Chassis

5

This chapter describes the following chassis:

Chassis		See
General info about chassis		page 86
Safety Manager		
CPCHAS-0001	Chassis for redundant or non-redundant Controller (Safety Manager)	page 87
IOCHAS-0001S	IO Chassis for non-redundant IO modules (Safety Manager)	page 98
IOCHAS-0001R	IO chassis for redundant IO modules (Safety Manager)	page 107
Safety Manager A.R.T.		
CPCHAS-0002	Chassis for redundant Controller (Safety Manager A.R.T.)	page 116
IOCHAS-0002S	IO Chassis for non-redundant IO modules (Safety Manager A.R.T.)	page 126
IOCHAS-0002R	IO chassis for redundant IO modules (Safety Manager A.R.T.)	page 135

General info about chassis

Safety Manager is installed in a cabinet, as described in “Cabinet” on page 33. A cabinet contains the Control Processor modules and the IO modules, which are placed in several chassis:

- All Control Processor modules are placed in a Control Processor chassis.
- All non-redundant IO modules are placed in one or more IOCHAS-0001S or IOCHAS-0002S chassis.
- All redundant IO modules are placed in one or more IOCHAS-0001R or IOCHAS-0002R chassis.

A chassis consists of a metal housing, in which the modules, busses and backplanes are placed. The details are described separately for each type of chassis in this chapter.

The housing of a Controller chassis differs from the housing of an IO chassis.

CPCHAS-0001

Chassis for redundant or non-redundant Controller (Safety Manager)

General

The Controller chassis CPCHAS-0001 is used to contain the Control Processor modules. Each Safety Manager has one Controller chassis. The Controller chassis is generally located at the top position in the cabinet, and the IO chassis at lower positions.

A Controller chassis contains the following components:

- Controller housing (see “Controller housing” on page 87)
- Controller backplane CPB-0001 (see “Controller backplane CPB-0001” on page 91)

Controller housing

The Controller housing has been designed specifically for Safety Manager. It is a 19" housing that is open at the front and covered at the back.

Control Processor modules are placed in the chassis through the front of the housing with the use of module guides, which are located at the bottom and top plate of the housing.

The modules are locked in the chassis with the quarter turn fasteners, located below the module-grips.

Figure 43 on page 87 shows the front of a filled redundant Controller chassis.

Figure 43 Front view of a redundant Controller chassis

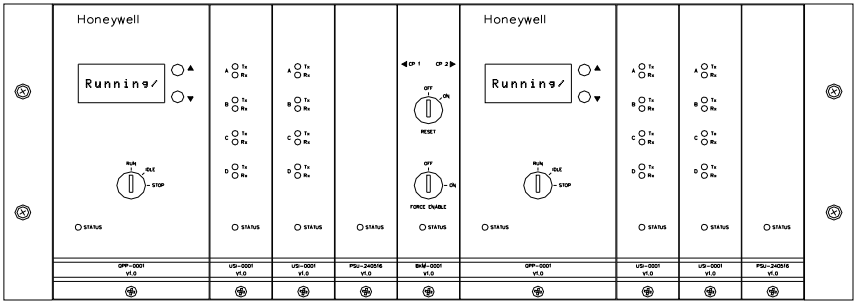
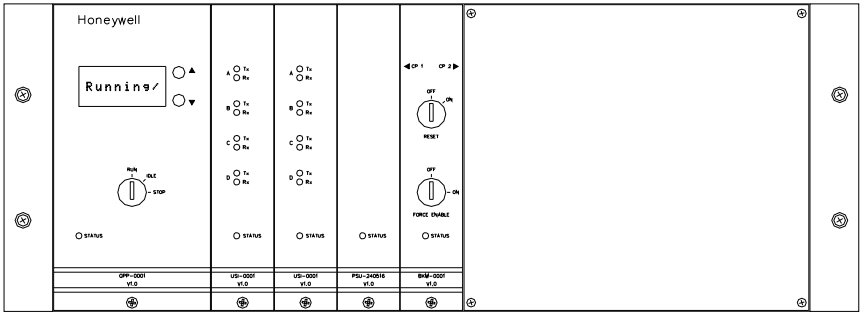


Figure 44 on page 88 shows the front of a filled non-redundant Controller chassis.

