

System Cabling for SIMATIC S7

Catalog KT 10.2 · 2011



SIMATIC TOP CONNECT

Answers for industry.

SIEMENS

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Industry Mall

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SIRIUS

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IC 10

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Industrial Controls

Catalogs in pdf format

IC 01

E86060-D1001-A101-A1 ¹⁾

¹⁾ Available only in German

SIMATIC TOP connect

System Cabling

Catalog KT 10.2 · 2011



The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 1108). The certificate is recognized by all IQNet countries.

Supersedes:
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Refer to the Industry Mall for current updates of this catalog:

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The products contained in this catalog can also be found in the interactive Catalog CA 01.

Order No.:

E86060-D4001-A500-C9-7600

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Totally Integrated Automation
The Industry Mall
SIMATIC TOP connect

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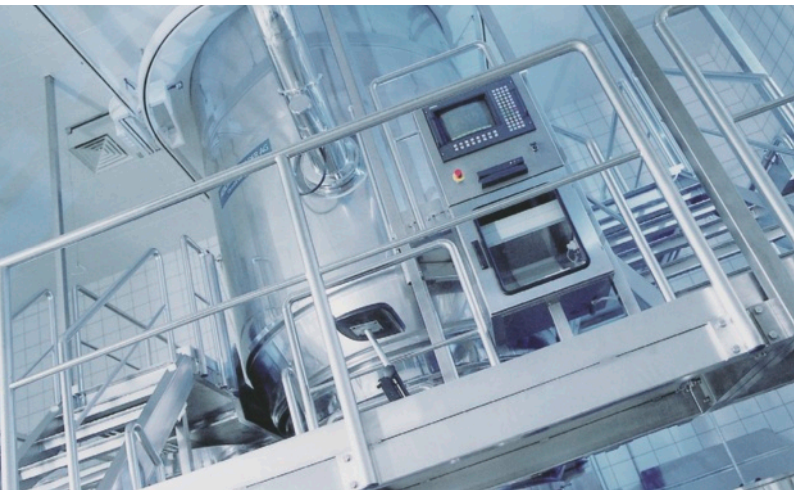
Brief instruction to the configuration guide
Configuration guides

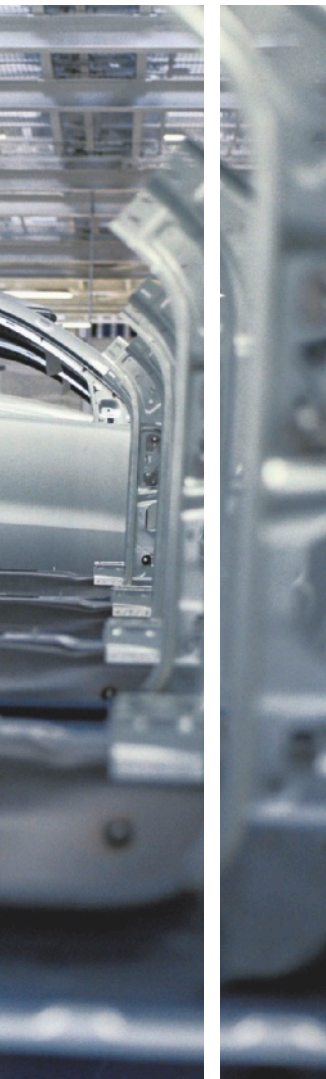
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Answers for industry.

Siemens Industry answers the challenges in the manufacturing and the process industry as well as in the building automation business. Our drive and automation solutions based on Totally Integrated Automation (TIA) and Totally Integrated Power (TIP) are employed in all kinds of industry. In the manufacturing and the process industry. In industrial as well as in functional buildings.

Siemens offers automation, drive, and low-voltage switching technology as well as industrial software from standard products up to entire industry solutions. The industry software enables our industry customers to optimize the entire value chain – from product design and development through manufacture and sales up to after-sales service. Our electrical and mechanical components offer integrated technologies for the entire drive train – from couplings to gear units, from motors to control and drive solutions for all engineering industries. Our technology platform TIP offers robust solutions for power distribution.

The high quality of our products sets industry-wide benchmarks. High environmental aims are part of our eco-management, and we implement these aims consistently. Right from product design, possible effects on the environment are examined. Hence many of our products and systems are RoHS compliant (Restriction of Hazardous Substances). As a matter of course, our production sites are certified according to DIN EN ISO 14001, but to us, environmental protection also means most efficient utilization of valuable resources. The best example are our energy-efficient drives with energy savings up to 60 %.

Check out the opportunities our automation and drive solutions provide. And discover how you can sustainably enhance your competitive edge with us.

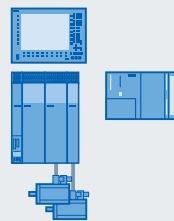
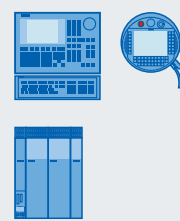
ERP – Enterprise Resource Planning

Management Level

MES – Manufacturing Execution Systems

**Operations Level**SIMATIC PCS 7
Process Control (DCS)**Control Level****Industrial Software for**

- Design and Engineering
- Installation and Commissioning
- Operation
- Maintenance
- Modernization and Upgrade
- Energy Management

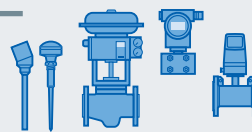
SIMOTION
Motion Control SystemSINUMERIK
Computer Numeric Control**Field Level**

PROFIBUS PA

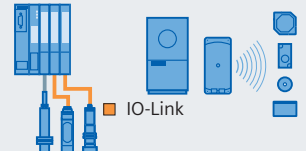


HART

Process Instrumentation



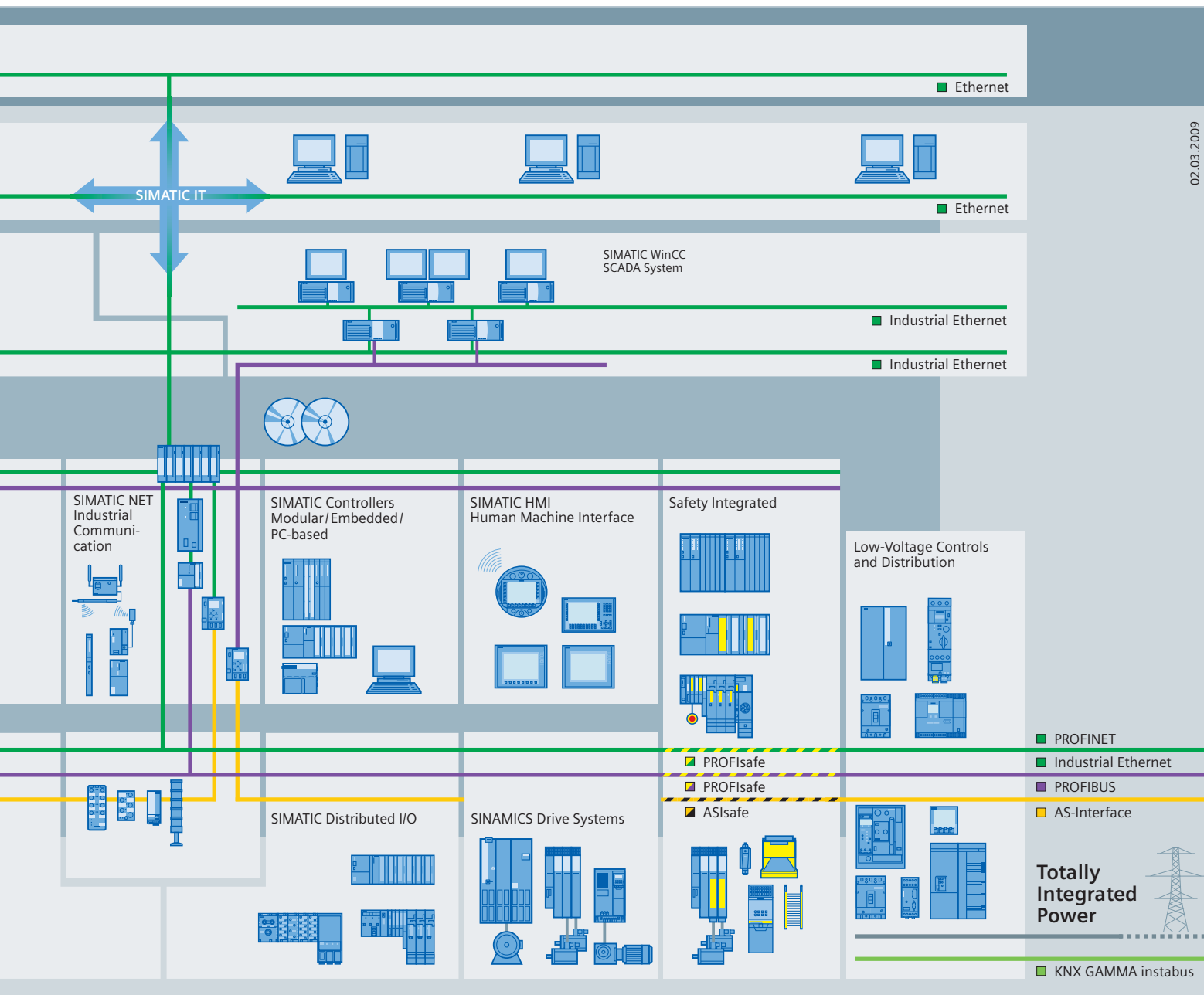
SIMATIC Sensors

**Totally Integrated Automation**

Setting standards in productivity and competitiveness.

Totally Integrated Automation.

Thanks to Totally Integrated Automation, Siemens is the only provider of an integrated basis for implementation of customized automation solutions – in all industries from inbound to outbound.



TIA is characterized by its unique continuity.

It provides maximum transparency at all levels with reduced interfacing requirements – covering the field level, production control level, up to the corporate management level. With TIA you also profit throughout the complete life cycle of your plant – starting with the initial planning steps through operation up to modernization, where we offer a high measure of investment security resulting from continuity in the further development of our products and from reducing the number of interfaces to a minimum.

The unique continuity is already a defined characteristic at the development stage of our products and systems.

The result: maximum interoperability – covering the controller, HMI, drives, up to the process control system. This reduces the complexity of the automation solution in your plant. You will experience this, for example, in the engineering phase of the automation solution in the form of reduced time requirements and cost, or during operation using the continuous diagnostics facilities of Totally Integrated Automation for increasing the availability of your plant.



Much more than a catalog. The Industry Mall.

You have a catalog in your hands that will serve you well for selecting and ordering your products. But have you heard of the electronic online catalog (the Industry Mall) and all its benefits? Take a look around it sometime:

www.siemens.com/industrymall



Selecting

Find your products in the structure tree, in the new "Bread-crum" navigation or with the integral search machine with expert functions. Electronic configurators are also integrated into the Mall. Enter the various characteristic values and the appropriate product will be displayed with the relevant order numbers. You can save configurations, load them and reset them to their initial status.

Ordering

You can load the products that you have selected in this way into the shopping basket at a click of the mouse. You can create your own templates and you will be informed about the availability of the products in your shopping cart. You can load the completed parts lists directly into Excel or Word.

Delivery status

When you have sent the order, you will receive a short e-mail confirmation which you can print out or save. With a click on "Carrier", you will be directly connected to the website of the carrier where you can easily track the delivery status.

Added value due to additional information

So you have found your product and want more information about it? In just a few clicks of the mouse, you will arrive at the image data base, manuals and operating instructions. Create your own user documentation with My Documentation Manager. Also available are FAQs, software downloads, certificates and technical data sheets as well as our training programs. In the image database you will find, depending on the product, 2D/3Dgraphics, dimension drawings and exploded drawings, characteristic curves or circuit diagrams which you can download.

Convinced? We look forward to your visit!



SIMATIC TOP connect

TOP-class system cabling ..

... ensures fault-free and secure connection between individual components of an electronic system - a basic requirement for correct functioning.



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.

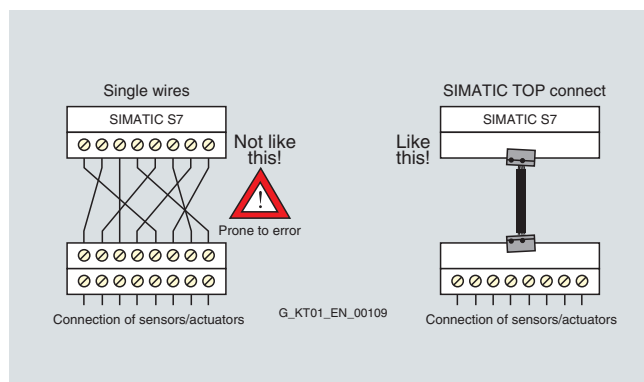
Standards are required here that simplify handling, increase clarity, and reduce costs. Global availability must also be considered.

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 thanks to significantly faster, global availability of the system.

You avoid errors

It is almost impossible to mix up individual 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.

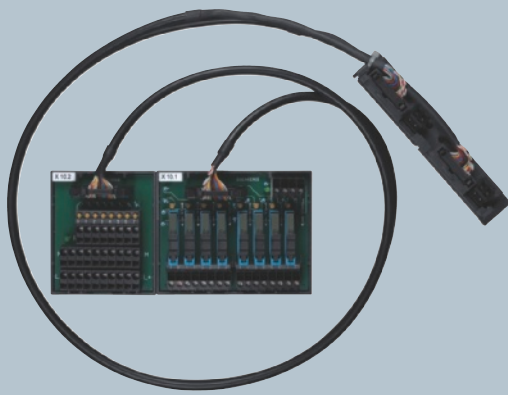
You can be flexible

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

We offer you two cabling variants for implementing your control cabinet concepts:

Fully modular connection

consisting of the following individual components:

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

The wiring overhead is extremely low and connection errors are prevented thanks to reverse polarity protection. The modular building block principle allows fewer storage items, even when you use different SIMATIC systems.

Flexible connections

Consisting of:

- Front connector with fixed, bundled individual wires

The single wires are also available with UL/CSA-certified cores.

The blue wires are sequentially numbered and can be routed direct to each element in the control cabinet. These numbers of the single wires correspond to the coding of the front connector contacts.

This eliminates time-consuming preparing of as many as 2 x 46 individual wires per module.

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

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

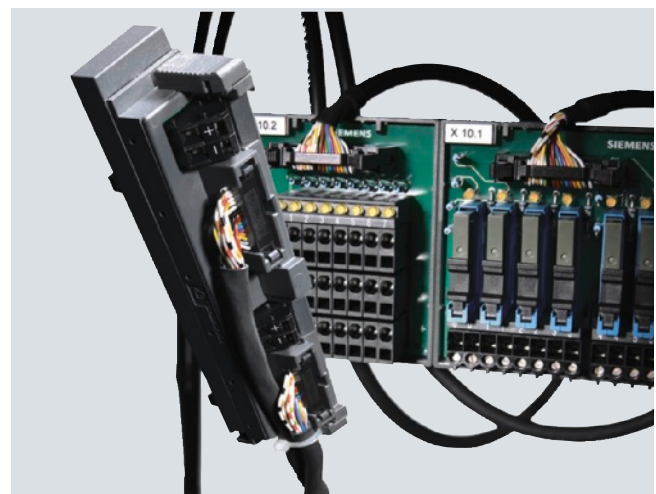
Application

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 length-optimized 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.



Fully modular connection



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Fully modular connection

Introduction

Overview



The fully modular connection is the standard connection for the SIMATIC S7-300/400. The fully modular connection allows the peripherals to be conveniently and quickly connected to the SIMATIC S7-300/400 without errors.

Benefits

- Easy plugging in of front connector module, connecting 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 in wiring errors, clear control cabinet wiring
- Distribution of digital signals by byte or by double-byte
- Each component can be replaced individually.
- Every 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 connecting to the module. These are plugged into the module to be wired instead of the front connector. The front connector modules are available in many different versions. For the SIMATIC S7-300 and SIMATIC S7-400, digital or analog. The connecting cables are plugged into these front connector modules.

Connecting cable

The connecting 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 as 2 x 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 the aid of pliers (to be ordered separately). The cable transmits 8 or 2 x 8 channels over a distance of up to 30 m.

The connecting 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 standard mounting rail.

The connection modules are available for two connection methods: 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 that are fitted with relays or optocouplers.

If other voltage or power levels are required in the field, the connection module for output signals TPRo or TP0o is used. For the TPRo connection module, relays are used for the implementation. For the TP0o connection module, optocouplers are used for the implementation. 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 simply converts the 230 V AC signal to 24 V DC. This means that there is always the same voltage level on the module side.

Use with optocouplers for the TPRo relay modules

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

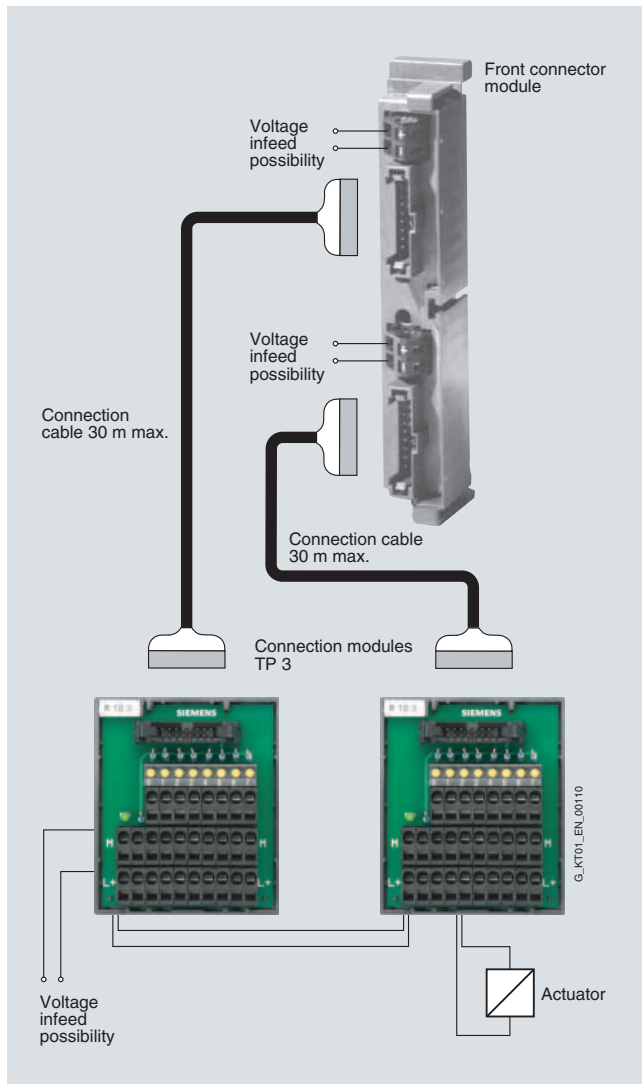
Design (continued)**Shield plate**

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 terminal elements, optimal shield connection is achieved between the shielded round-sheath ribbon cable or the shielded field cables and the grounded mounting rail.

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 connecting 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.



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

Fully modular connection

Introduction

Integration

With the fully modular connection of SIMATIC TOP connect, it is possible to wire the following components:

Note:

The product version of the modules can change, which in turn can change the order numbers of the modules.



For the SIMATIC S7-300

Compact CPU	Digital I/O modules	Analog I/O modules
• CPU 312C 6ES7 312-5BE03-0AB0 • CPU 313C 6ES7 313-5BF03-0AB0 • CPU 313C-2PtP 6ES7313-6BF03-0AB0 • CPU 313C-2 DP 6ES7313-6CF03-0AB0 • CPU 314C-2PtP 6ES7314-6BG03-0AB0 • CPU 314C-2 DP 6ES7314-6CG03-0AB0	SM 321 • DI 32 x DC 24 V 6ES7321-1BL00-0AA0 • DI 16 x DC 24 V 6ES7321-1BH02-0AA0 • DI 16 x DC 24 V high speed 6ES7321-1BH10-0AA0 • DI 16 x DC 24 V; source input 6ES7321-1BH50-0AA0 SM 322 • DO 32 x DC 24 V/0,5 A 6ES7322-1BL00-0AA0 • DO 16 x DC 24 V/0,5 A can be redundant 6ES7322-8BH01-0AB0 • DO 16 x DC 24 V/0,5 A 6ES7322-1BH01-0AA0 • DO 16 x DC 24 V/0,5 A high speed 6ES7322-1BH10-0AA0 • DO 8 x DC 24 V/0,5 A 6ES7322-8BF00-0AB0 • DO 8 x DV 24 V/2 A 6ES7322-1BF01-0AA0 SM 323 • DI 16/DO 16 x DC 24 V/0,5 A 6ES7323-1BL00-0AA0 • DI 8/DO 8 x DC 24 V/0,5 A 6ES7323-1BH01-0AA0	SM 331 • AI 8 x 13 bit 6ES7331-1KF02-0AB0 • AI 2 x 9/12/14 bit 6ES7331-7KB02-0AB0 • AI 8 x 9/12/14 bit 6ES7331-7KF02-0AB0 • AI 8 x 16 bit 6ES7331-7NF00-0AB0 • AI 8 x 16 bit 6ES7331-7NF10-0AB0 • AI 8 x 16 (internal 24) bit 6ES7331-7PF01-0AB0 • AI 8 x 16 bit 6ES7331-7PF11-0AB0 SM 332 • AO 2 x 11/12 bit 6ES7332-5HB01-0AB0 • AO 4 x 11/12 bit 6ES7332-5HD01-0AB0 • AO 8 x 11/12 bit 6ES7332-5HF00-0AB0 • AO 4 x 15 bit 6ES7332-7ND02-0AB0 SM 334 • AI 4/AO 2 x 8/8 bit 6ES7334-0CE01-0AA0 • AI 4/AO 2 x 12/12 bit 6ES7334-0KE00-0AB0 SM 335 • AI 4 x 14 bit 6ES7335-7HG02-0AB0

Integration (continued)

Note:

The product version of the modules can change, which in turn can change the order numbers of the modules.



