sinatic Topconnect

System Cabling for SIMATIC S7

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System cabling SIMATIC TOP connect Catalog KT 10.2 · 2006	Introduction	Welcome to Automation and Drives Totally Integrated Automation Introduction into SIMATIC TOP connect for SIMATIC S7	1
Supersedes Catalog KT 10.2 · 2000 The products contained in this catalog are also part of the CA 01 Catalog. Order No.: CD-ROM: E86060-D4001-A110-C4-7600 DVD: E86060-D4001-A510-C4-7600	Fully modular connection	Overview Benefits Design Function Integration Selection overview Front connector modules Connection cables Connection modules Configuration and wiring	2
Please contact your Siemens branch office for further information. © Siemens AG 2006	Flexible connection	Overview Benefits Application Design Front connector with S7-300 single cores Front connector with S7-400 single cores Front connectors	3
The INTERNATIONAL CENTINGATION NETWORK The products and sys- tems described in this catalog are produced/ distributed in accor- dance with the require- ments of a quality management system	Configuration	Brief instruction to the configuration guide Configuration guides	4
which has been certified to DIN EN ISO 9001 (Certificate Registration No. 1108). The certifi- cate is recognized in all IQNet countries.	Appendix	Subject index Index of order numbers Siemens contacts world- wide A&D online services Terms and conditions of sale and delivery Export regulations	5

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Welcome to Automation and Drives



We would like to welcome you to Automation and Drives and our comprehensive range of products, systems, solutions and services for production and process automation and building technology worldwide.

With Totally Integrated Automation and Totally Integrated Power, we deliver solution platforms based on standards that offer you a considerable savings potential.

Discover the world of our technology now. If you need more detailed information, please contact one of your regional Siemens partners.

They will be glad to assist you.



Totally Integrated Automation – innovations for more productivity

With the launch of Totally Integrated Automation, we were the first ones on the market to consistently implement the trend from equipment to an integrated automation solution, and have continuously improved the system ever since.

Whether your industry is process- and production-oriented or a hybrid, Totally Integrated Automation is a unique "common solution" platform that covers all the sectors.

Totally Integrated Automation is an integrated platform for the entire production line - from receiving to technical processing



and production areas to shipping. Thanks to the systemoriented engineering environment, integrated, open communications as well as intelligent diagnostics options, your plant now benefits in every phase of the life cycle.

In fact, to this day we are the only company worldwide that can offer a control system based on an integrated platform for both the production and process industry.



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Overview

A fault-free and secure connection between the individual components of an electronic plant is a precondition for their function.

Conventional wiring such as single wiring with terminal strips is often costly and error-prone. The larger the plant, the more complex the cabling becomes. Significant added costs arise, both for commissioning and for later service work.

Standards are required here that simplify handling, increase clarity, and reduce costs. Global availability must also be considered.

The solution:

SIMATIC TOP connect system cabling for SIMATIC S7

With SIMATIC TOP connect, we supply all the connections for SIMATIC on a worldwide basis.

You can choose between two connection concepts: fully modular connection in accordance with the building-block principle, and flexible connection with bundled single cores.



Wiring of SIMATIC S7 I/O modules with the sensors/actuators is a significant factor with respect to time/cost overhead, configuration, control cabinet manufacture, procurement and ease of service.

With SIMATIC TOP connect system cabling, this connection is established for your SIMATIC S7-300/400 simply, quickly and reliably.

Benefits

You save a lot of time

Plugging in standardized connection elements is simply faster than connecting a host of individual wires.

You save money

Competitive advantages due to significantly faster, global availability of the system.

You avoid errors

It is almost impossible to mix up single cores.

You gain clarity

The cable strands can be easily followed down to the last detail with visual quality features.

Connection is easy

Use your competent people where they're needed.

You can be flexible

Whether you're using bundled single cores, pre-assembled round cables, or your own assemblies – you decide.

You get everything from a single

source with the familiar Siemens quality. With a single order – and that means simplified logistics for you.



Design

Convert your control cabinet concepts; we offer you two cabling versions for this:

Fully modular connection comprising the following individual components:

- Front connector module for SIMATIC S7-300 and S7-400
- Connection cable, pre-assembled or available by the meter
- Connection module in the versions: basic module, signal module and function module



The wiring overhead is extremely low and connection errors are eliminated due to reverse polarity protection. The modular principle minimizes spare parts stocks even when you use different SIMATIC systems.

Flexible connection comprising:

• Front connector with attached, bundled single cores

The single cores are also available with UL/CSA certification.

The blue cores are numbered consecutively and can be routed directly to any element in the control cabinet. The numbering of the single cores corresponds to the designation of the front connector contacts.

Costly assembly of up to 2 x 46 single cores per module is eliminated.

The core cross-section is also suitable for higher currents.

Even when the cores are shortened or redirected, wiring remains extremely simple and you won't lose track of your connection. And although single cores are used, the wiring arrangement is always neat and tidy.



Application

Fully modular connection is the

fastest and most secure method of system cabling. Sensors and actuators from the I/O are routed to the connection module of SIMATIC TOP connect and linked to the front connector module of the SIMATIC S7-300 or S7-400 easily and without errors using a connection cable. The connection cables here are available either preassembled or by the meter for lengthoptimized self-assembly.

The connection modules are not only the electrical interface between the control cabinet and the machine: On the signal modules, LEDs indicate the switching status of digital signals and application of the 24 V DC voltage. The function modules enable adaptation to the voltage potentials required in the I/O.

With **flexible connection**, comprising front connector with single cores, 16 or 32 digital input and output channels are connected directly with the sensors and actuators. The single cores are attached with screw contacts or crimp contacts, installed in the front connector and cut off straight at the other end. The cores can be easily assigned to any element in the control cabinet.

Fifty percent of assembly costs are saved compared with conventional single wiring.









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Overview



The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection facilitates convenient, fast, and correct connection of the I/O to the SIMATIC S7-300/400.

Benefits

- Easy plugging in of front connector module, connection cable and connection module
- Fast and low-cost wiring
- Supply voltage connectable to front connector module or connection module for digital and analog signals
- Reduction of wiring errors, clear control cabinet wiring
- Distribution of digital signals by byte or by double-byte
- Each component can be replaced individually
- Each cable length can be configured without cutting, or pre-assembled cables can be used

Design

Front connector module

Modified front connectors, called front connector modules, are available for connection to the module. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in various versions. For the SIMATIC S7-300 and SIMATIC S7-400, digital or analog. The connection cables are plugged into these front connector modules.

Connection cable

The connection cable is available in two different versions.

As a pre-assembled 16-pole round cable (shielded or unshielded) up to a length of 5 m, or the 16-pole round-sheath ribbon cable (with or without shield), which can be easily assembled by the user, or 2×16 -pole round-sheath ribbon cables (without shield).

When assembled, there are one or two insulation displacement connectors (female ribbon connectors) at both ends of the cable.

The round-sheath ribbon cable is assembled by the user with help of a crimping tool (to be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connection cable connects the front connector module with the connection module.

Connection module

The system has digital and analog connection modules for connecting the I/O signals. These are snapped onto the mounting rail.

The connection modules are available in two connection technologies: with spring-loaded or screw-type terminals.

Basic module:

Connection modules with basic functionality for getting the signal from the field to the module or from the module to the field quickly and easily. For digital or analog signals.

Signal module:

Expands the digital basic module with LEDs for signaling the active high signal. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. One LED signals the availability of the supply voltage.

Function module:

Digital connection modules fitted with a relay. If other voltage or power levels are required in the field, the connection module for output signals TPRo is used. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that easily converts the 230 V AC signal to 24 V DC. This means you always have the same voltage level on the module side.

If higher switching frequencies of the relay connection module are required for the output signals, the relay can simply be replaced with an optocoupler (please note technical data) in order to increase the switching frequency here.

Design (continued)

Shield plate

The shield plate is latched onto the connection module for 3-core initiators or optionally onto the connection module for analog signals and then snapped onto the mounting rail with the connection module. With the shield connection terminals, optimal shield connection is achieved between the shielded round-sheath ribbon cable or the shielded field cable and the grounded mounting rail.



Design of the fully modular connection (16-channel in example)

Function

By using the fully modular system, the signal modules and the sensors/actuators can be up to 30 m apart, depending on requirements. Connection modules can be connected to the connection cables. The I/O is connected to the connection module on site. The connection module is available in various performance ranges.

The potential infeed can be applied at the connection module or the front connector module.

Integration

Wiring of the following components is possible with the fully modular connection of SIMATIC TOP connect.

Note:

The release version of the modules may change, and this can also change the order numbers of the modules.



For the SIMATIC S7-300 modules

Compact CPU	Digital I/O modules	Analog I/O modules
 CPU 312C 6ES7312-5BD01-0AB0 CPU 313C 6ES7313-5BE01-0AB0 CPU 313C-2PtP 6ES7313-6EE01-0AB0 CPU 314C-2PtP 6ES7314-6BF02-0AB0 CPU 314C-2 DP 6ES7314-6CF02-0AB0 	 SM 321 DI 32 × 24 V DC 6ES7321-1BL00-0AA0 DI 16 × 24 V DC 6ES7321-1BH02-0AA0 DI 16 × 24 V DC High Speed 6ES7321-1BH10-0AA0 DI 16 × 24 V DC; active low 6ES7321-1BH50-0AA0 SM 322 DO 32 × 24 V DC/0.5 A 6ES7322-1BL00-0AA0 DO 16 × 24 V DC/0.5 A 6ES7322-8BH01-0AB0 DO 16 × 24 V DC/0.5 A 6ES7322-1BH10-0AA0 DO 16 × 24 V DC/0.5 A 6ES7322-1BH01-0AB0 DO 16 × 24 V DC/0.5 A 6ES7322-1BH01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7322-1BH01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7322-1BH01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7322-1BF01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7323-1BF01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7323-1BF01-0AA0 DO 8 × 24 V DC/0.5 A 6ES7323-1BH01-0AA0 DI 16/D0 16 × 24 V DC/0.5 A 6ES7323-1BH01-0AA0 DI 8/D0 8 × 24 V DC/0.5 A 6ES7323-1BH01-0AA0 	SM 331 • Al 8 × 13 bit 6ES7331-1KF00-0AB0 • Al 2 × 9/12/14 bit 6ES7331-7KF02-0AB0 • Al 8 × 9/12/14 bit 6ES7331-7KF02-0AB0 • Al 8 × 16 bit 6ES7331-7NF10-0AB0 • Al 8 × 16 bit 6ES7331-7PF10-0AB0 • Al 8 × 16 bit 6ES7331-7PF11-0AB0 SM 332 • AO 2 × 11/12 bit 6ES7332-5HB01-0AB0 • AO 4 × 15 bit 6ES7332-7ND02-0AB0 SM 334 • AI 4/AO 2 × 8/8 bit 6ES7334-0CE01-0AA0 • AI 4/AO 2 × 12/12 bit 6ES7334-0KE00-0AB0 SM 335 • AI 4 × 14 bit 6ES7335-7HG01-0AB0

Integration



For the SIMATIC S7-400 modules

Digital I/O modules	Analog I/O modules
SM 421 • DI 32 x 24 V DC 6ES7421-1BL01-0AA0 SM 422 • DO 16 x 24 V DC/2 A 6ES7422-1BH11-0AA0 • DO 32 x 24 V DC/0.5 A 6ES7422-1BL00-0AA0 • DO 32 x 24 V DC/0.5 A with 0.15 ms output delay 6ES7422-7BL00-0AB0	SM 431 • Al 8 x 13 bit 6ES7431-1KF00-0AB0 • Al 8 x 14 bit 6ES7431-1KF20-0AB0 • Al 16 x 13 bit 6ES7431-1HH00-0AB0 • Al 8 x 16 bit 6ES7431-1KF10-0AB0 SM 432 • AO 8 x 13 bit 6ES7432-1HF00-0AB0

Selection overview SIMATIC S7-300 Compact CPU

		Front	con	nector mo	odules					Connection cables				
				for digital modules	I	for Comp	bact CPU r	nodules		Round-s ribbon ca sold by th	heath able ne meter		Round c assemble IDC conr	able ed with nectors
Modules SIMATIC S7-30	0 Compact CPU			4 x	1/0	CPU	312C	CPU 313	C/314C-2	16-	2x16-	16-	16-	16-
	Order No. 6ES731	Con- nec-	Poles	Spring terminals	Screw terminals	Spring terminals	Screw- terminals	Spring terminals	Screw- terminals	pole un- shielded	pole un- shielded	pole shielded	pole un- shielded	pole shielded
Compact CPU 312C	2-5BD01-0AB0	tor X1	40			1	1			5	1	√ 3	1	√ 3
Compact CPU 313C	3-5BE01-0AB0	X1	40					1	1	(4)		√ 3	√ ⊕	√ 3
		X2	40	1	1					1	7	√ 3	1	√ 3
Compact CPU 313C-2PtP	3-6BE01-0AB0	X1												
		X2	40	1	1					1	1	√3	1	√3
Compact CPU 313C-2DP	3-6CE01-0AB0	X1												
		X2	40	1	1					1	1	√3	1	√3
Compact CPU 4-6E 814C-2PtP	4-6BF02-0AB0	X1	40					1	1	√ ⊕		√3	√ ⊕	√3
		X2	40	1	1					1	1	√3	1	√3
Compact CPU 314C-2DP	4-6CF02-0AB0	X1	40					1	1	√ @		√3	√ ⊕	√3
		X2	40	1	1					1	1	√3	1	√3
	c	Order 1	No.:	6ES7921-3AA20-0AA0	6ES7921-3AB20-0AA0	6ES7921-3AJ20-0AA0	6ES7921-3AK20-0AA0	6ES7921-3AL20-0AA0	6ES7921-3AM20-0AA0	6ES7923-0	6ES7923-2	6ES7923-0	6ES7923-0	6ES7923-0
										Lengths CD = CG =	30 m 60 m		Lengths BBC BBC BBC BBC BBC BBC C BBC C C BBC C C C C C C C C C C C C C C C C C C C	$b = 0.5 \text{ m}^{1)}$ $a = 1.0 \text{ m}^{10}$ $b = 1.5 \text{ m}^{10}$ $b = 2.0 \text{ m}^{10}$ $b = 2.5 \text{ m}^{10}$ $b = 3.0 \text{ m}^{10}$ $b = 4.0 \text{ m}^{10}$ $b = 5.0 \text{ m}^{10}$ shielded

Module can be used

1 Only for the digital outputs (max. 2 units)

2 Only for the digital outputs (max. 1 unit)

③ The shielded cable must be used for the analog signals. If necessary, it can also be used for the digital signals – a shield connection must be provided on the user side.

