10313/1/1 5 Vdc & watchdog distribution module

Description

The 10313/1/1 module is used for the distribution of 5 Vdc and watchdog (WD) signals in the FSC system.

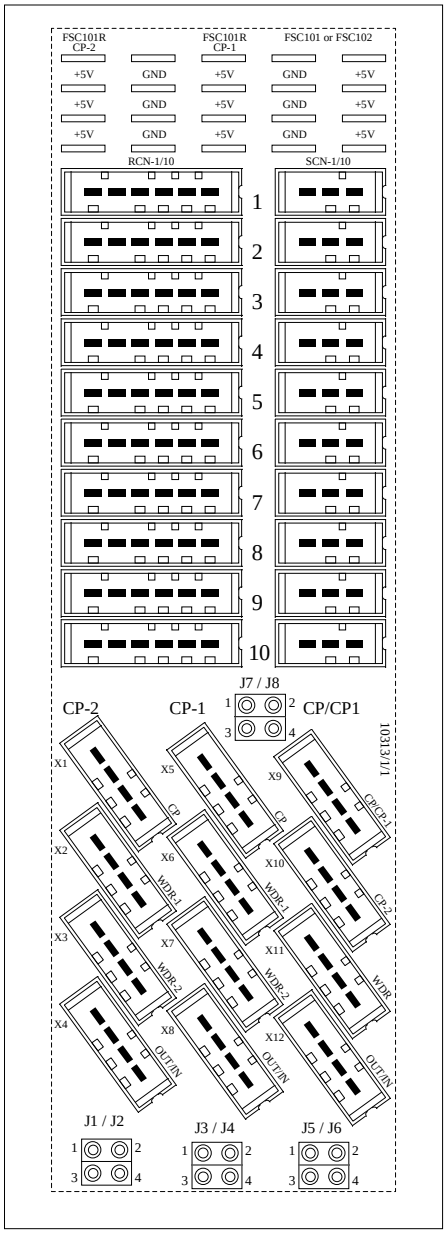


Figure 1 Top view

The module has a universal snap-in facility for standard DIN EN rails.

Connections

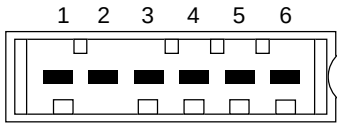
The 10313/1/1 module has the following connection facilities (see Figure 1):

- ten connectors (RCN-1 to RCN-10) for connecting redundant I/O backplanes (10315/1/1) (see Figure 2),
- ten connectors (SCN-1 to SCN-10) for connecting non-redundant I/O backplanes (10314/1/1) (see Figure 3),
- 'FSC101 or FSC102' fastons for the incoming 5 Vdc power (for non-redundant I/O backplanes),
- 'FSC101R CP-1' and 'FSC101R CP-2' fastons for the incoming 5 Vdc power (for redundant I/O backplanes),
- connectors for directly connecting the watchdog repeaters (WDRs), and
- connectors for directly connecting the 10005/O/1 modules.
- connectors for linking an additional 10313/1/1 module in a separate cabinet (next 'section').

Pin connections

RCN-x

Figure 2 below shows the pin connections of the RCN-x connectors, which are used to connect redundant I/O backplanes.

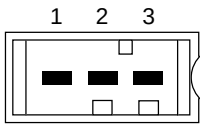


1 : WDG (CP2)
2 : GND
3 : +5V (CP2)
4 : GND
5 : +5V (CP1)
6 : WDG (CP1)

Figure 2 Pin connections of RCN-x

SCN-x

Figure 3 below shows the pin connections of the SCN-x connectors, which are used to connect non-redundant I/O backplanes.



1 : WDG
2 : GND
3 : +5V

Figure 3 Pin connections of SCN-x

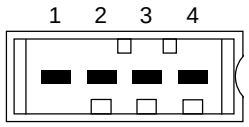
10005/O/1 module

Table 1 below shows the connectors that are used to connect 10005/O/1 modules, depending on the system configuration.