For the SIMATIC S7-400

	Digital I/O modules	Analog I/O modules
	SM 421 • DI 32 x DC 24 V 6ES7421-1BL01-0AA0 SM 422 • DO 16 x DC 24 V/2 A 6ES7422-1BH11-0AA0 • DO 32 x DC 24 V/0,5 A 6ES7422-1BL00-0AA0 • DO 32 x DC 24 V/0,5 A with 0,15 ms output delay 6ES7422-7BL00-0AB0	SM 431 • AI 8 x 13 bit 6ES7431-1KF00-0AB0 • AI 8 x 14 bit 6ES7431-1KF20-0AB0 • AI 16 x 13 bit 6ES7431-0HH00-0AB0 • AI 8 x 16 bit 6ES7431-1KF10-0AB0 SM 432 • AO 8 x 13 bit 6ES7432-1HF00-0AB0

Fully modular connection

Selection overview

SIMATIC S7-300 Compact CPU

Selection overview SIMATIC S7-300 Compact CPU

Modules SIMATIC S7-300 Compact CPU		Front connector modules						Connection cables				
				for digital modules		for Compact CPU modules		Round-sheath ribbon cable sold by the meter			Round cable assembled with IDC connectors	
				4 x I/O		CPU 312C	CPU 313C/314C-2	16-pole unshielded	2x16-pole unshielded	16-pole shielded	16-pole shielded	16-pole shielded
	Order No. 6ES731.-...	Con- nector	Poles	Spring termi- nals	Screw termi- nals	Screw terminals	Screw terminals					
Compact CPU 312C	2-5BD01-0AB0	X1	40							 ③		 ③
Compact CPU 313C	3-5BE01-0AB0	X1	40					 ④		 ③	 ④	 ③
		X2	40							 ③		 ③
Compact CPU 313C-2PtP	3-6BE01-0AB0	X1										
		X2	40							 ③		 ③
Compact CPU 313C-2DP	3-6CE01-0AB0	X1										
		X2	40							 ③		 ③
Compact CPU 314C-2PtP	4-6BF02-0AB0	X1	40					 ④		 ③	 ④	 ③
		X2	40							 ③		 ③
Compact CPU 314C-2DP	4-6CF02-0AB0	X1	40					 ④		 ③	 ④	 ③
		X2	40							 ③		 ③
Order No.:				6ES7921-3AA20-0AA0	6ES7921-3AB20-0AA0	6ES7921-3AK20-0AA0	6ES7921-3AM20-0AA0	6ES7923-0  00-0AA0	6ES7923-2  00-0AA0	6ES7923-0  00-0BA0	6ES7923-0  00-0CB0	6ES7923-0  00-0DB0
								Lengths  CD = 30 m  CG = 60 m		Lengths  BA5 = 0.5 m ¹⁾  BB0 = 1.0 m  BB5 = 1.5 m ¹⁾  BC0 = 2.0 m  BC5 = 2.5 m  BD0 = 3.0 m  BE0 = 4.0 m  BF0 = 5.0 m ¹⁾ only unshielded		

● 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)

Fully modular connection

Selection overview

SIMATIC S7-300 Compact CPU

2

	Connection modules										Accessories						
	max. number of required connection modules per module		for inputs/outputs digital						Relay, output and 8 NO contacts		analog	Crimping tool	8 connectors and 8 strain-relief assemblies	Labeling strip	Labeling strip	Shield plate	Shield connection terminal
			1x8 I/O		2x8 I/O		1x8 I/O		Input 24 V DC	Input 230 V AC							
	8 I/O	CPU	TP1 ¹⁾		TPK ¹⁾		TP3 ²⁾		TPRo TPOo	TPRi	TPA						
digital	analog	without LED	with LED	without LED	with LED	without LED	with LED	with LED	with LED	without LED							
	3		●	●	●	●	●	●	●		●	●	●	●	●	●	
	1	2	●	●			●	●		●	●	●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
	1	2	●	●			●	●		●	●	●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
	1	2	●	●			●	●		●	●	●	●	●	●	●	
	4		●	●	●	●	●	●	①	④		●	●	●	●	●	
			6ES7924-0AA10-0A ■ 0	6ES7924-0AA10-0B ■ 0	6ES7924-1AA10-0A ■ 0	6ES7924-1AA10-0B ■ 0	6ES7924-0CA10-0A ■ 0	6ES7924-0CA10-0B ■ 0	6ES7924-0BD10-0B ■ 0	6ES7924-0BE10-0B ■ 0	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 Important: When counting the connection modules, the connection module TPK counts as 2. 1) TP1, TPK = 1-wire connection 2) TP3 = 3-wire connection																

Fully modular connection

Selection overview

SIMATIC S7-300 digital

Selection overview SIMATIC S7-300 digital

Modules SIMATIC S7-300 digital			Front connector modules						Connection cables						
			for digital modules				for 2 ampere digital outputs		Round-sheath ribbon cable sold by the meter			Round cable assembled with IDC connectors			
			2x8 E/A		4x8 E/A				16-pole un-shielded	2x16-pole un-shielded	16-pole shielded	16-pole un-shielded	16-pole shielded		
		Order No. 6ES732-....	Poles	Spring terminals	Screw terminals	Spring terminals	Screw terminals	Spring terminals	Screw terminals						
SM 321	DI 32 x 24 V DC	1-1BL00-0AA0	40			●	●			●	●	●③	●	●③	
	DI 16 x 24 V DC	1-1BH02-0AA0	20	●	●					●	●	●③	●	●③	
	DI 16 x 24 V DC High Speed	1-1BH10-0AA0	20	●	●					●	●	●③	●	●③	
	DI 16 x 24 V DC source input	1-1BH50-0AA0	20	●	●					●	●	●③	●	●③	
SM 322	DO 32 x 24 V DC/0.5 A	2-1BL00-0AA0	40			●	●			●	●	●③	●	●③	
	DO 16 x 24 V DC/ 0.5 A can be made redundant	2-8BH01-0AB0	40			●	●			●	●	●③	●	●③	
	DO 16 x 24 V DC/0.5 A	2-1BH01-0AA0	20	●	●					●	●	●③	●	●③	
	DO 16 x 24 V DC/0.5 A High Speed	2-1BH10-0AA0	20	●	●					●	●	●③	●	●③	
	DO 8 x 24 V DC/0.5 A	2-8BF00-0AB0	20	●	●					●	●	●③	●	●③	
	DO 8 x 24 V DC/2 A	2-1BF01-0AA0	20					●	●	●	●	●③	●	●③	
SM 323	DI 16/DO 16 x 24 V DC/0.5 A	3-1BL00-0AA0	40			●	●			●	●	●③	●	●③	
	DI 8/DO 8 x 24 V DC/0.5 A	3-1BH01-0AA0	20	●	●					●	●	●③	●	●③	
Order 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 ■ 0-0CB0	6ES7923-0 ■ 0-0DB0	
										Lengths ■ CD = 30 m ■ CG = 60 m		Lengths ■■■ BA5 = 0.5 m ¹⁾ ■■■ BB0 = 1.0 m ■■■ BB5 = 1.5 m ¹⁾ ■■■ BC0 = 2,0 m ■■■ BC5 = 2.5 m ■■■ BD0 = 3.0 m ■■■ BE0 = 4.0 m ■■■ BF0 = 5.0 m ¹⁾ only unshielded			

● Module can be used

① Only for the outputs

② Only for the inputs

③ If necessary, the shielded cable can be used – a shield connection must be provided on the user side.

Fully modular connection

Selection overview

SIMATIC S7-300 digital

2

	Connection modules											Accessories				
	For inputs/outputs digital								Relais, output and 8 NO contacts		2 ampere, 8 digital outputs		Crimping tool	8 connectors and 8 strain-relief assemblies	Labeling strip	Labeling strip
	1x8 I/O		2x8 I/O		1x8 I/O		Input 24 V DC	Input 230 V AC								
	max. no. of required 8 I/O connection modules per module	TP1 ¹⁾		TPK ¹⁾		TP3 ²⁾		TPRo TPOo	TPRi	TP2		insulation displacement connectors	insulation displacement connectors	for connection modules, inserted	for connection modules, self-adhesive	
	without LED	with LED	without LED	with LED	without LED	with LED	with LED	with LED	without LED	with LED						
	4															
	2															
	2															
	2															
	4															
	4															
	2															
	2															
	2															
	1															
	4							①	②							
	2							①	②							
		6ES7924-0AA10-0A 0	6ES7924-0AA10-0B 0	6ES7924-1AA10-0A 0	6ES7924-1AA10-0B 0	6ES7924-0CA10-0A 0	6ES7924-0CA10-0B 0	6ES7924-0BD10-0B 0	6ES7924-0BE10-0B 0	6ES7924-0BB10-0A 0	6ES7924-0BB10-0B 0	6ES7928-0AA00-0AA0	6ES7921-3BE10-0AA0	6ES7928-2AB00-0AA0	6ES7928-2BB00-0AA0	
	Type A = Screw terminals B = Spring terminals Important: When counting the connection modules, the connection module TPK counts as 2. 1) TP1, TPK = 1-wire connection 2) TP3 = 3-wire connection															

Fully modular connection

Selection overview

SIMATIC S7-300 analog

Selection overview SIMATIC S7-300 analog

Modules SIMATIC S7-300 analog			Front connector modules				Connection cables		
			for analog modules				Round-sheath ribbon cable sold by the meter	Round cable assembled with IDC connectors	
			20-pole		40-pole		16-pole shielded	16-pole shielded	
	Order No. 6ES733-...	Poles	Spring terminals	Screw terminals	Spring terminals	Screw terminals			
SM 331 AI 8 x 13 bits	1-1KF01-0AB0	40			●	●	●	●	
AI 2 x 9/12/14 bits	1-7KB02-0AB0	20	●	●			●	●	
AI 8 x 9/12/14 bits	1-7KF02-0AB0	20	●	●			●	●	
AI 8 x 16 bits	1-7NF00-0AB0	40			●	●	●	●	
AI 8 x 16 bits	1-7NF10-0AB0	40			●	●	●	●	
AI 8 x RTD x 16 bits (internal 24 bits)	1-7PF01-0AB0	40			●	●	●	●	
8 x TC x 16 bits	1-7PF11-0AB0	40			●	●	●	●	
SM 332 AO 2 x 11/12 bits	2-5HB01-0AB0	20	●	●			●	●	
AO 4 x 11/12 bits	2-5HD01-0AB0	20	●	●			●	●	
AO 8 x 11/12 bits	2-5HF00-0AB0	40			●	●	●	●	
AO 4 x 15 bits	2-7ND02-0AB0	20	●	●			●	●	
SM 334 AI 4/AO 2 x 8/8 bits	4-0CE01-0AA0	20	●	●			●	●	
AI 4/AO 2 x 12/12 bits	4-0KE00-0AB0	20	●	●			●	●	
SM 335 AI 4 x 14 bits	5-7HG01-0AB0	20	●	●			●	●	
Order No.:			6ES7921-3AF00-0AA0	6ES7921-3AG00-0AA0	6ES7921-3AF20-0AA0	6ES7921-3AG20-0AA0	6ES7923-0-00-0BA0	6ES7923-0-0-0DB0	
							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

Fully modular connection

Selection overview

SIMATIC S7-300 analog

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
	max. number of required connection modules per module	analog TPA without LED	insulation displacement connectors	insulation displacement connectors	for connection modules, inserted	for connection modules, self-adhesive	for analog connection module	for shield plate
	4	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	1	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	4	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
	2	●	●	●	●	●	●	●
		6ES7924-0CC10-0A0	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							

Fully modular connection

Selection overview

SIMATIC S7-400

Selection overview SIMATIC S7-400 modules

Modules SIMATIC S7-400		Poles	Front connector modules			Connecting cables						
			for digital modules		for analog modules	Round-sheath ribbon cable sold by the meter			Round cable assembled with IDC connectors			
				2 ampere								
			4 x I/O	2 x 8 A		16-pole unshielded	2x16-pole unshielded	16-pole shielded	16-pole unshielded	16-pole shielded		
	Order No. 6ES74...-...		Screw terminals	Screw terminals	Screw terminals							
SM 421	DI 32 x 24 V DC	21-1BL01-0AA0	48						 ③		 ③	
SM 422	DO 16 x 24 V DC/2 A	22-1BH11-0AA0	48						 ③		 ③	
	DO 32 x 24 V DC/0.5 A	22-1BL00-0AA0	48						 ③		 ③	
	DO 32 x 24 V DC/0.5 A	22-7BL00-0AB0	48						 ③		 ③	
SM 431	AI 8 x 13 bits	31-1KF00-0AB0	48									
	AI 8 x 16 bits	31-7KF10-0AB0	48									
	AI 8 x 14 bits	31-1KF20-0AB0	48									
	AI 16 x 13 bits	31-0HH00-0AB0	48									
SM 432	AO 8 x 13 bits	32-1HF00-0AB0	48									
Order No.:			6ES7921-4AB00-0AA0	6ES7921-4AD00-0AA0	6ES7921-4AG00-0AA0	6ES7923-0  00-0AA0	6ES7923-2  00-0AA0	6ES7923-0  00-0BA0	6ES7923-0  0-0CB0	6ES7923-0  0-0DB0		
						Lengths  CD = 30 m  CG = 60 m			Lengths  BA5 = 0.5 m ¹⁾  BB0 = 1.0 m  BB5 = 1.5 m ¹⁾  BC0 = 2.0 m  BC5 = 2.5 m  BD0 = 3.0 m  BE0 = 4.0 m  BF0 = 5.0 m ¹⁾ only unshielded			

● Module can be used

① Only for the outputs

③ If necessary, the shielded cable can be used – a shield connection must be provided on the user side.

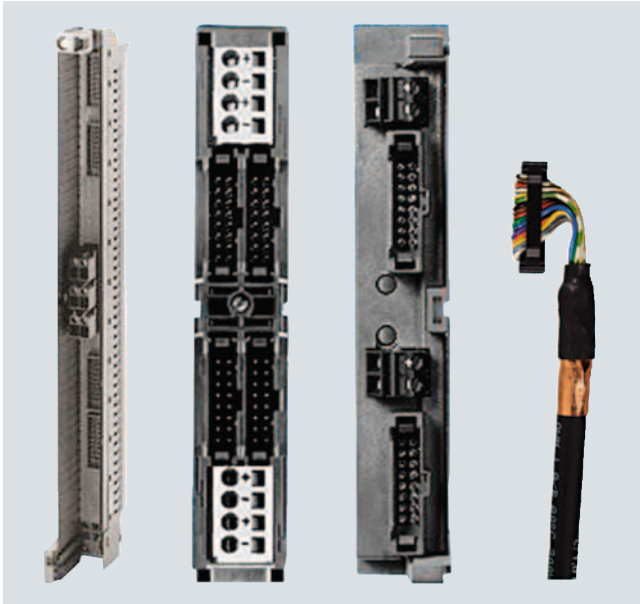
2/14

Fully modular connection

Front connector modules

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.

More information

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

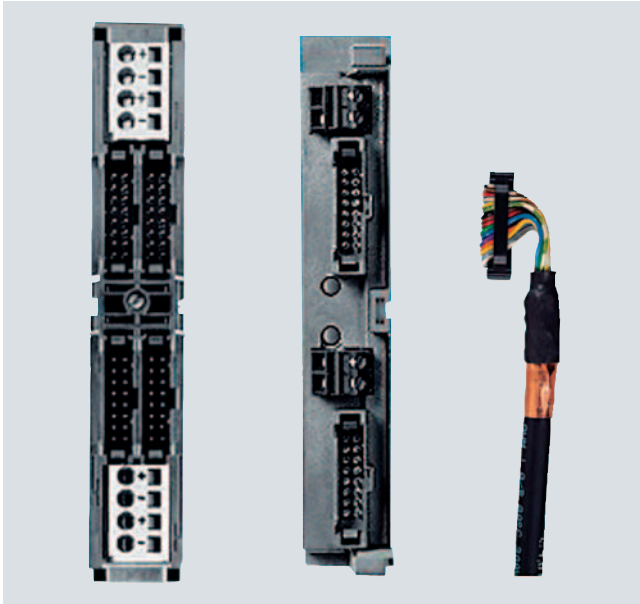
Additional connection cables are used to route summation currents which are higher than 4 A from an external power supply to the module. The additional connection cables are connected to special connection sockets of the front connector..

Fully modular connection

Front connector modules

S7-300 front connector modules

Design



With the compact CPUs, up to three connecting cables can be connected to the front connector modules at slot X1. The connection modules can be connected by means of the connecting 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 connecting 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 connecting cables.

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

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

Integration

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

- Use with components of the SIMATIC S7-300
- The front connector modules replace the standard SIMATIC connectors
 - 6ES7 392-1AJ00-0AA0
 - 6ES7 392-1AM00-0AA0
 - 6ES7 392-1BJ00-0AA0
 - 6ES7 392-1BM01-0AA0
 - 6ES7 392-1CJ00-0AA0
 - 6ES7 392-1CM00-0AA0
 - 6ES7 921-3AH00-0AA0
 - 6ES7 921-3AH20-0AA0
- *The circuit diagrams for the front connector modules (module on top - IDC connector below) can also be found under "Circuit diagrams".*

Technical specifications

Technical data of front connector module	
Rated operating voltage	24 VDC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current	1 A
• per connector pin	
Max. permissible summation current	4 A/byte
Permissible ambient temperature	0 to + 60°C
Test voltage	0.5 kV, 50 Hz, 60 sec.
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

Fully modular connection

Front connector modules

S7-300 front connector modules

Technical specifications (continued)

Front connector module *SIMATIC TOP connect*, connection for potential infeed

Modules up to 4 connections		
	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables with/without wire end ferrule	0.25 to 1.5 mm ²	
Number of wires 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 cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm ²	-	
• with insulating collar 1.5 mm ²	-	
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		
	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables with/without wire end ferrule	0.25 to 0.75 mm ²	
Number of wires per connection	1 or a combination of 2 wires 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 cables		
• without insulating collar	6 mm	
• with insulating collar	-	
Wire-end ferrules in acc. with DIN 46228		
• without insulating collar	Form A; 5 to 7 mm long	
• with insulating collar 0.25 to 1.0 mm ²	-	
• with insulating collar 1.5 mm ²	-	
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

Selection and ordering Data

Designation	Order No.
Front connector module (compact CPU 312C) Power supply via • Screw terminals	6ES7921-3AK20-0AA0
Front connector module (compact CPU 313C/314C-2PtP/314C-2DP), slot X1 Power supply via • Screw terminals	6ES7921-3AM20-0AA0
Front connector module (digital 2 x 8 I/O) Power supply via • Spring-loaded terminals • Screw terminals	6ES7921-3AA00-0AA0 ¹⁾ 6ES7921-3AB00-0AA0 ¹⁾
Front connector module (digital 4 x 8 I/O) Power supply via • Spring-loaded terminals • Screw terminals	6ES7921-3AA20-0AA0 6ES7921-3AB20-0AA0
Front connector module (1 x 8 outputs) for 2 ampere digital outputs Power supply via • Spring-loaded terminals • Screw terminals	6ES7921-3AC00-0AA0 ¹⁾ 6ES7921-3AD00-0AA0 ¹⁾
Front connector module 20-pin (analog) Power supply via • Spring-loaded terminals • Screw terminals	6ES7921-3AF00-0AA0 ²⁾ 6ES7921-3AG00-0AA0 ²⁾
Front connector module 40-pin (analog) Power supply via • Spring-loaded terminals • Screw terminals	6ES7921-3AF20-0AA0 ²⁾ 6ES7921-3AG20-0AA0 ²⁾

1) The terminal assignments of these front connector modules are unambiguous, so dimension drawings can be omitted.

