10 |
| 20 | BOOL | 1 | 1-signal at input z16 | 11 |
| 21…40 | BOOL | 0 | None | |
| 41 | BOOL | 1 | 1-signal at output z22 Y1 | 24 |
| 42 | BOOL | 1 | 1-signal at output z18 DF1 | 25 |
| 43 | BOOL | 1 | 1-signal at output d22 Y2 | 26 |
| 44 | BOOL | 1 | 1-signal at output d18 DF2 | 27 |
| 45 | BOOL | 1 | 1-signal at output z24 Y3 | 28 |
| 46 | BOOL | 1 | 1-signal at output z20 DF3 | 29 |
| 47 | BOOL | 1 | 1-signal at output d24 Y4 | 30 |
| 48 | BOOL | 1 | 1-signal at output d20 DF4 | 31 |

Table 1: Module Status via Modbus

Value: 0 always has the opposite meaning
H: Hexadecimal value
Absolute address: A = p * 256 + relative address
Absolute event no.: E = (p - 1) * 32 + relative event no.
p = Slot no. in the subrack

## Reading of All Variables

Function code 3, 84 WORDS

Starting with address 2000 H, 3000 H or 4000 H

| | WORD 0 (16-bit) | | WORD 1 (16-bit) | | WORD 2 (16-bit) | | WORD 3 (16-bit) | |
|---|---|---|---|---|---|---|---|---|
| Relative address | 0 | 8…1 | 24…17 | 16…9 | 40…33 | 32…25 | | 48…41 |
| Data | Module type | Module status | None | None | None | None | None | Outputs |

For error-free data transfer, all 84 WORDS must be read. This ensures that the variables of all the modules within a subrack are transferred. 0 is transferred for unused module slots.


HIMA Paul Hildebrandt GmbH, P.O. Box 1261, 68777 Brühl
English translation of the German original document: HI 804 021 D, 42 500 (1516)

## Communication via PROFIBUS DP

### Reading of Variables

Relative addresses of WORD and BYTE type

| WORD | Bit | BYTE | Bit | Value | Description |
|---|---|---|---|---|---|
| 0 | 0…7 | 0 | 0…7 | 45 H | Module type 42 500 |
| | 8 | 1 | 0 | 0 | None |
| | 9 | | 1 | 1 | Module removed |
| | 10 | | 2 | 1 | Communication with module not ok |
| | 11 | | 3 | 1 | Module in slot, communication ok |
| | 12 | | 4 | 1 | Operating voltage too low, no RDY |
| | 13 | | 5 | 1 | Module fault, ERR |
| | 14 | | 6 | 0 | None |
| | 15 | | 7 | 0 | None |
| 1 | 0 | 2 | 0 | 1 | 1-signal at input z2 |
| | 1 | | 1 | 1 | 1-signal at input d2 |
| | 2 | | 2 | 1 | 1-signal at input z4 |
| | 3 | | 3 | 1 | 1-signal at input z6 |
| | 4 | | 4 | 1 | 1-signal at input d6 |
| | 5 | | 5 | 1 | 1-signal at input z8 |
| | 6 | | 6 | 1 | 1-signal at input z10 |
| | 7 | | 7 | 1 | 1-signal at input d10 |
| | 8 | 3 | 0 | 1 | 1-signal at input z12 |
| | 9 | | 1 | 1 | 1-signal at input z14 |
| | 10 | | 2 | 1 | 1-signal at input d14 |
| | 11 | | 3 | 1 | 1-signal at input z16 |
| | 12…15 | | 4…7 | 0 | None |
| 2 | | 4…5 | | 0 | None |
| 3 | 0 | 6 | 0 | 1 | 1-signal at output z22 Y1 |
| | 1 | | 1 | 1 | 1-signal at output z18 DF1 |
| | 2 | | 2 | 1 | 1-signal at output d22 Y2 |
| | 3 | | 3 | 1 | 1-signal at output d18 DF2 |
| | 4 | | 4 | 1 | 1-signal at output z24 Y3 |
| | 5 | | 5 | 1 | 1-signal at output z20 DF3 |
| | 6 | | 6 | 1 | 1-signal at output d24 Y4 |
| | 7 | | 7 | 1 | 1-signal at output d20 DF4 |
| | 8…15 | 7 | 0…7 | 0 | None |

Table 2: Module Status via PROFIBUS DP

Value: 0 always has the opposite meaning
H: Hexadecimal value

Absolute address WORD: W = 4 * (p - 1) + relative address

Absolute address BYTE: B = 8 * (p - 1) + relative address

p = Slot no. in the subrack

HIMA Paul Hildebrandt GmbH, P.O. Box 1261, 68777 Brühl
English translation of the German original document: HI 804 021 D, 42 500 (1516)