Figure 44 Front view of a non-redundant Controller chassis

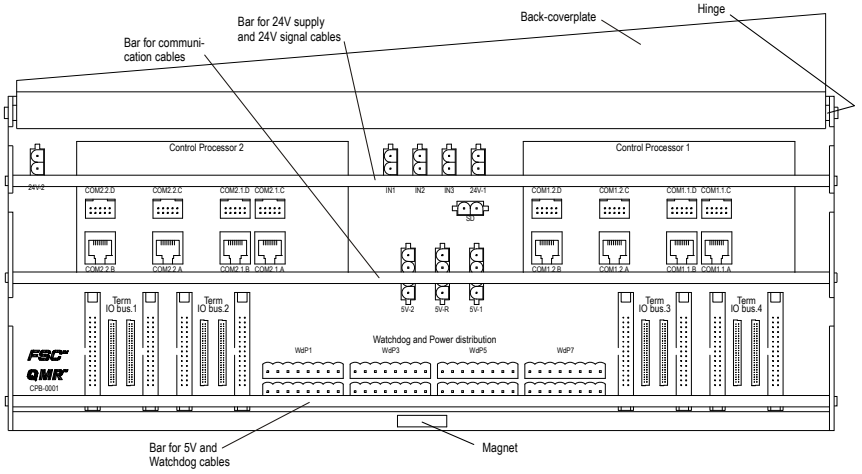


The back of the housing is covered by a magnetically locked back cover plate, which can be swung upwards to reveal the Controller backplane.

Cables must be tie-wrapped to one of the three horizontal bars at the back of the housing, to lead them towards the side of the chassis.
The top bar is reserved for the 24V-supply and 24V-signal wires/cables.
The middle bar is reserved for the communication cables.
The bottom bar is reserved for the 5V and Watchdog cables (WdPx and 5V-x).

Figure 45 on page 88 shows the back of an empty Controller chassis.

Figure 45 Back view of an empty Controller chassis



Location of Control Processor modules

The Controller chassis CPCHAS-0001 contains all Control Processor modules.

Table 5 on page 89 shows the location of the Control Processor modules in a non-redundant and a redundant Controller (as seen from the front of the cabinet). As you can see, all Control Processor modules are doubled in a redundant Controller configuration, with the exception of the Battery and Key switch module, which is shared by both Control Processors.

Table 5 Distribution of the various Control Processor modules in the Controller chassis

Redundant Controller								
Non-Redundant Controller								
CPU 1	COM 1 .1	COM 1 .2	PSU 1	BKM	CPU 2	COM 2 .1	COM 2 . 2	PSU 2

Legend:		
Item	**Description**	**See**
CPU1	the processor module of the first Control Processor	
	QPP-0001 Quad Processor Pack	page 240
	QPP-0002 Quad Processor Pack	page 253
COM1.1	the first communication module of the first Control Processor	
	USI-0001 Universal Safety Interface, or	page 266
	USI-0002 Universal Safety Interface, or	page 271
	BLIND-COM Dummy Communication Module	page 275
COM1.2	the second communication module of the first Control Processor	
	USI-0001 Universal Safety Interface, or	page 266
	USI-0002 Universal Safety Interface, or	page 271
	BLIND-COM Dummy Communication Module	page 275
PSU1	the power supply module of the first Control Processor	
	PSU-240516 Power Supply Unit 24/5 Vdc, 16A	page 284
BKM	the battery and key switch module of (both) Control Processor(s)	
	BKM-0001 Battery and Key switch Module	page 277
CPU2	the processor module of the first Control Processor	
	QPP-0001 Quad Processor Pack	page 240
	QPP-0002 Quad Processor Pack	page 253

Table 5 Distribution of the various Control Processor modules in the Controller chassis *(continued)*

Redundant Controller		
Non-Redundant Controller		
COM2.1	the first communication module of the second Control Processor	
	USI-0001 Universal Safety Interface, or	page 266
	USI-0002 Universal Safety Interface, or	page 271
	BLIND-COM Dummy Communication Module	page 275
COM2.2	the second communication module of the second Control Processor	
	USI-0001 Universal Safety Interface, or	page 266
	USI-0002 Universal Safety Interface, or	page 271
	BLIND-COM Dummy Communication Module	page 275
PSU2	the power supply module of the second Control Processor	
	PSU-240516 Power Supply Unit 24/5 Vdc, 16A	page 284

In case of a non-redundant Controller, the unused positions in the Controller chassis (CPU2, COM2.1, COM2.2, and PSU2 are covered by an BLIND-CPS plate (see Figure 44 on page 88).