Table 1 Connectors used to connect 10005/O/1 module

System configuration		Connectors used on 10313/1/1 module
Central Part(s)	**I/O**	
Non-redundant	Non-redundant	'CP/CP-1' connector (X9)
Redundant	Non-redundant	'CP/CP-1' and 'CP-2' connectors (X9 and X10)
Redundant	Redundant	'CP' connectors of CP-1 and CP-2 (X1 and X5)
Redundant	Redundant & Non-redundant	'CP' connectors of CP-1 and CP-2 (X1 and X5)

Figure 4 below shows the pin connections of these connectors.



1 : WDG
2 : GND
3 : GND
4 : +5V

Figure 4 Pin connections of 'CP' and 'CP/CP-1' connector

Watchdog repeaters

Table 2 below shows the connectors that are used to connect watchdog repeaters, depending on the system configuration.

Table 2 Connectors used to connect watchdog repeaters

System configuration		Connectors used on 10313/1/1 module
I/O	**Watchdog**	
Redundant	1st watchdog repeater	'WDR-1' connectors (X2 and X6)
	2nd watchdog repeater	'WDR-2' connectors (X3 and X7)
Non-redundant	one watchdog repeater	'WDR' connector (X11)

Figure 5 on the next page shows the pin connections of these connectors.

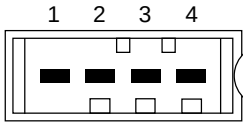


Figure 5 Pin connections of 'WDR', 'WDR-1' and 'WDR-2' connectors

Additional 10313/1/1 modules

The 'OUT/IN' connectors (X4, X8 and X12) are used to link an additional 10313/1/1 module in a separate cabinet (next 'section'). Figure 6 shows the pin connections of these connectors.

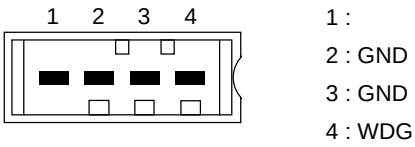


Figure 6 Pin connections of 'OUT/IN' connectors

Connectors used for various configurations

Table 3 below provides an overview of the connectors that may be used for the various FSC configurations:

Table 3 Use of connectors on 10313/1/1 module

System configuration		Connectors on 10313/1/1 module		
Central Part(s)	**I/O**	**'RCN'**	**'SCN'**	**'X'**
Non-redundant	Non-redundant	–	1-10	X9, X11, X12
Redundant	Non-redundant	–	1-10	X9-X12
Redundant	Redundant	1-10	–	X1-X8
Redundant	Redundant & Non-redundant	1-10	1-10	X1-X8, X12

Application

Figure 7 shows an example of how to use the 10313/1/1 module for the 5 Vdc and watchdog distribution by using the system power interconnection cables:

- WD-01 cable, which connects the 10313/1/1 module to the non-redundant backplane 10314/1/1.
- WD-02 cable, which connects the 10313/1/1 module to the redundant backplane 10315/1/1.
- WDG cable, which connects the 10313/1/1 module to the 10005/O/1 watchdog horizontal bus.
- WD-WD cable, which connects the 10313/1/1 module to the 10313/1/1 module in the next section.
- WDR cable, which connects the 10313/1/1 module to the watchdog repeater 10302/2/1.

The concept diagram below shows the connections of a redundant configuration.

