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SIMATIC S5-115U/H/F

Digital input/output modules

Digital input modules

Application

The digital input modules convert the external binary signals from the process to the internal signal level of the programmable controllers.

Design

Digital input modules are available with 8, 16 or 32 inputs and for a range of input voltages. The modules require 1/2 or 1 slot (depending on the subrack).

The modules comprise:
- Green LEDs for indicating signal status
- Enable input F (434-4 digital input module for NAMUR sensors only) for disabling input signals
- Relay contact (MELD) and 24 V input (RESET) for interrupt processing

The signal leads must be connected with front connectors. They can be labelled in the fields next to the LEDs.

Principle of operation

Enable input

Digital input 434-4 only:
The input signals can be dis-abled by means of enable input F. This enable input can be deactivated by removing a jumper on the module.

Interrupt processing

Digital input 434-7 only:
A group signal generates an interrupt in the CPU when a particular input signal changes. The group signal drives a latching relay on the module (the relay contact MELD is accessible from the front panel), which can be reset via a 24 V input (RESET).

In the user program the user can specify for each input whether the interrupt is to be set by the positive- or negative-going edge.

If interrupt processing is not essential, the 434-7 module can be used in any type of subrack. Interrupt evaluation by the 434-7 digital input module is only possible in a central controller. The module takes up two bytes for input addresses and two bytes for output addresses.

Interrupt evaluation is only possible in an expansion unit (ER 701-3 subrack) which is connected using the IM 307 and IM 317 interface modules and if the 432-4 digital input module (S5-135/-155U) is used in the expansion unit instead of the 434-7 digital input module generating the interrupt.

Note

All digital input modules of the S5-135U/-155U programmable controllers (see Section 4) can be used in the S5-115U with adapter casings.

The 434-4 digital input module requires an adapter casing (see page 3/98).

Technical specifications

Digital input module	6ES5 420-7LA11	6ES5 430-7LA12	6ES5 431-7LA11	6ES5 432-7LA11	6ES5 434-7LA12	6ES5 434-4UA12
Number of inputs	**32**	**32**	**16**	**16**	**8** (with group signal)	see page 4/36 (S5-135U, S5-155U/H)
Galvanic isolation	No	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)	
• In groups of	—	8	4	4	1	
Input voltage						
• Rated value	**24 V DC**	**24 V DC**	**24/48 V UC**	**48/60 V UC**	**24 V DC**	
• Frequency with AC	—	—	47 ... 63 Hz	47 ... 63 Hz	—	
• For "0" signal	- 30 ... + 5 V	- 30 ... + 5 V	0 ... 5 V	0 ... 10 V	- 30 ... + 5 V	
• For "1" signal	+ 13 ...+ 30 V	+ 13 ...+ 30 V	13 ... 60 V	30 ...72 V	+ 13 ...+ 30 V	
Input current for "1" signal typ.	8.5 mA	8.5 mA	8.5/10.5 mA	9/10 mA	8.5 mA	
Delay						
• At "0" → "1"	1.4 ... 5 ms	2.2 ... 4.6 ms	2 ... 13 ms	2 ... 13 ms	0.5 ... 1.5 ms	
• At "1" → "0"	1.4 ... 5 ms	4.5 ... 12 ms	10 ... 25 ms	10 ... 25 ms	0.5 ... 1.5 ms	
Load factor[1)] at 55 °C	100 %	100 %	100 %	100 %	100 %	

1) With respect to number of inputs in a group

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Digital input modules (continued)

Technical specifications (continued)