④ Only for the digital inputs (max. 2 units)

Conne	ection	modu	les								Accesso	ories				
max. ni of requi connec module	umber ired tion	for inp	uts/out	tputs di	gital			Relay, put an contac	out- d 8 NO :ts	analog Crimp- ing tool	8 connec- tors and 8 strain- relief as-	Labeling strip	Labeling strip	Shield plate	Shield connec- tion terminal	
per mo	dule	1x8	3 I/O	2x8	3 I/O	1x8	3 I/O	Input 24 V DC	Input 230 V AC		insula- tion displace-	semblies insulation displace- ment con-	for con- nection modules,	con- for con- tion nection dules, modules,	for analog connec- tion mod-	for shield plate
8 I/O	CPU	TP	1 ¹⁾	TF	ΥΚ ¹⁾	TF	3 2)	TPRo	TPRi	TPA	connec-	nectors	inserted	adhesive	ule	
digital	analog	with- out LED	with LED	with- out LED	with LED	with- out LED	with LED	with LED	with LED	without LED	1013					
3		1	1	1	1	1	1	/ 2	√ @		1	1	1	1	1	1
1	2	1	1			1	1		1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	√ 1	√ @		1	1	1	1	1	1
4		1	1	1	1	1	1	√ ①	√4		1	1	1	1	1	1
4		1	1	1	1	1	1	√ ①	√4		1	1	1	1	1	1
1	2	1	1			1	1		1	1	1	1	1	1	1	1
4		1	1	1	1	1	1	√ 1	√ 4		1	1	1	1	1	1
1	2	1	1			1	1		1	1	 Image: A start of the start of	1	1	1	1	1
4		1	1	1	1	1	1	√ 1	√ @		 Image: A start of the start of	1	1	1	1	1
		0 V	BO	0 V	B	0 V	B	B 0	0	0 V	1AA0	AA0	AA0	AA0	AA0	
		A10-0	A10-0	A10-0	A10-0	A10-0	A10-0	D10-0	E10-0	C10-0	A00-0	E10-0	B00-0	B00-0	A00-0	B00-0 A00-0
		4-0A	4-0A	4-1A,	4-1A,	4-0C	4-0C	4-0BI	4-0BI	4-0C	8-0A	1-3BI	8-2AI	8-2BI	8-1B/	0-5A 0-5B 0-5C/
		:S792	:S792	:S792	:S792	:S792	:S792	:S792	:S792	:S792	:S792	S792	:S792	:S792	:S792	S739 S739
		6 E	6E	6E	66	9E	66	6E	6E	6E	6E	96	66	66	66	6E 6E 6E
		Type A = S	Screw te	rminals												
		B = S	Spring te	erminals												

Important: When counting the connection modules, $^{1)}$ TP1, TPK = 1-wire connection the connection module TPK counts as 2. $^{2)}$ TP3 = 3-wire connection

Selection overview SIMATIC S7-300 digital

			Fror	nt conne	ctor mo	dules				Connec	tion cabl	es			
				for digit	al modul	es		for 2 an digital c	npere outputs	Round-sheath ribbon cable sold by the meter			Round cable assembled with IDC connectors		
Module	s SIMATIC S7-36	00 digital Order No. 6ES732	Poles	2xi Spring termi- nals	8 I/O Screw termi- nals	4xi Spring termi- nals	8 I/O Screw termi- nals	Spring termi- nals	Screw termi- nals	16- pole un- shielded	2x16- pole un- shielded	16- pole shielded	16- pole un- shielded	16- pole shielded	
SM 321	DI 32 x 24 V DC	1-1BL00-0AA0	40			1	1			1	1	√3	1	√3	
	DI 16 x 24 V DC	1-1BH02-0AA0	20	1	1					1	1	√3	1	√3	
	DI 16 x 24 V DC High Speed	1-1BH10-0AA0	20	1	1					1	1	√3	1	√3	
014 000	DI 16 x 24 V DC source input	1-1BH50-0AA0	20	1	1					1	1	√3	1	√3	
SM 322	DO 32 x 24 V DC/0.5 A	2-18L00-0AA0	40			1	1			1	1	√3	1	√3	
	0.5 A can be made redundant	2-86H01-0A60	40			1	1			1	1	√3	1	√3	
	24 V DC/0.5 A	2-18H10-04A0	20	1	1					1	1	√3	1	√3	
	24 V DC/0.5 A High Speed	2-88E00-0AB0	20	1	1					1	1	√3	1	√3	
	24 V DC/0.5 A	2-1BF01-0AA0	20	1	1					1	1	√3	1	√3	
SM 323	24 V DC/2 A DI 16/DO 16 x	3-1BL00-0AA0	40					1	 Image: A start of the start of	1	1	√ 3	1	√3	
	24 V DC/0.5 A	3-1BH01-0AA0	20			1	1			1	1	√ 3	1	√3	
	24 V DC/0.5 A			1	1					1	1	√3	 	√ ₃	
		Order I	No.:	6ES7921-3AA00-0AA0	6ES7921-3AB00-0AA0	6ES7921-3AA20-0AA0	6ES7921-3AB20-0AA0	6ES7921-3AC00-0AA0	6ES7921-3AD00-0AA0	6ES7923-0 00-0AA0	6ES7923-2 - 00- 0AA0	6ES7923-0 - 00- 0BA0	6ES7923-0	6ES7923-0	
										Lengths CD = CG =	30 m 60 m		Lengths BAS BBC BBC BCC BCC BCC BCC BCC BCC BCC BC	i = 0.5 m ¹⁾ = 1.0 m i = 1.5 m ¹⁾ = 2.0 m = 2.5 m = 3.0 m = 4.0 m = 5.0 m shielded	

Module can be used
 Only for the outputs
 Only for the inputs
 If necessary, the shielded cable can be used – a shield connection must be provided on the user side.

nax. number f required I/O con- ection w nodules L er module	For inpu 1x8	its/outpu	its digital				Belais.		2 ampei	70	Crimping	8 connec-	Labeling	Labeline
nax. number f required I/O con- ection w nodules L er module	1x8	1/0					Relais, output and 8 NO contacts		2 ampere, 8 digital outputs		Crimping 8 connec- tool 8 strain- relief as- combligs	strip	strip	
I/O con- ection w odules L er module	TP1 ¹⁾		2x8					24 V 230 V DC AC				semblies insulation displace- ment con- nectors	for con- nection modules,	for con- nection modules
odules	TP	1 ¹⁾	TP	K ¹⁾	TF	3 2)	TPRo	TPRi	Т	P2	TIECIOI3	TIECTOI 3	Inserteu	adhesive
	without _ED	with LED	without LED	with LED	without LED	with LED	with LED	with LED	without LED	with LED				
4	1	1	1	1	1	1		1			1	1	1	1
2	1	1	1	1	1	1		1			1	1	1	1
2	1	1	1	1	1	1		1			1	1	1	1
2	1		1		1						1	1	1	1
4	1	1	1	1	1	1	1				1	1	1	1
4	1	1	1	1	1	1	1				1	1	1	1
2	1	1	1	1	1	1	1				1	1	1	1
2	1	1	1	1	1	1	1				1	1	1	1
2	1	1	1	1	1	1	1				1	1	1	1
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2	1	1	1	1	1	1	√ 1	/ 2			1	1	1	1
	0AA10-0A 🗖 0	0AA10-0B	1AA10-0A 🗖 0	1AA10-0B 0	0CA10-0A 🗖 0	0CA10-0B	0BD10-0B 0	0BE10-0B 0	0BB10-0A 0	0BB10-0B	04400-0440	3BE10-0AA0	2AB00-0AA0	2BB00-0AA0
	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7924-	6ES7928-	6ES7921-	6ES7928-	6ES7928-
T	Type A = Scr B = Spr	ew termir ring termin	nals nals											

Selection overview SIMATIC S7-300 analog

			Front	connector n	nodules			Connection cab	les	
				for analog m	odules			Round-sheath ribbon cable sold by the meter	Round cable assembled with IDC connectors	
Modules	SIMATIC S7-300 anal	og Order No.	Poles	20- Spring	pole Screw	40 Spring	-pole Screw	16-pole shielded	16-pole shielded	
GM 221	AL 9 v 12 bits	1 1KE01 0AB0	40	terminais	terminais	terminais	terminais			
514 551			40			✓	<i>√</i>	1	1	
	AI 2 x 9/12/14 bits	1-7KB02-0AB0	20	1	√			1	1	
	Al 8 x 9/12/14 bits	1-7KF02-0AB0	20	1	1			1	1	
	Al 8 x 16 bits	1-7NF00-0AB0	40			1	1	1	1	
	AI 8 x 16 bits	1-7NF10-0AB0	40			1	 ✓ 	1	1	
	AI 8 x RTD x 16 bits (internal 24 bits)	1-7PF01-0AB0	40			1	 ✓ 	1	1	
	8 x TC x 16 bits	1-7PF11-0AB0	40			1	 ✓ 	1	1	
SM 332	AO 2 x 11/12 bits	2-5HB01-0AB0	20	1	1			1	1	
	AO 4 x 11/12 bits	2-5HD01-0AB0	20	1	1			1	1	
	AO 8 x 11/12 bits	2-5HF00-0AB0	40			1	1	1	1	
	AO 4 x 15 bits	2-7ND02-0AB0	20	1	1			1	1	
SM 334	AI 4/AO 2 x 8/8 bits	4-0CE01-0AA0	20	1	1			1	1	
	AI 4/AO 2 x 12/12 bits	4-0KE00-0AB0	20	1	1			1	1	
SM 335	Al 4 x 14 bits	5-7HG01-0AB0	20	1	1			1	1	
		Orde	No.:	6ES7921-3AF00-0AA0	6ES7921-3AG00-0AA0	6ES7921-3AF20-0AA0	6ES7921-3AG20-0AA0	6ES7923-0	6ES7923-0	
								Lengths CD = 30 m CG = 60 m	Lengths BB0 = 1.0 m BC0 = 2.0 m BC5 = 2.5 m BD0 = 3.0 m BE0 = 4.0 m BF0 = 5.0 m	

Module can be used

2

Connection	module	Accessories					
	for inputs/outputs	Crimping tool	8 connectors and 8 strain-relief assemblies	Labeling strip	Labeling strip	Shield plate	Shield connection terminal
	analog	insulation displacement connectors	insulation displacement connectors	for connection modules, inserted	for connection modules, self-adhesive	for analog connection module	for shield plate
max. number of required connection modules per module	TPA without LED	-					
4	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1
4	 Image: A second s	 Image: A second s	1	1	1	1	1
4	v	1	1	1	1	1	1
4	✓	1	1	1	1	1	1
4	✓	 Image: A second s	1	1	1	1	1
1	✓	1	1	1	1	1	1
2	✓	1	1	1	1	1	1
4	✓	1	1	1	1	1	1
2	1	1	1	1	1	1	1
2	1	1	1	 Image: A second s	 Image: A second s	1	1
2	1	1	1	1	1	1	1
2	1	1	1	1	1	1	 Image: A start of the start of
	6ES7924-0CC10-0A 0	6ES7928-0AA00-0AA0	6ES7921-3BE10-0AA0	6ES7928-2AB00-0AA0	6ES7928-2BB00-0AA0	6ES7928-1BA00-0AA0	6ES7390-5AB00-0AA0 6ES7390-5BA00-0AA0 6ES7390-5CA00-0AA0
	Type A = Screw terminals B = Spring terminals						

Selection overview SIMATIC S7-400

	Front connector modules				Connecting cables						
				for digital modules		for analog modules	Round-she sold by the	ath ribbon c meter	able	Round cabl	e with
					2 ampere					IDC connec	tors
Modules	SIMATIC S7-4			4 x I/O	2 x 8 A	0	16-pole unshielded	2x16-pole unshielded	16-pole shielded	16-pole unshielded	16-pole shielded
		Order No. 6ES74	Poles	Screw terminals	Screw terminals	Screw terminals					
SM 421	DI 32 x 24 V DC	21-1BL01-0AA0	48	1			1	1	√3	1	√3
SM 422	DO 16 x 24 V DC/2 A	22-1BH11-0AA0	48		1		1	1	√3	1	√3
	DO 32 x 24 V DC/0.5 A	22-1BL00-0AA0	48	1			1	1	√3	1	√3
	DO 32 x 24 V DC/0.5 A	22-7BL00-0AB0	48	1			1	1	√3	1	√3
SM 431	Al 8 x 13 bits	31-1KF00-0AB0	48			1			1		1
	Al 8 x 16 bits	31-7KF10-0AB0	48			1			1		1
	Al 8 x 14 bits	31-1KF20-0AB0	48			 Image: A second s			1		1
	AI 16 x 13 bits	31-0HH00-0AB0	48			1			1		1
SM 432	AO 8 x 13 bits	32-1HF00-0AB0	48			1			1		1
Order No.: 99				6ES7921-4AB00-0AA0	6ES7921-4AD00-0AA0	6ES7921-4AG00-0AA0	6ES7923-0	6ES7923-2	6ES7923-0	6ES7923-0	6ES7923-0
							Lengths CD = 30 CG = 60	im Im		Lengths BA5 = BB0 = BC0 = BC5 = BD0 = BC0	0.5 m ¹⁾ 1.0 m 1.5 m ¹⁾ 2.0 m 2.5 m 3.0 m 4.0 m 5.0 m elded

Module can be used

Inclusion out to accurate a strength of the outputs
If necessary, the shielded cable can be used – a shield connection must be provided on the user side.