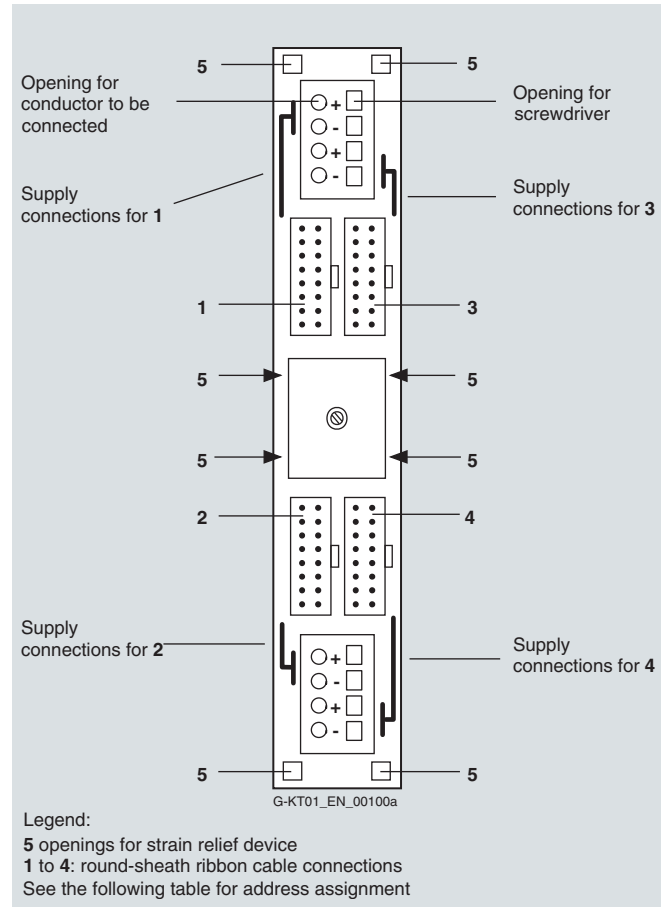
2) The dimension drawings for these front connector modules can be found under "Wiring of S7-300 analog modules".

Dimensional drawings

Terminal assignment for the wiring of the 32-channel front connector module for digital modules and compact CPUs for the X2 interface

Refers to the following order numbers:

- 6ES7921-3AA20-0AA0
- 6ES7921-3AB20-0AA0



Front view of the front connector module for 32-channel digital modules and compact CPUs for the X2 interface

The connections for the supply voltage are shown as spring terminals. These are also available as screw version.

In the table below you can use the address assignment to find the allocation of the respective connecting cable connections to the channels of the signal modules.

Assignment of the connecting cable connections to the address bytes of the 32-channel digital modules and compact CPUs for the X2 interface

Connecting cable connection	Address assignment for		
	Digital input module	Digital output module	Digital input/output module and compact CPU X2 interface
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)

Fully modular connection

Front connector modules

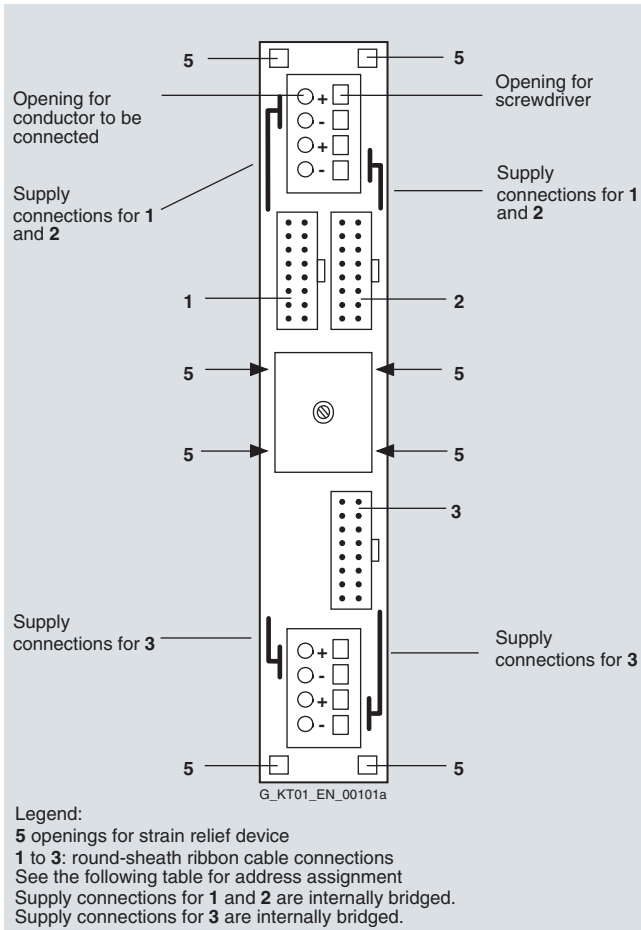
S7-300 front connector modules

Dimensional drawings (continued)

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

Refers to the following order number:

- 6ES7921-3AK20-0AA0



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

The connections for the supply voltage are shown as spring terminals. These are only available as screw version.

In the table below you can use the address assignment (X1) to find the allocation of the respective connecting cable connections to the channels of the compact CPU 312C.

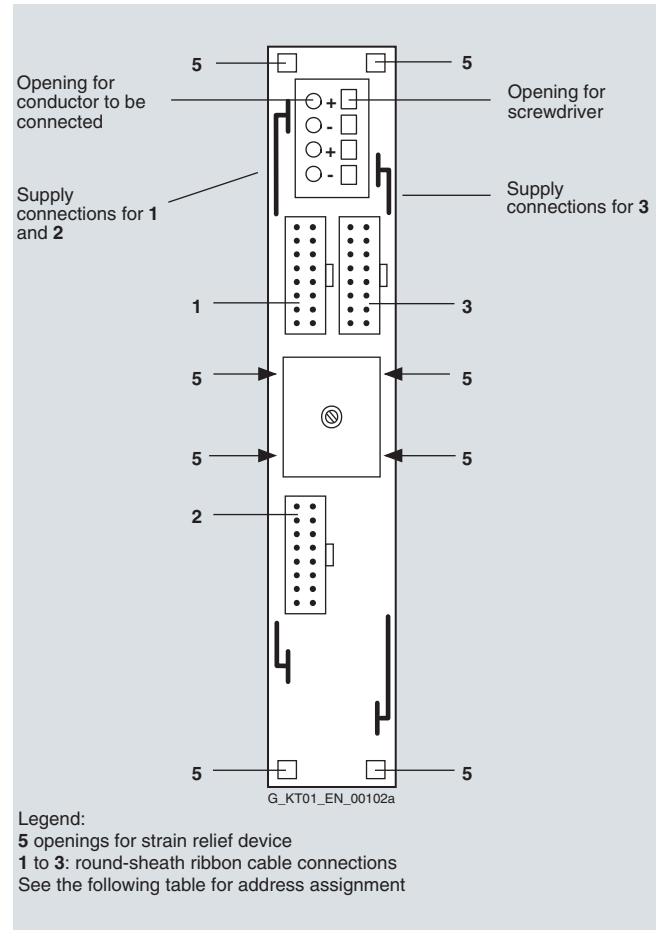
Assignment of the connecting cable connections to the address bytes (X1) of the compact CPU 312C

Connecting cable interface	Address assignment (X1) for the 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

Refers to the following order number:

- 6ES7921-3AM20-0AA0



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

The connections for the supply voltage are shown as spring terminals. These are only available as screw version.

In the table below you can use the address assignment (X1) to find the allocation of the respective connecting cable connections to the channels of the compact CPU.

Assignment of the connecting cable connections to the address bytes (X1) of the compact CPU 313C, 314C-2PtP, 314C-2DP

Connecting cable interface	Address assignment (X1) for the compact CPU
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

Fully modular connection

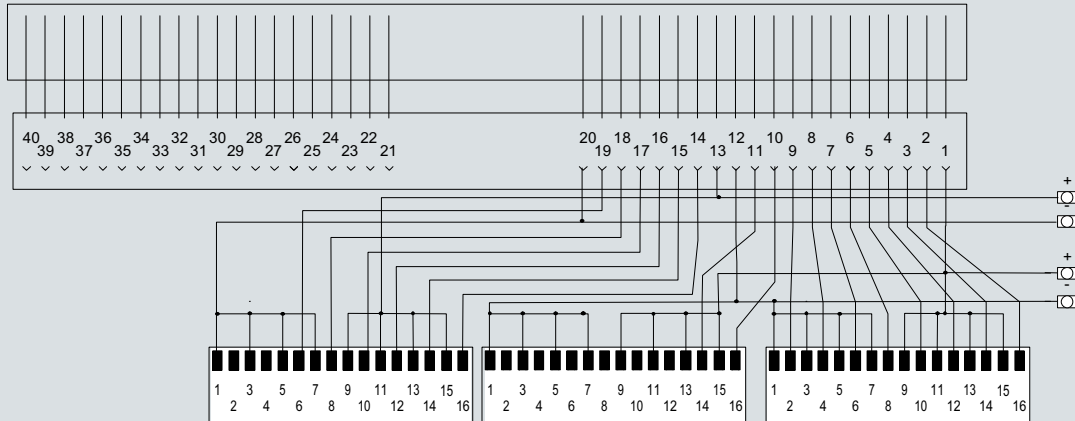
Front connector modules

S7-300 front connector modules

Schematics

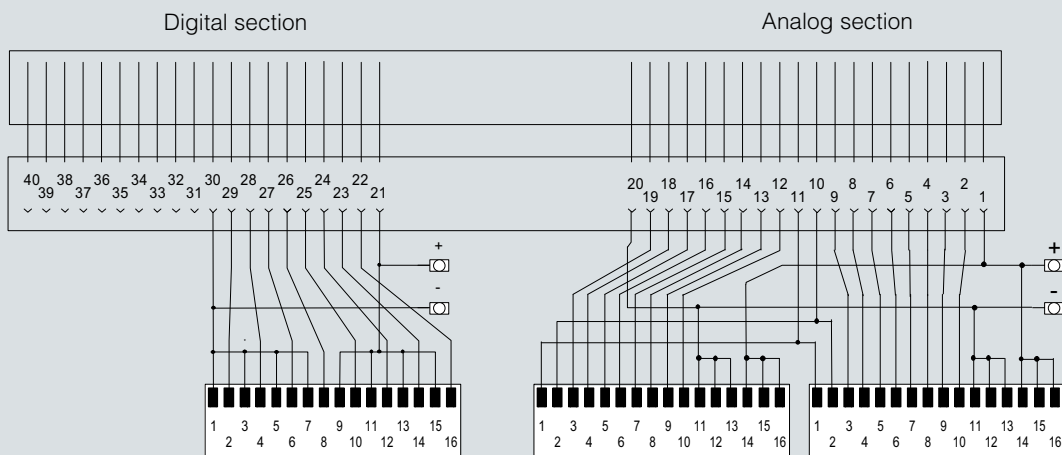
S7-300, CPU312C

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



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

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



Fully modular connection

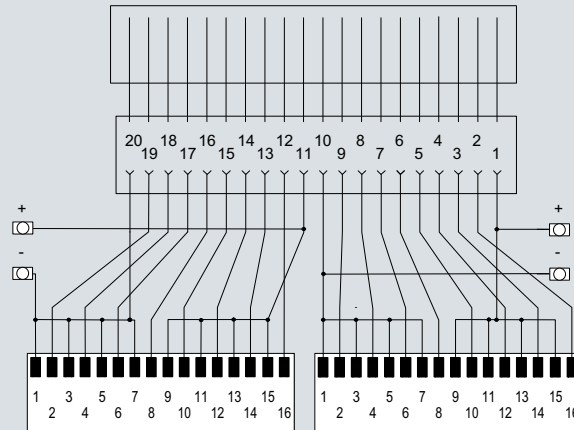
Front connector modules

S7-300 front connector modules

Schematics

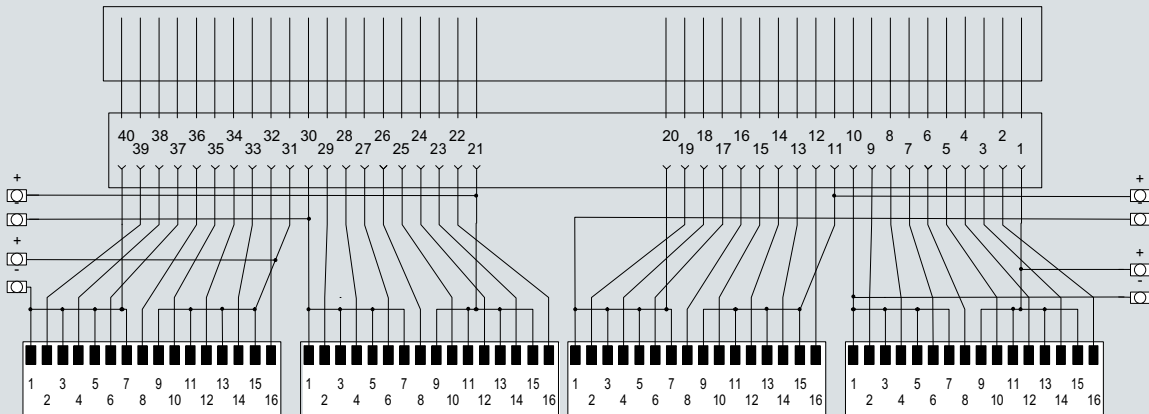
S7-300, digital 2 x 8 I/O

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



Fully modular connection

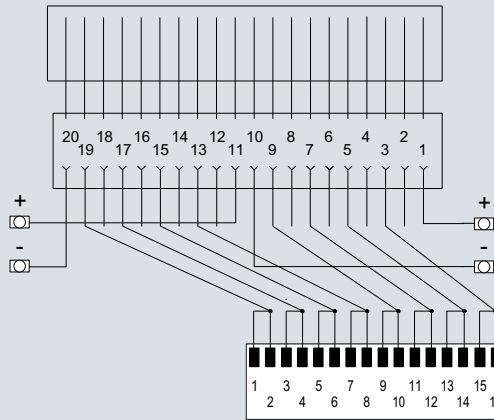
Front connector modules

S7-300 front connector modules

Schematics

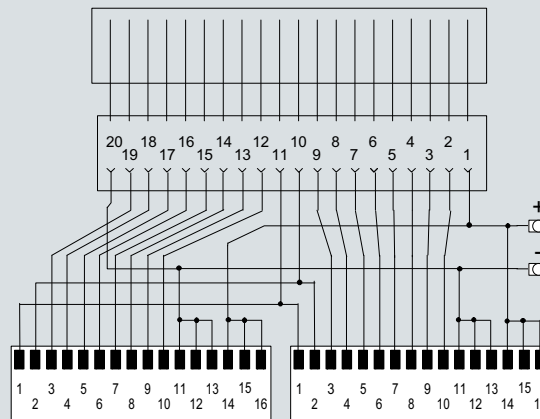
S7-300, 2 ampere digital 1 x 8 O

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

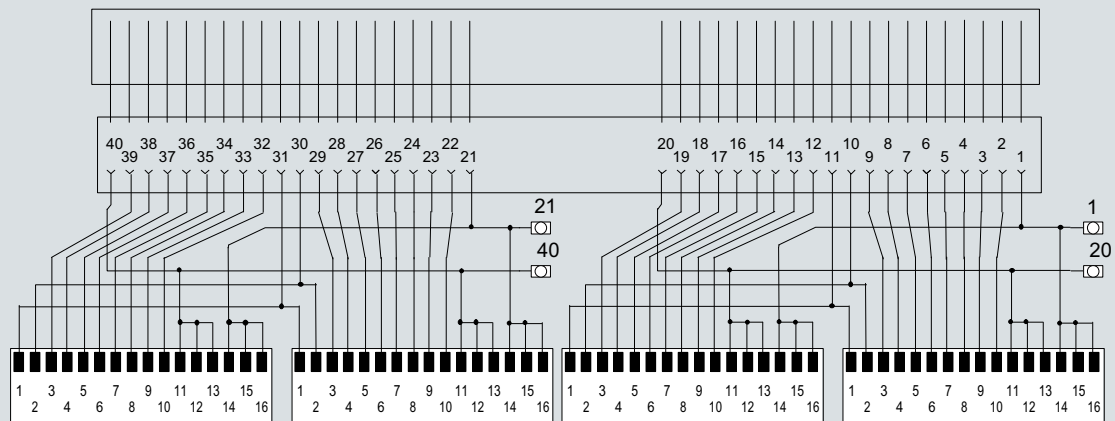
Front connector modules

S7-300 front connector modules

Schematics

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



Fully modular connection

Front connector modules

S7-400 front connector modules

Design



Up to 2 connecting cables or one 2 x 16-pole flat round-sheath ribbon cable can be connected to the front connector modules for digital modules (version 2 A) with 16 channels, up to 4 connecting cables or two 2 x 16-pole flat round 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 connecting 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 connecting cables and up to 3 connections for the potential infeed. There are several 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 also be found under "Circuit diagrams".

Technical specifications

Technical data of front connector module	
Rated operating voltage	24 V DC
Max. permissible operating voltage	60 V DC
Max. permissible continuous current	1 A
• per connector pin	
Max. permissible summation current	4 A/byte (power supply)
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

Fully modular connection

Front connector modules

S7-400 front connector modules

Technical specifications (continued)

Wiring rules for the front connector modules SIMATIC TOP connect, connection for potential supply

Modules up to 4 connections	
	Screw connection
Connectable cable cross-section	
• solid cables	No
• flexible cables with/without wire end ferrule	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 cables	
• without insulating collar	6 mm
• with insulating collar	-
Wire-end ferrules to DIN 46228	
• without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm ²	-
• with insulating collar 1.5 mm ²	-
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 64 connections	
	Screw connection
Connectable cable cross-sections	
• solid cables	No
• flexible cables with/without wire end ferrule	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 wires	
• without insulating collar	6 mm
• with insulating collar	-
Wire-end ferrules to DIN 46228	
• without insulating collar	Form A; 5 to 7 mm long
• with insulating collar 0.25 to 1.0 mm ²	-
• with insulating collar 1.5 mm ²	-
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	6ES7921-4AB00-0AA0
Front connector module (2 x 8 outputs) for 2 ampere digital outputs	
Voltage infeed via	
• Screw terminals	6ES7921-4AD00-0AA0
Front connector module (analog)	
Voltage infeed via	
• Screw terminals	6ES7921-4AG00-0AA0

