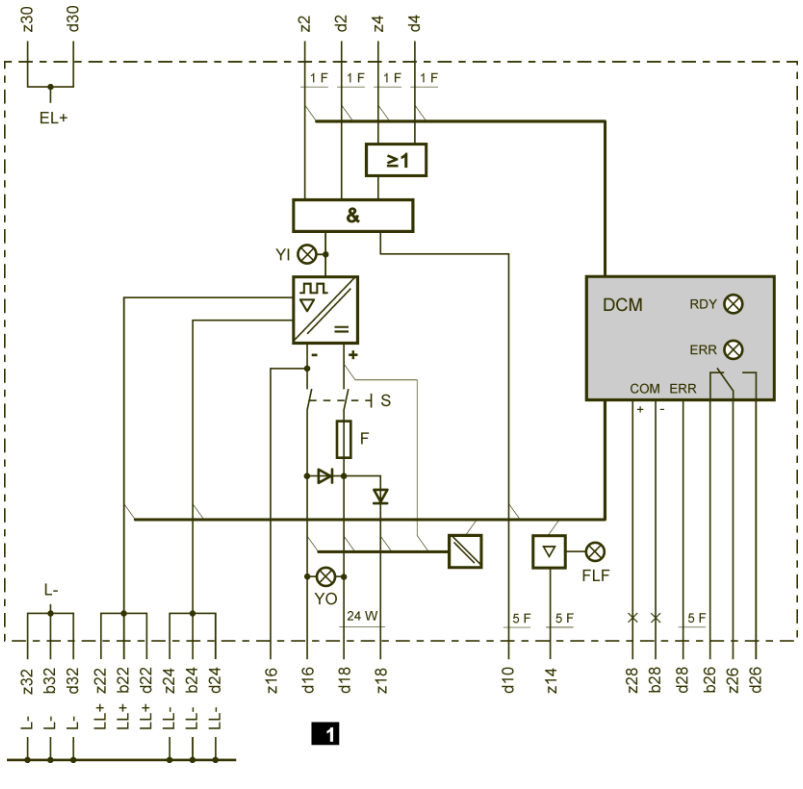
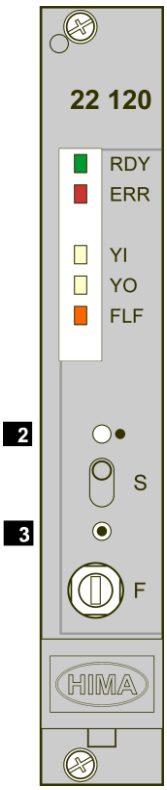
22 120: Output Module

- **Safety-related**
- Output 25 VDC / 24 W

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





1 Outputs: short-circuit-proof
2 Switch position: off
3 Switch position: on

Figure 1: Block Diagram

With energized inputs, the output d16-d18 carries a voltage of approx. 25 V that can be loaded up to P_N = 24 W (with U_N = 24 V). This voltage is galvanically separated from the operating voltage and can directly control inductive loads.

The S switch is used for 2-pole shutdown of the output circuit during maintenance and repair works. If only one-pole shutdown is required, pin d16 can be bridged with pin z16.

On delivery, the value of fuse F is 4 A time-lag (T). The fuse is usually not triggered if a short-circuit occurs since the output is short-circuit-proof. The fuse is intended for being used as the mandatory back-up fuse for valves of type (Ex)d (flameproof enclosure) in Ex zone 1. For the corresponding value, refer to the test certificate of the solenoid valve.

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Switching time	Approx. 4 ms
Reset time (z18/d18)	Approx. 12 ms at rated load
Reset time (d10)	Approx. 7 ms
Operating data EL+	24 VDC / 70 mA
Operating data LL+	24 VDC / 1.4 A at rated load, min. fuse: 2 A time-lag (T)
Space requirement	3 RU, 4 HP

Opening of switch contacts *S* or fuse triggering is indicated by FLF. Output z14 is not safety-related; it is suitable for busbar wiring.

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).

Notices

- Output d10 is intended for the design of a latching circuit via input d4. For safety reasons, it may not be used for wired-OR connections.
- To increase availability, two modules can be controlled in parallel, and the outputs decoupled by diodes (z18) can be connected in parallel.
- To ensure touch protection, 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.
- Module type 22 121 offers the same functionality, but it is designed for an output voltage of 60 VDC.

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	22 H	Module type 22 120	
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	BOOL	1	Fault in the output circuit, FLF	
8	BOOL	1	No voltage LL+ for amplifiers	
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...40	BOOL	0	None	
41	BOOL	1	1-signal at output d10 YI	24
42	BOOL	1	1-signal at output d18 YO	25
43...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	Inputs	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	22 H	Module type 22 120
	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	1	Fault in the output circuit, FLF
	15		7	1	No voltage LL+ for amplifiers
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...7		4...7	0	None
	8...15	3	0...7	0	None
2		4...5		0	None
3	0	6	0	1	1-signal at output d10 YI
	1		1	1	1-signal at output d18 YO
	2...7		2...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