1		ouule		Connection module									Accessories				
	for inp	uts/out	puts di	gital			Relais output and 8 contac	, t NO cts	2 amp 8 digit output	ere, al ts	analog	Crimp- ing tool	8 con- nectors and 8 strain-	Labe- ling strip	Labe- ling strip	Shield plate	Shie conr tion term
max. number of	1x8	I/O	2x8	3 I/O	1x8	3 I/O	Input 24 V DC	Input 230 V AC				incula	relief assem- blies	for	for	for	for
8 I/O connec-	тр	1)	те	1)		10 ²⁾	TDDo	TDD:	т.	D 2	TDA	tion displace-	tion dis- place-	connec- tion mo-	connec- tion mo-	analog connec-	shiel
tion modules per c module	with- out LED	with LED	with- out LED	with LED	with- out LED	with LED	with LED	with LED	with- out LED	with LED	without LED	ment connec- tors	ment connec- tors	dules, inserted	dules, self- adhesive	tion module	
4	1	1	1	1	1	1		1				1	1	1	1		
2									1	1		1	1	1	1		
4	1	1	1	1	1	1	1					1	1	1	1		
4	1	1	1	1	1	1	1					1	1	1	1		
4											1	1	1	1	1	1	•
4											1	1	1	1	1	1	
4											1	1	1	1	1	1	
4											1	1	1	1	1	1	,
4											1	1	1	1	1	1	
	A 🗖 0	B 0	0 - V	B 0	0 - V	B 0	B 0	B 0	A 0	B 0	A - 0	AAO	AA0	AAO	AAO	AAO	AAO
	A10-0	A10-0	A10-0	A10-0	A10-0	A10-0	3D10-0	3E10-0	3B10-0	3B10-0	C10-0	VA00-0	3E10-0	NB00-0	3B00-0	3A00-0	NB00-0
	924-07	924-07	924-1/	924-17	924-00	924-00	924-0E	924-0E	924-0E	924-0E	924-00	. 928-07	921-3E	628-24	928-2E	928-1E	390-57
	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7	6ES7

Fully modular connection Front connector modules

S7-300 and S7-400 front connector modules

Overview



Modified front connectors, called front connector modules, are available for connection to the modules. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in various versions.

For the SIMATIC S7-300 and SIMATIC S7-400, digital or analog. The connection cables are plugged into these front connector modules.

The following restrictions apply when connecting front connector modules:

The summation current less than 4 A per byte

The positive infeed of an external supply voltage can be connected to the connection module. In this way the supply voltage is routed over the connection cable. Due to the restricted current carrying capacity of the connection cable, the summation current of 4 A/byte must never be exceeded.

Summation current higher than 4 A per byte

Additional connection cables are used to route summation currents which are higher than 4 A from an external power supply to the module. The additional connection cables are connected to special connection sockets of the front connector.

Design



With the Compact CPUs, up to three connection cables can be connected to the front connector modules at slot X1. The connection modules can be connected by means of the connection cables. The front connector modules for 32 digital channels can be connected to the front connector modules at slot X2.

Up to 2 or 4 connection cables can be connected to the front connector modules for digital modules with 16 or 32 channels. The connection modules can be connected by means of the connection cables.

Up to 2 or 4 shielded connection cables can be connected to the front connector modules for one analog connection module each with 20-pole or 40-pole connection.

The potential infeed can be applied at the connection module or the front connector module.

Integration

For the connection to the signal module (integrated I/O with the Compact CPUs, digital and analog) the front connector module is connected to the signal module instead of the SIMATIC S7-300 front connector. It has 2 to 4-pin connectors for the connection of the connection cables and 2 to 4 connections for the potential infeed. There are versions for the connection to the Compact CPUs (X1), digital 24 V/0.5 A I/O 16 and 32-channel signals, for digital 24 V/2 A output modules and for analog I/O modules.

 Use with SIMATIC S7-300 components The front connector modules replace the standard SIMATIC connectors
 6ES7392-1AJ00-0AA0

6ES7392-1BJ00-0AA0 6ES7921-3AH00-0AA0 6ES7392-1AM00-0AA0 6ES7392-1BM01-0AA0 6ES73921-3AH20-0AA0

 The circuit diagrams for the front connector modules (module on top – IDC connector below) can be found on pages 2/19 to 2/22.

Technical data				
Technical data of front connector module				
Rated operating voltage	24 V DC			
Max.permissible operating voltage	60 V DC			
Max. permissible continuous current				
 per connector pin 	1 A			
Max. permissible summation current	4 A/byte			
Permissible ambient temperature	0 to +60 °C			
Test voltage	0.5 kV, 50 Hz, 60 s			
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2			

Technical data (continued)

	SIMATIC TOP connect front connector module, connection for potential infeed				
	Spring connection	Screw connection			
	Modules up to 4 connections				
Connectable cable cross-sections solid cables flexible cables with/without wire end ferrule 	No 0.25 to 1.5 mm ²				
Number of cables per connection	1 or a combination of 2 conductors up to 1.5 mm ² (total) in a common wire end ferrule				
Max. diameter of the cable insulation	3.1 mm				
Stripping length of the cableswithout insulation collarwith insulation collar	6 mm -				
Wire-end ferrules in acc. with DIN 46228 • without insulation collar • with insulation collar 0.25 to 1.0 mm ² • with insulation collar 1.5 mm ²	Form A; 5 to 7 mm long - -				
Blade width of the screwdriver	3.5 mm (cylindrical shape)				
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm			

	Modules up to 8 connections			
Connectable cable cross-sections solid cables flexible cables with/without wire end ferrule 	No 0.25 to 0.75 mm ²			
Number of cables per connection	1 or a combination of 2 conductors up to 0.75	1 or a combination of 2 conductors up to 0.75 mm ² (total) in a common wire end ferrule		
Max. diameter of the cable insulation	2.0 mm			
Stripping length of the cableswithout insulation collarwith insulation collar	6 mm -			
 Wire-end ferrules in acc. with DIN 46228 without insulation collar with insulation collar 0.25 to 1.0 mm² with insulation collar 1.5 mm² 	Form A; 5 to 7 mm long - -			
Blade width of the screwdriver	3.5 mm (cylindrical shape)			
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm		

Fully modular connection Front connector modules

S7-300 front connector modules

Dimension drawings

Selection and ordering data

Front connector module

Front connector module (Compact CPU 313C/ 314C-2PtP/314C-2DP), slot X1

Front connector module (digital 2 x 8 I/O) Voltage infeed via • Spring terminals

Front connector module (digital 4 x 8 l/O) Voltage infeed via

Front connector module (1 x 8 outputs) for 2 ampere

Front connector module 20-pole

Front connector module 40-pole

¹⁾ The terminal assignment of these front connector modules is

²⁾ The dimension drawings for these front connector modules can be found under "Wiring of S7-300 analog modules" on pages 2/47

unambiguous, so dimension drawings can be omitted.

(Compact CPU 312C)

Voltage infeed via

Spring terminals

Screw terminals

Voltage infeed via • Spring terminals

Screw terminals

Screw terminals

Spring terminalsScrew terminals

digital outputs Voltage infeed via

• Spring terminals

Screw terminals

Voltage infeed via

• Spring terminals

Screw terminals

Voltage infeed via

Spring terminals

· Screw terminals

to 2/49.

(analog)

(analog)

Order No.

6ES7921-3AJ20-0AA0

6ES7921-3AK20-0AA0

6ES7921-3AL20-0AA0 6ES7921-3AM20-0AA0

6ES7921-3AA00-0AA0 1)

6ES7921-3AB00-0AA0 1)

6ES7921-3AA20-0AA0

6ES7921-3AB20-0AA0

6ES7921-3AC00-0AA0 1)

6ES7921-3AD00-0AA0 1)

6ES7921-3AF00-0AA0 2)

6ES7921-3AG00-0AA0 2)

6ES7921-3AF20-0AA0²⁾ 6ES7921-3AG20-0AA0²⁾

Designation

Terminal assignment for the wiring of the 32-channel front connector module for digital modules and Compact CPU for X2 connection

Applies to the following order numbers:

• 6ES7921-3AA20-0AA0

• 6ES7921-3AB20-0AA0

	Opening for conductor to be - connected	5 ——		5	Opening for screwdriver
	Supply connections for 1				Supply connections fo
		1		3	
		5 —		└── 5	
		5		└─── 5	
		2		4	
	Supply				
	connections for 2		4 0+ [] 0- []		Supply connections fo
		5 —	G-KT01 EN 00100a	5	
	Legend:				
	5 openings for strai	n relief dev	vice		
	1 to 4: round-sheat	n ribbon ca	ble connections		
	See the following ta	ble for add	ress assignmen	t	

Front view of the front connector module for 32-channel digital modules and Compact CPU for X2 connection

The connections for the supply voltage are displayed as spring terminals. They are also available as screw terminals.

The following table shows the assignment of the respective connection cable connections via the address assignment to the channels of the signal modules.

Assignment of the connection cables connections to the address bytes of the 32-channel digital modules and Compact CPU for the X2 connection

Connection Address assignment for cable connection

	Digital input module	Digital output module	Digital input/out- put module and Compact CPU X2 connection
1	EB x	AB x	EB x
2	EB (x+1)	AB (x+1)	EB (x+1)
3	EB (x+2)	AB (x+2)	AB x
4	EB (x+3)	AB (x+3)	AB (x+1)

3

4

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Fully modular connection Front connector modules

S7-300 front connector modules

Dimension drawings (continued)

Terminal assignment for the wiring of the front connector module (X1) for the Compact CPU 312C

Applies to the following order numbers:

- 6ES7921-3AJ20-0AA0
- 6ES7921-3AK20-0AA0



Front view of the front connector module (X1) for the Compact CPU 312C

The connections for the supply voltage are displayed as spring terminals. They are also available as screw terminals.

The following table shows the assignment of the respective connection cable connections via the address assignment (X1) to the channels of the Compact CPU 312C.

Assignment of the connection cables connections to the address bytes (X1) of the Compact CPU 312C				
Connection cable connection	Address assignment (X1) for Compact CPU 312C			
1	EB x			
2	EB (x+1)			
3	AB x			

Terminal assignment for the wiring of the front connector module (X1) for the Compact CPU 313C, 314C-2PtP, 314C-2DP

Applies to the following order numbers:

- 6ES7921-3AL20-0AA0
- 6ES7921-3AM20-0AA0



5 openings for strain relief device 1 to 3: round-sheath ribbon cable connections See the following table for address assignment

Front view of the front connector module (X1) for the Compact CPU 313C, 314C-2PtP, 314C-2DP

The connections for the supply voltage are displayed as spring terminals. They are also available as screw-type terminals.

The following table shows the assignment of the respective connection cable connections via the address assignment (X1) to the channels of the Compact CPU 312C.