Fully modular connection

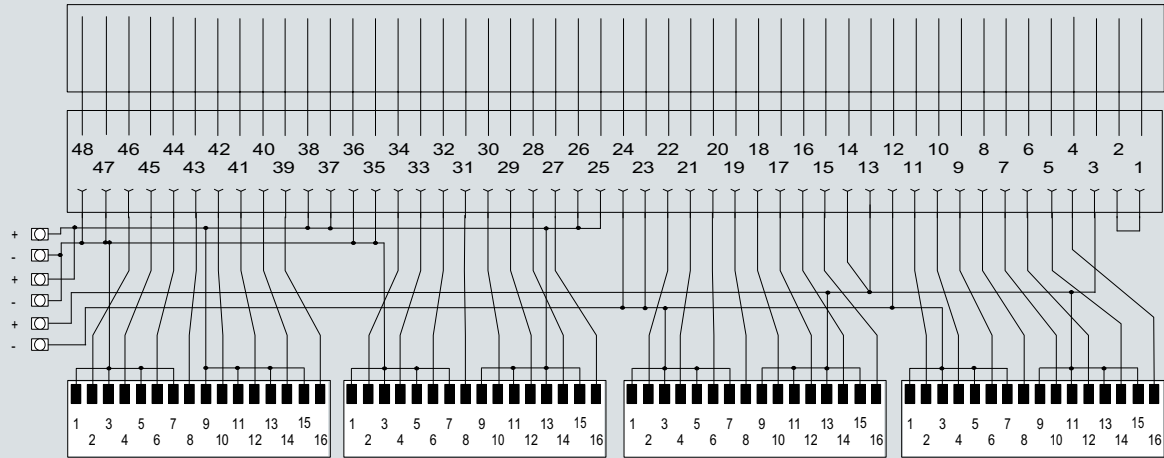
Front connector modules

S7-400 front connector modules

Schematics

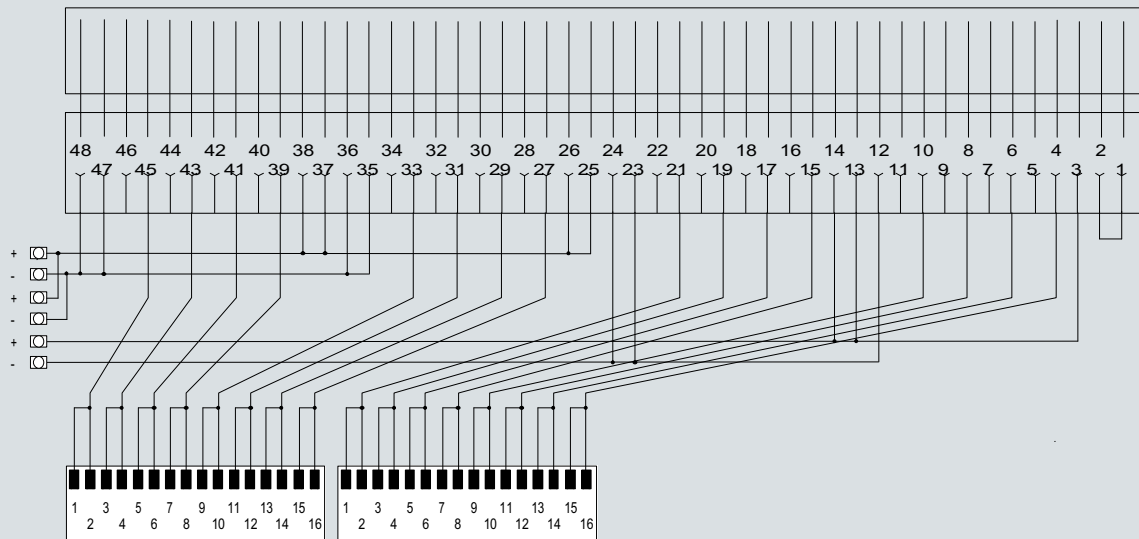
S7-400, digital 4 x 8 I/O

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



S7-400, 2 ampere digital 2 x 8 O

Front connector module with potential infeed via screw connection 6ES7921-4AD00-0AA0



Fully modular connection

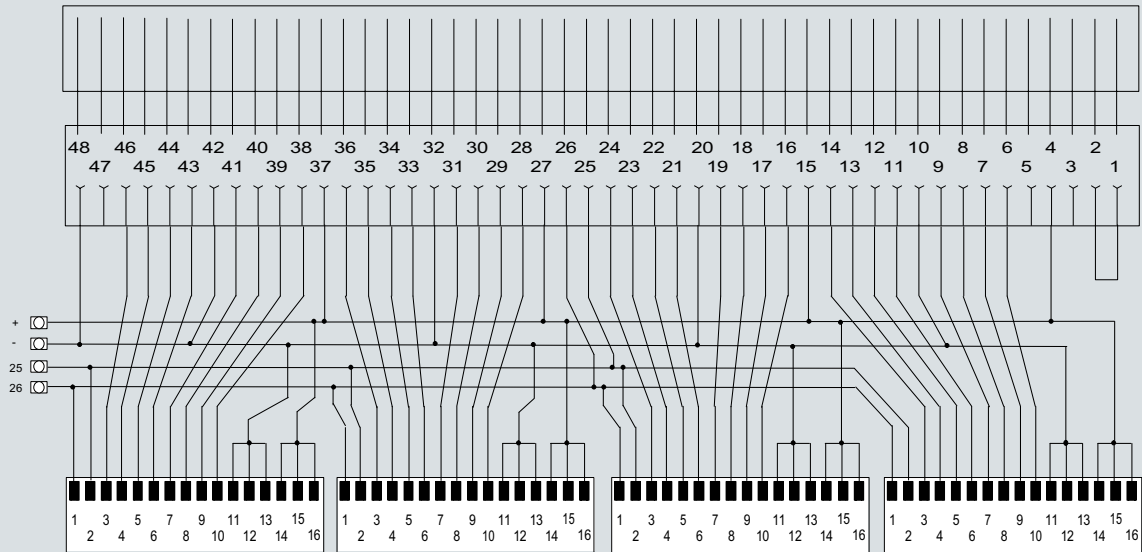
Front connector modules

S7-400 front connector modules

Schematics

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

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



Fully modular connection

Connecting cables

Connecting cables

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 connecting 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 un-sheathed 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 mm^2 . 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 mm^2 . 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 specifications

Technical data of connecting 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

Fully modular connection

Connecting cables

Connecting cables

Selection and ordering Data

Designation	Order No.
Pre-assembled round cable	
<u>16-pole, 0.14 mm²</u>	
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	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	6ES7923-0BF00-0DB0
Round-sheath ribbon cable	
<u>16-pole, 0.14 mm²</u>	
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	
<u>2 x 16-pole, 0.14 mm²</u>	
unshielded	
30 m	6ES7923-2CD00-0AA0
60 m	6ES7923-2CG00-0AA0
Accessories	
Crimping tool	6ES7928-0AA00-0AA0
For processing the connectors (female ribbon cable connector)	
Female ribbon connector (16-pole)	6ES7921-3BE10-0AA0
Insulation displacement system with cable grips package unit: 8 connectors and 8 cable grips	

Overview



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

Connection to front connector modules

For connecting to the front connector modules, one connecting cable is used per byte or per analog terminal module. In the case of the 2 x 16-pole round-sheath ribbon cable, two bytes can be connected. Up to 4 terminal modules are connected via the connecting cables, depending on the front connector module. Up to 8 signal channels are run via the 16-pole connecting 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 coupling modules. Passive and active connection modules (function modules) are available. The function modules are fitted with coupling elements. The I/O terminals on the connection module are available with spring-loaded or screw-type terminals. 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 power 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 configuring 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.

Fully modular connection

Connection modules

Basic modules

Overview



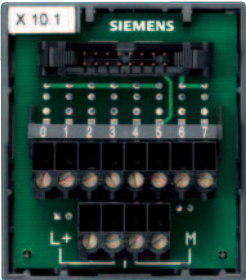
In the case of the basic module, the connection modules are used with basic functionality. Here, the I/O signal is connected quickly and simply from the field to the module or from the module to the field.

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

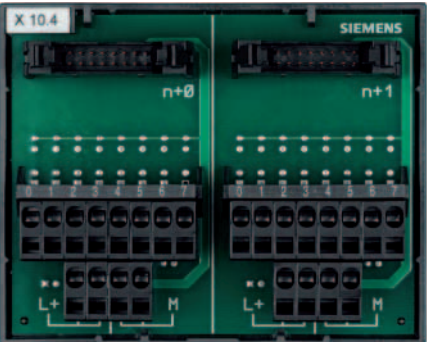
Design

Below is an overview of the terminal layout of the terminal modules for the wiring.

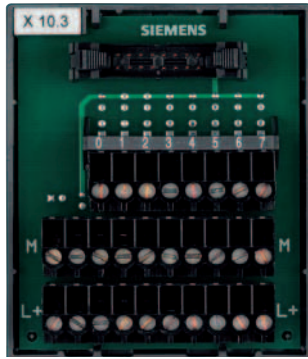
Terminal assignment of the connection module (TP1) for 1-wire initiators

Front view of the connection module	Terminal assignment
	Top row Terminals 0 to 7: Inputs/outputs x.0 to x.7 Bottom row 2 terminals L+ and 2 terminals M potential

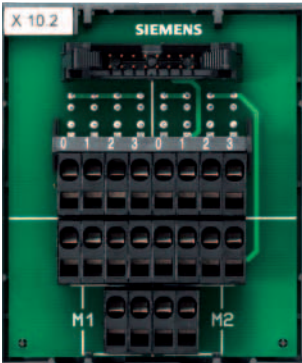
Terminal assignment of the connection module (TPK) for 1-wire initiators

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

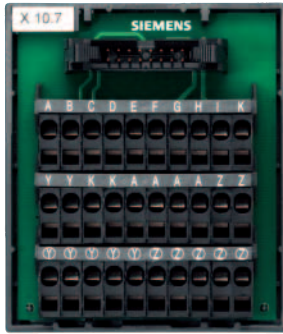
Terminal assignment of the connection module (TP3) for 3-wire initiators

Front view of the connection module	Terminal assignment
	Top row Terminals 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 (TP2) for 2 A modules

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

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

Front view of the connection module	Terminal assignment
	Top row Terminals A to K: Analog signals or compensation interface Middle row Terminal Y: L+ potential Terminal Z: M potential Terminals A and K: Compensation interface Bottom row You can use the 2 x 5 terminals Z and Y for multiplying any potentials and signals.

Fully modular connection

Connection modules

Basic modules

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 x 8 terminals for the signals, and there are 2 x 2 frame potential connections and 2 x 2 positive potential connections available to the user.

Connection module for 2 A output 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 connecting 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 under "Circuit diagrams".

Note: See under "Configuring and wiring" for mounting of a round-sheath ribbon cable on the 16-pole connector.

Technical specifications

Connection module TP1, TP3 and 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
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 analog modules 6ES7924-0CC10-0A_0	Approx. 68 x 43.2 x 80

Wiring rules for the connection modules TPA, TP1, TP2, TP3, TPK

	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm ²	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	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)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm ²	
Number of cables per connection	1 or a combination of 2 cables 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

Fully modular connection

Connection modules

Basic modules

Selection and ordering data

Designation	Order No.
Connection module TP1 for 1-wire initiators Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0AA10-0AB0 6ES7924-0AA10-0AA0
Connection module TP3 for 3-wire initiators Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0CA10-0AB0 6ES7924-0CA10-0AA0
Connection module TPK for 2 x 8 signals Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-1AA10-0AB0 6ES7924-1AA10-0AA0
Connection module TP2 for 2 A modules for 2-wire initiators Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0BB10-0AB0 6ES7924-0BB10-0AA0
Connection module TPA for analog signals Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0CC10-0AB0 6ES7924-0CC10-0AA0
Accessories	
Labeling plates for connection modules Insertable labeling plate PU = 200 units Self-adhesive labeling plate PU = 200 units	6ES7928-2AB00-0AA0 6ES7928-2BB00-0AA0
Shield plate for analog connection module (4 units)	6ES7928-1BA00-0AA0
Shield connection terminal for shield plate, 2 units, with cable diameter • 2 to 6 mm (2 cables) • 3 to 8 mm • 4 to 13 mm	6ES7390-5AB00-0AA0 6ES7390-5BA00-0AA0 6ES7390-5CA00-0AA0

Fully modular connection

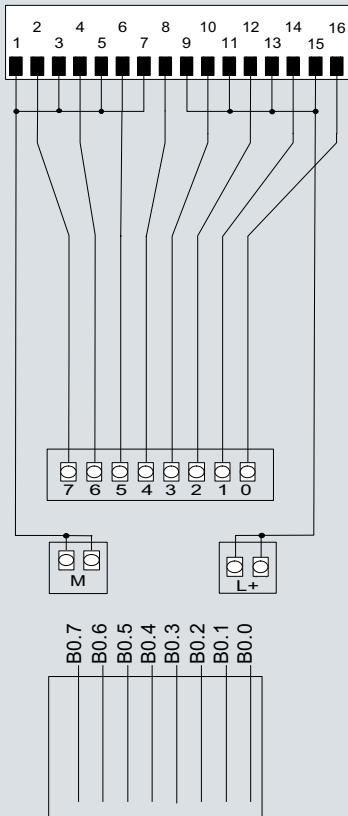
Connection modules

Basic modules

Schematics

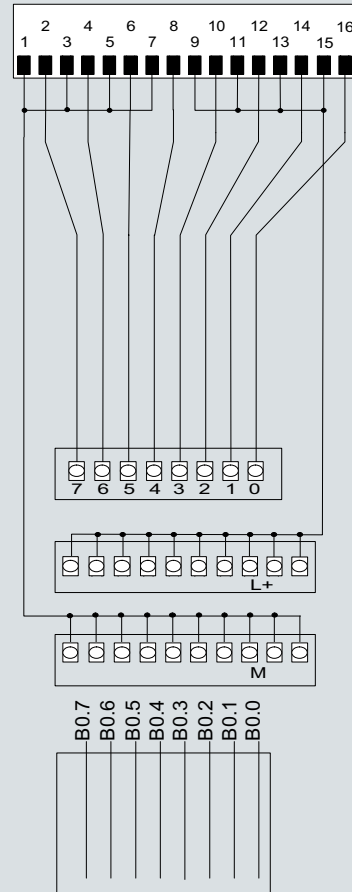
Connection module TP1

- 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



Fully modular connection

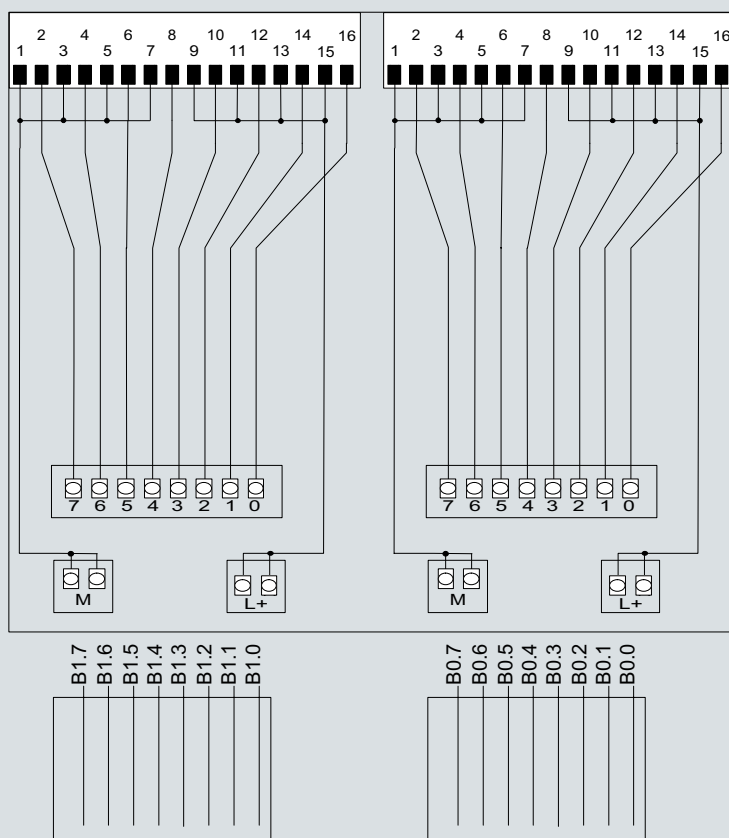
Connection modules

Basic modules

Schematics

Connection module TPK

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



Fully modular connection

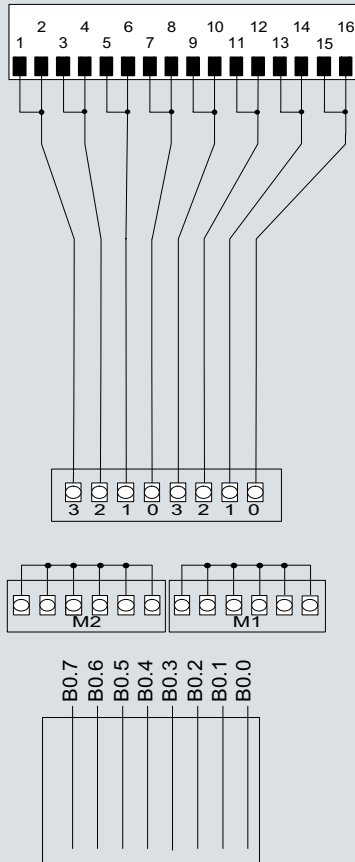
Connection modules

Basic modules

Schematics

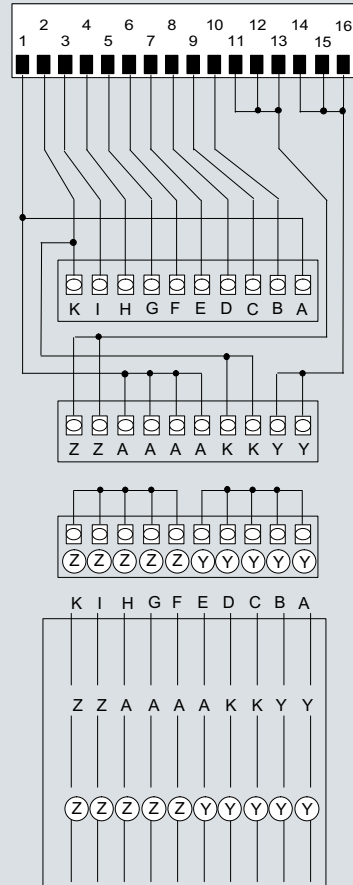
Connection module TP2

- 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



Fully modular connection

Connection modules

Signal modules

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.

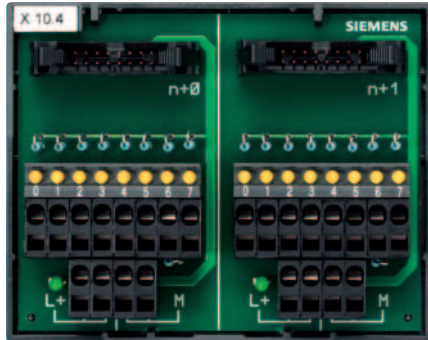
Design

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

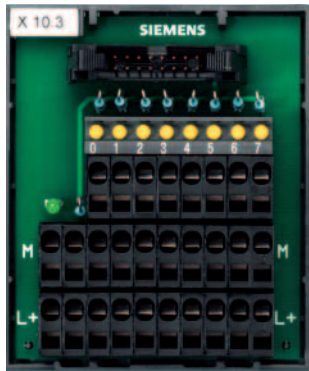
Terminal assignment of the connection module (TP1) with LED for 1-wire initiators

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

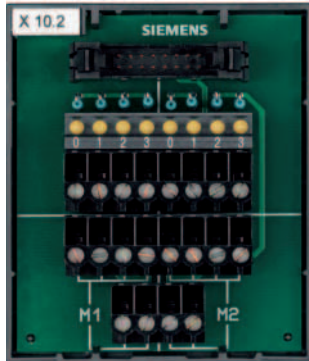
Terminal assignment of the connection module (TPK) with LED for 1-wire initiators

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

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

Front view of the connection module	Terminal assignment
	LEDs for indicating <u>Top row</u> Terminals 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 of the connection module (TP2) with LED for 2 A modules

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

Fully modular connection

Connection modules

Signal modules

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 connecting cables. This compact connection module comprises 2 x 8 terminals for the signals, and there are 2 x 2 frame potential connections and 2 x 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 also find the circuit diagrams of the connection modules under "Circuit diagrams".

Note: See under "Configuring and wiring" for mounting of a round-sheath ribbon cable on the 16-pole connector.