Digital input module (cont.)	6ES5 420-7LA11	6ES5 430-7LA12	6ES5 431-7LA11	6ES5 432-7LA11	6ES5 432-7LA12	6ES5 434-4UA12
Cable length						see page 4/36
• Unshielded max.	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	(S5-135U,
• Shielded max.	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	S5-155U/H)
Interrupt output	—	—	—	—	Latching relay contact	
• Permissible load max.	—	—	—	—	100 V DC; 0.2 A	
• Switching capacity max.	—	—	—	—	20 W; 35 VA	
Reset input	—	—	—	—	24 V DC	
Insulation voltage rating (external connections to housing, internal connections, other groups)						
• In acc. with VDE 0160	—	30 V DC	60 V AC	60 V AC	30 V DC	
• Tested with	—	500 V AC	500 V AC	500 V AC	500 V AC	
Current consumption						
• Internal (from power supply module; 5 V) max.	5 mA	5 mA	5 mA	5 mA	70 mA	
Power loss (rated operation) typ.	6.5 W	6.5 W	9.0 W	10.0 W	2 W	
Front connector	46-pin	46-pin	24-pin	24-pin	46-pin	
Weight approx.	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	

Digital input module	6ES5 435-7LA11	6ES5 435-7LB11	6ES5 435-7LC11	6ES5 436-7LA11	6ES5 436-7LB11	6ES5 436-7LC11
Number of inputs	**16**	**16**	**8**	**16**	**16**	**8**
Galvanic isolation	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)	Yes (optocoupler)
• in groups of	4	2	1	4	2	1
Input voltage						
• Rated value	**115 V UC**	**115 V UC**	**115 V UC**	**230 V UC**	**230 V UC**	**230 V UC**
• Frequency with AC	47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz	47 ... 63 Hz
• For "0" signal	0 ... 40 V	0 ... 40 V	0 ... 40 V	0 ... 70 V	0 ... 70 V	0 ... 100 V
• For "1" signal	85 ... 135 V	85 ... 135 V	85 ... 135 V	170 ... 264 V	170 ... 264 V	170 ... 264 V
Input current	6 mA DC	6 mA DC	6 mA DC	2.2 mA DC	2.2 mA DC	2.2 mA DC
at "1" signal typ.	15 mA AC	10 mA AC	10 mA AC	15 mA AC	15 mA AC	16 mA AC
Delay						
• At "0" → "1"	2 ... 13 ms	2 ... 13 ms	2 ... 13 ms	2 ... 13 ms	2 ... 13 ms	2 ... 13 ms
• At "1" → "0"	10 ... 25 ms	10 ... 25 ms	10 ... 25 ms	10 ... 35 ms	10 ... 35 ms	10 ... 25 ms
Load factor [1]						
• At 55 °C	75 %	75 %	75 %	75 %	75 %	100 %
• At 20 °C	100 %	100 %	100 %	100 %	100 %	100 %
Cable length						
• Unshielded max.	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)	600 m (1968 ft)
• Shielded max.	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)	1000 m (3280 ft)
Insulation voltage rating (external connections to housing, internal connections, other groups)						
• In acc. with VDE 0160	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC	250 V AC
• Tested with	1500 V AC	1500 V AC	2700 V AC	1500 V AC	1500 V AC	2700 V AC
Current consumption						
• Internal (from power supply module; 5 V) max.	5 mA	5 mA	5 mA	5 mA	5 mA	5 mA
Power loss (rated operation) typ.	11.0 W	11.0 W	5.5 W	11.0 W	11.0 W	5.5 W
Front connector	24-pin	24-pin	24-pin	24-pin	24-pin	24-pin
Weight approx.	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)	0.7 kg (1.5 lb)

1) With respect to number of inputs in a group

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Digital input modules (continued)

