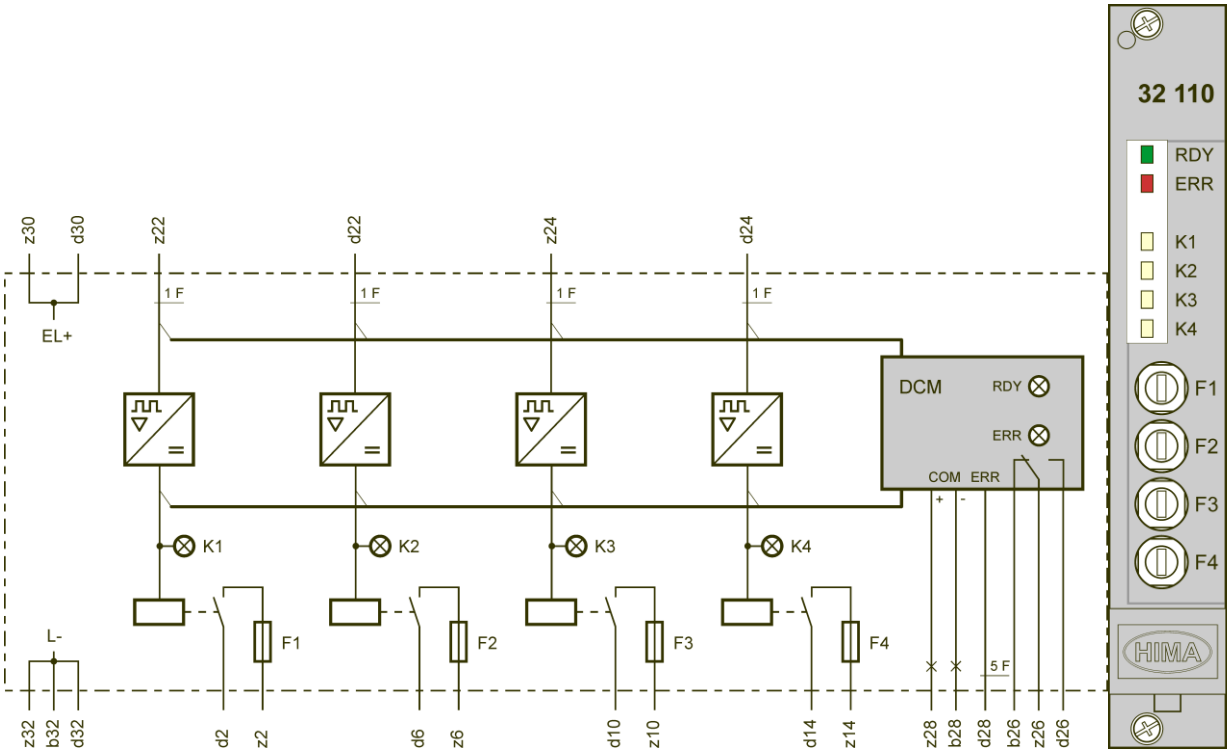
32 110: Relay Module

- **Safety-related**
- 4 channels

The module is TÜV-tested for SIL 2 in accordance with IEC 61508.



F1...F4 delivery condition 4 A time-lag (T)

Figure 1: Block Diagram

The relay amplifier features safe separation of the inputs or supply voltage from the output contacts in accordance with EN 50178 (VDE 0160). The air and creepage distances are designed for overvoltage category III up to 300 V.

The output contacts are separated from one another up to 250 V in accordance with EN 60664-1 (VDE 0110-1), overvoltage category III.

SIL 3 can be achieved by connecting in series the contact outputs of two 32 110 modules.

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Output	1 potential-free make contact each (sealed) See the relay contact data
Switching time	Approx. 8 ms
Reset time	Approx. 18 ms
Operating data	24 VDC / 170 mA
Space requirement	3 RU, 4 HP

Relay Contact Data

Contact material	AgNi, gold plated
Switching voltage	250 VDC / VAC, ≥ 1 mV (> 60 V with special protective measures)
Switching current	≤ 4 A, ≥ 1 mA
Inrush peak current	≤ 12 A for 1 s (not periodic)
Fuse	4 A time-lag (T), delivery condition
Switching capacity AC	≤ 1000 VA, cos φ > 0.5
Switching capacity DC	Up to 30 V: ≤ 60 W Up to 250 V: ≤ 40 W, induction-free load
Bounce time	< 1.5 ms
Frequency of operation	≤ 10 switching operations/s
Lifetime	
▪ mechanical	> 10^7 switching operations
▪ electrical	> 2.5 x 10^5 switching operations at ohmic load and ≤ 0.1 switching operations/s

All the module functions, except for the output contacts with the fuses, 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 operating voltage (≥ 20 V).

Notices

To ensure touch safety when switching voltages of > 60 V are applied, these modules should be placed in a separate subrack with a complete coverage of the rear side or coverage of the connections with heat-shrinkable sleeves.

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	35 H	Module type 32 110	
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 z22	0
10	BOOL	1	1-signal at input d22	1
11	BOOL	1	1-signal at input z24	2
12	BOOL	1	1-signal at input d24	3
13…40	BOOL	0	None	
41	BOOL	1	Relay 1 energized K1	24
42	BOOL	1	Relay 2 energized K2	25
43	BOOL	1	Relay 3 energized K3	26
44	BOOL	1	Relay 4 energized K4	27
45…48	BOOL	0	None	

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.

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	35 H	Module type 32 110
	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 z22
	1		1	1	1-signal at input d22
	2		2	1	1-signal at input z24
	3		3	1	1-signal at input d24
	4…7		4…7	0	None
	8…15	3	0…7	0	None
2		4…5		0	None
3	0	6	0	1	Relay 1 energized K1
	1		1	1	Relay 2 energized K2
	2		2	1	Relay 3 energized K3
	3		3	1	Relay 4 energized K4
	4…7		4…7	0	None
	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