Wiring rules for the connection modules TP1 LED, TPK LED, TP2 LED, TP3 LED

	Spring connection	Screw connection
Connectable cable cross-sections		
• solid cables	No	
• flexible cables without wire end ferrule	0.5 to 2.5 mm ²	
• flexible cables with wire end ferrule in accordance with DIN 46228/1	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)
• flexible cables with wire end ferrule and plastic collar in accordance with DIN 46228/4	0.5 to 1.5 mm ²	
Number of wires 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	

Technical specifications

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), over-voltage 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 6ES7924-0BB10-0B_0	Approx. 68 x 43.2 x 80

Fully modular connection

Connection modules

Signal modules

Selection and ordering data

Designation	Order No.
Connection module TP1 with LED for 1-wire initiators Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0AA10-0BB0 6ES7924-0AA10-0BA0
Connection module TP3 with LED for 3-wire initiators Packaging unit (1 unit) • Spring terminals • Screw terminals	6ES7924-0CA10-0BB0 6ES7924-0CA10-0BA0
Connection module TPK with LED for 2 x 8 signals Packaging unit (1 unit) • Spring terminals • Screw 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 terminals • Screw terminals	6ES7924-0BB10-0BB0 6ES7924-0BB10-0BA0
Accessories Labeling plates for connection modules Insertable labeling plate PU = 200 units Self-adhesive labeling plate PU = 200 units	6ES7928-2AB00-0AA0 6ES7928-2BB00-0AA0

Fully modular connection

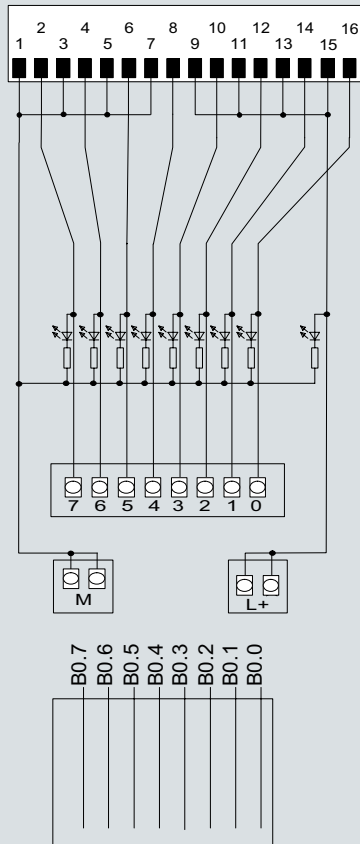
Connection modules

Signal modules

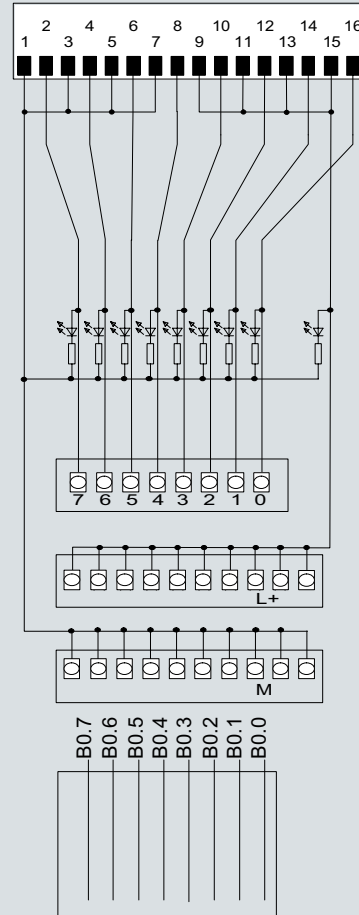
Schematics

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



2

Fully modular connection

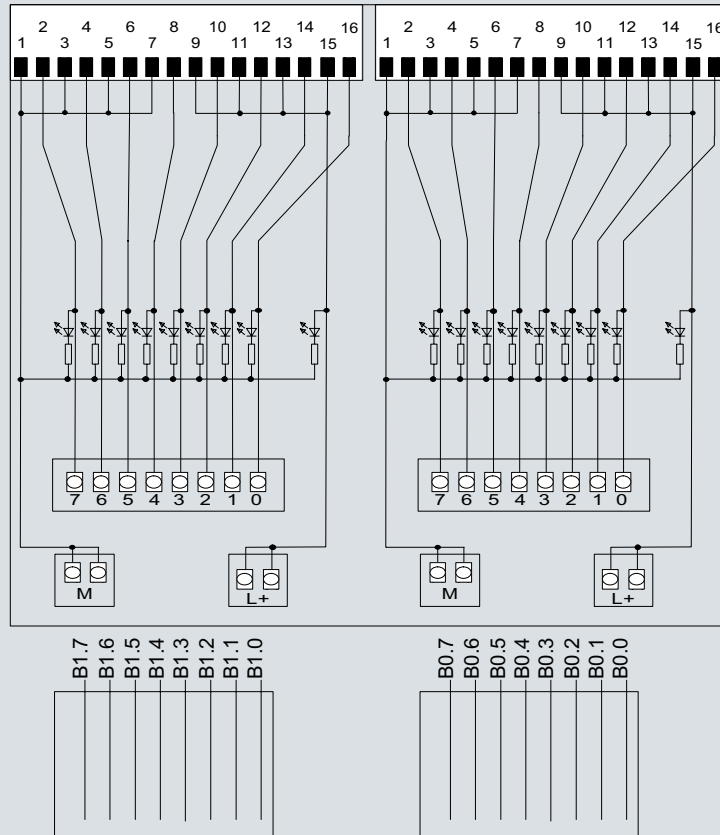
Connection modules

Signal modules

Schematics

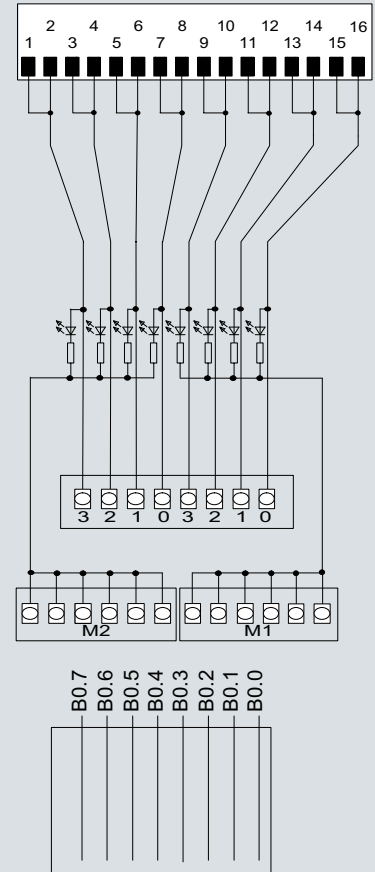
Connection module TPK

- 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



Connection module TP2

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



Fully modular connection

Connection modules

Function module

Overview



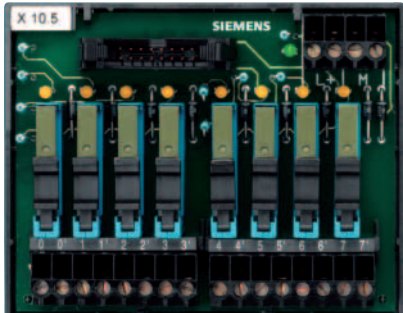
Function modules are implemented with digital connection modules fitted with relays or optocouplers.

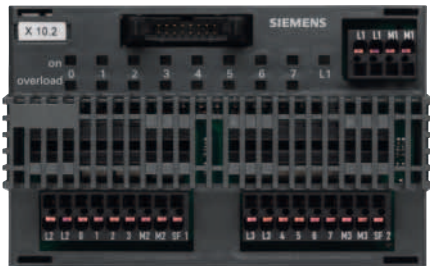
If other voltage or power levels are required in the field, the connection module for output signals TPRo or TPOo is used. For the TPRo connection module, relays are used for the implementation. For the TPOo connection module, optocouplers are used for the implementation. This converts the 24 V DC output 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.

Design

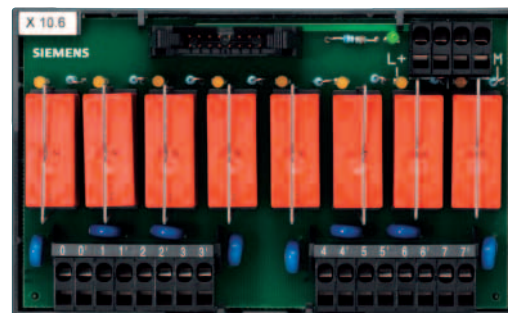
Below is an overview of the terminal layout the connection module for the wiring.

Terminal assignment of the connection modules

Front view of the TPRo connection module	Terminal assignment
	2 x 2 terminals for connecting 24 V DC potential LEDs for indicating Relay with socket Bottom row Terminals 0 to 7: Connection for the field signals (outputs) in 2-wire technology

Front view of the TPOo optocoupler module	Terminal assignment
	2 x 2 terminals for connecting 24 V DC potential LEDs for indicating Integrated optocouplers Bottom row L2/L3 and M2/M3 for output potential (4-grouping) Terminals 0 to 7: connections for the field signals (outputs) SF1/SF2 terminal for group fault message

Front view of the TPRi connection module



Terminal assignment

2 x 2 terminals for connecting 24 V DC potential
 LEDs for indicating Relay with socket
 Bottom row
 Terminals 0 to 7: Connection for the field signals (inputs) in 2-wire technology

Fully modular connection

Connection modules

Function module

Function

The connection modules have been expanded by an optocoupler module (TPOo), which allows high loads up to 4 A for 24 V to be quickly activated. The individual channels of the compact module are overload-proof and short-circuit proof. The operating statuses of the 8 channels are indicated by green and red LEDs. If there is an error at an output, a group fault signaling contact is activated.

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

The function modules with relays are equipped with LEDs for indicating.

The yellow LEDs indicate that 24 V DC is present at the relay coil of the TPRo.

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

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 if the 24 V DC voltage for supplying the module is present.

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

The relays have sockets for both function modules with relays and can be swapped in the event of a fault.

Use with optocouplers for the TPRo relay modules

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

Installation information for connection modules (TPRo) only affects order numbers 6ES7924-0BD10-0BB0 and 6ES7924-0BD10-0BA0.

To protect the relay contacts, inductive loads must be dampened externally with an effective protective circuit. No measures are provided for this in the TPR.

When using a relay (e.g. Nais APE 30024):

To cope with surge voltage values ± 2 kV, overvoltage protection must be provided (e.g. Weidmüller 940149 0000 DK4U 60 V AC/85 V DC or equivalent).

Installation information for connection modules (TPRo and TPOo) only affects order numbers 6ES7924-0BD10-0BB0/6ES7924-0BD10-0BA0 and 6ES7924-0BF10-0BA0/6ES7924-0BF10-0BB0.

When using optocouplers such as for TPOo or TPRo (e.g. Nais AQE 34224 or Nais AQE 12124 for TPRo):

To cope with surge voltage values ± 1 kV, overvoltage protection must be provided (e.g. Weidmüller 940149 0000 DK4U 60 V DC/85 V DC or equivalent).

Integration

Connection module with optocoupler (TPOo) for outputs

If you want quick switching of high loads (up to 4 A) for 24 V DC voltages between the output signals and the field signals, the connection module with integrated optocoupler can be used. On the connection module with optocoupler, 8 signal connections are available to the user for the field signals.

The individual channels of the compact module are overload-proof and short-circuit proof. If there is an error at an output, a group fault signaling contact is activated. Potential supply to the module can be made from the connection module or from the front connector module.

The operating statuses of the 8 channels are indicated by green and red LEDs.

Connection module with relay (TPRo) for outputs

If you want to isolate or adapt a potential (e.g. 24 V DC to 230 V AC) between the output signals and the field signals, the connection module with a relay can be used. On the connection module with relay, the user has 8 signal connections in 2-wire technology for the field signals. Potential supply 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 optical signaling.

Connection module with relay (TPRi) for inputs

If you want to adapt a potential (e.g. 230 V AC to 24 V DC) between the field signals and input signals, the connection module with a relay is used. On the connection module with relay, the user has 8 signal connections in 2-wire technology for the field signals. Potential supply 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 optical signaling.

You can find the circuit diagrams of the connection modules under "Circuit diagrams".

Note: See "Configuring and wiring" for assembly of a round-sheath ribbon cable on the 16-pin connector.

Fully modular connection

Connection modules

Function module

2

Technical specifications

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 min. load ≥ 10 mA
Switching frequency	20 cycles/minute
Service life	
• Mechanical	5 x 10 ⁶ switching cycles
• Electrical	3 x 10 ⁴ operating cycles at 230 V AC/2 A/ cos ϕ = 1
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance 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 optocoupler for outputs (TPOo)

Input data

Power supply	
Potential connection (L1/M1)	24 V DC (20.4 ... 28.8 V DC)
Status indicator "L1"	Green LED

Switching inputs

Number	8 channels (channel 0 ... 7) with reverse polarity protection
Input voltage "off"	0 V DC (0 ... 5 V DC)
Input voltage "on"	24 V DC (15 ... 28.8 V DC)
Input current	min. 5 mA / 20 V DC, per channel
Status indicator "on"	Green LED per channel

Output data

Power supply

Operating voltage U_B (L2/M2, L3/M3)	24 V DC (20 ... 30 V DC) per group of 4 one V_B
U_B conditionally protected against polarity reversal ¹⁾	Up to 30 V DC
Current consumption	approx. 10 mA for 24 V DC + output currents per group of 4
Aggregate current	max. 8 A per group of 4

Switching outputs

Number	8 channels (channel 0 ... 7)
Short-circuit protection ²⁾	for $U_B < 24$ V DC or 24 ... 30 V DC/max. 20 A
Output voltage	typ. $U_B - 1$ V (for input "on")
Output current	Max. 4 A per channel
• Lamp load	max. 20 W at 24 V per channel
Demand factor per group of 4	50 %, max. 2 outputs active under full load (4 A)
Short-circuit response	Clocked output signal (approx. 2 ... 20 ms)
On/off-delay	typ. 100 μ s/250 μ s / resistive load

Switching frequency	max. 500 Hz with 4 A resistive load (square wave voltage, pulse/pause 1:1)
"Overload" fault indication	Red LED per channel, in case of wire breakage or short-circuit
• Wire break indication	Active/ _{out} < 0.1 A/inactive/ _{out} $\geq$ 0.9 A
Group fault messages SF1, SF2	
Monitored channels	SF1: Channels 0 ... 3, SF2: for channels 4 ... 7
Voltage U_{SF1} , U_{SF2}	
• No error at the switching output	typ. $U_B - 2$ V
• Wire break at the switching output	Approx. 0 V
• Short-circuit at the switching output	0 V to U_B , clocked
Current I_{SF1} , I_{SF2}	min. 4 mA/max. 200 mA

General data

Degree of protection	IP20
Operating temperature	0 ... 60 °C
Mounting position	Any, except overhead
Connecting terminals	Screw-type or spring-loaded term.
Stripped length	9 mm
Conductor cross-section	
• Finely stranded without end sleeve	0.5 ... 2.5 mm ²
• with end sleeve for screw-type terminals	0.5 ... 2.5 mm ² according to DIN 46228-1
• with end sleeve for spring-loaded terminals	0.5 ... 1.5 mm ² according to DIN 46228-1 and DIN 46228-4
Screwdriver	acc. to DIN 5264 B 0.6 x 3.5 mm
Tightening torque of screw-type terminals	0.4 Nm
Weight	Approx. 400 g
Dimensions (W x H x D) in mm	134 x 84 x 77

- ¹⁾ Protected against polarity reversal, if the ground potential of the output load is directly connected to the 0 V supply of the power supply unit
²⁾ Not sustained short-circuit-proof, max. duration approx. 60 min.

Connection module with relay for inputs (TPRI)

Energizing side

Operating voltage for coil	230 V AC (207 ... 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 A/24 V AC, max. 50 mA/48 V DC max. 50 mA/60 V DC recommended min. load ≥ 5 mA
Switching frequency	200 cycles/minute
Service life	
• Mechanical	10 x 10 ⁶ switching cycles
• Electrical	3 x 10 ⁶ operating cycles at 230 V AC/50 mA/cos ϕ = 1
Operating temperature	0 ... +60 °C
Mounting position	Any
Clearance 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 6ES7924-0BE10-0B_0	ca. 130 x 45 x 80

Fully modular connection

Connection modules

Function module

Technical specifications (continued)

Wiring rules for the connection modules TPRo and TPRI

	Spring-loaded connection	Screw-type connection
Connectable cable cross-sections		
• Solid conductors	No	
• Flexible cables without end sleeve	0.5 ... 2.5 mm ²	
• Flexible cables with end sleeve according to DIN 46228/1	0.5 ... 1.5 mm ²	0.5 to 2.5 mm ² (2.5 mm ² with a crimp in accordance with EN 60947-1)
• Flexible cables with end sleeve and plastic collar according to DIN 46228/4	0.5 ... 1.5 mm ²	
Number of conductors per connection	1 or a combination of 2 conductors up to the cross-sections specified above (total) in a shared end sleeve	
Blade width of the screwdriver	3.5 mm (cylindrical design)	
Tightening torque for connecting the cables	-	0.4 ... 0.7 Nm

Selection and ordering data

Name	Order No.
Connection module TPRo for output signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	6ES7924-0BD10-0BB0
• Screw-type terminals	6ES7924-0BD10-0BA0
Connection module optocoupler	
Packaging unit 1 unit	
• Spring-loaded terminals	6ES7924-0BF10-0BB0
• Screw-type terminals	6ES7924-0BF10-0BA0
Connection module TPRI for input signals	
for 2-wire connection	
Packaging unit 1 unit	
• Spring-loaded terminals	6ES7924-0BE10-0BB0
• Screw-type terminals	6ES7924-0BE10-0BA0
Accessories	
Labels for connection modules	
Insertable labels	6ES7928-2AB00-0AA0
PU = 200 units	
Self-adhesive labels	6ES7928-2BB00-0AA0
PU = 200 units	
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 in the case of TPRo	6ES7928-3DA00-4AA0
PU = 4 units	
Optocoupler AC alternative for relay in the case of TPRo	6ES7928-3CA00-4AA0
PU = 4 units	

Fully modular connection

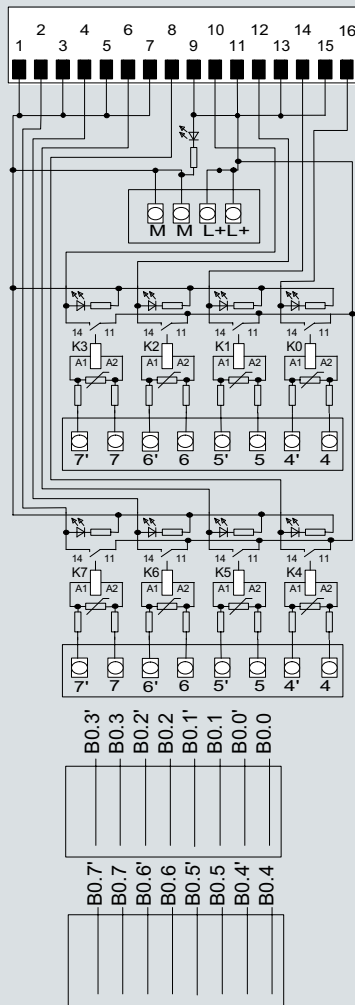
Connection modules

Function module

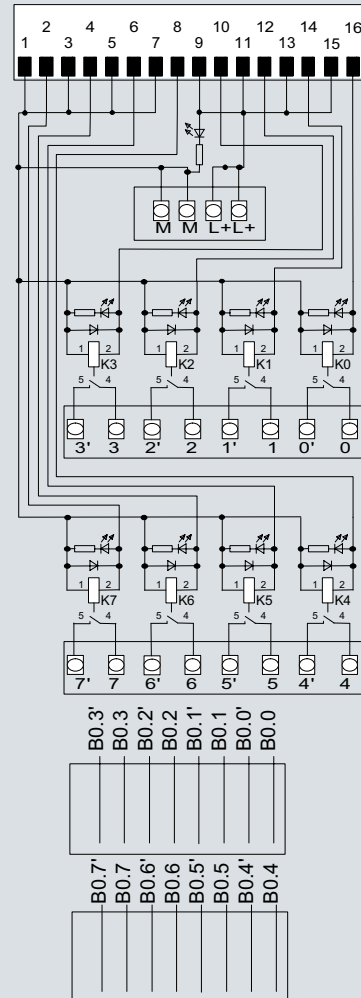
Schematics

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 TPPro**

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



2

Fully modular connection

Connection modules

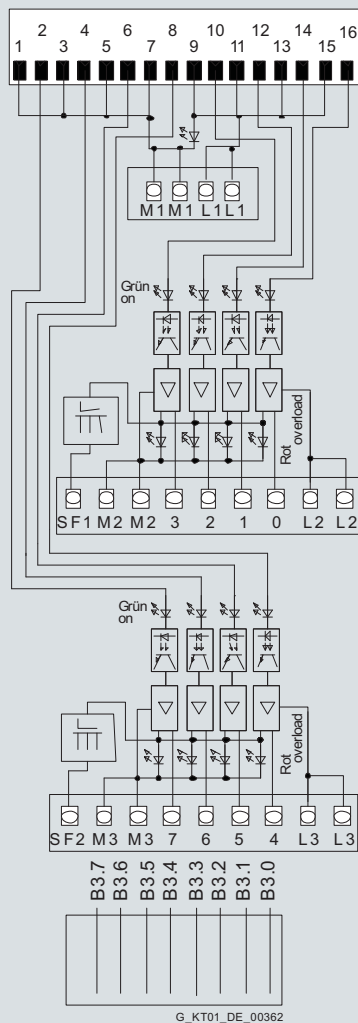
Function module

Schematics (continued)

Optocoupler circuit diagram:

Connection module TPOo

- 8 NO with LED, spring connection
6ES7924-0BF10-0BB0 or
- 8 NO with LED, screw connection
6ES7924-0BF10-0BA0



Fully modular connection

Configuration and wiring

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 module, approx. 40 mm 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 module, approx. 100 mm must be removed from the cable sheath.