For each Quad Processor Pack, room is provided for two communication modules in the Controller chassis. Table 6 on page 90 shows possible locations for different combinations of communication modules.

Note

If only one communication module is used in a Control Processor, the module is placed in the COM1 slot (see Table 6 on page 90). A blind communication module (BLIND-COM) should be placed in all unused communication slots.

Table 6 Possible locations of communication modules in the Controller chassis

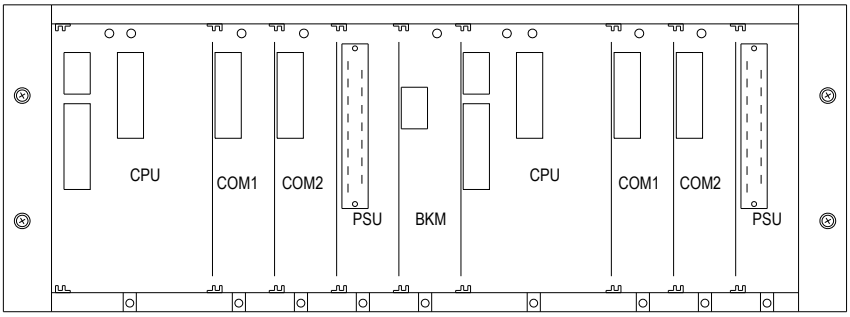
Number of modules	COM1 Slot	COM2 Slot
0	BLIND-COM	BLIND-COM
1	USI-0001 or USI-0002	BLIND-COM
2	USI-0001 or USI-0002	USI-0001 or USI-0002

Controller backplane CPB-0001

The Controller backplane is part of the Controller chassis. The front side contains the connectors for the Control Processor modules. The keying pins in the backplane connect the module housings with ground.

Figure 46 on page 91 shows the front view of an empty redundant Controller chassis, showing the Controller backplane.

Figure 46 Front view of an empty redundant Controller chassis



The back side of the Controller backplane contains all the connectors for signals that go in or out of the (non-)redundant Controller. These connectors are visible when the back cover plate is swung upwards (see Figure 45 on page 88).

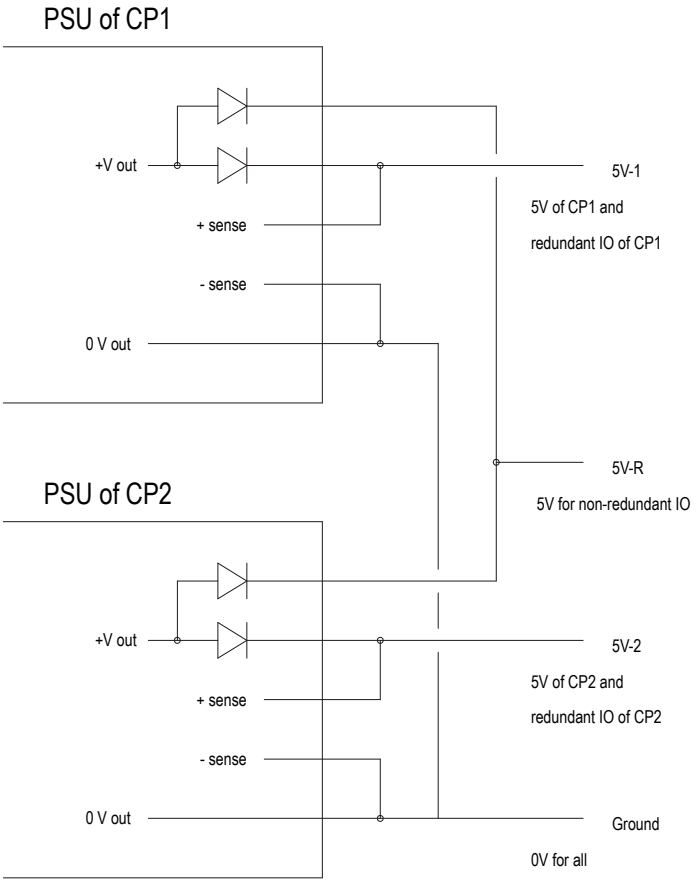
The Controller backplane connects the 5VR output of the PSU of CP1 with the 5VR output of the PSU of CP2.