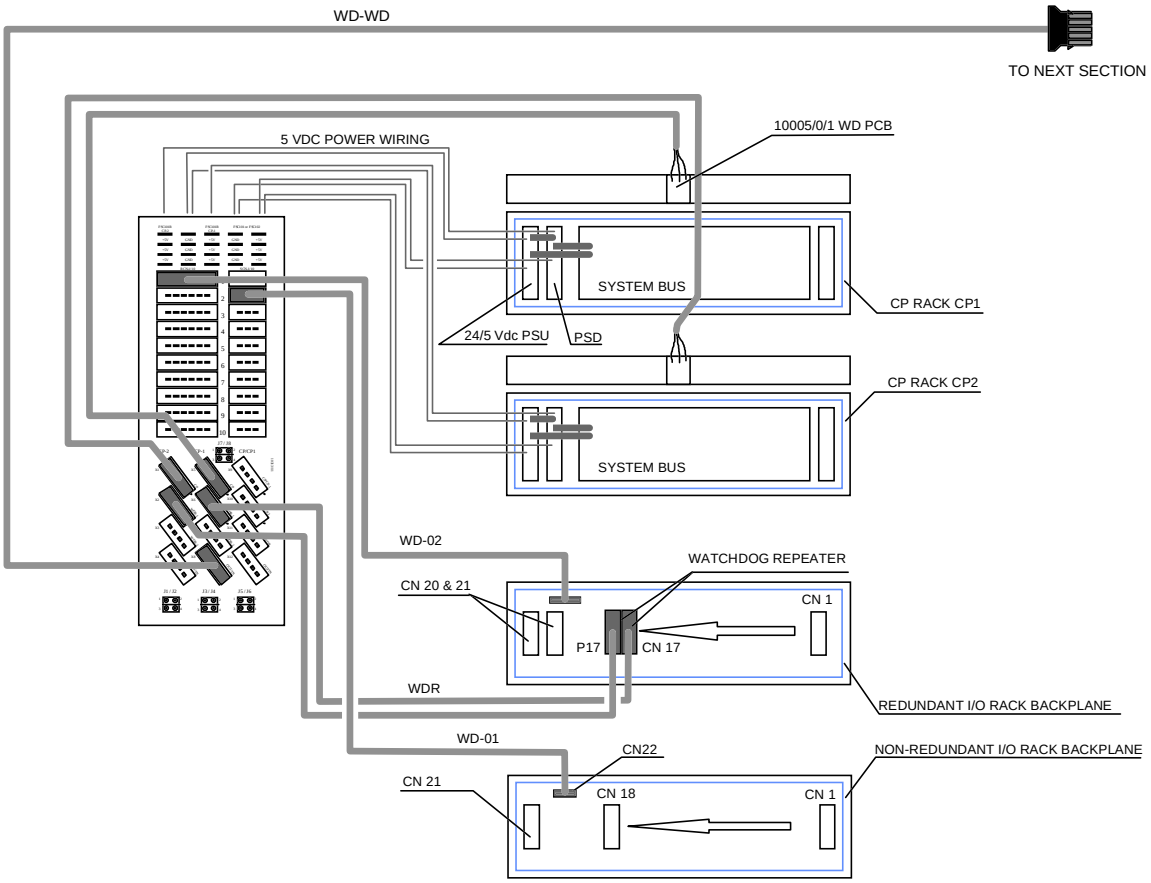


Figure 7 Concept diagram of 5 Vdc & watchdog distribution

Distribution examples

The following pages contain a number of distribution examples for the various FSC configurations. Each example has been subdivided into configurations that consist of one, two or three cabinets ('sections'). Each of the examples assumes that the Central Part racks are located in section 1.

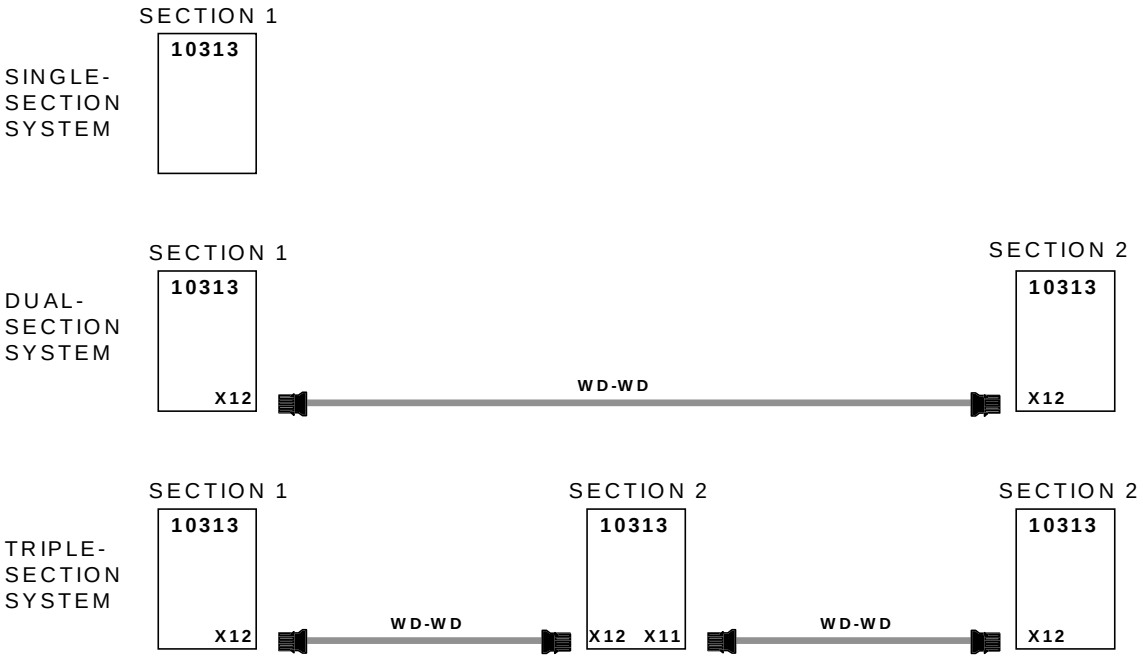
Examples of the following configurations are given:

- Non-redundant Central Part and non-redundant I/O,
- Redundant Central Parts and non-redundant I/O,
- Redundant Central Parts and redundant I/O,
- Redundant Central Parts, with redundant I/O in section 1 and non-redundant I/O in sections 2/3, and
- Redundant Central Parts, with redundant I/O in sections 1/2 and non-redundant I/O in section 3.

Example 1

Non-redundant Central Part and non-redundant I/O

The Central Part racks are located in section 1. Depending on the number of watchdog repeaters (WDRs) and the number of sections per FSC system, the following jumper settings must be made:



	Section 1				
	Section 1				**Section 2**
	Section 1			**Section 2**	**Section 3**
Jumper:	**1x WDR**	**No WDR**	**with only +5V**	**No WDR**	**No WDR**
J1/J2	not placed	not placed	not placed	not placed	not placed
J3/J4	not placed	not placed	not placed	not placed	not placed
J5/J6	not placed	1 - 3	3 - 4	1 - 3	not placed
J7/J8	not placed	not placed	not placed	not placed	not placed

Function of jumper settings:

J5/J6 in section 1, setting 1-3: to connect the WDG line to the I/O racks via the SCN connectors.

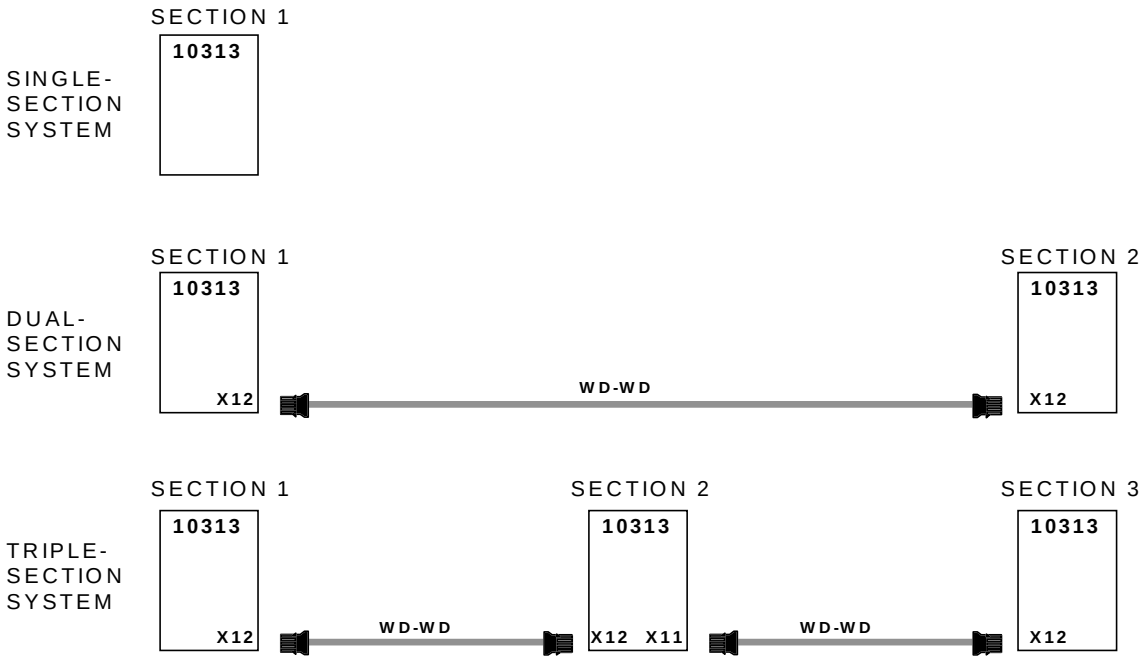
J5/J6 in section 1, setting 3-4: to connect the 5 Vdc to the WDG lines of the I/O racks via the SCN connectors.