Assignment of the connection ca bytes (X1) of the Compact CPU 3	bles connections to the address 13C, 314C-2PtP, 314C-2DP
Connection cable connection	Address assignment (X1) for Compact CPU 312C
1	PEW x+0; PEW x+2; PEW x+4
2	PEW x+6; PEW x+8; PAW x+0; PAW x+2
3	EB x

Circuit diagrams

S7-300, CPU312C

Front connector module with potential infeed via spring connection 6ES7921-3AJ20-0AA0 screw connection 6ES7921-3AK20-0AA0



S7-300, CPU313C/314C-2PtP/314C-2DP

Front connector module with potential infeed via spring connection 6ES7921-3AL20-0AA0 screw connection 6ES7921-3AM20-0AA0



Circuit diagrams

S7-300, digital 2 x 8 I/O

Front connector module with potential infeed via spring connection 6ES7921-3AA00-0AA0 screw connection 6ES7921-3AB00-0AA0



S7-300, digital 4 x 8 I/O

Front connector module with potential infeed via spring connection 6ES7921-3AA20-0AA0 screw connection 6ES7921-3AB20-0AA0



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Circuit diagrams

S7-300, 2 ampere digital 1 x 8 A

Front connector module with potential infeed via spring connection 6ES7921-3AC00-0AA0 screw connection 6ES7921-3AD00-0AA0



S7-300, analog 20-pole I/O module

Front connector module	with potential infeed via
spring connection	6ES7921-3AF00-0AA0
screw connection	6ES7921-3AG00-0AA0



Fully modular connection Front connector modules

S7-300 front connector modules

Circuit diagrams

S7-300, analog 40-pole I/O module

Front connector module with potential infeed via spring connection 6ES7921-3AF20-0AA0 screw connection 6ES7921-3AG20-0AA0



Design



Up to 2 connection cables or one 2×16 -pole round-sheath ribbon cable can be connected to the front connector modules for digital modules (version 2 A) with 16 channels, up to 4 connection cables or two 2×16 -pole round-sheath ribbon cables can be connected to the front connector modules for digital modules with 32 channels. The connection modules can be connected by means of the connection cables.

Up to 4 shielded connection cables can be connected to the front connector modules for analog modules with one analog connection module each.

The potential infeed can be applied at the connection module or the front connector module.

Integration

For the connection to the signal module the front connector module is connected to the signal module instead of the SIMATIC S7-400 front connector. It has 2 to 4-pin connectors for the connection of the connection cables and up to 3 connections for the potential infeed. There are versions for the connection of the digital 24 V/0.5 A I/O signals, for digital 24 V/2 A output modules and for analog I/O modules.

 Use with SIMATIC S7-400 components The front connector modules replace the standard SIMATIC connectors
 6ES7492-1AL00-0AA0
 6ES7492-1BL00-0AA0

6ES7492-1CL00-0AA0

 The circuit diagrams for the front connector modules (module on top – IDC connector below) can be found on pages 2/25 to 2/26.

Technical data

Technical data of front connector	module
Rated operating voltage	24 V DC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current	
 per connector pin 	1 A
Max. permissible summation current	4 A/byte (voltage infeed)
Permissible ambient temperature	0 to +60 °C
Test voltage	0.5 kV, 50 Hz, 60 s
Air gaps and creepage distances	IEC 664 (1980), IEC 664 A (1981), in accordance with DIN VDE 0110 (01.89), overvoltage class II, pollution degree 2

Technical data (continued)

Wiring rules for the front connector modules

	SIMATIC TOP connect front connector module, connection for potential infeed
	Screw connection
	Modules up to 4 connections
Connectable cable cross-sections • solid cables • flexible cables with/without wire end ferrule	No 0.25 to 1.5 mm ²
Number of cables per connection	1 or a combination of 2 conductors up to 1.5 mm ² (total) in a common wire end ferrule
Max. diameter of the cable insulation	3.1 mm
Stripping length of the cableswithout insulation collarwith insulation collar	6 mm -
Wire-end ferrules in acc. with DIN 46228 • without insulation collar • with insulation collar 0.25 to 1.0 mm ² • with insulation collar 1.5 mm ²	Form A; 5 to 7 mm long – –
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

	Modules up to 6 connections
Connectable cable cross-sections solid cables flexible cables with/without wire end ferrule 	No 0.25 to 0.75 mm ²
Number of cables per connection	1 or a combination of 2 conductors up to 0.75 mm ² (total) in a common wire end ferrule
Max. diameter of the cable insulation	2.0 mm
Stripping length of the cableswithout insulation collarwith insulation collar	6 mm -
 Wire-end ferrules in acc. with DIN 46228 without insulation collar with insulation collar 0.25 to 1.0 mm² with insulation collar 1.5 mm² 	Form A; 5 to 7 mm long - -
Blade width of the screwdriver	3.5 mm (cylindrical shape)
Tightening torque for connecting the cables	0.4 to 0.7 Nm

Selection and ordering data	
Designation	Order No.
Front connector module (digital 4 x 8 I/O)	
Voltage infeed via	
 Screw terminals 	6ES7 921-4AB00-0AA0
Front connector module (2 x 8 outputs) for 2 ampere digital outputs	
Voltage infeed via	
 Screw terminals 	6ES7 921-4AD00-0AA0
Front connector module (analog)	
Voltage infeed via	
 Screw terminals 	6ES7 921-4AG00-0AA0

Circuit diagrams

S7-400, digital 4 x 8 I/O

Front connector module with potential infeed via screw connection 6ES7921-4AB00-0AA0



S7-400, 2 ampere digital 2 x 8 A Front connector module with potential infeed via screw connection 6ES7921-4AD00-0AA0



Fully modular connection Front connector modules

S7-400 front connector modules

Circuit diagrams

S7-400, analog 48-pole I/O module

Front connector module with potential infeed via screw connection 6ES7921-4AG00-0AA0


Overview



The connection cable is the linking element between the front connector module and the connection module. It transmits 8 signals and the supply voltage. The maximum bridgeable distance is 30 m. The connection cable is available in two different versions:

- The pre-assembled round cable
- The round-sheath ribbon cable assembled by the user

Benefits

The pre-assembled round cables offer the following benefits:

- The round cable is ready for use and just has to be plugged in. (plug and play)
- The components of the round cable have UL/CSA approval for the North-American market.
- As usual, this cable is available in a shielded version.

The **round-sheath ribbon cables** to be assembled by the user offer the following benefits:

- The round-sheath ribbon cable is available with a 16-pole flat cable or two 16-pole flat cables. The signals can be transmitted by byte or word.
- The round-sheath ribbon cable can be stripped at any point (unbonded) so the inner flat cable is ready for further processing after stripping.
- The round-sheath ribbon cable always allows laying of optimal lengths.
- The outer sheath of the round-sheath ribbon cable provides this cable with higher mechanical protection than an unsheathed flat cable, while still retaining its flexibility (easy to lay).
- The round-sheath ribbon cable can be assembled by machine (the cable can be stripped by machine and the insulation displacement connectors can be attached by machine).
- The 16-pole round-sheath ribbon cable is also available in a shielded version.

Design

- The **pre-assembled round cable** consists of 16 individual cores with a cable cross-section of 0.14 mm². Both ends are prepared with an insulation displacement connector. The round cable is available in unshielded and shielded versions in different lengths.
- The **round-sheath ribbon cable** is only available by the meter and is assembled by the user with the help of a crimping tool (to be ordered separately). This cable can be stripped at any point and is easy to assemble with the available insulation displacement connector. The round-sheath ribbon cable consists of a 16-pole flat cable with a cross-section of 0.14 mm². It is available as a 16-pole shielded/unshielded version and as a 2 x 16-pole unshielded version in lengths of 30 m and 60 m.

Technical data

Technical data of connection cable from SIMATIC S7 to connection module		
Operating voltage	60 V DC	
Continuous current per signal conductor	1 A	
Max. summation current	4 A/byte	
Operating temperature	0 to +60 °C	
Outer diameter of pre-assembled round cable in mm, unshielded/shielded	Approx. 6.5/7.0	
Outer diameter of round-sheath ribbon cable in mm, 16-pole/2 x 16-pole	Approx. 9.5/11.5	

Selection and ordering data

Designation	Order No.
Pre-assembled round cable 16-pole, 0.14 mm ²	
unshielded	
0.5 m	6ES7923-0BA50-0CB0
1.0 m	6ES7923-0BB00-0CB0
1.5 m	6ES7923-0BB50-0CB0
2.0 m	6ES7923-0BC00-0CB0
2.5 m	6ES7923-0BC50-0CB0
3.0 m	6ES7923-0BD00-0CB0
4.0 m	6ES7923-0BE00-0CB0
5.0 m	6ES7923-0BF00-0CB0
shielded	
1.0 m	6ES7923-0BB00-0DB0
2.0 m	6ES7923-0BC00-0DB0
2.5 m	6ES7923-0BC50-0DB0
3.0 m	6ES7923-0BD00-0DB0
4.0 m	6ES7923-0BE00-0DB0
5.0 m	6E57923-0BF00-0DB0
Round-sheath ribbon cable 16-pole, 0.14 mm ²	
unshielded	
30 m	6ES7923-0CD00-0AA0
60 m	6ES7923-0CG00-0AA0
shielded	
30 m	6ES7923-0CD00-0BA0
60 m	6ES7923-0CG00-0BA0
Round-sheath ribbon cable	
2 x 16-pole, 0.14 mm ²	
unshielded	
30 m	6ES7923-2CD00-0AA0
60 m	6ES7923-2CG00-0AA0
8 connectors (16-pole)	6ES7921-3BE10-0AA0
Insulation displacement system	
with 8 cable grips	

Accessories

Crimping tool

For processing the connectors (female ribbon cable connector)

6ES7928-0AA00-0AA0

Overview



The connection modules form the interface between the I/O connection cables from the field and the SIMATIC S7-300/400. They allow simple and secure connection of almost all SIMATIC S7-300/400 automation device.

Connection to front connector modules

For connection to the front connector modules, one connection cable is used per byte or per analog connection module. In the case of the 2×16 -pole round-sheath ribbon cable, two bytes can be connected. Up to 4 connection modules are connected via the connection cables, depending on the front connector module. Up to 8 signal channels are run via the 16-pole connection cable.

Connection modules

There is a choice of different connection concepts with associated connection modules. The connection modules are latched onto the mounting rail in place of terminal strips or link modules. Passive and active connection modules (function modules) are available. The function modules are fitted with coupling elements. As standard the I/O terminals on the connection module are available with spring or screw connections. The digital connection modules are optionally available with LEDs. The yellow LEDs on the connection module are assigned to every signal path, and these LEDs indicate the signal state "active high". The voltage supply is indicated by a green LED.

Distance

There can be a distance of up to 30 m between the SIMATIC S7 and the connection modules. This depends on the requirements in each case and is at the discretion of the configuration engineer.

Accessories

Plug-in or self-adhesive labeling plates are available for individual and unique system labeling of the connection modules. These labeling plates can be printed by machine and are suitable both for the basic modules and the signal and function modules.

Basic module

Overview



In the case of the basic module, the connection modules are used with basic functionality. Here, the I/O signal is connected quickly and simply from the field to the module or from the module to the field.

The connection terminals for the I/O signals are designed as screw terminal or spring terminal. The connection modules are available for digital and analog signals.

Integration

Connection module for 1-wire initiators (TP1)

If the frame potential of the individual sensors/actuators is not run individually to the connection module, the connection module for 1-wire connection with eight signal connections is used. Two frame potential connections and two positive potential connections are available for potential infeed of the I/O module.

Connection module for 3-wire initiators (TP3)

The connection module for 3-wire initiators provides the user with 8 signal connections, 10 frame potential connections and 10 positive potential connections. This provides sufficient reserves for potential bridges and infeeds.

Connection module for 2 x 8 signals (TPK)

If a connection module for 1-wire connection with two bytes is required, the compact connection module TPK is used. It is connected to the front connector module using two connection cables. This compact connection module comprises 2×8 terminals for the signals, and there are 2×2 frame potential connections and 2×2 positive potential connections available to the user.

Connection module for 2 A modules (TP2)

The 2 ampere modules of the SIMATIC S7 can be connected to the connection module specially designed for these modules.

Connection module for analog signals (TPA)

A special connection module for analog signals is available here for the analog signals of the SIMATIC S7. With the connection module, signals can be connected extremely easily and comfortably. The shield connection of the signal cables is possible using an optional shield plate with the associated shield connection terminals.

Special attention should be given to the following:

All the cores of the connection cable are required for transferring the signals of the 2 A modules. For this reason, the voltage supply of the module must be cabled separately.

You can find the circuit diagrams of the connection modules on pages 2/33 to 2/35.

<u>Note:</u> See under "Configuration and wiring" for mounting of a round-sheath ribbon cable on the 16-pole connector. Pages 2/45 to 2/50.

Technical data

Connnection module TP1, TP3 and	d TPK
Max. operating voltage	60 V DC
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
1-wire connection 6ES7924-0AA10-0A 0	Approx. 55 x 43.2 x 63
• for 3-wire initiators 6ES7924-0CA10-0A_0	Approx. 68 x 43.2 x 80
• for 2 x 8 signals 6ES7924-1AA10-0A_0	Approx. 100 x 43.2 x 80
Connection module TP2	
Max. operating voltage	60 V DC
Continuous current signal conductor	2 A
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2,CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
• for 2 ampere modules 6ES7924-0BB10-0A_0	Approx. 68 x 43.2 x 80
Connection module TPA	
Max. operating voltage	60 V DC
Continuous current signal conductor	1 A
Operating temperature	0 to +60 °C

Air gaps and creepage distances IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II,

Any

pollution degree 3 Dimensions (W x H x D) in mm

• for analog modules 6ES7924-0CC10-0A_0

Mounting position

Approx. 68 x 43.2 x 80

Basic module

Technical data (continued)

	Connection module TPA, TP1, TP2, TP3, TPK	
	Spring connection	Screw connection
Connectable cable cross-sections solid cables flexible cables without wire end ferrule flexible cables with wire end ferrule in accordance with DIN 46228/1 flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4 	No 0.5 to 2.5 mm ² 0.5 to 1.5 mm ² 0.5 to 1.5 mm ²	0.5 to 2.5 mm ² (2.5 mm ² with a crimp in accordance with EN 60947-1)
Number of cables per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Design

Below is an overview of the terminal arrangement of the connection modules for wiring.