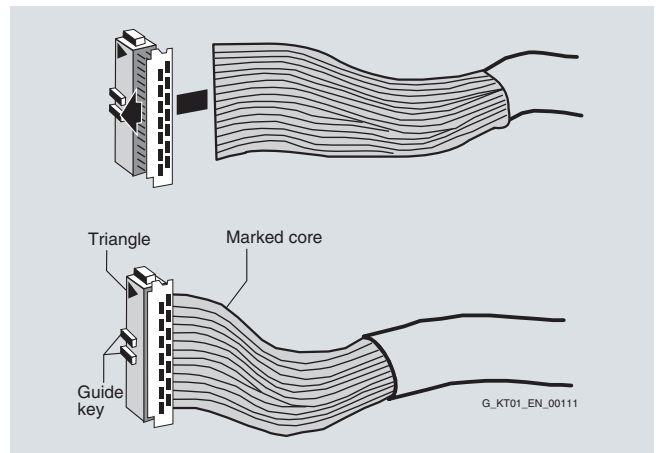
Connection of round-sheath ribbon cable to 16-pole connector

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
Round sheath ribbon cable 1 x 16-pole • Front connector module 20-pole • Front connector module 40-pole and Compact CPU (X1 connector) • Connection module		Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath
	8 I/O each	approx. 110 mm	approx. 70 mm	
	8 I/O each	approx. 115 mm	approx. 75 mm	
Round-sheath ribbon cable 2 x 16-pole • Front connector module 20-pole	2 x 8 I/O	approx. 95 mm		approx. 40 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

Fully modular connection

Configuration and wiring

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 module, 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 module, approx. 100 mm must be removed from the cable sheath.

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

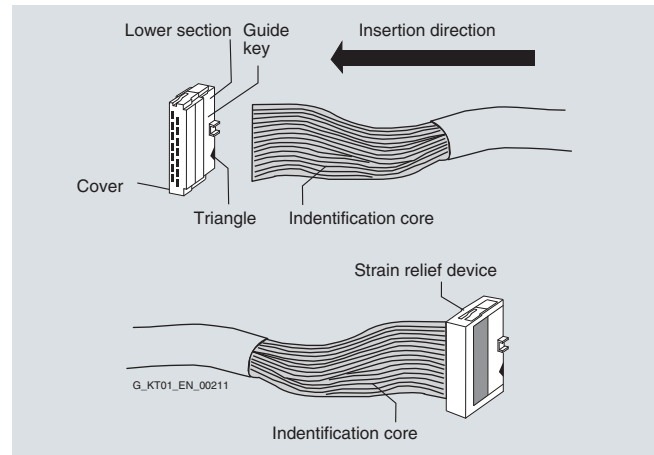
The flat cable is threaded into the 16-pole connector. The connector is fitted with a guide key. Pin 1 is marked with a triangle on the side of the guide key.

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.

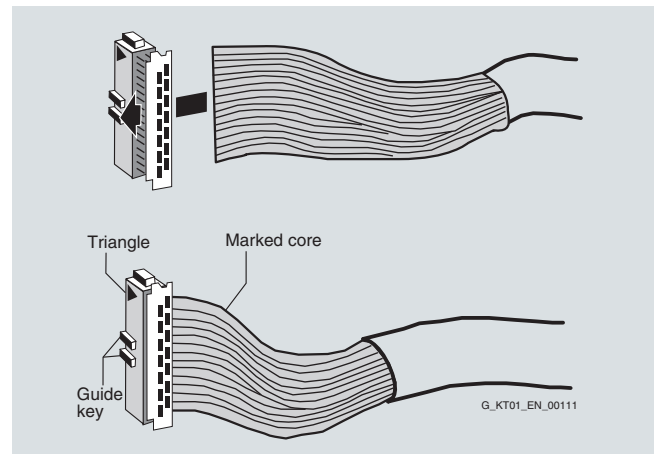
Make absolutely sure that the position of the marked core is correct, once for the front connector module (see graphic at top right) and once for the connection module (see graphic at bottom right). The connector is an insulation displacement connector and can now be pressed on easily.

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 round-sheath 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
Flat round cable 1 x 16-pole • Front connector module 48-pole • Connection module	8 I/O each	Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath	Dismantling of cable sheath
		approx. 315 mm	approx. 270 mm	approx. 160 mm	approx. 140 mm	approx. 40 mm
Flat round cable 2 x 16-pole • Front connector module 48-pole • Connection modul	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	ca. 100 mm

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 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.

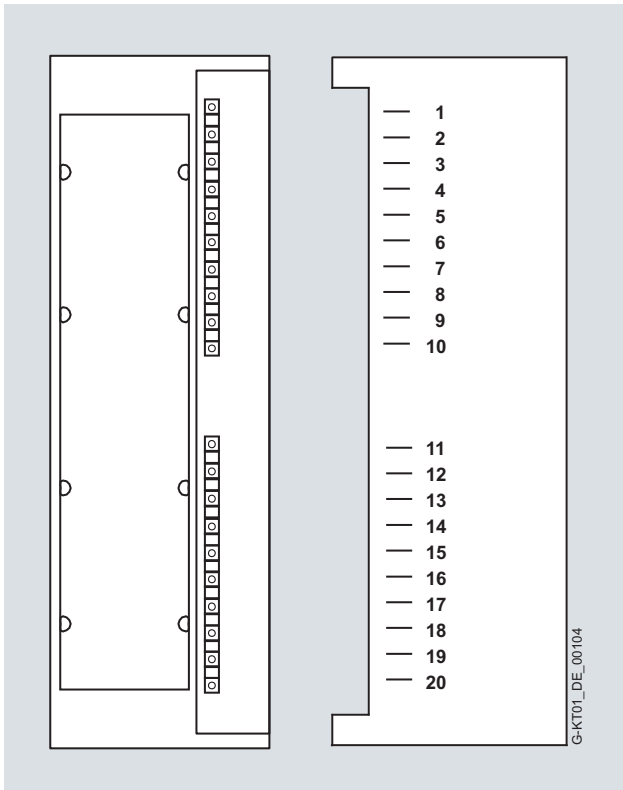
Terminal assignment

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 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

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

Fully modular connection

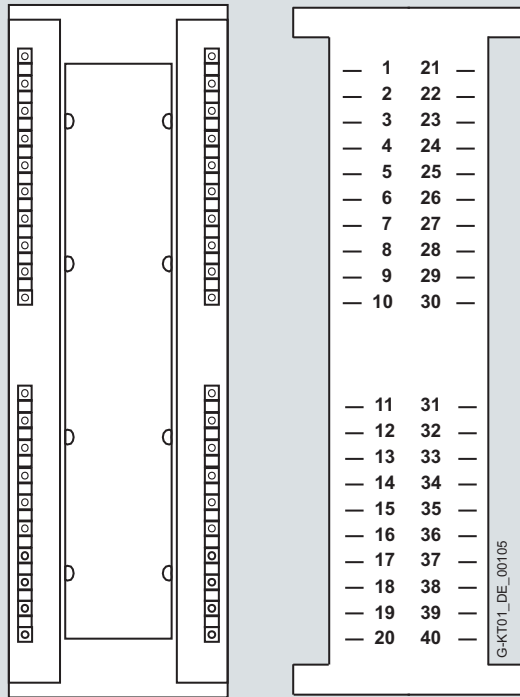
Configuration and wiring

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.



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

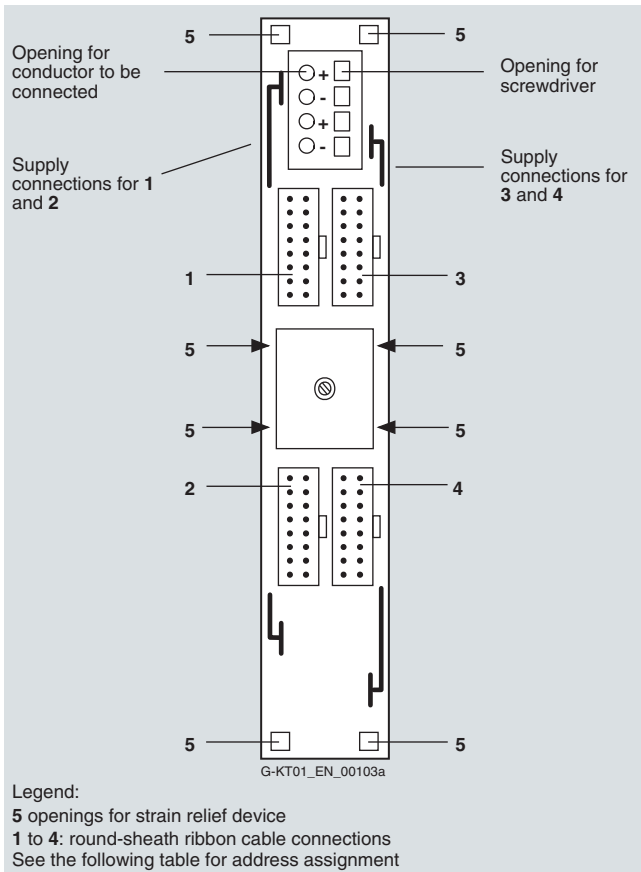
Connection assignment for connection module TPA				Connection assignment for connection module TPA	
Conne- ction module 1	Conne- ction module 2	Module labeling		Conne- ction module 3	Conne- ction module 4
Y	Y	1	21	Y	Y
B		2	22	B	
C		3	23	C	
D		4	24	D	
E		5	25	E	
F		6	26	F	
G		7	27	G	
H		8	28	H	
I		9	29	I	
K	K	10	30	K	K
A	A	11	31	A	A
	B	12	32		B
	C	13	33		C
	D	14	34		D
	E	15	35		E
	F	16	36		F
	G	17	37		G
	H	18	38		H
	I	19	39		I
Z	Z	20	40	Z	Z

Fully modular connection

Configuration and wiring

Wiring of S7-300 analog modules

Overview (continued)

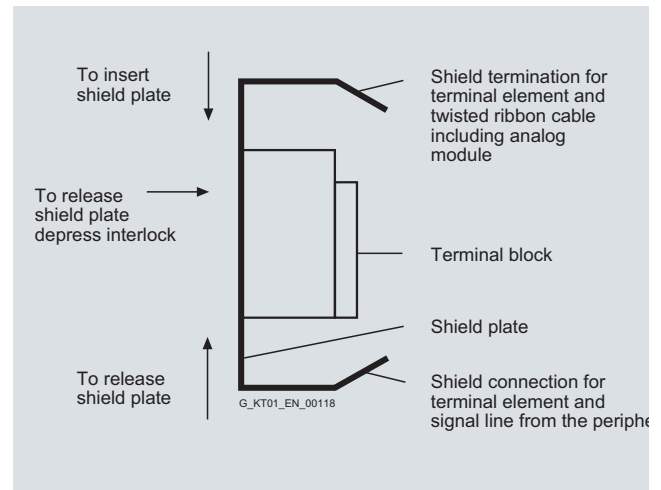


Terminal block assignment to the 40-pole analog front connector module

Connection cable connection (see graphic for 40-pole analog front connector module for assignment)	Connection module assign- ment 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

Fully modular connection

Configuration and wiring

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 Front connector module	Connection			
	X1	X2	X3	X4
	Connection module			
	1	2	3	4
1				
2				
3				
4	Y	Y	Y	Y
5				
6	B			
7	C			
8	D			
9	E			
10	Z	Z	Z	Z
11	F			
12	G			
13	H			
14	I			
15	Y	Y	Y	Y
16		B		
17		C		
18		D		
19		E		
20	Z	Z	Z	Z
21		F		
22		G		
23		H		
24		I		
25	K	K	K	K
26	A	A	A	A
27	Y	Y	Y	Y
28			B	
29			C	
30			D	
31			E	
32	Z	Z	Z	Z
33			F	
34			G	
35			H	
36			I	
37	Y	Y	Y	Y
38				B
39				C
40				D
41				E
42	Z	Z	Z	Z
43				F
44				G
45				H
46				I
47				
48	Z	Z	Z	Z

Shield connection

See "wiring of S7-300 analog modules".

Flexible connection

**3/2****Introduction****3/3****Front connector modules**

3/3

S7-300 front connector with single cores

3/4

S7-400 front connector with single cores

3/5

Front connectors

3/6

Front connectors for S7-300 with crimp connections

Flexible connection

Introduction

Flexible connection

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 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 thanks to bundled individual 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 versions 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.

Flexible connection

Front connector modules

S7-300 front connector with single cores

Overview



- Can be used for modules of the SIMATIC S7-300
- The front connectors with single wires replace the standard SIMATIC connectors
 - 6ES7 392-1AJ00-0AA0
 - 6ES7 392-1BJ00-0AA0
 - 6ES7392-1CJ00-0AA0
 - 6ES7392-1CM00-0AA0
 - 6ES7 921-3AH00-0AA0
 - 6ES7 392-1AM00-0AA0
 - 6ES7 392-1BM01-0AA0
 - 6ES7 921-3AH20-0AA0

Technical specifications

Front connector with single cores for 16 channels	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load of all wires, 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
Core color	Blue, RAL 5010
Designation of cores	Numbered from 1 to 20 (front connector contact = core number)
Assembly	Screw-type or crimp contacts

Front connector with single cores for 32 channels	
Rated operating voltage	24 V DC
Permissible continuous current with simultaneous load of all wires, 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	40
Core cross-section	0.5 mm ² ; Cu
Bundle diameter in mm	approx. 17
Core color	Blue, RAL 5010
Designation of cores	Numbered from 1 to 40 (front connector contact = core number)
Assembly	Screw-type or crimp contacts

Selection and ordering data

Designation	Order No.
Front connector with single cores for 16-channel digital modules SIMATIC S7-300, 20 x 0.5 mm²	
Core type H05V-K	
<u>Screw-type version</u>	
Packaging unit: 1 unit; Length:	
• 2.5 m	6ES7922-3BC50-0AB0
• 3.2 m	6ES7922-3BD20-0AB0
• 5 m	6ES7922-3BF00-0AB0
• Custom lengths	On request
Packaging unit: 5 units; Length:	
• 2.5 m	6ES7922-3BC50-5AB0
• 3.2 m	6ES7922-3BD20-5AB0
• 5.0 m	6ES7922-3BF00-5AB0
<u>Crimp version</u>	
Packaging unit: 1 unit	
Length:	
• 2.5 m	6ES7922-3BC50-0AF0
• 3.2 m	6ES7922-3BD20-0AF0
• 5.0 m	6ES7922-3BF00-0AF0
• Custom lengths	On request
Core type UL/CSA-certified	
<u>Screw-type version</u>	
Packaging unit: 1 unit; Length:	
• 3.2 m	6ES7922-3BD20-0UB0
• 5.0 m	6ES7922-3BF00-0UB0
Front connector with single cores for 32-channel digital modules SIMATIC S7-300, 40 x 0.5 mm²	
Core type H05V-K	
<u>Screw-type version</u>	
Packaging unit: 1 unit; Length:	
• 2.5 m	6ES7922-3BC50-0AC0
• 3.2 m	6ES7922-3BD20-0AC0
• 5.0 m	6ES7922-3BF00-0AC0
• Custom lengths	On request
Packaging unit: 5 units; Length:	
• 2.5 m	6ES7922-3BC50-5AC0
• 3.2 m	6ES7922-3BD20-5AC0
• 5.0 m	6ES7922-3BF00-5AC0
<u>Crimp version</u>	
Packaging unit: 1 unit; Length:	
• 2.5 m	6ES7922-3BC50-0AG0
• 3.2 m	6ES7922-3BD20-0AG0
• 5.0 m	6ES7922-3BF00-0AG0
• Custom lengths	On request
Core type UL/CSA-certified	
<u>Screw version</u>	
Packaging unit: 1 unit; Length:	
• 3.2 m	6ES7922-3BD20-0UC0
• 5.0 m	6ES7922-3BF00-0UC0

Flexible connection

Front connector modules

S7-400 front connector with single cores

Overview



- Can be used for modules of the SIMATIC S7-400.
- The front connectors with single wires replace the standard SIMATIC connectors:
 - 6ES7 492-1AL00-0AA0
 - 6ES7 492-1BL00-0AA0
 - 6ES7 492-1CL00-0AA0

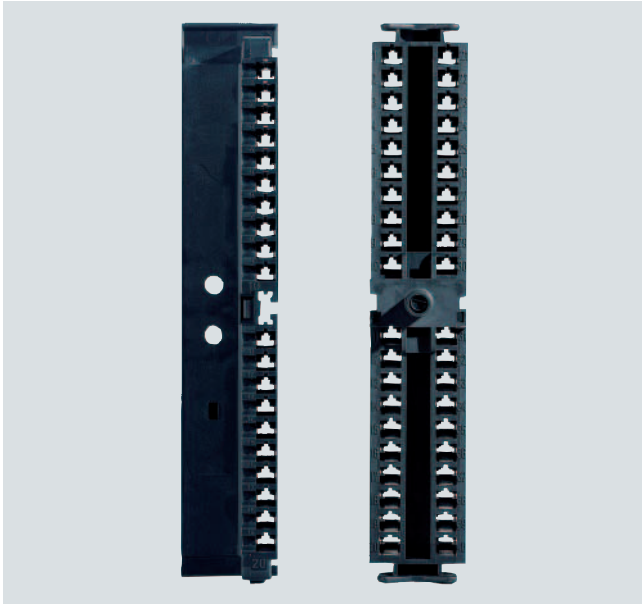
Technical specifications

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
Core color	Blue, RAL 5010
Designation of cores	Numbered 3 to 48 (adapter contact = core number)
Assembly	Screw-type or crimp contacts

Selection and ordering data

Designation	Order No.
Front connector with single cores for 32-channel module	
SIMATIC S7-400, 46 x 0.5 mm²	
Core type H05V-K	
<u>Screw connection</u>	
Packaging unit: 1 unit	
Length:	
• 2.5 m	6ES7922-4BC50-0AD0
• 3.2 m	6ES7922-4BD20-0AD0
• 5 m	6ES7922-4BF00-0AD0
• Custom lengths	On request
Packaging unit: 5 units	
Length:	
• 2.5 m	6ES7922-4BC50-5AD0
• 3.2 m	6ES7922-4BD20-5AD0
• 5 m	6ES7922-4BF00-5AD0
<u>Crimp connection</u>	
Packaging unit: 1 unit	
Length:	
• 2.5 m	6ES7922-4BC50-0AE0
• 3.2 m	6ES7922-4BD20-0AE0
• 5 m	6ES7922-4BF00-0AE0
• Custom lengths	On request
Packaging unit: 5 units	
Length:	
• 2.5 m	6ES7922-4BC50-5AE0
• 3.2 m	6ES7922-4BD20-5AE0
• 5 m	6ES7922-4BF00-5AE0
Core type UL/CSA-certified	
<u>Screw-type version</u>	
Packaging unit: 1 unit	
Length:	
• 3.2 m	6ES7922-4BD20-0UD0
• 5 m	6ES7922-4BF00-0UD0
• Custom lengths	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. Then it only fits into the modules of the same type.

Flexible connection

Front connector modules

Front connectors for S7-300 with crimp connections

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.

Selection and ordering data (Papier)

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 Packaging unit (250 units)	6XX3070
Crimping tool for crimping the crimp contacts	6XX3071
Unlocking tool for crimp contacts	6ES5497-4UC11

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

Configuration



4/2

**Brief instruction
to the configuration guide**

4/3

Configuration guides

Configuration

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.