J5/J6 in section 2, setting 1-3: to link the WDG line to section 3.

Example 2

Redundant Central Parts and non-redundant I/O

The Central Part racks are located in section 1. Depending on the number of watchdog repeaters (WDRs) and the number of sections per FSC system, the following jumper settings must be made:



	Section 1			
	Section 1			**Section 2**
	Section 1		**Section 2**	**Section 3**
Jumper:	**1x WDR**	**No WDR**	**No WDR**	**No WDR**
J1/J2	not placed	not placed	not placed	not placed
J3/J4	not placed	not placed	not placed	not placed
J5/J6	not placed	3 - 4	1 - 3	not placed
J7/J8	not placed	not placed	not placed	not placed

Function of jumper settings:

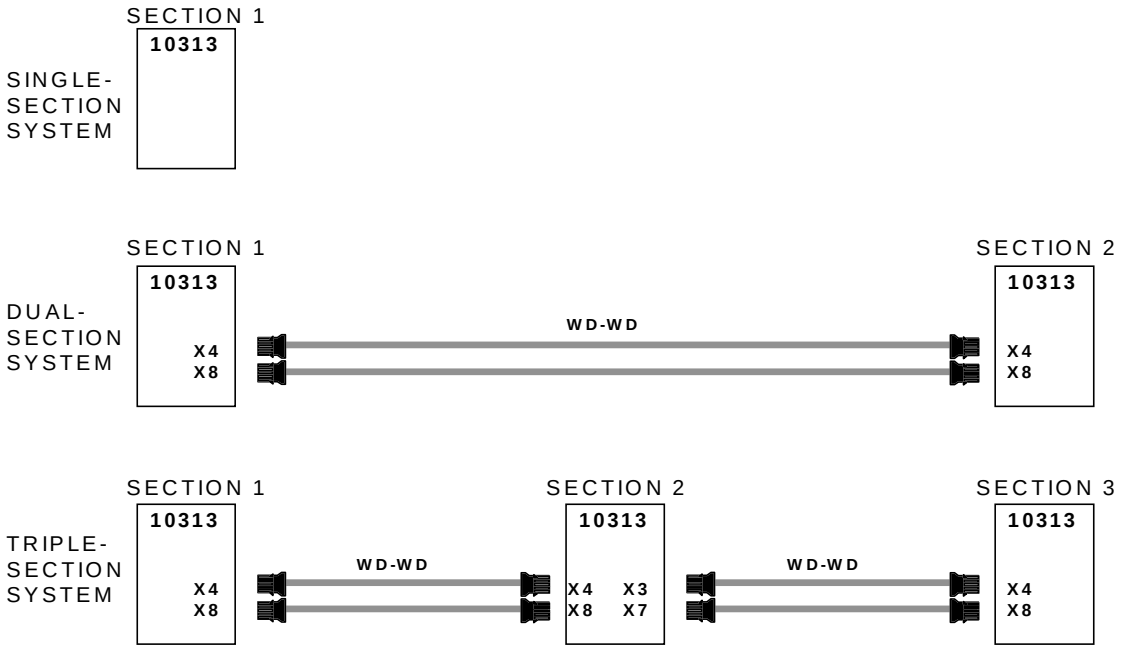
J5/J6 in section 1, setting 3-4: to connect the 5 Vdc to the WDG lines of the I/O racks via the SCN connectors.

J5/J6 in section 2, setting 1-3: to link the WDG line to section 3.

Example 3

Redundant Central Parts and redundant I/O

The Central Part racks are located in section 1. Depending on the number of watchdog repeaters (WDRs) and the number of sections per FSC system, the following jumper settings must be made:



	Section 1				
	Section 1				**Section 2**
	Section 1			**Section 2**	**Section 3**
Jumper:	**2x WDR**	**1x WDR**	**No WDR**	**No WDR**	**No WDR**
J1/J2	1 - 2	1 - 2 3 - 4	1 - 3	3 - 4	not placed
J3/J4	1 - 2	1 - 2 3 - 4	1 - 3	3 - 4	not placed
J5/J6	not placed	not placed	not placed	not placed	not placed
J7/J8	not placed	not placed	not placed	not placed	not placed

Note: 2 x WDR = 2 x redundant WDR pairs in the redundant I/O part.