The resulting 5V-R is used to supply the non-redundant IO.

Thanks to the output diodes in the PSU-240516 (see Figure 168 on page 286) the 5V-R will be available as long as (at least) one of the PSUs is operating.

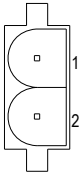
Figure 47 on page 92 shows the 5V connection of the two PSU-240516 modules on the Controller backplane.

Figure 47 5V PSU-connection on the CP backplane



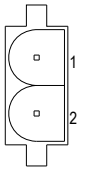
Pin allocation

The back view and pin allocation of the 24V-1 and 24V-2 connectors are:



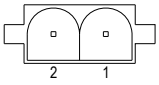
	24V-1	**24V-2**
1	+24V for CP1	+24V for CP2
2	0V for CP1	0V for CP2

The back view and pin allocation of the IN1, IN2 and IN3 connectors are:



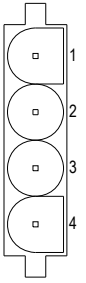
	IN1	IN2	IN3
1	+24V_red	+24V_red	+24V_red
2	input1	input2	input3

The back view and pin allocation of the SD connector is:



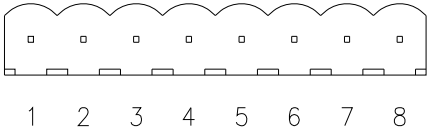
	SD
1	+24V_sd
2	input

The back view and pin allocation of the 5V-2, 5V-R and 5V-1 connectors are:



	5V-2	5V-R	5V-1
1	ground	ground	ground
2	WD of CP2	WDR of CP1 and CP2	WD of CP1
3	ground	ground	ground
4	5V of CP2	5VR of CP1 and CP2	5V of CP1

The back view and pin allocation of the eight WdPx connectors are:



	WdPx
1	5V of CP2
2	WD of CP2
3	ground
4	5VR of CP1 and CP2
5	WDR of CP1 and CP2
6	ground
7	5V of CP1
8	WD of CP1

Connector function

Table 7 on page 94 describes the function of the connectors on the back side of the Controller backplane.

Table 7 Connectors at the back side of the Controller backplane

Group	Name	Connector type	Used for
Control Processor 1	Com1.1.A	RJ45	Ethernet communication channels 1 and 2 of the communication module in the COM1 location
	Com1.1.B	RJ45	
	Com1.1.C	10-pin male	General purpose communication channels 3 and 4 of the communication module in the COM1 location
	Com1.1.D	10-pin male	
	Com1.2.A	RJ45	Ethernet communication channels 1 and 2 of the communication module in the COM2 location
	Com1.2.B	RJ45	
	Com1.2.C	10-pin male	General purpose communication channels 3 and 4 of the communication module in the COM2 location
	Com1.2.D	10-pin male	
Control Processor 2	Com2.1.A	RJ45	Ethernet communication channels 1 and 2 of the communication module in the COM1 location
	Com2.1.B	RJ45	
	Com2.1.C	10-pin male	General purpose communication channels 3 and 4 of the communication module in the COM1 location
	Com2.1.D	10-pin male	
	Com2.2.A	RJ45	Ethernet communication channels 1 and 2 of the communication module in the COM2 location
	Com2.2.B	RJ45	
	Com2.2.C	10-pin male	General purpose communication channels 3 and 4 of the communication module in the COM2 location
	Com2.2.D	10-pin male	
IO bus 1	IO bus1.1	Flat cable connector	first IO bus of Control Processor 1
	IO bus2.1	Flat cable connector	first IO bus of Control Processor 2
	Term IO bus1	2 × 50-pin connector	IO bus terminator for the first IO bus(es) Type: TERM-0001 or TERM-0002, see page 485 for details.
IO bus 2	IO bus1.2	Flat cable connector	second IO bus of Control Processor 1
	IO bus2.2	Flat cable connector	second IO bus of Control Processor 2
	Term IO bus2	2 × 50-pin connector	IO bus terminator for the second IO bus(es) Type: TERM-0001 or TERM-0002, see page 485 for details.