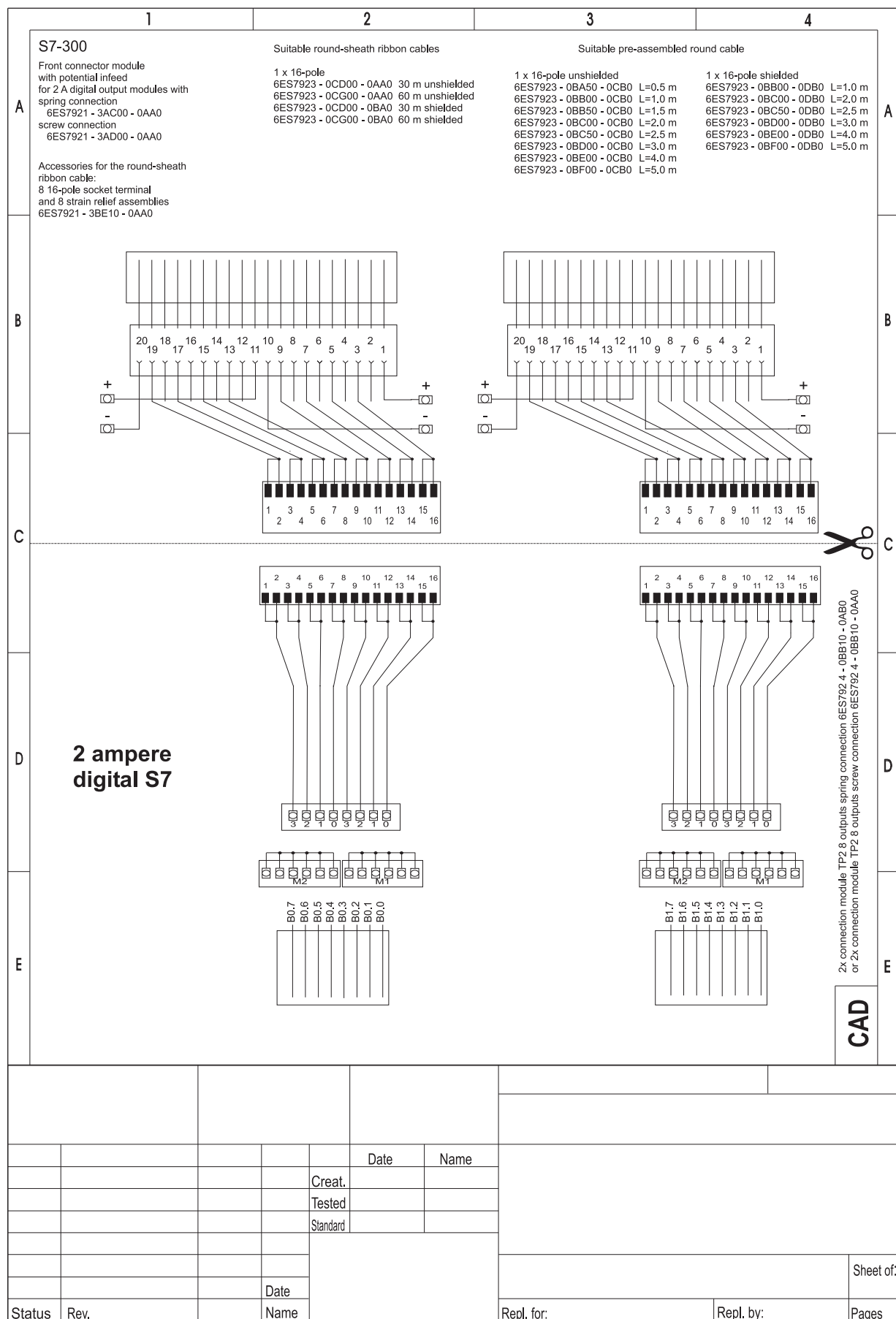
Follow all the other steps on the copy.

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.

	1	2	3	4	
S7-300	Suitable round-sheath ribbon cables		Suitable pre-assembled round cable		PLC type
A	Front connector module with potential feed with spring connection 6ES7921-3AA00-0AA0 screw connection 6ES7921-3AB00-0AA0 Accessories for the round-sheath ribbon cable: 8 16-pole socket terminal and 8 strain relief assemblies 6ES7921-3BE10-0AA0	1 x 16-pole 6ES7923-0CD00-0AA0 30 m unshielded 6ES7923-0CG00-0AA0 60 m unshielded 6ES7923-0CD00-0BA0 30 m shielded 6ES7923-0CG00-0BA0 60 m shielded 2 x 16-pole 6ES7923-2CD00-0AA0 30 m unshielded 6ES7923-2CG00-0AA0 60 m unshielded	1 x 16-pole shielded 6ES7923-0BA50-0CB0 L=0,5 m 6ES7923-0BB00-0CB0 L=1,0 m 6ES7923-0BB50-0CB0 L=1,5 m 6ES7923-0BC00-0CB0 L=2,0 m 6ES7923-0BC50-0CB0 L=2,5 m 6ES7923-0BD00-0CB0 L=3,0 m 6ES7923-0BE00-0CB0 L=4,0 m 6ES7923-0BF00-0CB0 L=5,0 m	1 x 16-pole shielded 6ES7923-0BB00-0DB0 L=1,0 m 6ES7923-0BC00-0DB0 L=2,0 m 6ES7923-0BC50-0DB0 L=2,5 m 6ES7923-0BD00-0DB0 L=3,0 m 6ES7923-0BE00-0DB0 L=4,0 m 6ES7923-0BF00-0DB0 L=5,0 m	Data for ordering and documentation
B					Labeling field for the signals of the module
C					Assignment of the signal cables to the connector board
D					Perforated line for cutting and activating the configuration guide
E					Assignment of the IDC connector
					Assignment of the signal cables on the module board
					Data for ordering and documentation
					Assignment of the screw connection side
					Labeling field for incoming or outgoing signals



Configuration



1	2	3	4
S7-300 Front connector module with potential infeed with spring connection 6ES7921 - 3AA00 - 0AA0 screw connection 6ES7921 - 3AB00 - 0AA0 Accessories for the round-sheath ribbon cable: 8 16-pole socket terminal and 8 strain relief assemblies 6ES7921 - 3BE10 - 0AA0	Suitable round-sheath ribbon cables 1 x 16-pole 6ES7923 - 0CD00 - 0AA0 30 m unshielded 6ES7923 - 0CG00 - 0AA0 60 m unshielded 6ES7923 - 0CD00 - 0BA0 30 m shielded 6ES7923 - 0CG00 - 0BA0 60 m shielded 2 x 16-pole 6ES7923 - 2CD00 - 0AA0 30 m unshielded 6ES7923 - 2CG00 - 0AA0 60 m unshielded	Suitable pre-assembled round cable 1 x 16-pole unshielded 6ES7923 - 0BA50 - 0CB0 L=0,5 m 6ES7923 - 0BB00 - 0CB0 L=1,0 m 6ES7923 - 0BB50 - 0CB0 L=1,5 m 6ES7923 - 0BC00 - 0CB0 L=2,0 m 6ES7923 - 0BC50 - 0CB0 L=2,5 m 6ES7923 - 0BD00 - 0CB0 L=3,0 m 6ES7923 - 0BE00 - 0CB0 L=4,0 m 6ES7923 - 0BF00 - 0CB0 L=5,0 m 1 x 16-pole shielded 6ES7923 - 0BB00 - 0DB0 L=1,0 m 6ES7923 - 0BC00 - 0DB0 L=2,0 m 6ES7923 - 0BC50 - 0DB0 L=2,5 m 6ES7923 - 0BD00 - 0DB0 L=3,0 m 6ES7923 - 0BE00 - 0DB0 L=4,0 m 6ES7923 - 0BF00 - 0DB0 L=5,0 m	

4x connection module TP1 8 I/O spring connection with LEDs 6ES792 4 - 0AA10 - 0BB0
 or 4x connection module TP1 8 I/O screw connection with LEDs 6ES792 4 - 0AA10 - 0BA0

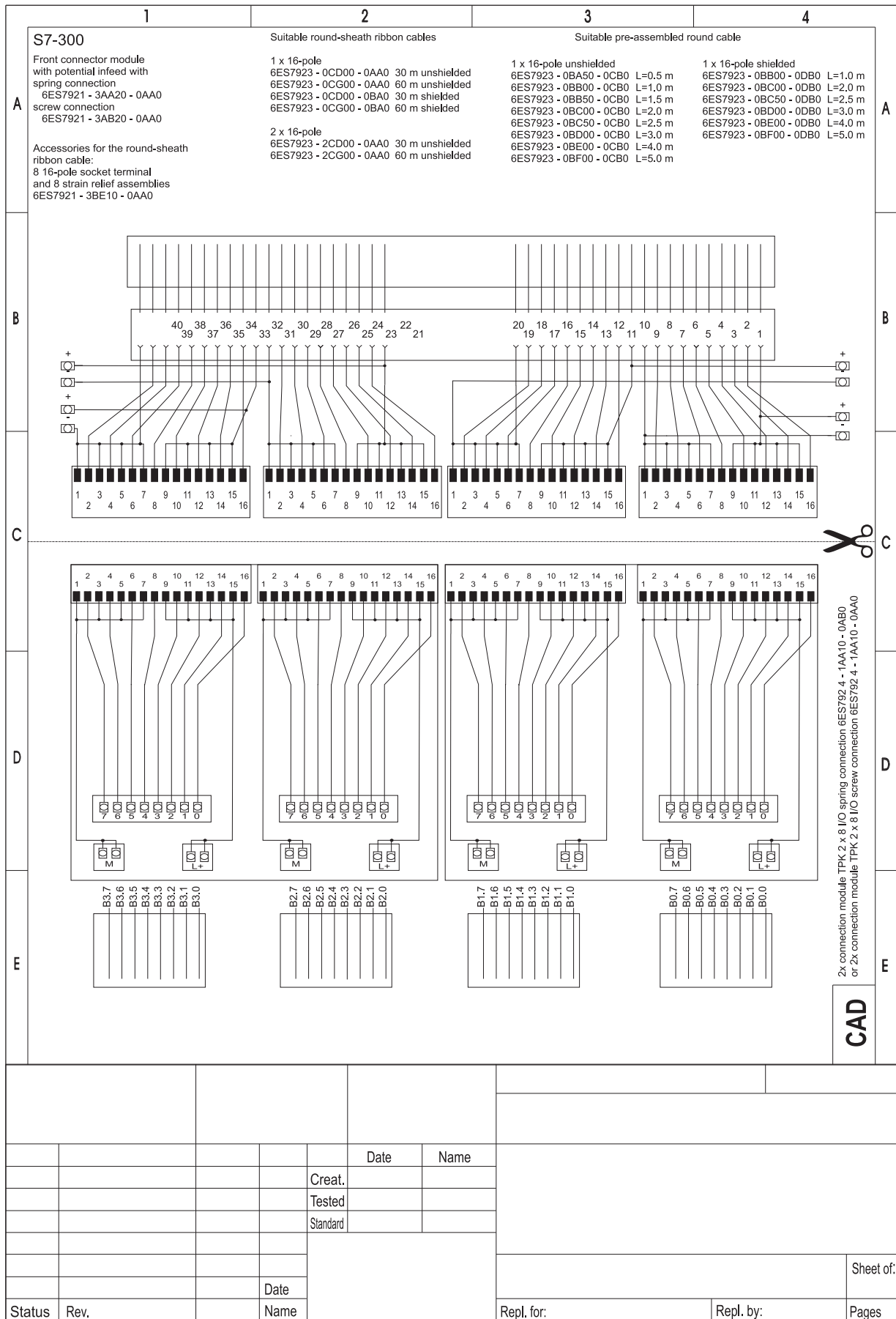
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Configuration

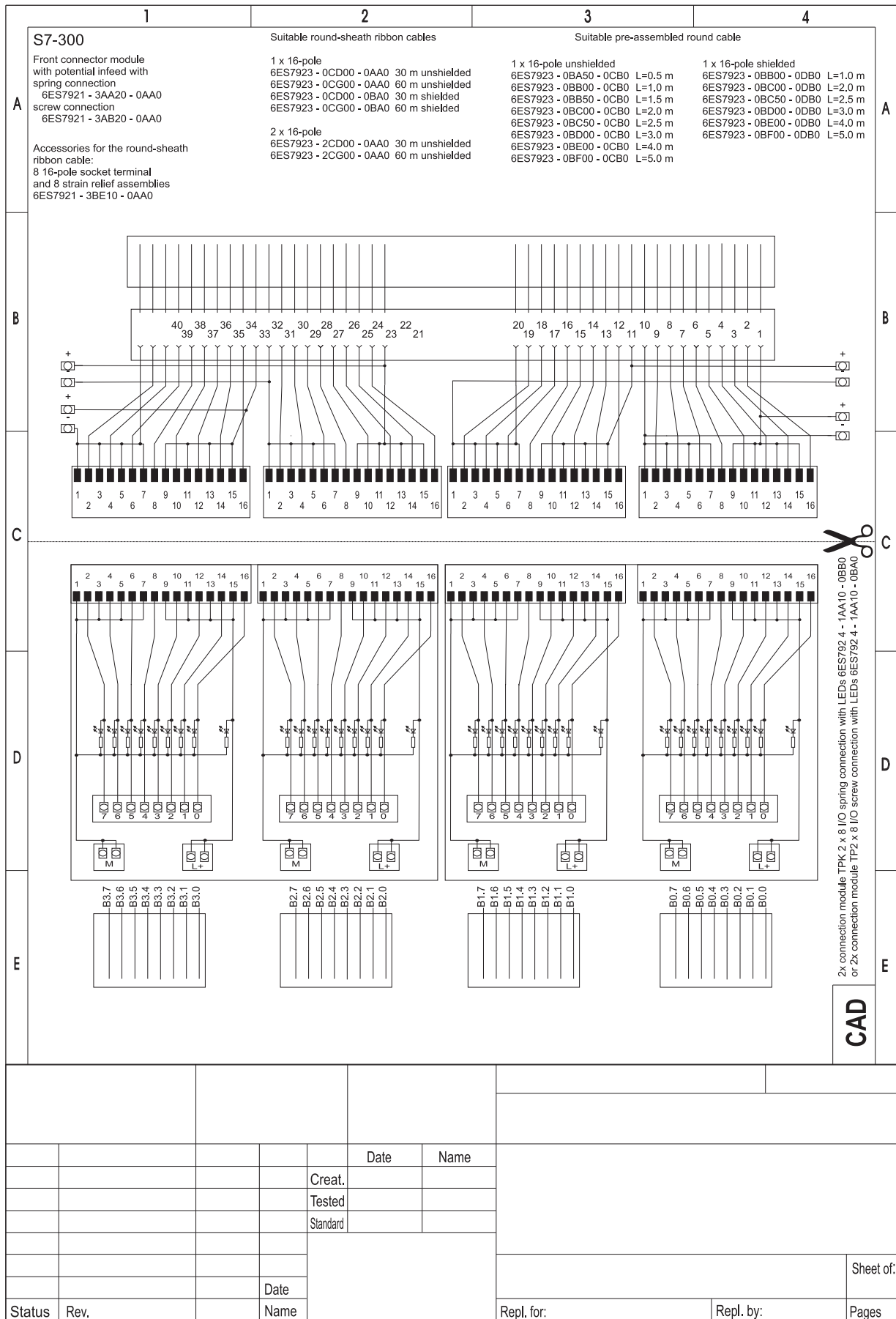
Configuration guides

1	2	3	4																								
S7-400 Front connector module with potential infeed for 2 A digital output modules with screw connection 6ES7921-4AD00-0AA0 Accessories for the round-sheath ribbon cable: 8 16-pole socket terminal and 8 strain relief assemblies 6ES7921-3BE10-0AA0 Suitable round-sheath ribbon cables 1 x 16-pole 6ES7923-0CD00-0AA0 30 m unshielded 6ES7923-0CG00-0AA0 60 m unshielded 6ES7923-0CD00-0BA0 30 m shielded 6ES7923-0CG00-0BA0 60 m shielded 2 x 16-pole 6ES7923-2CD00-0AA0 30 m unshielded 6ES7923-2CG00-0AA0 60 m unshielded Suitable pre-assembled round cable 1 x 16-pole unshielded 6ES7923-0BA50-0CB0 L=0.5 m 6ES7923-0BB00-0CB0 L=1.0 m 6ES7923-0BB50-0CB0 L=1.5 m 6ES7923-0BC00-0CB0 L=2.0 m 6ES7923-0BC50-0CB0 L=2.5 m 6ES7923-0BD00-0CB0 L=3.0 m 6ES7923-0BE00-0CB0 L=4.0 m 6ES7923-0BF00-0CB0 L=5.0 m 1 x 16-pole shielded 6ES7923-0BB00-0DB0 L=1.0 m 6ES7923-0BC00-0DB0 L=2.0 m 6ES7923-0BC50-0DB0 L=2.5 m 6ES7923-0BD00-0DB0 L=3.0 m 6ES7923-0BE00-0DB0 L=4.0 m 6ES7923-0BF00-0DB0 L=5.0 m																											
2 ampere digital S7 2x connection module TP2 8 outputs spring connection 6ES792 4-0BB10-0BB0 or 2x connection module TP2 8 outputs screw connection 6ES792 4-0BB10-0BA0 CAD																											
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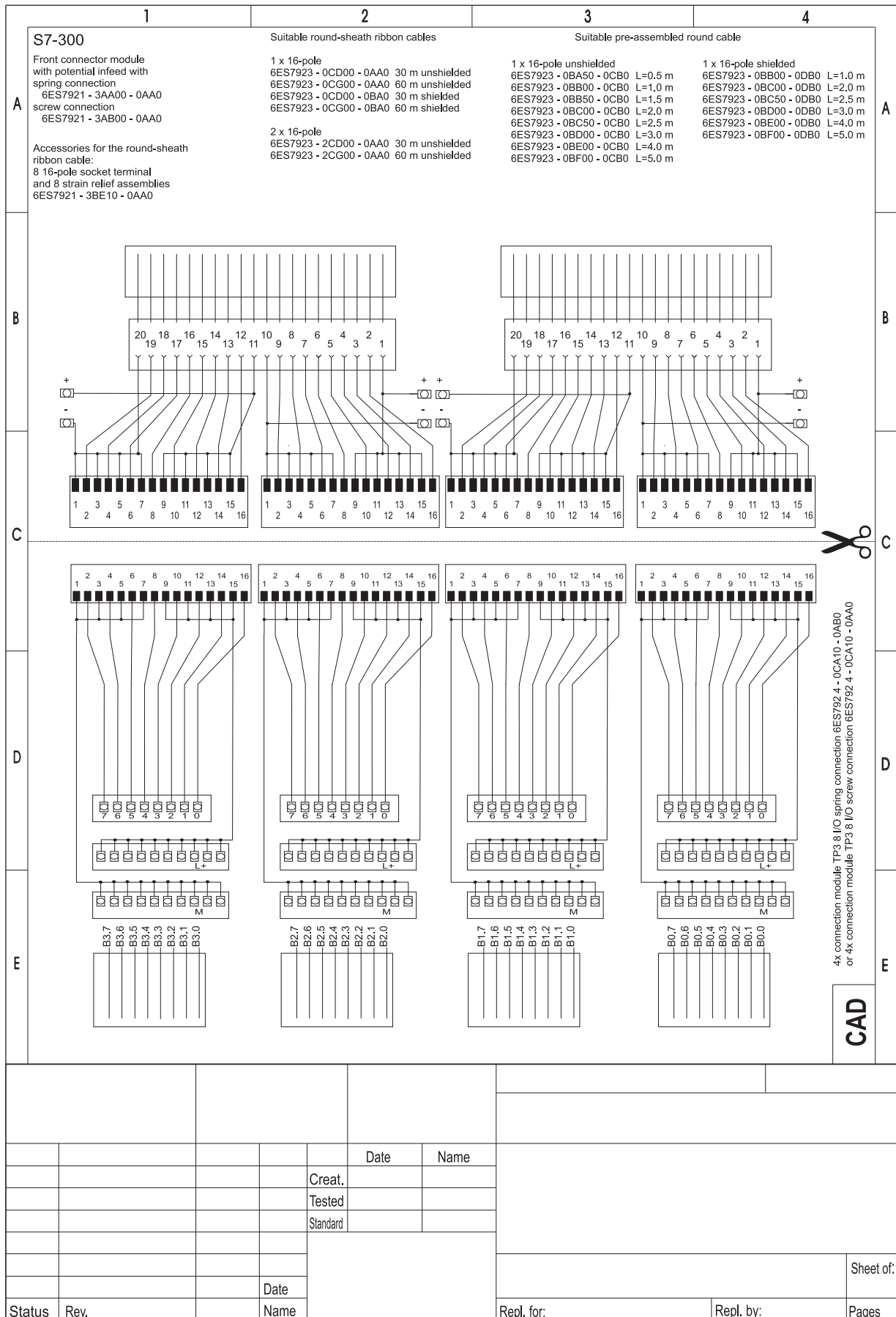
Configuration