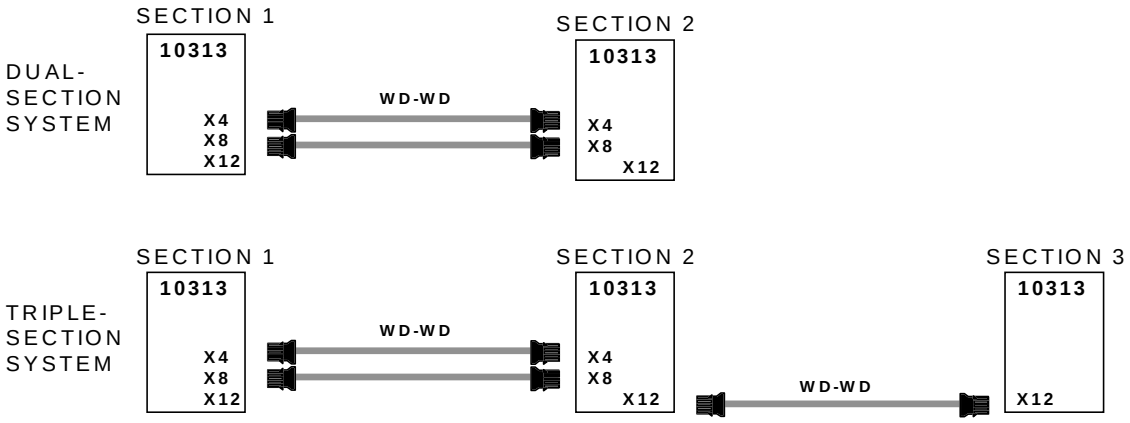
Function of jumper settings:

J1/J2 and J3/J4 in section 1, setting 1-2:	to connect the WDs from the central parts to the WDG inputs of the watchdog repeater module.
J1/J2 and J3/J4 in section 1, setting 3-4:	to connect the WDG outputs of the watchdog repeater module (if only one watchdog repeater module is used) to the WDG lines of the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 1, setting 1-3:	to connect the WDG lines to the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 2, setting 3-4:	to link the WDG lines to section 3.

Example 4

Redundant Central Parts and hybrid I/O, with redundant I/O in section 1, redundant/non-redundant I/O in section 2, and non-redundant I/O in section 3.

The Central Part racks are located in section 1. Depending on the number of watchdog repeaters (WDRs) and the number of sections per FSC system, the following jumper settings must be made:



	Section 1			Section 2		
	Section 1			Section 2		Section 3
Jumper:	**(2 +0) x WDR**	**(1 + 0) x WDR**	**(0 + 0) x WDR**	**(0 + 1) x WDR**	**(0 + 0) x WDR**	**(0 + 0) x WDR**
J1/J2	1 - 2	1 - 2 3 - 4	1 - 3	1 - 3	not placed	not placed
J3/J4	1 - 2	1 - 2 3 - 4	1 - 3	1 - 3	not placed	not placed
J5/J6	not placed	not placed	not placed	not placed	3 - 4	not placed
J7/J8	not placed	not placed	not placed	1 - 2 3 - 4	not placed	not placed

Note: (2 + 0) x WDR = 2 redundant WDR pairs in redundant I/O part and no WDR in non-redundant part.

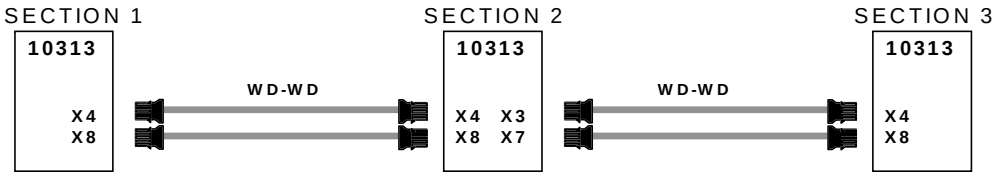
Function of jumper settings:

J1/J2 and J3/J4 in section 1, setting 1-2:	to connect the WDs from the central parts to the WDG inputs of the watchdog repeater module.
J1/J2 and J3/J4 in section 1, setting 3-4:	to connect the WDG outputs of the watchdog repeater module (if only one watchdog repeater module is used) to the WDG lines of the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 1, setting 1-3:	to connect the WDG lines to the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 2, setting 1-3:	to connect the WDs from the central parts to the WDG input of the watchdog repeater module in the non-redundant I/O part.
J5/J6 in section 2, setting 3-4:	to connect the WDG line to the 5 Vdc.
J7/J8 in section 2, setting 1-2/3-4:	to connect the WDs from the central parts to the WDG input of the watchdog repeater module in the non-redundant I/O part.

Example 5

Redundant Central Parts and hybrid I/O, with redundant I/O in sections 1/2 and redundant/non-redundant I/O in section 3.

The Central Part racks are located in section 1. Depending on the number of watchdog repeaters (WDRs) and the number of sections per FSC system, the following jumper settings must be made:



	Section 1			Section 2	Section 3	
Jumper:	**(2 +0) x WDR**	**(1 + 0) x WDR**	**(0 + 0) x WDR**	**(0 + 0) x WDR**	**(0 + 1) x WDR**	**(0 + 0) x WDR**
J1/J2	1 - 2	1 - 2 3 - 4	1 - 3	3 - 4	1 - 3	not placed
J3/J4	1 - 2	1 - 2 3 - 4	1 - 3	3 - 4	1 - 3	not placed
J5/J6	not placed	not placed	not placed	not placed	not placed	3 - 4
J7/J8	not placed	not placed	not placed	not placed	1 - 2 3 - 4	not placed

Note: (2 + 0) x WDR = 2 redundant WDR pairs in redundant I/O part and no WDR in non-redundant I/O part.

Function of jumper settings:

J1/J2 and J3/J4 in section 1, setting 1-2:	to connect the WDs from the central parts to the WDG inputs of the watchdog repeater module.
J1/J2 and J3/J4 in section 1, setting 3-4:	to connect the WDG outputs of the watchdog repeater module (if only one watchdog repeater module is used) to the WDG lines of the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 1, setting 1-3:	to connect the WDG lines to the I/O racks via the RCN connectors.
J1/J2 and J3/J4 in section 2, setting 3-4:	to link WDG lines to section 3.
J1/J2 and J3/J4 in section 3, setting 1-3:	to connect the WDs from the central parts to the WDG input of the watchdog repeater module in the non-redundant I/O part.
J5/J6 in section 3, setting 3-4:	to connect the WDG line to the 5 Vdc.
J7/J8 in section 3, setting 1-2/3-4:	to connect the WDs from the central parts to the WDG input of the watchdog repeater module in the non-redundant I/O part.

Connectors

The connectors on the 10313/1/1 module are of make AMP.
The table below lists the items that should be used when handling the connectors:

Item	AMP description	AMP part no.
Receptacle housing:	3 POS. RECEPTACLE HOUSING	1-178288-3
	4 POS. RECEPTACLE HOUSING	1-178288-4
	6 POS. RECEPTACLE HOUSING	1-178288-6
Crimp pin type:	RECEPTACLE CONTACTS (on reel)	0-175195-2
	RECEPTACLE CONTACTS (loose pieces)	0-175217-2
Crimp tool for these pins:	HANDTOOL	0-914595-2
Extraction tool:	EXTRACTION TOOL	0-914677-1

Wire types

The following wire types can be used:

– 0.25 mm² (AWG 24), or

– 0.5 mm² (AWG 20).

Technical data

The 10313/1/1 module has the following specifications:

General

Type number:	10313/1/1 20701*
Approvals:	CE, TÜV; UL approval pending

Power

Current consumption:	none (included in I/O module data sheets)
Max. current on faston pin:	4 A
Max. current on I/O connector pin:	2 A

Physical

Dimensions:	240 x 87 x 60 mm (L x W x H) 9.45 x 3.43 x 2.36 in (L x W x H)
DIN EN rails:	TS32 / TS35 x 7.5
Used rail length:	241 mm (9.49 in)

*** Note:**
10313/1/1 modules with suffix code 20700 have a different connector layout.