Terminal assignment of the connection module (TP1) for 1-wire initiators

Front view of the connection module	Terminal assignment
X 10.1 SIEMENS	Top row Terminal 0 to 7: Inputs/outputs x.0 to x.7 <u>Bottom row</u> 2 terminals L+ and 2 terminals M potential

Terminal assignment of the connection module (TP3) for 3-wire initiators



Top row Terminal 0 to 7: Inputs/outputs x.0 to x.7 Middle row All terminals: M potential

Bottom row All terminals: L+ potential

Terminal assignment of the connection module (TPK) for 1-wire initiators



Terminal assignment

Top row 2 x terminal 0 to 7: Inputs/outputs x.0 to x.7 Bottom row 2 x 2 terminals L+ and 2 x 2 terminals M potential

Terminal assignment of the connection module (TP2) for 2 A modules

Front view of the connection module	Terminal assignment left	Terminal assignment right
	Top row Terminal 0 to 3: Outputs x.0 to x.3 <u>Middle row</u> Terminal 0 to 3: Potential M1 for x.0 to x.3 <u>Bottom row</u> 2 terminals Connection for M1	Top row Terminal 0 to 3: Outputs x.4 to x.7 <u>Middle row</u> Terminal 0 to 3: Potential M2 for x.4 to x.7 <u>Bottom row</u> 2 terminals Connection for M2

2

Basic module

Design (continued)

Terminal assignment of the connection module (TPA) for analog modules

Front view of the connection module	Terminal assignment
X 10.7 SIEMENS	Top row Terminal A to K: Analog signals or compensation connect
	Middle row Terminal Y: L+ potential Terminal Z: M potential Terminal A and K: Compensation connect
	Bottom row You can use the 2 x 5 terminals Z and Y to mu any potentials and sign

<u>Top row</u> Terminal A to K: Analog signals or compensation connection
<u>Middle row</u> Terminal Y: L+ potential Terminal Z: M potential Terminal A and K: Compensation connection
Bottom row
You can use the 2 x 5 terminals Z and Y to multiply any potentials and signals.

Selection and ordering data

Order No.
6ES7924-0AA10-0AB0 6ES7924-0AA10-0AA0
6ES7924-0CA10-0AB0
6ES7924-0CA10-0AA0
6ES7924-1AA10-0AB0 6ES7924-1AA10-0AA0
6ES7924-0BB10-0AB0 6ES7924-0BB10-0AA0
6ES7924-0CC10-0AB0 6ES7924-0CC10-0AA0
6ES7928-2AB00-0AA0 6ES7928-2BB00-0AA0
6ES7928-1BA00-0AA0
6ES7390-5AB00-0AA0 6ES7390-5BA00-0AA0 6ES7390-5CA00-0AA0

Basic module

Circuit diagrams

Connection module TP1

- 8 I/O, spring connection 6ES7924-0AA10-0AB0 or
- 8 I/O, screw connection 6ES7924-0AA10-0AA0



Connection module TP3

8 I/O, spring connection 6ES7924-0CA10-0AB0 or
8 I/O, screw connection 6ES7924-0CA10-0AA0



Basic module

Circuit diagrams

- Connection module TPK
- 2 x 8 I/O, spring connection 6ES7924-1AA10-0AB0 or
- 2 x 8 I/O, screw connection 6ES7924-1AA10-0AA0



Basic module

Circuit diagrams

Connection module TP2

- 8 outputs, spring connection 6ES7924-0BB10-0AB0 or
- 8 outputs, screw connection 6ES7924-0BB10-0AA0





Connection module TPA

- analog I/O, spring connection 6ES7924-0CC10-0AB0 or
 analog I/O, screw connection
 - 6ES7924-0CC10-0AA0



Signal module

Overview



In the case of the signal module, the digital connection modules with LED are used. The yellow LEDs indicate the "active high" signal of the individual channels. This makes commissioning easier for you, and you always have an overview of the signal states of your I/O. At the same time, a green LED indicates when the 24 V DC is applied.

The connection terminals for the I/O signals are designed as screw terminals or spring terminals. The connection modules are available for digital signals.

Integration

Connection module for 1-wire initiators (TP1) with LED

If the frame potential of the individual sensors/actuators is not run individually to the connection module, the compact connection module for 1-wire connection with 8 signal connections is used. 2 frame potential connections and 2 positive potential connections are available for potential infeed of the I/O module.

Connection module for 3-wire initiators (TP3) with LED

The connection module for 3-wire initiators provides the user with 8 signal connections, 10 frame potential connections and 10 positive potential connections. This provides sufficient reserves for potential bridges and infeeds.

Connection module for 2 x 8 signals (TPK) with LED

If a connection module for 1-wire connection with 2 bytes is required, the compact connection module TPK is used. It is connected to the front connector module using 2 connection cables. This compact connection module comprises 2×8 terminals for the signals, and there are 2×2 frame potential connections and 2×2 positive potential connections available to the user.

Connection module for 2 A modules (TP2) with LED

The 2 ampere modules of the SIMATIC S7 can be connected to the connection module specially designed for these modules.

Special attention should be given to the following:

All the cores of the connection cable are required for transferring the signals of the 2 A modules. For this reason, the voltage supply of the module must be cabled separately.

For the LED display to function, the "connection module for 2 A modules (TP2) with LED" must be supplied with frame potential.

You can find the circuit diagrams of the connection modules on pages 2/39 to 2/40.

<u>Note:</u> See under *"Configuration and wiring"* for mounting of a round-sheath ribbon cable on the 16-pole connector. Pages 2/45 to 2/50.

Technical data

Connection module TP1, TP3 and	TPK with LED
Max. operating voltage	24 V DC
Continuous current per signal	1 A
Max. summation current (voltage infeed)	4 A/byte
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
1-wire connection with LED 6ES7924-0AA10-0B_0	Approx. 55 x 43.2 x 63
 for 3-wire initiators with LED 6ES7924-0CA10-0B_0 	Approx. 68 x 43.2 x 80
 for 2 x 8 signals with LED 6ES7924-1AA10-0B 0 	Approx. 100 x 43.2 x 80

Connection module TP2 with LED	
Max. operating voltage	24 V DC
Continuous current per signal conductor	2 A
Operating temperature	0 to + 60 °C
Mounting position	Any
Air gaps and creepage distances	IEC Report 664, IEC 664 A, IEC 1131 T2, CSA C22.2 No 142 UL 508, VDE 0160 (12.90), overvoltage category II, pollution degree 3
Dimensions (W x H x D) in mm	
 for 2 ampere modules with LED 	Approx 68 x 43 2 x 80

6ES7924-0BB10-0B_0

Signal module

Technical data (continued)

	Connection module TP1 LED, TPK LED, TP2 LED, TP3 LED	
	Spring connection	Screw connection
Connectable cable cross-sections		·
 solid cables flexible cables without wire end ferrule flexible cables with wire end ferrule in accordance with DIN 46228/1 flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4 	No 0.5 to 2.5 mm ² 0.5 to 1.5 mm ² 0.5 to 1.5 mm ²	0.5 to 2.5 mm ² (2.5 mm ² with a crimp in accordance with EN 60947-1)
Number of cables per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule	
Blade width of the screwdriver	3.5 mm (cylindrical shape)	
Tightening torque for connecting the cables	-	0.4 to 0.7 Nm

Design

Below is an overview of the terminal arrangement of the connection modules for wiring:

Terminal assignment of the connection module (TP1) with LED for 1-wire initiators Front view of the connection module <u>Terminal assignment</u>

From view of the connection module	Termi
X 10.1	LEDs
	Top ro Termir Inputs Botton 2 term 2 term

LEDs for signaling <u>Top row</u> Terminal 0 to 7 Inputs/outputs x.0 to x.7 <u>Bottom row</u> 2 terminals L+ and 2 terminals M potential

Terminal assignment of the connection module (TP3) with LED for 3-wire initiators

Front view of the connection mod
X 10.3 SIEMENS
(Decision)
66 5 5 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
L+000000000L+

LEDs for signaling <u>Top row</u> Terminal 0 to 7: Inputs/outputs x.0 to x.7 <u>Middle row</u> All terminals: M potential <u>Bottom row</u> All terminals L+ potential

Terminal assignment

Terminal assignment of the connection module (TPK) with LED for 1-wire initiators



Terminal assignment

LEDs for signaling <u>Top row</u> 2 x terminal 0 to 7: Inputs/outputs x.0 to x.7

Bottom row 2 x 2 terminals L+ and 2 x 2 terminals M potential Terminal assignment of the connection module (TP2) with LED for 2 A modules

Front view of the connection module	Terminal assignment left	Terminal assignment right
X 10.2 SIEMENS	LEDs for signaling	LEDs for signaling
8888888	Top row Terminal 0 to 3 Outputs x.0 to x.3	Top row Terminal 0 to 3: Outputs x.4 to x.7
	Middle row Terminal 0 to 3: Potential M1 for x.0 to x.3	Middle row Terminal 0 to 3: Potential M2 for x.4 to x.7
M1 M2	Bottom row 2 terminals Connection for M1	Bottom row 2 terminals Connection for M2

Signal module

Selection and ordering data

-	
Designation	Order No.
Connection moduleTP1 with LED for 1-wire initiators Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-0AA10-0BB0 6ES7924-0AA10-0BA0
Connection module TP3 with LED for 3-wire initiators Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-0CA10-0BB0 6ES7924-0CA10-0BA0
Connection module TPK with LED for 2 x 8 signals Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-1AA10-0BB0 6ES7924-1AA10-0BA0
Connection module TP2 with LED for 2 A modules for 2-wire initiators Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-0BB10-0BB0 6ES7924-0BB10-0BA0
Accessories	
Labeling plates for connection modules	
Insertable labeling plate PU = 200 units	6ES7928-2AB00-0AA0
Self-adhesive labeling plate PU = 200 units	6ES7928-2BB00-0AA0

2

Signal module

Circuit diagrams

Connection module TP1

- 8 I/O, spring connection with LEDs 6ES7924-0AA10-0BB0 or
- 8 I/O, screw connection with LEDs 6ES7924-0AA10-0BA0



Connection module TP3

- 8 I/O, spring connection with LEDs 6ES7924-0CA10-0BB0 or
- 8 I/O, screw connection with LEDs 6ES7924-0CA10-0BA0



Signal module

Circuit diagrams

Connection module TPK

- 2 x 8 I/O, spring connection with LEDs 6ES7924-1AA10-0BB0 or
- 2 x 8 I/O, screw connection with LEDs 6ES7924-1AA10-0BA0





- 8 outputs, spring connection with LEDs 6ES7924-0BB10-0BB0 or
- 8 outputs, screw connection with LEDs 6ES7924-0BB10-0BA0



Overview



Function modules are implemented with digital connection modules fitted with relays or optocouplers.

If other voltage or power levels are required in the field, the connection module for output signals TPRo is used. This converts the 24 V DC output signal simply and reliably to another voltage or power level. If 230 V AC input signals have to be transmitted to the controller in the field, a connection module with relay TPRi is available that converts the 230 V AC signal simply to 24 V DC. This means you always have the same voltage level on the module side.

Function

The function modules are equipped with LEDs for signaling.

The yellow LEDs indicate the presence of 24 V DC at the relay coil in the case of TPRo.

The yellow LED of the connection module with relay (TPRi) indicates that the relay contact has switched the 24 V DC through to the module.

This makes commissioning easier for you and provides you with a constant overview of the switching state of your I/O. At the same time, a green LED indicates whether the 24 V DC for the module supply is present.

The connection terminals for the I/O signals are designed as screw terminal or spring terminal.

The relays on both modules have sockets and can be replaced in the event of a fault.

Use with optocoupler

If higher switching frequencies of the relay connection module are required for output signals, the relay can be simply replaced by an optocoupler (please note technical data) in order to increase the switching frequency here.

The installation information for connection modules (TPRo) refers only to the order numbers 6ES7924-0BD10-0BB0 and 6ES7924-0BD10-0BA0.

Inductive loads must be attenuated externally with an effective circuit for protecting the relay contacts; no measures are provided for this in the TPR.

When using relays (e.g. Nais APE 30024):

Overvoltage protection (e.g. Weidmüller 940149 0000 DK4U 60 V AC/85 V DC or equivalent) must be provided to overcome transient voltages of ±2 kV.

When using optocouplers (e.g. Nais AQE 34224 or Nais AQE 12124):

Overvoltage protection (e.g. Weidmüller 940149 0000 DK4U 60 V AC/85 V DC or equivalent) must be provided to overcome transient voltages of ±1 kV.

Function module

Integration

Connection module with relay (TPRo) for outputs

If galvanic isolation or adaptation of the potential (e.g. 24 V DC to 230 V AC) is desired between the output signals and the field signals, the connection module with relay is used. On the connection module with relay, the user has 8 signal connections in 2-wire technology for the field signals. Potential infeed to the module can be made from the connection module or from the front connector module. The relays can be replaced by optocouplers. The electrical values must be noted here. These relay connection modules are fitted with LEDs for signaling.

Connection module with relay (TPRi) for inputs

If galvanic isolation (e.g. 230 V AC to 24 V DC) is desired between the field signals and the input signals, the connection module with relay is used. On the connection module with relay, the user has 8 signal connections in 2-wire technology for the field signals. Potential infeed to the module can be made from the connection module or from the front connector module. These relay connection modules are fitted with LEDs for signaling.