Ordering data	Order No.
Non-floating:	
420-7 digital input module for S5-115U/H 32 inputs, 24 V DC	**6ES5 420-7LA11**
Floating:	
430-7 digital input module for S5-115U/H/F 32 inputs, 24 V DC, in groups of 8	**6ES5 430-7LA12**
431-7 digital input module for S5-115U/H 16 inputs, 24/48 V UC, in groups of 4	**6ES5 431-7LA11**
432-7 digital input module for S5-115U/H 16 inputs, 48/60 V UC, in groups of 4	**6ES5 432-7LA11**
434-4 digital input module for NAMUR[1] sensor for S5-115U/H 32 inputs, 5/15 V DC (TTL, CMOS, NAMUR)	**6ES5 434-4UA12**
434-7 digital input module for S5-115U/H/F with interrupt group signal 8 inputs, 24 V DC, in groups of 1	**6ES5 434-7LA12**
435-7 digital input module	
for S5-115U/H 16 inputs, 115 V UC,	
in groups of 4	**6ES5 435-7LA11**
in groups of 2	**6ES5 435-7LB11**
for S5-115 U/H/F 8 inputs, 115 V UC, in groups of 1	**6ES5 435-7LC11**

	Order No.
436-7 digital input module	
for S5-115U/H 16 inputs, 230 V UC,	
in groups of 4	**6ES5 436-7LA11**
in groups of 2	**6ES5 436-7LB11**
for S5-115U/H/F 8 inputs, 230 V UC, in groups of 1	**6ES5 436-7LC11**
The operating instructions are included in the S5-115U manual (see page 3/23).	
490 front connector	
For screw terminals	
• 24-pin	**6ES5 490-7LB11**
• 46-pin	**6ES5 490-7LB21**
For crimp terminals, 46-pin	
• With 59 crimp contacts	**6ES5 490-7LA11**
• Without crimp contacts	**6ES5 490-7LA21**
For snap-on clip terminals, 46-pin	**6ES5 490-7LC11**
497 front connector for 434-4 digital input module	
• Crimp terminals, single-width, 42-pin	**6ES5 497-4UA12**
• Screw terminals, single-width, 42-pin	**6ES5 497-4UB31**
Adapter casing	see page 3/98

1) NAMUR = Working group on standards in the measurement technique and control engineering

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Digital input modules (continued)