Table 7 Connectors at the back side of the Controller backplane *(continued)*

Group	Name	Connector type	Used for
IO bus 3	IO bus1.3	Flat cable connector	third IO bus of Control Processor 1
	IO bus2.3	Flat cable connector	third IO bus of Control Processor 2
	Term IO bus3	2 × 50-pin connector	IO bus terminator for the third IO bus(es) Type: TERM-0001 or TERM-0002, see page 485 for details.
IO bus 4	IO bus1.4	Flat cable connector	fourth IO bus of Control Processor 1
	IO bus2.4	Flat cable connector	fourth IO bus of Control Processor 2
	Term IO bus4	2 × 50-pin connector	IO bus terminator for the fourth IO bus(es) Type: TERM-0001 or TERM-0002, see page 485 for details.
Watchdog and Power[1] distribution	WdP1	8-pin male connector	Watchdog and Power to IO chassis 1[2]
	WdP2	8-pin male connector	Watchdog and Power to IO chassis 2
	WdP3	8-pin male connector	Watchdog and Power to IO chassis 3
	WdP4	8-pin male connector	Watchdog and Power to IO chassis 4
	WdP5	8-pin male connector	Watchdog and Power to IO chassis 5
	WdP6	8-pin male connector	Watchdog and Power to IO chassis 6
	WdP7	8-pin male connector	Watchdog and Power to IO chassis 7
	WdP8	8-pin male connector	Watchdog and Power to IO chassis 8

Table 7 Connectors at the back side of the Controller backplane *(continued)*

Group	Name	Connector type	Used for
Power	24V-1	2-pin male connector	24V for Control Processor 1 (for cable details see “PDC-CP24” on page 807).
	24V-2	2-pin male connector	24V for Control Processor 2 (for cable details see “PDC-CP24” on page 807).
	5V-1	4-pin male connector	5V and Watchdog of Control Processor 1. This connector is used to distribute these signals to other (extension) cabinets using an PDB-IOX05 (for more information see “PDB-IOX05” on page 830).
	5V-2	4-pin male connector	5V and Watchdog of Control Processor 2. This connector is used to distribute these signals to other (extension) cabinets using an PDB-IOX05 (for more information see “PDB-IOX05” on page 830).
	5V-R	4-pin male connector	Redundant 5V and redundant Watchdog. This connector is used to distribute these signals to other (extension) cabinets using an PDB-IOX05 (for more information see “PDB-IOX05” on page 830).
Various	SD	2-pin male connector	Connector for an Emergency Shut Down system. The chassis is delivered with the LINK-SD link placed. This link is required if the Emergency Shut Down function is not used (see also QPP data sheets “QPP-0001” on page 240 and “QPP-0002” on page 253 and “SICP-0002/L3” on page 722).
	IN1	2-pin male connector	24 Volt non-safety related general purpose input. This input can generate an interrupt (on the rising edge) e.g. for external clock synchronization (see also “BKM-0001” on page 277 and “SICP-0002/L3” on page 722).
	IN2	2-pin male connector	24 Volt non-safety related general purpose input (see also “BKM-0001” on page 277 and “SICP-0002/L3” on page 722).
	IN3	2-pin male connector	24 Volt non-safety related general purpose input (see also “BKM-0001” on page 277 and “SICP-0002/L3” on page 722).

1 Watchdog and 5 Volt of Control Processor 1, Control Processor 2 and the redundant Watchdog and 5 Volt.

2 The chassis numbers mentioned here are defined by jumpers on the IO backplane

Technical data

General	Type number[1]:	FS-CPCHAS-0001 V1.1
	Approvals:	CE, UL, CSA, TUV, FM
Power	5V-1:	0.05 A
	5V-2:	0.05 A
Dimensions	Height:	4 HE (177 mm, 7 in)
	Width:	482.6 mm, 19 in
	Depth:	280 mm, 11 in
	Weight:	5.8 kg, 12.8 lb

1 Chassis with suffix code V1.1 and higher have an improved cover plate design and reduced power consumption. (Chassis with suffix code V1.0 consume 0.5A per feeder.)
There are no functional changes.