You can find the circuit diagrams of the connection modules on page 2/44.

<u>Note:</u> See under *"Configuration and wiring"* for mounting of a round-sheath ribbon cable on the 16-pole connector. Pages 2/45 to 2/50.

Technical data

Connection module with relay for	outputs (TPRo)
Energizing side	
Operating voltage for coil	24 V DC
Input circuit	Reverse polarity protection and freewheeling diodes
Contact side	
Number of relay outputs	8 (NO contacts)
Contact design	Single contact, 1 NO contact
Switching capacity (resistive load)	max. 4 A/250 V AC, max. 3 A/30 V DC max. 0.6 A/48 V DC max. 0.4 A/60 V DC recommended minimum load ≥ 10 mA
Switching frequency	20 cycles/minute
Service life • mechanical • electrical	5 x 10^6 operating cycles 3 x 10^4 operating cycles at 230 V AC/2 A/cos $\phi = 1$
Operating temperature	0 to +60 °C
Mounting position	Any
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; Cul (Reference CSA C22.2 No. 142) overvoltage category III pollution degree 2
Dimensions (W x H x D) in mm	
6ES7924-0BD10-0B_0	Approx. 100 x 45 x 80

Connection module with relay for inputs (TPRi)			
Energizing side			
Operating voltage for coil	230 V AC		
	from 207 to 280 V AC		
Input circuit	Varistors		
Contact side			
Number of relay outputs	8 (NO contacts)		
Contact design	Single contact, 1 NO contact		
Switching capacity (resistive load)	max. 50 mA/24 V DC max. 50 mA/48 V DC max. 50 mA/60 V DC recommended minimum load ≥ 5 mA		
Switching frequency	200 cycles/minute		
Service life • mechanical • electrical	10 x 10 ⁶ operating cycles 3 x 10 ⁶ operating cycles at 230 V AC/50 mA/cos ϕ = 1		
Operating temperature	0 to +60 °C		
Mounting position	Any		
Air gaps and creepage distances	Basic standard IEC 60664-1; UL 508; Cul (Reference CSA C22.2 Nr. 142) overvoltage category III pollution degree 2		
Dimensions (W x H x D) in mm			
6ES7924-0BE10-0B_0	Approx. 120 x 45 x 80		

Function module

Technical data (continued)

	Connection module TPRo and TPRi		
	Spring connection	Screw connection	
Connectable cable cross-sections			
 solid cables flexible cables without wire end ferrule flexible cables with wire end ferrule in accordance with DIN 46228/1 flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4 	No 0.5 to 2.5 mm ² 0.5 to 1.5 mm ² 0.5 to 1.5 mm ²	0.5 to 2.5 mm ² (2.5 mm ² with a crimp in accordance with EN 60947-1)	
Number of cables per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared wire end ferrule		
Blade width of the screwdriver	3.5 mm (cylindrical shape)		
Tightening torque for connecting the cables	3 – 0.4 to 0.7 Nm		

Design

Below is an overview of the terminal arrangement of the connection modules for wiring.

Terminal assignment of the connection modules (TPR) with relays



2 x 2 terminals for 24 V DC potential connection LEDs for signaling Relays with sockets Bottom row Terminal 0 to 7: Connections for field signals (outputs) in 2-wire connection

Selection and ordering data

Designation	Order No.
Connection module TPRo for output signals	
for 2-wire connection	
Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-0BD10-0BB0 6ES7924-0BD10-0BA0
Connection module TPRi for input signals	
for 2-wire connection	
Packaging unit (1 unit)	
Spring terminalsScrew terminals	6ES7924-0BE10-0BB0 6ES7924-0BE10-0BA0
Accessories	
Labeling plates	
for connection modules	
Insertable labeling plate	6ES7928-2AB00-0AA0
PU = 200 units	
Self-adhesive labeling plate PU = 200 units	6ES7928-2BB00-0AA0
Replacement relay for relay connection module	
PU = 4 units	
Replacement relay for TPRi	6ES7928-3BA00-4AA0
Replacement relay for TPRo	6ES7928-3AA00-4AA0
Optocoupler DC alternative for relay with TPRo PU = 4 units	6ES7928-3DA00-4AA0
Optocoupler AC alternative for relay with TPRo PU = 4 units	6ES7928-3CA00-4AA0

Front view of the connection module TPRi



Terminal assignment

2 x 2 terminals for 24 V DC potential connection LEDs for signaling Relays with sockets Bottom row Terminal 0 to 7: Connections for field signals (inputs) in 2-wire connection

Function module

Circuit diagrams

Connection module TPRi

- 8 NO contacts with LEDs, spring connection 6ES7924-0BE10-0BB0 or
- 8 NO contacts with LEDs, screw connection 6ES7924-0BE10-0BA0



Connection module TPRo

- 8 NO contacts with LEDs, spring connection 6ES7924-0BD10-0BB0 or
- 8 NO contacts with LEDs, screw connection 6ES7924-0BD10-0BA0



Mounting of round-sheath ribbon cable and S7-300 connector

Integration

Preparation of round-sheath ribbon cables for mounting

The round-sheath ribbon cable is first cut to the required length by the user prior to mounting.

Round-sheath ribbon cable 1 x 16-pole

For the 2 x 8 I/O front connector module (20-pole), the cable sheath must be shortened by approx. 110 mm for connection to the upper socket of the module, and by approx. 70 mm for connection to the lower socket. For the 4 x 8 I/O front connector module (40-pole) and the front connector module for the Compact CPU (connector X1), the cable sheath must be shortened by approx. 115 mm for connection to the upper socket of the module, and by approx. 75 mm for connection to the lower socket. For connection to the connection to the lower must be removed from the cable sheath.

Round-sheath ribbon cable 2 x 16-pole

For the 2 x 8 I/O front connector module (20-pole), the cable sheath must be shortened by approx. 95 mm. For connection to the upper socket of the front connector module, the outer flat cable must be shortened to 95 mm, and for connection to the lower socket, the inner flat cable must be shortened to 40 mm. For the 4 x 8 I/O front connector module (40-pole) and the front connector module for the Compact CPU (connector X1), the cable sheath must be shortened by approx. 115 mm. For connection to the upper socket of the front connector module, the outer flat cable must be shortened to 115 mm, and for connection to the lower socket, the inner flat cable must be shortened to 75 mm. For connection to the connection to the connection module, approx. 100 mm must be removed from the cable sheath.

Connection of round-sheath ribbon cable to 16-pole connector

The flat cable is threaded into the 16-pole connector. The socket is fitted with a guide key. Pin 1 is marked with a triangle on the side of the guide key.

The flat cable must be inserted in such a way that the marked core of the flat cable ends above the triangle of the connector. The connector is an insulation displacement connector and can be simply pressed on.

The strain relief is then fitted to the connector on the connection module side of the round-sheath ribbon cable. After it has been pressed on, the round-sheath ribbon cable is laid back over the connector. The supplied strain relief can then be slipped over the round-sheath ribbon cable until it latches to the connector.

When connecting the 2 x 16-pole round-sheath ribbon cable to the 2 x 8 I/O front connector module (20-pole), the cable sheath is positioned within the latter. The round-sheath ribbon cable is secured to the front connector module using a cable tie.



Mounting of a round-sheath ribbon cable to a 16-pole connector, suitable for a connection module and S7-300 front connector modules

		Front connector module		Connection module
	View to the socket in mounting position	Upper socket	Lower socket	Socket
		Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath
Round-sheath ribbon cable	1 x 16-pole		•	
Front connector module 20-pole	8 I/O each	approx. 110 mm	approx. 70 mm	
Front connector module 40-pole and Compact CPU (X1 connector)	8 I/O each	approx. 115 mm	approx. 75 mm	
Connection module				approx. 40 mm
Round-sheath ribbon cable	2 x 16-pole			
Front connector module 20-pole	2 x 8 I/O	approx. 95 mm		
		then shortening of the outer flat cable to approx. 95 mm	then shortening of the outer flat cable to approx. 40 mm	
Front connector module 40-pole and Compact CPU (X1 connector)	2 x 8 I/O	115 mm		
		then shortening of the outer flat cable to approx. 115 mm	then shortening of the outer flat cable to approx. 75 mm	
Connection module				approx. 100 mm

Mounting of round-sheath ribbon cable and S7-400 connector

Integration

Preparation of round-sheath ribbon cables for mounting

The round-sheath ribbon cable is first cut to the required length by the user before mounting.

Round-sheath ribbon cable 1 x 16-pole

When connecting to the top socket of the front connector module, the cable sheath must be removed by approx. 315 mm, when connecting to the second socket from the top by approx. 270 mm, when connecting to the second socket from the bottom by approx. 160 mm, and when connecting to the bottom socket by approx. 140 mm.

For connection to the connection, approx. 40 mm must be removed from the cable sheath.

Round-sheath ribbon cable 2 x 16-pole

When connecting to the two top sockets of the front connector module, the cable sheath must be removed by approx. 270 mm, and then the outer flat ribbon cable shortened to approx. 265 mm and the inner flat ribbon cable to 230 mm. For the two bottom sockets of the front connector module, the cable sheath must be removed by approx. 120 mm, and then the outer flat ribbon cable shortened to approx. 115 mm and the inner flat ribbon cable to 85 mm.

For connection to the connection, approx. 100 mm must be removed from the cable sheath.

Connection of round-sheath ribbon cable to 16-pole connector

The flat cable is threaded into the 16-pole connector. The connector is fitted with a guide key. Pin 1 is marked with a triangle on the side of the guide key.

The flat cable must be inserted in such a way that the marked core of the flat cable ends above the triangle of the connector.

Make absolutely sure that the position of the marked core is correct, once for the front connector module (see graphic at top right) and once for the connection (see graphic at bottom right). The connector is an insulation displacement connector and can now be pressed on easily.

Then fix the strain relief. To do this, lay the round-sheath ribbon cable back over the plug.

The supplied strain relief can then be slipped over the roundsheath ribbon cable and latched to the connector.



Mounting of a round-sheath ribbon cable to a 16-pole connector, suitable for a SIMATIC S7-400 front connector module



Mounting of a round-sheath ribbon cable to a 16-pole connector, suitable for a connection module and S7-400 front connector modules

	Front connector module					Connection module
	View to the socket in mounting position	Upper socket	Second upper socket	Second lower socket	Lower socket	Socket
		Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath
Flat round cable 1	x 16-pole					
Front connector module 48-pole	8I/O each	approx. 315 mm	approx. 270 mm	approx. 160 mm	approx. 140 mm	
Connection module						approx. 40 mm
Flat round cable 2	x 16-pole					
Front connector module 48-pole	2 x 8 I/O	approx. 270 mm		approx. 120 mm		
		then shortening of the outer flat cable to approx. 265 mm	then shortening of the outer flat cable to approx. 230 mm	then shortening of the outer flat cable to approx. 115 mm	then shortening of the outer flat cable to approx. 85 mm	
Connection module						approx. 100 mm

Wiring of S7-300 analog modules

Overview

Wiring of analog modules for the SIMATIC S7-300 with SIMATIC TOP connect

An analog connection module is available for wiring SIMATIC S7-300 analog modules with SIMATIC TOP connect. The follow-ing connection information must be followed when wiring.

Load voltage supply

In the front connector module, there are separate connections for the load voltage L+ and M. This allows you to connect the load voltage supply of the analog module either on the front connector module or on the connection module. The distance between the front connector module and the connection module can be up to 30 m.

Terminal assignment

The individual terminals are labeled alphabetically on the connection module TPA. This makes it easier for you to assign the individual terminals on the analog module to the terminals of the connection module.

In the tables, you can see the assignment between the terminals on the analog module and on the connection module.

Assignment of 20-pole analog front connector module to the connection module

The upper socket of the front connector module is the connection for connection module 1, and the lower socket of the front connector module is the connection for connection module 2.



Terminal assignment of the 20-pole analog modules to the connection modules

	Connection assignme module TPA	Connection assignment for connection module TPA			
Module labeling	Connection module 1	Connection module 2			
1	Y	Y			
2	В				
3	C				
4	D				
5	E				
6	F				
7	G				
8	Н				
9	I				
10	К	К			
11	А	A			
12		В			
13		С			
14		D			
15		E			
16		F			
17		G			
18		Н			
19		1			
20	Z	Z			

Wiring of S7-300 analog modules

Overview (continued)

Assignment of 40-pole analog front connector module to the connection module

In the table for the 40-pole analog front connector module, you can see the assignment of the sockets to the connection module.



