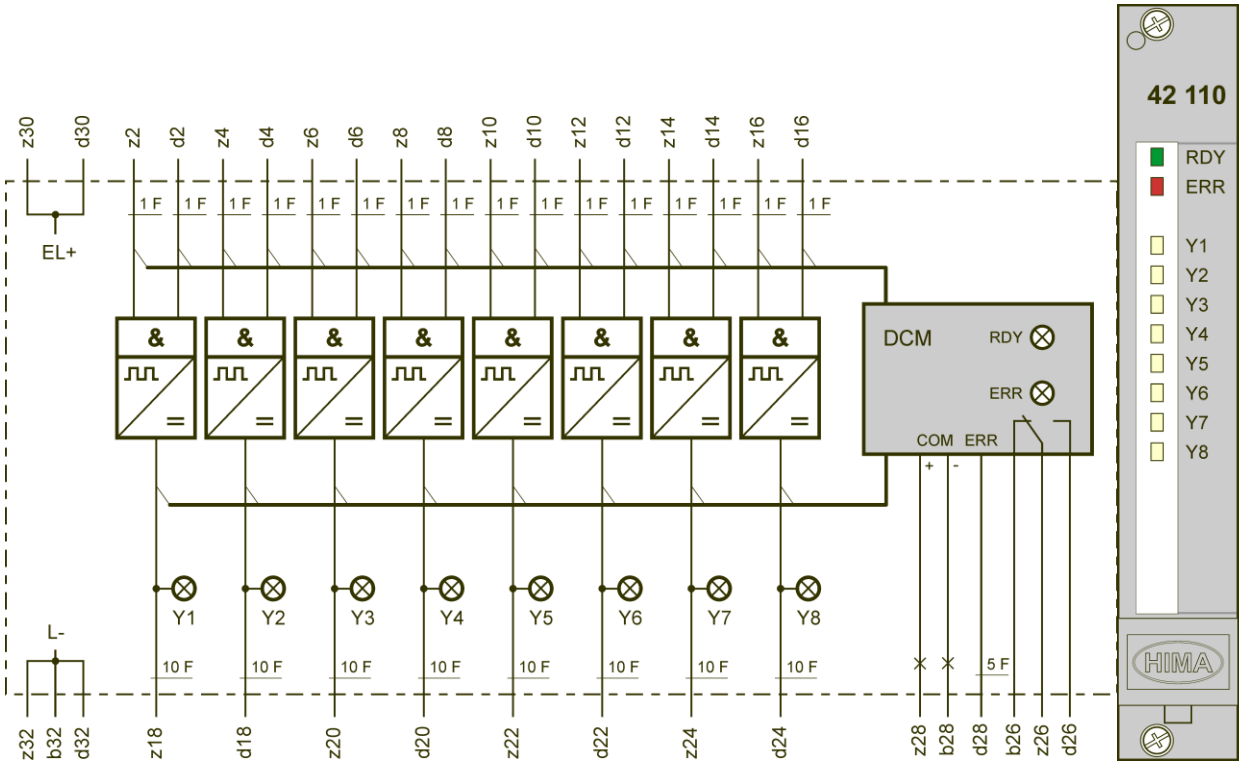
42 110: AND Module

- **Safety-related**
- 8 AND functions with 2 inputs each

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



Outputs are short-circuit-proof

Figure 1: Block Diagram

The module includes 8 AND functions with 2 inputs each.

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).

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

Switching time	Approx. 2 ms
Reset time	Approx. 8 ms
Operating data EL+	24 VDC / 140 mA
Space requirement	3 RU, 4 HP

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English translation of the German original document: HI 804 017 D, 42 110 (1516)

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	42 H	Module type 42 110	
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 d4	3
13	BOOL	1	1-signal at input z6	4
14	BOOL	1	1-signal at input d6	5
15	BOOL	1	1-signal at input z8	6
16	BOOL	1	1-signal at input d8	7
17	BOOL	1	1-signal at input z10	8
18	BOOL	1	1-signal at input d10	9
19	BOOL	1	1-signal at input z12	10
20	BOOL	1	1-signal at input d12	11
21	BOOL	1	1-signal at input z14	12
22	BOOL	1	1-signal at input d14	13
23	BOOL	1	1-signal at input z16	14
24	BOOL	1	1-signal at input d16	15
25…40	BOOL	0	None	
41	BOOL	1	1-signal at output z18 Y1	24
42	BOOL	1	1-signal at output d18 Y2	25
43	BOOL	1	1-signal at output z20 Y3	26
44	BOOL	1	1-signal at output d20 Y4	27
45	BOOL	1	1-signal at output z22 Y5	28
46	BOOL	1	1-signal at output d22 Y6	29
47	BOOL	1	1-signal at output z24 Y7	30
48	BOOL	1	1-signal at output d24 Y8	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

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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.

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	42 H	Module type 42 110
	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 d4
	4		4	1	1-signal at input z6
	5		5	1	1-signal at input d6
	6		6	1	1-signal at input z8
	7		7	1	1-signal at input d8
	8	3	0	1	1-signal at input z10
	9		1	1	1-signal at input d10
	10		2	1	1-signal at input z12
	11		3	1	1-signal at input d12
	12		4	1	1-signal at input z14
	13		5	1	1-signal at input d14
	14		6	1	1-signal at input z16
	15		7	1	1-signal at input d16
2		4…5		0	None
3	0	6	0	1	1-signal at output z18 Y1
	1		1	1	1-signal at output d18 Y2
	2		2	1	1-signal at output z20 Y3
	3		3	1	1-signal at output d20 Y4
	4		4	1	1-signal at output z22 Y5
	5		5	1	1-signal at output d22 Y6
	6		6	1	1-signal at output z24 Y7
	7		7	1	1-signal at output d24 Y8
	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