IOCHAS-0001S

IO Chassis for non-redundant IO modules (Safety Manager)

Description

The IOCHAS-0001S is a chassis for up to 18 non-redundant IO modules. It consists of the following components:

Table 8 Components of the FS-IOCHAS-0001S[1] V1.0

Component	Amount	Description	See
IO housing	1	19 inch mechanical case including cover plates for up to 18 IO modules	page 99
FS-IOB-0001S[1]	1	IO Backplane for non-redundant IO	page 100
FS-IO-0001[1] V1.0	1	IO Extender module located at slot 21	page 479
FS-IOBUS-HBS[1] V1.0	1	Horizontal IO bus backplane for non-redundant IO	page 104
Blind fronts	2	Located at slot 19 and 20	

1 FS-type modules are non conformal coated modules.

Table 9 Components of the FC-IOCHAS-0001S[1] CCV1.0

Component	Amount	Description	See
IO housing	1	19 inch mechanical case including cover plates for up to 18 IO modules	page 99
FS-IOB-0001S	1	IO Backplane for non-redundant IO	page 100
FC-IO-0001[1] CCV1.0	1	IO Extender module located at slot 21	page 479
FC-IOBUS-HBS[1] CCV1.0	1	Horizontal IO bus backplane for non-redundant IO	page 104
Blind fronts	2	Located at slot 19 and 20	

1 FC-type modules are conformal coated modules. Conformal coated modules have the letters ‘CC’ preceding the version number.

Figure 48 Front view of an empty IOCHAS-0001S

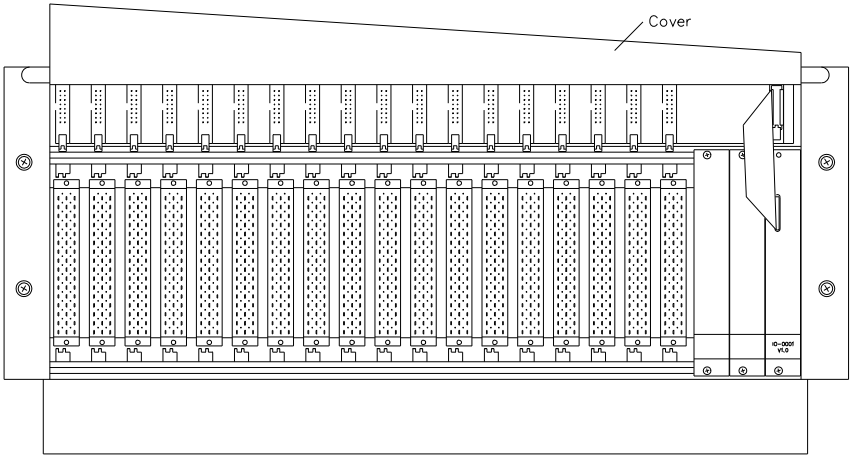


Figure 48 on page 99 shows the front side of an empty IOCHAS-0001S with the front-cover raised. A 19" chassis has 21 slots for modules (each 4TE wide). These slots are numbered 1 to 21, starting at the left-hand side of the chassis.
In the IOCHAS-0001S, slots 1 to 18 are available for IO modules.
Slot 19 and 20 cannot be used and slot 21 contains the IO-0001 module.
The IOB-0001S provides the 18 IO-connectors in the middle of the chassis.
The IOBUS-HBS provides the 18 flatcable-connectors in the top of the chassis.