G-KT01_EN_00105

Connection assignment for connection module TPA			Connection a connection r	assignment for nodule TPA	
Connection module 1	nection Connection Module Co dule 1 module 2 labeling mo		Connection module 3	Connection module 4	
Y	Y	1	21	Y	Y
В		2	22	В	
С		3	23	С	
D		4	24	D	
E		5	25	E	
F		6	26	F	
G		7	27	G	
Н		8	28	Н	
I		9	29	1	
К	К	10	30	К	К
А	А	11	31	А	А
	В	12	32		В
	С	13	33		С
	D	14	34		D
	E	15	35		E
	F	16	36		F
	G	17	37		G
	Н	18	38		Н
	1	19	39		I
Z	Z	20	40	Z	Z

Terminal assignment of the 40-pole analog modules to the connection modules

Wiring of S7-300 analog modules

Overview (continued)



Legend:

5 openings for strain relief device

1 to 4: round-sheath ribbon cable connections

See the following table for address assignment

Terminal block assignment to the 40-pole analog front connector module

Connection cable connection (see graphic for 40-pole analog front connector module for assignment)	Connection module assignment to the 40-pole analog front connector module
1	Connection module 1
2	Connection module 2
3	Connection module 3
4	Connection module 4

Shield connection

On the analog module, you can connect the shield of the shielded signal cable to ground via a shield connection element, and on the connection module you can connect the shield to ground via the shield plate. You can connect the shield of the signal cables or the round-sheath ribbon cable directly to the connection module. Secure a shield plate to the connection module for this purpose before assembly. In the graphic you can see that the shield plate is on the rear of the connection module and that the connection to the grounded mounting rail is made in this way. You connect the shield of the signal cables or the round-sheath ribbon cable with the shield connection terminals on the shield plate.



Analog connection module with shield plate

Wiring of S7-400 analog modules

Overview

Wiring of analog modules for the SIMATIC S7-400 with SIMATIC TOP connect

An analog connection module is available for wiring SIMATIC S7-400 analog modules with SIMATIC TOP connect. The following connection information must be followed when wiring.

Load voltage supply

In the front connector module, there are separate connections for the load voltage L+ and M. This allows you to connect the load voltage supply of the analog module either on the front connector module or on the connection module. The distance between the front connector module and the connection module can be up to 30 m.

Terminal assignment

The individual terminals are labeled alphabetically on the connection module TPA. This makes it easier for you to assign the individual terminals on the analog module to the terminals of the connection module.

In the table, you can see the assignment between the terminals on the analog module and on the connection module.

Numbering	Connection			
Front connector module	X1	X2	Х3	X4
	Connection	module		
	1	2	2	4
1				
2				
3				
4	Y	Y	Y	Y
5				
6	В			
7	С			
8	D			
9	E			
10	Z	Z	Z	Z
11	F			
12	G			
13	Н			
14	1			
15	Y	Y	Y	Y
16		В		
17		С		
18		D		
19		E		
20	Z	Z	Z	Z
21		F		
22		G		
23		Н		
24		1		
25	К	К	К	К
26	A	А	A	А
27	Y	Y	Y	Y
28			В	
29			С	
30			D	
31			E	
32	Z	Z	Z	Z
33			F	
34			G	
35			Н	
36			I	
37	Y	Y	Y	Y
38				В
39				С
40				D
41				E
42	Z	Z	Z	Z
43				F
44				G
45				Н
46				1
47				
48	Z	Z	Z	Z

Shield connection

See "Wiring of S7-300 analog modules". Page 49.



3/2	Overview
3/2	Benefits
3/2	Application
3/2	Design
3/3	Front connector with S7-300 single cores
3/4	Front connector with S7-400 single cores
3/5	Front connector

Overview



The flexible connection guarantees a fast and direct connection from the input/output modules of the SIMATIC S7-300/400 to the individual elements in the control cabinet.

Already attached single cores reduce the wiring effort.

The core cross-sections of 0.5 mm² also allow higher currents.

Benefits

- Individual cores can be routed directly to each element in the control cabinet
- Higher currents possible due to greater cross-section with lower voltage drop
- Reduction in wiring overhead through simple connection of the pre-assembled cable to the I/O module
- Easy wiring. The number printed on the cores corresponds to the connection point on the I/O connector
- · Clear control cabinet wiring due to bundled single cores

Application

On the front connector with single cores, up to 16 or 32 digital input and output channels can be connected directly with the I/O. The single cores are fitted with screw contacts or crimp contacts and are cut off straight at the other end. The cores can be easily assigned since they are coded in accordance with the pin designations on the front connector.

The single cores are available as H05V-K version or with UL/CSA certification.

The UL/CSA single cores are certified in accordance with UL 1007/1569 or TR64.

Design

- · Front connector with attached single cores.
- The front connectors are available in the version with screw contacts or crimp contacts.
- The single cores are available as H05V-K version or with UL/CSA certification.
- The cores have a cross-section of 0.5 mm² and are labelled with a printed number.
- Cable ties combine the single cores into a bundle.
- The standard lengths are 2.5 m, 3.2 m and 5.0 m. Special lengths are available on request.

Overview



- Can be used with SIMATIC S7-300 modules
- The front connectors with single cores replace the SIMATIC Ine front connectors with standard connectors - 6ES7392-1AJ00-0AA0 - 6ES7392-1BJ00-0AA0 - 6ES7392-1AM00-0AA0 - 6ES7392-1AM00-0AA0 - 6ES7392-1BM01-0AA0

 - 6ES7921-3AH20-0AA0

Technical data

Front connector with single cores	16 channels	
Rated operating voltage	24 V DC	
Permissible continuous current with simultaneous loadon all cores, max.	1.5 A	
Permissible ambient temperature	0 to +60 °C	
Core type	H05V-K or with UL 1007/1569; CSA TR64	
Number of single cores	20	
Core cross-section	0.5 mm ² ; Cu	
Bundle diameter in mm	Approx. 15	
Color of core	Blue, RAL 5010	
Designation of cores	Numbered from 1 to 20 (front connector contact = core number)	
Fabrication	Screw or crimp contacts	
Front connector with single cores 32 channels		
Rated operating voltage	24 V DC	
Permissible continuous current with	1.5 A	

simultaneous load of all wires, max.	
Permissible ambient temperature	0 to +60 °C
Core type	H05V-K or with UL 1007/1569; CSA TR64
Number of single cores	40
Core cross-section	0.5 mm ² ; Cu
Bundle diameter in mm	Approx. 17
Color of core	Blue, RAL 5010
Designation of cores	Numbered from 1 to 40 (front connector contact = core number)
Fabrication	Screw or crimp contacts

Front connector with \$7-300 single co es

Selection and ordering data	
Designation	Order No.
Front connector with single cores for <u>16-channel</u> digital modules SIMATIC S7-300, 20 x 0,5 mm ²	
Core type H05V-K	
<u>Screw version</u> Packaging unit (1 unit) Length: a 9.5 m	
 2.5 m 5.0 m Special lengths 	6ES7922-3BC30-0AB0 6ES7922-3BD20-0AB0 6ES7922-3BF00-0AB0
Packaging unit (5 units) Length:	omequest
• 2.5 m • 3.2 m • 5.0 m	6ES7922-3BC50-5AB0 6ES7922-3BD20-5AB0 6ES7922-3BF00-5AB0
<u>Crimp version</u> Packaging unit (1 unit) Length:	
• 2.5 m • 3.2 m • 5.0 m	6ES7922-3BC50-0AF0 6ES7922-3BD20-0AF0 6ES7922-3BF00-0AF0
• Special lengths	onrequest
Screw version Packaging unit (1 unit) Length: 3.2 m	6FS7922-3BD20-01IB0
+ 0.2 m	
• 5.0 m	6ES7922-3BF00-0UB0
• 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm ² Core type H05V-K <u>Screw version</u> Packaging unit (1 unit)	6ES7922-3BF00-0UB0
• 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm ² Core type H05V-K Screw version Packaging unit (1 unit) Length: • 2.5 m • 3.2 m • 5.0 m • Special lengths	6ES7922-3BF00-0UB0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BF00-0AC0 on request
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 	6ES7922-3BC50-0UB0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 on request
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC 57-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m 	6ES7922-3BC50-0UB0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BF00-0AC0 on request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC 57-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: <l< td=""><td>6ES7922-3BC50-0UB0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BF00-0AC0 on request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0</td></l<>	6ES7922-3BC50-0UB0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BF00-0AC0 on request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC 57-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m 	6ES7922-3BC50-0AC0 6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 0n request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BC50-0AG0 6ES7922-3BC50-0AG0 6ES7922-3BF00-0AG0
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths 	6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 0n request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BD20-0AG0 6ES7922-3BD20-0AG0 6ES7922-3BD20-0AG0 0n request
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Special lengths Core type UL/CSA-certified Screw version 	6ES7922-3BC50-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 on request 6ES7922-3BC50-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BD20-0AG0 6ES7922-3BD20-0AG0 6ES7922-3BD20-0AG0 0 n request
 5.0 m Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Special lengths Packaging unit (5 units) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Crimp version Packaging unit (1 unit) Length: 2.5 m 3.2 m 5.0 m Cre type UL/CSA-certified Screw version Packaging unit (1 unit) Length: 2.5 m 3.2 m 	6ES7922-3BF00-0UB0 6ES7922-3BF00-0UB0 6ES7922-3BD20-0AC0 6ES7922-3BD20-0AC0 0 n request 6ES7922-3BF00-0AC0 0 n request 6ES7922-3BD20-5AC0 6ES7922-3BF00-5AC0 6ES7922-3BF00-0AG0 6ES7922-3BF00-0AG0 0 n request 6ES7922-3BF00-0AG0 6ES7922

Front connector with S7-400 single cores

Overview



- 3
- Can be used for SIMATIC S7-400 modules
- The front connectors with single cores replace the SIMATIC standard connectors
 - 6ES7492-1AL00-0AA0
 - 6ES7492-1BL00-0AA0
 - 6ES7492-1CL00-0AA0

Technical data

Front connector with single cores	•
Rated operating voltage	24 V DC
Max. permissible continuous current with simultaneous load on all cores	1.0 A
Permissible ambient temperature	0 to +60 °C
Core type	H05V-K or with UL style 1007/1569 CSA TR64
Number of cores	46
Core cross-section	0.5 mm ² , Cu
Bundle diameter in mm	Approx. 17
Color of core	Blue, RAL 5010
Designation of cores	Numbered from 3 to 48 (adapter contact = core number)
Fabrication	Screw or crimp contacts

Selection and ordering data Designation Order No. Front connector with single cores for <u>32-channel</u> digital modules SIMATIC S7-400, 46 x 0,5 mm² Core type H05V-K Screw version Packaging unit (1 unit) Length: • 2.5 m 6ES7922-4BC50-0AD0 • 3.2 m 6ES7922-4BD20-0AD0 • 5.0 m 6ES7922-4BF00-0AD0 Special lengths on request Packaging unit (5 units) Length: • 2.5 m 6ES7922-4BC50-5AD0 6ES7922-4BD20-5AD0 • 3.2 m 6ES7922-4BF00-5AD0 • 5.0 m Crimp version Packaging unit (1 unit) Length: • 2.5 m 6ES7922-4BC50-0AE0 • 3.2 m 6ES7922-4BD20-0AE0 • 5.0 m 6ES7922-4BF00-0AE0 • Special lengths on request Packaging unit (5 units) Length: • 2.5 m 6ES7922-4BC50-5AE0 6ES7922-4BD20-5AE0 • 3.2 m • 5.0 m 6ES7922-4BF00-5AE0 Core type UL/CSA-certified Screw version

Packaging unit (1 unit) Length:

- 3.2 m
- 5.0 m
- Special lengths

6ES7922-4BD20-0UD0 6ES7922-4BF00-0UD0

on request

Overview



For easy and user-friendly connection of sensors and actuators.

The front connector enables easy and user-friendly connection of sensors and actuators to signal modules. It is connected to the modules and covered by the door at the front.

- Retaining the wiring when the module is replaced. When replacing modules, only the front connector has to be removed. Time-consuming replacement of all cables is not necessary.
- With a coding element to prevent mistakes when replacing modules.

To avoid mistakes when replacing modules, the front connector is coded when inserted for the first time. It will then only fit into modules of the same type.

Design

The front connector is available in two designs

The 20-pole front connector contains:

- 20 connections for crimp contacts for connecting the wiring
- Strain relief for the cables
- Unlatching key; for unlatching the front connector when replacing the module
- Holder for coding element attachment; there are two coding elements with attachments on the modules. The attachments latch in when inserting into the front connector for the first time.

The 40-pole front connector contains:

- 40 connections for crimp contacts for connecting the wiring
- · Strain relief for the cables
- Locking screw; for fixing and detaching the front connector when the module is replaced
- Holder for coding element attachment; there is a coding element with an attachment on the modules. The attachment latches in when inserting into the front connector for the first time.

Front connector

Integration

Use of the 20-pole front connector with

- 16-channel signal modules
- Function modules
- CPU 312 IFM
- Use of the 40-pole front connector with
- 32-channel signal modules
- Compact CPUs

Selection and ordering data

Designation	Order No.
Front connector 20-pole, crimp version without crimp contacts	
Packaging unit (100 units)	6ES7921-3AH00-1AA0
Front connector 40-pole, crimp version without crimp contacts	
Packaging unit (100 units)	6ES7921-3AH20-1AA0
Accessories	
Crimp contacts for front connectors	6XX3070
Packaging unit (250 units)	
Crimping tool for crimping the crimp contacts	6XX3071
Unlocking tool for crimp contacts	6ES5497-4UC11

Notes



4/2	Brief instruction to the configuration guide
4/3	Configuration guides

Brief instruction to the configuration guide

For first time use Tear the drawing pages along the perforated line. The perforated line is indicated by the "scissors" symbol.

In daily use

- 1. In the upper part of the sheets, find the SIMATIC S7-300 or S7-400 with the relevant front connector module.
- 2. Find the connection module you intend to use by looking through the lower halves of the pages.

