52 110: Time Delay Module

- **Safety-related**
- 4 time off delay functions, (time range 1…15 s)

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

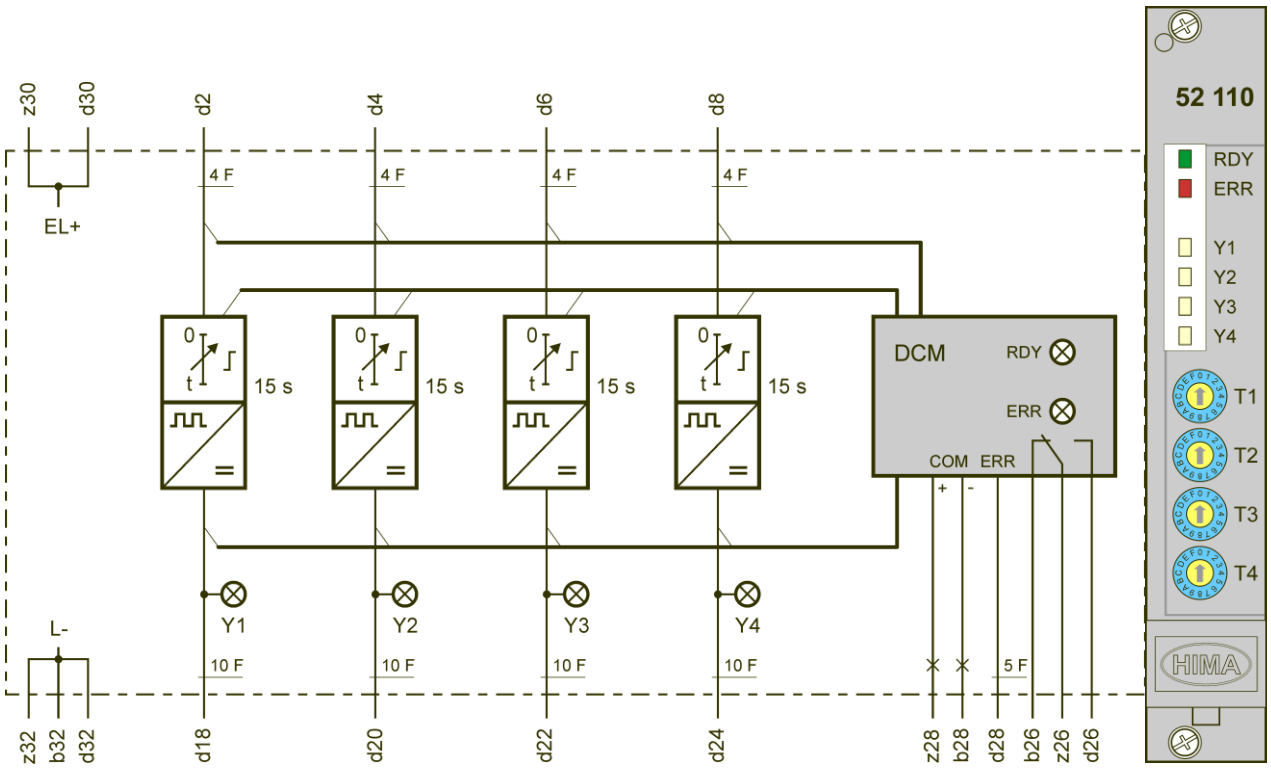

Figure 1: Block Diagram

Pre-selectors	0	1	2	…	9	A	B	C	D	E	F
Time off delay (seconds)	0	1	2	…	9	10	11	12	13	14	15

Table 1: Settings for Time Off Delay

Time accuracy 7 %

The delay times to forward a signal change 1-0 from the input to the output can be set in 15 stages by separate pre-selectors on the front plate.

Switching time	120…50 ms, depending on the 1-signal
Control time	≥ 500 ms (see below)
Operating data EL+	24 VDC / 110 mA
Space requirement	3 RU, 4 HP

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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. This is also the case if the time diverges by ± 30 % or more from the setpoint.

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).

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Prior to triggering the time delay (by switching off the input signal), the input signal must be present for at least 500 ms. If this control time is shorter, the output may potentially not achieve the full delay time.

The time off delay is defined as the safety function. If a fault occurs, the function signal switch-off can be delayed up to 90 s.

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	51 H	Module type 52 110	
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 d2	0
10	BOOL	1	1-signal at input d4	1
11	BOOL	1	1-signal at input d6	2
12	BOOL	1	1-signal at input d8	3
13…40	BOOL	0	None	
41	BOOL	1	1-signal at output d18 Y1	24
42	BOOL	1	1-signal at output d20 Y2	25
43	BOOL	1	1-signal at output d22 Y3	24
44	BOOL	1	1-signal at output d24 Y4	25
45…48	BOOL	0	None	

Table 2: 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	51 H	Module type 52 110
	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 d2
	1		1	1	1-signal at input d4
	2		2	1	1-signal at input d6
	3		3	1	1-signal at input d8
	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 d18 Y1
	1		1	1	1-signal at output d20 Y2
	2		2	1	1-signal at output d22 Y3
	3		3	1	1-signal at output d24 Y4
	4…7		4…7	0	None
	8…15	7	0…7	0	None

Table 3: 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