IO Housing

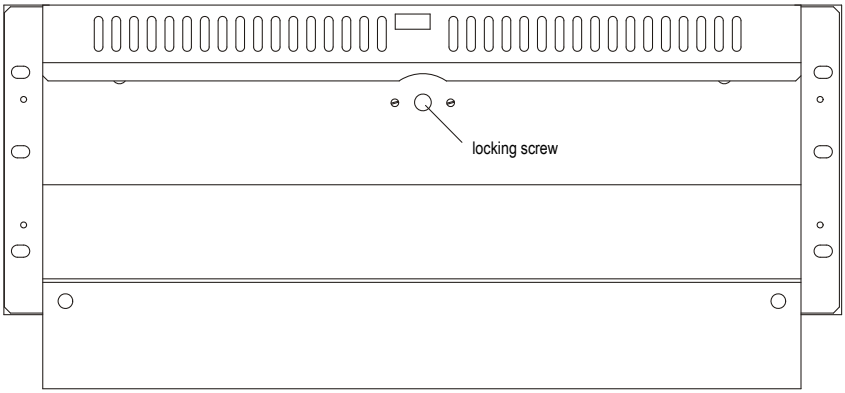
The IO housing is specifically designed for Safety Manager.

It is a 19" based housing.

A coverplate assembly at the front of the chassis shields the flatcables of the IO modules. This cover can be swung upwards to access the flatcables. To swing the cover upwards, unlock it by moving the two locking slides horizontally towards the middle of the chassis. The backside of the IO cover assembly provides room for a tagnumber assignment drawing.

The backside of the IO housing is covered by an IO back cover plate that can be removed by rotating the half-turn locking screw anti-clockwise (see Figure 49 on page 100).

Figure 49 Back view of a closed IOCHAS-0001S



Attention

The IO back cover plate will be completely unattached from the IO chassis after the locking screw has been turned. Be careful not to drop it.

IO cable clamp support (with tie wrap) at the back of the IO housing leads all cables towards the side of the IO chassis.

Figure 54 on page 106 shows a side view of the IOCHAS-0001S.

IO Backplane for non-redundant IO: IOB-0001S

The front of the IOB-0001S backplane is visible in the middle of Figure 48 on page 99.

Figure 50 on page 101 shows the back of the IOCHAS-0001S with the back-cover removed.

Table 10 on page 101 describes the connectors present on the IOB-0001S.

Figure 50 Back view of an open IOCHAS-0001S

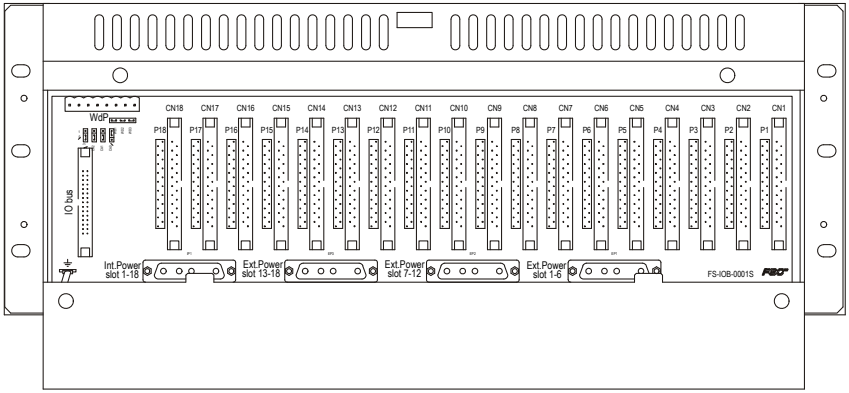


Table 10 Connectors on the IOB-0001S

Connector	Amount	Description	See
Front side			
48-pin female chassis connector	18	Connectors for IO modules, slot 1 to 18	“Input modules” on page 289 “Output modules” on page 343
48-pin female chassis connector	1	Connector for IO extender IO-0001, slot 21	“IO-0001” on page 479
Back side			
IO bus	1	Connector for IOBUS-CPIO (IO bus to Controller chassis)	“IOBUS-CPIO” on page 491
CN1 to CN18	18	Connector for system interconnection cables SICC-0001/Lx or SICP-0001/Lx, slot 1 to 18	“SICC-0001/Lx” on page 715 “SICP-0001/Lx” on page 718
P1 to P18	18	Connector for IO converter modules, slot 1 to 18	“Input converter modules” on page 321 “Output converter modules” on page 407
IP1	1	Connector for internal power, slot 1 to 18	Cable: FS-PDC-IOIP1, see “PDC-IOxPx” on page 809