You can find the valid assignment of front connector module to connection module in the selection overview on pages 2/6 to 2/13.

3. Copy the page that you have matched together.

Follow all the other steps on the copy.

- 4. Enter the signal assignment on the labeling field of the module.
- 5. Enter the incoming or outgoing signals in the labeling field of the connection module.
- 6. Fill out the customized labeling fields.






























Notes

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Appendix Siemens contacts worldwide







At

http://www.siemens.com/automation/partner

you can find details of Siemens contact partners worldwide responsible for particular technologies.

You can obtain in most cases a contact partner for

- technical support,
- spare parts/repairs,
- service,
- training,
- sales or
- consultation/engineering.
- You start by selecting a
- country,
- product or
- sector.

By further specifying the remaining criteria you will find exactly the right contact partner with his/her respective expertise.

Appendix A&D online services

Information and order possibilities on the Internet and on CD-ROM

A&D in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

The Siemens Automation and Drives Group (A&D) has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

http://www.siemens.com/automation

you will find everything you need to know about products, systems and services.

Product selection using the Offline Mall of Automation and Drives



Detailed information together with convenient interactive functions:

The Offline Mall CA 01 covers more than 80,000 products and thus provides a full summary of the Siemens Automation and Drives product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives. All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the Offline Mall CA 01 can be found on the Internet under

http://www.siemens.com/automation/ca01

or on CD-ROM or DVD.



Easy shopping with the A&D Mall

The A&D Mall is the virtual department store of Siemens AG on the Internet. Here you have access to a huge range of products presented in electronic catalogs in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking of the order to be carried out online via the Internet.

Numerous functions are available to support you.

For example, powerful search functions make it easy to find the required products, which can be immediately checked for availability. Customer-specific discounts and preparation of quotes can be carried out online as well as order tracking and tracing.

Please visit the A&D Mall on the Internet under:

http://www.siemens.com/automation/mall

Appendix Customer support

Our services for every phase of your project



In the face of harsh competition you need optimum conditions to keep ahead all the time:

a strong starting position, a sophisticated strategy and team for the necessary support - in every phase.

Service & Support from Siemens provides this support with a complete range of different services for automation and drives.

In every phase: from planning and commissioning to maintenance and upgrading.

Our specialists know when and where to act to keep the productivity and cost-effectiveness of your system running in top form.

Online support



The comprehensive information system available round the clock via Internet ranging from Product Support and Service & Support services to Support Tools in the Shop.

http://www.siemens.com/ automation/service&support

Configuration and software engineering



Support in configuring and developing with customer-oriented services from actual configuration to implementation of the automation project. ¹⁾

Service on site



With Service On Site we offer services for startup and maintenance, essential for ensuring system availability.

In Germany Phone: +49 (0)180 50 50 444 ¹⁾

Repairs and spare parts



In the operating phase of a machine or automation system we provide a comprehensive repair and spare parts service ensuring the highest degree of operating safety and reliability.

In Germany Phone: +49 (0)180 50 50 446 1)

Optimization and upgrading



To enhance productivity and save costs in your project we offer high-quality services in optimization and upgrading. ¹⁾



Competent consulting in technical questions covering a wide range of customer-oriented services for all our products and systems.

Phone: +49 (0)180 50 50 222 Fax: +49 (0)180 50 50 223

http://www.siemens.com/ automation/support-request

Technical consulting



Support in the planning and designing of your project from detailed actual-state analysis, target definition and consulting on product and system questions right to the creation of the automation solution. ¹⁾

> For country-specific telephone numbers go to our Internet site at: http://www.siemens.com/automation/service&support

Knowledge Base on CD-ROM



For locations without online connections to the Internet there are excerpts of the free part of the information sources available on CD-ROM (Service & Support Knowledge Base). This CD-ROM contains all the latest product information at the time of production (FAQs, Downloads, Tips and Tricks, Updates) as well as general information on Service and Technical Support.

The CD-ROM also includes a full-text search and our Know-

Automation Value Card



Small card - great support

The Automation Value Card is an integral component of the comprehensive service concept with which Siemens Automation and Drives will accompany you in each phase of your automation project.

It doesn't matter whether you want just specific services from our Technical Support or want to purchase high-quality Support Tools in our Online Shop, you can always pay with your Automation Value Card. No invoicing, transparent and safe. With your personal card number and associated PIN you can view the state of your account and all transactions at any time.

Services on card. This is how it's done.

Card number and PIN are on the back of the Automation Value Card. When delivered, the PIN is covered by a scratch field, guaranteeing that the full credit is on the card. ledge Manager for targeted searches for solutions. The CD-ROM will be updated every 4 months.

Just the same as our online offer on the Internet, the Service & Support Knowledge Base on CD comes complete in 5 languages (German, English, French, Italian, Spanish).

You can order the **Service & Support Knowledge Base** CD from your Siemens contact.

Order No. 6ZB5310-0EP30-0BA2

Orders via the Internet

(with Automation Value Card or credit card) at:

http://www.siemens.com/automation/service&support

in the Shop domain.

By entering the card number and PIN you have full access to the Service & Support services being offered. The charge for the services procured is debited from the credits on your Automation Value Card.

All the services offered are marked in currency-neutral credits, so you can use the Automation Value Card worldwide.

Automation Value Card order numbers

Credits	Order No.	
200	6ES7 997-0BA00-0XA0	
500	6ES7 997-0BB00-0XA0	
1000	6ES7 997-0BC00-0XA0	
10000	6ES7 997-0BG00-0XA0	

Detailed information on the services offered is available on our Internet site at:

http://www.siemens.com/automation/service&support

Service & Support à la Card: Examples

Technical Support		
"Priority"	Priority processing for urgent cases	
"24 h"	Availability round the clock	
"Extended"	Technical consulting for complex questions	
Support Tools in the Support Shop		
"System Utilities"	Tools that can be used directly for configuration, analysis and testing	
"Applications"	Complete topic solutions including ready-tested software	
"Functions & Samples"	Adaptable blocks for accelerating your developments	

Conditions of sale and delivery

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from the Siemens AG subject to the following terms. Please note! The scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside of Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity.

For customers with a seat or registered office in the Federal Republic of Germany

The "General Terms of Payment" as well as the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office in Germany" shall apply.

For customers with a seat or registered office outside of Germany

The "General Terms of Payment" as well as the "General Conditions for Supplies of Siemens, Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

For software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or registered Office outside of Germany" shall apply.

General

The prices are in € (Euro) ex works, exclusive packaging.

The sales tax (value added tax) is not included in the prices. It shall be debited separately at the respective rate according to the applicable legal regulations.

In addition to the prices of products which include silver, plump, aluminum and/or copper, surcharges may be calculated if the respective limits of the notes are exceeded. The respective note (e.g. source: German newspaper "Handesblatt" in category "deutsche Edelmetalle" and "Metallverarbeiter") for silver ("verarbeitetes Silber"), plump ("Blei in Kabeln"), aluminum ("Aluminium in Kabeln") and copper ("Elektrolytkupfer", "DEL-Notiz") respectively, of the day the order or rather the on call order is received, is decisive for the calculation of the surcharges.

Surcharges of copper shall be calculated for Drives at a note ("DEL-Notiz") above EUR 225,00 / 100 Kg and for chokes / transformers above EUR 150,00 / 100 kg.

Surcharges shall be charged based on the quantities of the materials which are contained in the relevant products.

Prices are subject to change without prior notice. We will debit the prices valid at the time of delivery.

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches only apply to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the corresponding pages, – especially with regard to data, dimensions and weights given – these are subject to change without prior notice.

Comprehensive Terms and Conditions of Sale and Delivery are available free of charge from your local Siemens business office under the following Order Nos.:

- 6ZB5310-0KR30-0BA0
- (for customers based in the Federal Republic of Germany) • 6ZB5310-0KS53-0BA0
- (for customers based outside of theFederal Republic of Germany)

or download them from the Internet:

http://www.siemens.com/automation/mall (Germany: A&D Mall Online-Help System)

Export regulations

The products listed in this catalog / price list may be subject to European / German and/or US export regulations.

Therefore, any export requiring a license is subject to approval by the competent authorities.

According to current provisions, the following export regulations must be observed with respect to the products featured in this catalog / price list:

AL	Number of the German Export List.
	Products marked other than "N" require an export license.
	In the case of software products, the export des- ignations of the relevant data medium must also be generally adhered to.
	Goods labeled with an " <u>AL not equal to N</u> " are subject to a European or German export authori- zation when being exported out of the EU
ECCN	Export Control Classification Number.
ECCN	Export Control Classification Number. Products marked other than "N" are subject to a reexport license to specific countries.
ECCN	Export Control Classification Number. Products marked other than "N" are subject to a reexport license to specific countries. In the case of software products, the export designations of the relevant data medium must also be generally adhered to.

Even without a label or with an "AL: N" or "ECCN: N", authorization may be required due to the final destination and purpose for which the goods are to be used.

The deciding factors are the AL or ECCN export authorization indicated on order confirmations, delivery notes and invoices. Errors excepted and subject to change without prior notice.

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Catalogs of the Automation and Drives Group (A&D)

Further information can be obtained from our branch offices listed in the appendix or at www.siemens.com/automation/partner

Automation and Drives	Catalog
Interactive catalog on CD-ROM and on DVD	
 The Offline Mall of Automation and Drives 	CA 01
Automation Systems for Machine Tools	
SINUMERIK & SIMODRIVE	NC 60
SINUMERIK & SINAMICS	NC 61
Drive Systems	
Variable-Speed Drives	D 11
SINAMICS G130 Drive Converter Classis Units, SINAMICS G150 Drive Converter Cabinet Units	DTI
SINAMICS G110 Inverter Chassis Units	D 11.1
SINAMICS GM150/SINAMICS SM150	D 12
Medium-Voltage Converter 0.6 MVA to 28 MVA	
SINAMICS S120	D 21.1
Vector Control Drive System	D of o
SINAMICS S120 Servo Control Drive System	D 21.2
SINAMICS S150 Drive Converter Cabinet Units	D 21.3
Asynchronous Motors Standardline	D 86.1
DU MOLOIS	
Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
SIMOREG DC MASTER 6RM70 Digital Converter	DA 22
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 410/420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMOVERT MASTERDRIVES Vector Control	DA 65.10
SIMOVERT MASTERDRIVES Motion Control	DA 65.11
Synchronous and asynchronous servomotors for SIMOVERT MASTERDRIVES	DA 65.3
SIMODRIVE 611 universal and POSMO	DA 65.4
Low-Voltage Three-Phase-Motors	
Squirrel-Cage Motors, Totally Enclosed, Fan-Cooled	M 11
Automation Systems for Machine Tools SIMODRIVE	NC 60
Main Spindle/Feed Motors	
Converter Systems SIMODRIVE 611/POSMO	
Automation Systems for Machine Tools SINAMICS	NC 61
Main Spindle/Feed Motors	
Drive System SINAMICS S120	
Drive and Control Components for Hoisting Equipment	HE 1
Electrical Installation Technology	
ALPHA Small Distribution Boards and Distribution Boards	ELA1
PDF: ALPHA 8HP Molded-Plastic Distribution System	ET A3
ALPHA FIX Terminal Blocks	ET A5
BETA Modular Installation Devices	ET B1
DELTA Switches and Socket Outlets	ET D1
GAMMA Building Management Systems	ET G1
	07.00
Human Machine Interface Systems SIMATIC HMI	51.80

Industrial Communication for Automation and Drives	<i>Catalog</i> IK PI
Low-Voltage	
Controls and Distribution – SIRIUS, SENTRON, SIVACON	LV 1
Controls and Distribution – Technical Information	LV 1 T
SINOS, SENTION, SIVACON	11/ 60
SIVENT Fans	LV 65
SIVACON 8PS Busbar trunking systems CD, BD01, BD2 up to 1250 A	LV 70
Motion Control System SIMOTION	PM 10
Process Instrumentation and Analytics	
Field Instruments for Process Automation Measuring Instruments for Pressure, Differential Pressure, Flow, Level and Temperature, Positioners and Liquid Meters	FI 01
PDF: Indicators for panel mounting	MP 12
SIREC Recorders and Accessories	MP 20
SIPART, Controllers and Software	MP 31
SIWAREX Weighing Systems	WT 01
Continuous Weighing and Process Protection	WT 02
Process Analytical Instruments	PA 01
PDF: Process Analytics, Components for the System Integration	PA 11
SIMATIC Industrial Automation Systems	
SIMATIC PCS Process Control System	ST 45
Products for Totally Integrated Automation and Micro Automation	ST 70
SIMATIC PCS 7 Process Control System	ST PCS 7
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7.1
Migration solutions with the SIMATIC PCS 7 Process Control System	ST PCS 7.2
pc-based Automation	ST PC
SIMATIC Control Systems	ST DA
SIMATIC Sensors	FS 10
SIPOS Electric Actuators	
Electric Rotary, Linear and Part-turn Actuators	MP 35
Electric Rotary Actuators for Nuclear Plants	MP 35.1/.2
Systems Engineering	
Power supplies SITOP power	KT 10.1
System cabling SIMATIC TOP connect	KT 10.2
System Solutions	
Applications and Products for Industry are part of the interactive catalog CA 01	
TELEPERM M Process Control System	
PDF: AS 488/TM automation systems	PLT 112

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