Configuration guides



Configuration

Configuration guides



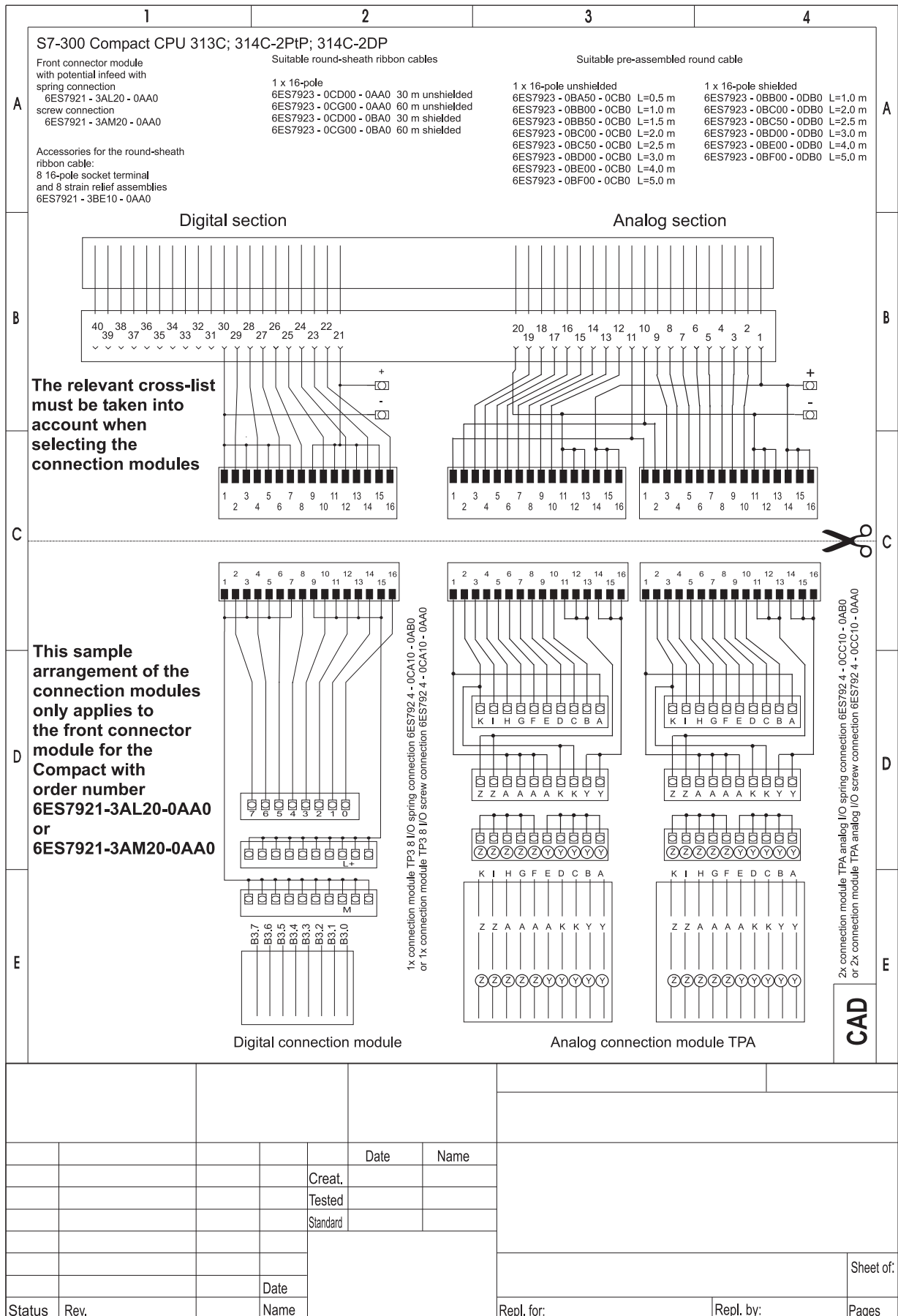
Configuration

Configuration guides

1		2		3		4	
S7-300 Compact CPU 312 C Front connector module with potential infeed with spring connection 6ES7921-3AJ20-0AA0 screw connection 6ES7921-3AK20-0AA0 Accessories for the round-sheath ribbon cable: 8 16-pole socket terminal and 8 strain relief assemblies 6ES7921-3BE10-0AA0		Suitable round-sheath ribbon cables 1 x 16-pole 6ES7923-0CD00-0AA0 30 m unshielded 6ES7923-0CG00-0AA0 60 m unshielded 6ES7923-0CD00-0BA0 30 m shielded 6ES7923-0CG00-0BA0 60 m shielded 2 x 16-pole 6ES7923-2CD00-0AA0 30 m unshielded 6ES7923-2CG00-0AA0 60 m unshielded		Suitable pre-assembled round cable 1 x 16-pole unshielded 6ES7923-0BA50-0CB0 L=0.5 m 6ES7923-0BB00-0CB0 L=1.0 m 6ES7923-0BB50-0CB0 L=1.5 m 6ES7923-0BC00-0CB0 L=2.0 m 6ES7923-0BC50-0CB0 L=2.5 m 6ES7923-0BD00-0CB0 L=3.0 m 6ES7923-0BE00-0CB0 L=4.0 m 6ES7923-0BF00-0CB0 L=5.0 m		1 x 16-pole shielded 6ES7923-0BB00-0DB0 L=1.0 m 6ES7923-0BC00-0DB0 L=2.0 m 6ES7923-0BC50-0DB0 L=2.5 m 6ES7923-0BD00-0DB0 L=3.0 m 6ES7923-0BE00-0DB0 L=4.0 m 6ES7923-0BF00-0DB0 L=5.0 m	

4





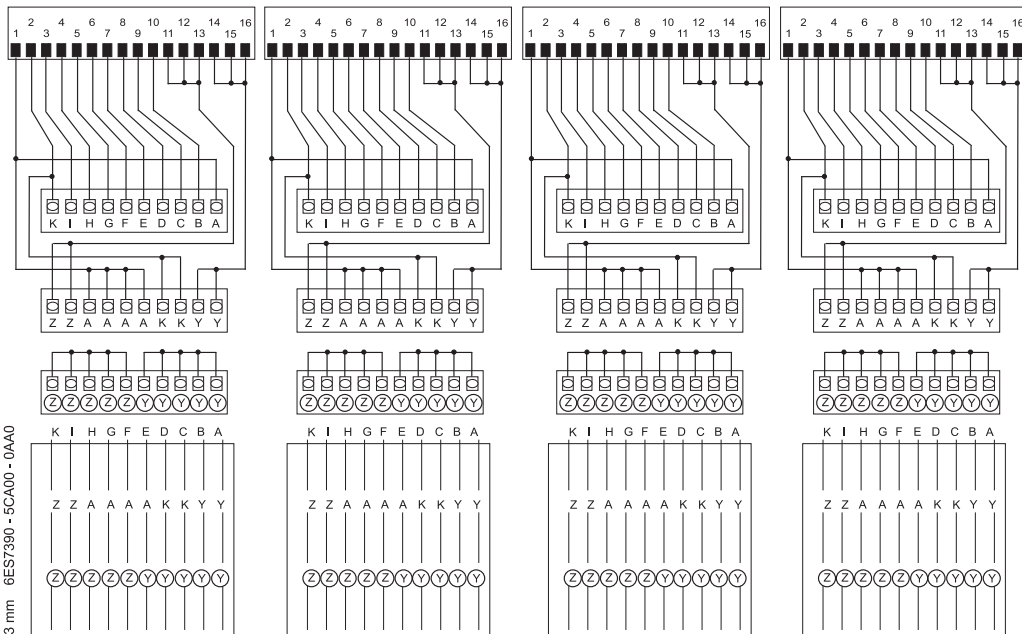
S7-300

Accessories for the round-sheath ribbon cable:
8 16-pole socket terminal
and 8 strain relief assemblies
6ES7921 - 3BE10 - 0AA0

1 x 16-pole
6ES7923 - 0CD00 - 0BA0 30 m shielded
6ES7923 - 0CG00 - 0BA0 60 m shielded

1 x 16-pole shielded
 6ES7923 - 0BB00 - 0DB0 L=1.0 m
 6ES7923 - 0BC00 - 0DB0 L=2.0 m
 6ES7923 - 0BC50 - 0DB0 L=2.5 m
 6ES7923 - 0BD00 - 0DB0 L=3.0 m
 6ES7923 - 0BE00 - 0DB0 L=4.0 m
 6ES7923 - 0BF00 - 0DB0 L=5.0 m

Analog S7



Shield connection terminal for cable diameter
6ES7390 - 5AB00 - 0AA0
3.....8 mm
6ES7390 - 5BA00 - 0AA0
4...13 mm
6ES7390 - 5CA00 - 0AA0

Optional shield plate for connection module TPA
6ES7928 - 1BA00 - 0AA0

4x connection module TPA analog I/O spring connection 6ES792 4 - 0CC10 - 0AB0
or 4x connection module TPA analog I/O screw connection 6ES792 4 - 0CC10 - 0AA0

CAD

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1
2
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4

S7-400

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

Accessories for the round-sheath ribbon cable:
 8 16-pole socket terminal
 and 8 strain relief assemblies
 6ES7921 - 3BE10 - 0AA0

Suitable round-sheath ribbon cables

1 x 16-pole
 6ES7923 - 0CD00 - 0BA0 30 m shielded
 6ES7923 - 0CG00 - 0BA0 60 m shielded

Suitable pre-assembled round cable

1 x 16-pole shielded
 6ES7923 - 0BB00 - 0DB0 L=1,0 m
 6ES7923 - 0BC00 - 0DB0 L=2,0 m
 6ES7923 - 0BC50 - 0DB0 L=2,5 m
 6ES7923 - 0BD00 - 0DB0 L=3,0 m
 6ES7923 - 0BE00 - 0DB0 L=4,0 m
 6ES7923 - 0BF00 - 0DB0 L=5,0 m

Analog S7

A
B
C
D
E

A
B
C
D
E

Analog S7

A
B
C
D
E

Shield connection terminal for cable diameter
 2x2...8 mm 6ES7390 - 5AB00 - 0AA0
 3...8 mm 6ES7390 - 5BA00 - 0AA0
 4...13 mm 6ES7390 - 5CA00 - 0AA0

Optional shield plate for connection module TPA
 6ES7928 - 1BA00 - 0AA0

4x connection module TPA analog I/O spring connection 6ES792 4 - 0CC10 - 0AB0
 or 4x connection module TPA analog I/O screw connection 6ES792 4 - 0CC10 - 0AA0

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Configuration

Configuration guides

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A	S7-400 Front connector module with potential infeed with screw connection 6ES7921-4AB00-0AA0 Accessories for the round sheath ribbon cable: 8 16-pole socket terminal and 8 strain relief assemblies 6ES7921-3BE10-0AA0	Suitable round sheath ribbon cables 1 x 16-pole 6ES7923-0CD00-0AA0 30 m unshielded 6ES7923-0CG00-0AA0 60 m unshielded 6ES7923-0CD00-0BA0 30 m unshielded 6ES7923-0CG00-0BA0 60 m unshielded 2 x 16-pole 6ES7923-2CD00-0AA0 30 m unshielded 6ES7923-2CG00-0AA0 60 m unshielded	Suitable pre-assembled round cables 1 x 16-pole unshielded 6ES7923-0BA50-0CB0L=0.5 m 6ES7923-0BB00-0CB0L=1.0 m 6ES7923-0BB50-0CB0L=1.5 m 6ES7923-0BC00-0CB0L=2.0 m 6ES7923-0BC50-0CB0L=2.5 m 6ES7923-0BD00-0CB0L=3.0 m 6ES7923-0BE00-0CB0L=4.0 m 6ES7923-0BF00-0CB0L=5.0 m	1 x 16-pole shielded 6ES7923-0BB00-0DB0L=1.0 m 6ES7923-0BC00-0DB0L=2.0 m 6ES7923-0BC50-0DB0L=2.5 m 6ES7923-0BD00-0DB0L=3.0 m 6ES7923-0BE00-0DB0L=4.0 m 6ES7923-0BF00-0DB0L=5.0 m																								
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Appendix



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5/4 5/4 5/5 5/5	Service & Support The unmatched complete service for the entire life cycle Knowledge Base on DVD Automation Value Card
5/6	Subject index
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5/8	Export regulations

Appendix

Partner at Industry Automation and Drive Technologies



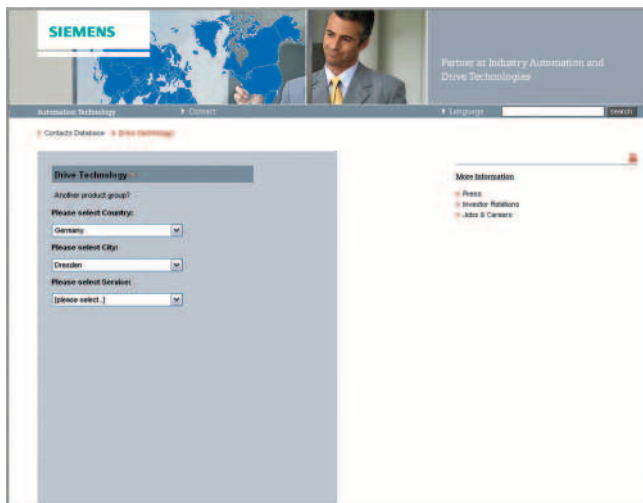
At Siemens Industry Automation and Drive Technologies, more than 85 000 people are resolutely pursuing the same goal: long-term improvement of your competitive ability. We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at: www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.



Siemens Industry Automation and Drive Technologies 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.

Siemens Industry Automation and Drive Technologies 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

www.siemens.com/industry

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

Product Selection Using the Offline Mall of Industry



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 Industry Automation and Drive Technologies 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.

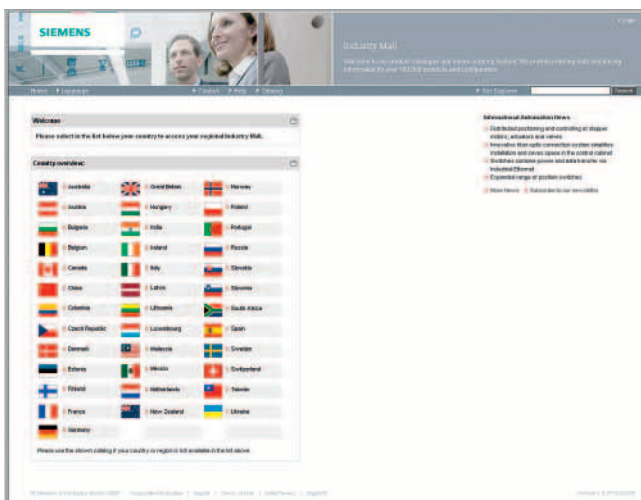
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

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

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the virtual department store of Siemens AG in 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.

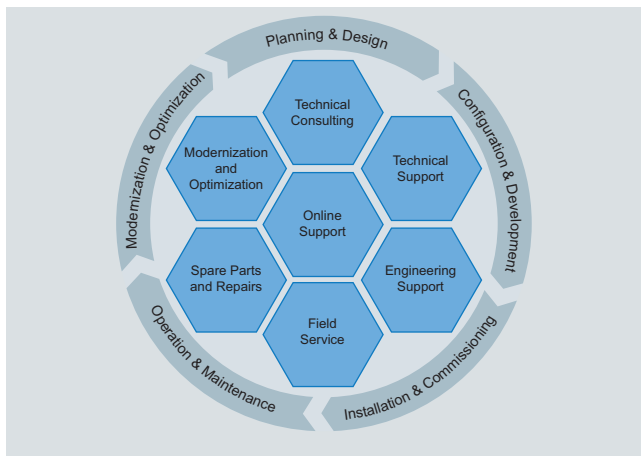
Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

Appendix

Service & Support

Services covering the entire life cycle



Our Service & Support are available worldwide to help you with every aspect of Siemens automation and drive technology. We offer on-site support for every phase of the life cycle of your machines and plants in more than 100 countries. Round the clock.

Every step of the way, you have access to an experienced team of specialists and their combined expertise. Thanks to regular training and the close cooperation of key employees around the globe, we are able to offer reliable services for a huge range of options.

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>

Technical Support



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

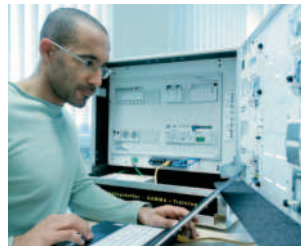
<http://www.siemens.com/automation/support-request>

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.

Engineering Support



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

Field Service



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

Spare Parts and Repairs



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

Optimization and Upgrading



After startup or during the operating phase, additional potential for increasing the productivity or for reducing costs often arises. For this purpose, we offer you high-quality services in optimization and upgrading.

You will find contact details in the Internet under:
<http://www.siemens.com/automation/service&support>

Knowledge Base on DVD



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

The DVD also includes a full-text search and our Knowledge Manager for targeted searches for solutions. The DVD will be updated every 4 months.

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

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

Order no. **6ZB5310-0EP30-0BA2**

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 something on our Online portal, 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.

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.

Order your Automation and Value Card easily and comfortably like a product with your sales contact.

Automation Value Card order numbers

Credits	Order no.
200	6ES7 997-0BA00-0XA0
500	6ES7 997-0BB00-0XA0
1 000	6ES7 997-0BC00-0XA0
10 000	6ES7 997-0BG00-0XA0

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

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
"Mature Products"	Consulting service for products that are not available any more

Support Tools in the Support Shop

Tools that can be used directly for configuration, analysis and testing

Appendix

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Appendix

Conditions of sale and delivery Export regulations

Terms and Conditions of Sale and Delivery

By using this catalog you can acquire hardware and software products described therein from 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. The following terms apply exclusively for orders placed with Siemens AG.

For customers with a seat or registered office in 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 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.

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.

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

Surcharges will be added to the prices of products that contain silver, copper, aluminum, lead and/or gold if the respective basic official prices for these metals are exceeded. These surcharges will be determined based on the official price and the metal factor of the respective product.

The surcharge will be calculated on the basis of the official price on the day prior to receipt of the order or prior to the release order.

The metal factor determines the official price as of which the metal surcharges are charged and the calculation method used. The metal factor, provided it is relevant, is included with the price information of the respective products.

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

- 6ZB5310-0KR30-0BA1
(for customers based in Germany)
- 6ZB5310-0KS53-0BA1
(for customers based outside Germany)

or download them from the Internet
www.siemens.com/industrymall
(Germany: Industry Mall Online-Help System)

Export regulations

Our obligation to fulfill this agreement is subject to the proviso that the fulfillment is not prevented by any impediments arising out of national and international foreign trade and customs requirements or any embargos and/or other sanctions.

If you transfer goods (hardware and/ or software and/ or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you shall comply with all applicable national and international (re-) export control regulations.

If required to conduct export control checks, you, upon request by us, shall promptly provide us with all information pertaining to particular end customer, destination and intended use of goods, works and services provided by us, as well as any export control restrictions existing.

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 <u>German Export List</u> Products marked other than "N" require an export license. In the case of software products, the export designations 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 authorization when being exported out of the EU.
ECCN	<u>Export Control Classification Number</u> 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. Goods labeled with an "<u>ECCN" not equal to "N"</u> are subject to a US re-export authorization.

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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Industry Automation, Drive Technologies and Low Voltage Distribution

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

Interactive Catalog on DVD		<i>Catalog</i>	
for Industry Automation, Drive Technologies and Low Voltage Distribution		CA 01	
Drive Systems			
<u>Variable-Speed Drives</u>			
SINAMICS G110, SINAMICS G120	D 11.1		
Standard Inverters			
SINAMICS G110D, SINAMICS G120D			
Distributed Inverters			
SINAMICS G130 Drive Converter Chassis Units	D 11		
SINAMICS G150 Drive Converter Cabinet Units			
SINAMICS GM150, SINAMICS SM150	D 12		
Medium-Voltage Converters			
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3		
SINAMICS S150 Converter Cabinet Units			
SINAMICS DCM Converter Units	D 23.1		
<u>Three-phase Induction Motors</u>	D 84.1		
• H-compact			
• H-compact PLUS			
Asynchronous Motors Standardline	D 86.1		
Synchronous Motors with Permanent-Magnet Technology, HT-direct	D 86.2		
DC Motors	DA 12		
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1		
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2		
<i>PDF: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units</i>	DA 22		
SIMOVERT PM Modular Converter Systems	DA 45		
SIEMOSYN Motors	DA 48		
MICROMASTER 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		
SIMOTION, SINAMICS S120 and Motors for Production Machines	PM 21		
SINAMICS S110	PM 22		
The Basic Positioning Drive			
<u>Low-Voltage Three-Phase-Motors</u>			
IEC Squirrel-Cage Motors	D 81.1		
MOTOX Geared Motors	D 87.1		
<u>Automation Systems for Machine Tools SIMODRIVE</u>	NC 60		
• Motors			
• Converter Systems SIMODRIVE 611/POSMO			
<u>Automation Systems for Machine Tools SINAMICS</u>	NC 61		
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• Drive System SINAMICS S120			
<u>Drive and Control Components for Hoisting Equipment</u>	HE 1		
<u>Mechanical Driving Machines</u>			
Flender Standard Couplings	MD 10.1		
Electrical Installation Technology			
<i>PDF: ALPHA Distribution Boards and Terminal Blocks</i>	ETA 1		
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<i>PDF: BETA Low-Voltage Circuit Protection</i>	ET B1		
<i>PDF: DELTA Switches and Socket Outlets</i>	ET D1		
<i>PDF: GAMMA Building Management Systems</i>	ET G1		
<i>PDF: These catalogs are only available as pdf files.</i>			
Motion Control		<i>Catalog</i>	
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Automation Systems for Machine Tools			
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