Connection diagrams

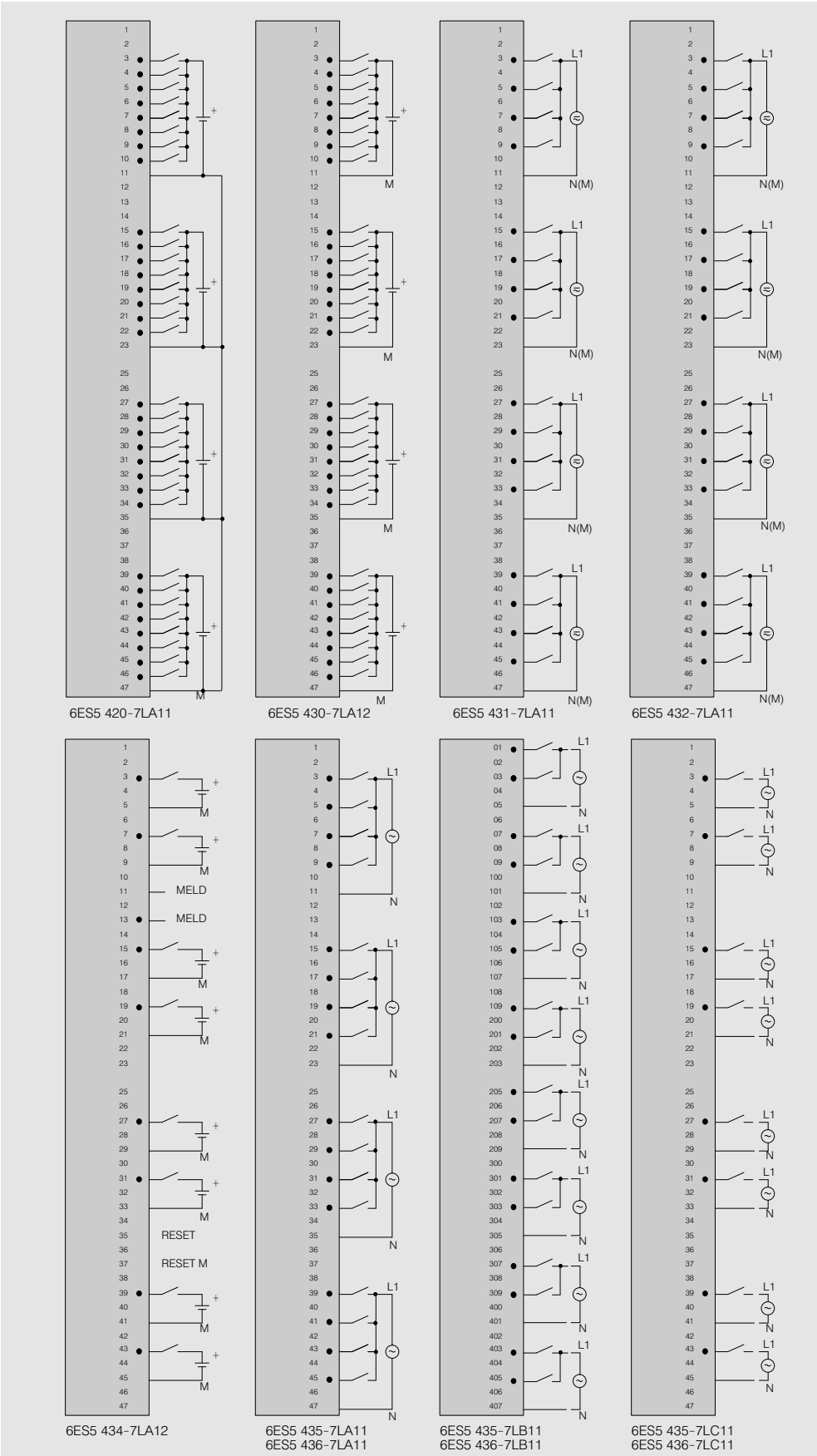

Fig. 3/25 Connection diagrams for digital input modules

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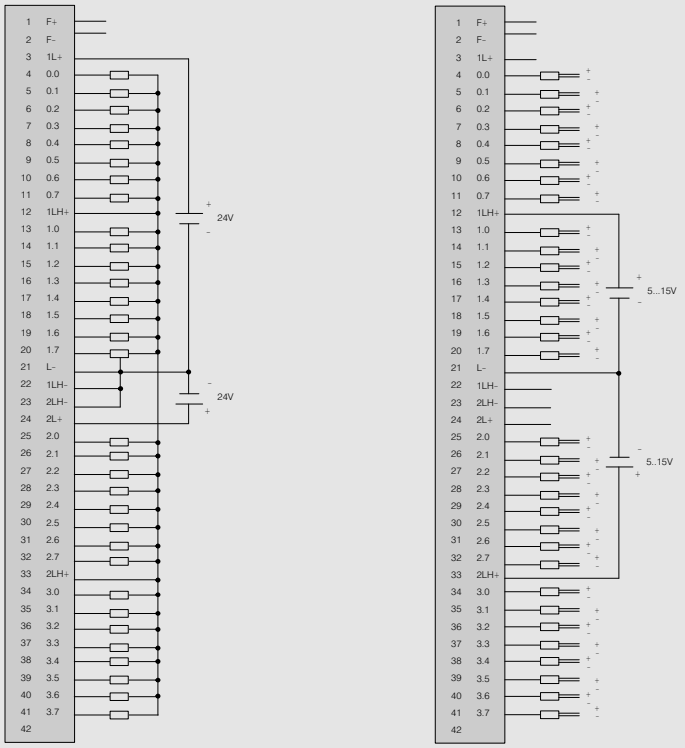
Digital input modules (continued)

Connection diagrams
(continued)



434-4UA12 with NAMUR sensors

434-4UA12 with TTL/CMOS sensors

Fig. 3/26 Connection diagrams for digital input modules