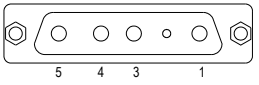
Table 10 Connectors on the IOB-0001S *(continued)*

Connector	Amount	Description	See
EP1	1	Connector for external power, slot 1 to 6	Cable: FS-PDC-IOEP1, see “PDC-IOxPx” on page 809
EP2	1	Connector for external power, slot 7 to 12	Cable: FS-PDC-IOEP2, see “PDC-IOxPx” on page 809
EP3	1	Connector for external power, slot 13 to 18	Cable: FS-PDC-IOEP3, see “PDC-IOxPx” on page 809
CA0 to CA3	4	Jumpers for defining the IO chassis address	“Address settings” on page 481
WdP	1	Connector for watchdog and 5 V power signal, connects to Controller backplane	“Controller backplane CPB-0001” on page 91 Cable: PDC-IOS05, see “PDC-IOS05” on page 838.
WD1 to WD3[1]	3	Connector to enable external watchdog grouping	See the *Safety Manual*.

1 On delivery, a triple jumper is placed and no watchdog grouping is used. Watchdog grouping can be used for each group (WD1 corresponds to slot 1—6, WD2 to slot 7—12, WD3 to slot 13—18) by removing the jumper from the WDx connector for that group, and connecting the WDx connector to the watchdog group relais (See the *Safety Manual*).

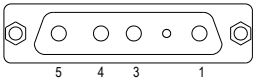
Pin allocation

The back view and pin allocation of the Internal Power connector IP1 is:



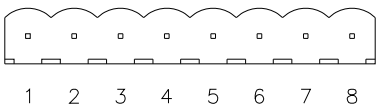
	IP1
1	IP slot 1—9
3	0 V
4	0 V
5	IP slot 10—18

The back view and pin allocation of the External Power connectors EP1, EP2 and EP3 are:



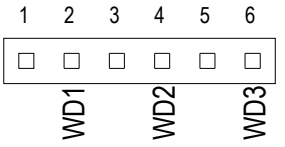
	EP3	EP2	EP1
1	EP slot 13, 14, 15	EP slot 7, 8, 9	EP slot 1, 2, 3
3	0 V	0 V	0 V
4	0 V	0 V	0 V
5	EP slot 16, 17, 18	EP slot 10, 11, 12	EP slot 4, 5, 6

The back view and pin allocation of the WdP connector is:



	WdP
1	nc
2	nc
3	ground
4	5VR of CP1 and CP2
5	WDR of CP1 and CP2
6	ground
7	nc
8	nc

The back view and pin allocation of the WD jumper is:

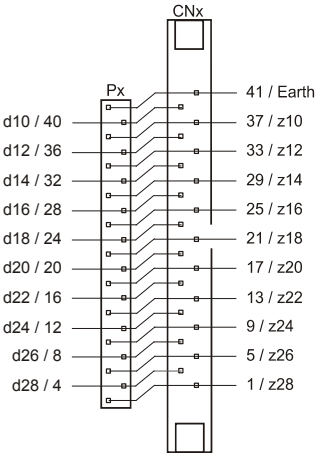


	WD
1	WDR of CP1 and CP2
2	WD of slot 1, 2, 3, 4, 5 and 6
3	WDR of CP1 and CP2
4	WD of slot 7, 8, 9, 10, 11 and 12
5	WDR of CP1 and CP2
6	WD of slot 13, 14, 15, 16, 17 and 18

The pin allocation of each respective input and output module can be found in the module datasheet.

Figure 51 on page 104 shows the pin mapping from an IO chassis connector at the front to both a SIC cable (CNx) connector and a converter (Px) connector at the back of the IO Chassis.

Figure 51 Pin mapping from IO connector to SIC cable (CNx) and converter (Px) connector



Horizontal IO bus backplane for non-redundant IO: IOBUS-HBS

Figure 48 on page 99 shows the IOBUS-HBS (in the top of the chassis).

Figure 52 on page 104 shows a front view of a filled IOCHAS-0001S with the cover opened.

Figure 53 on page 105 shows a front view of a filled IOCHAS-0001S with the cover closed.

Table 11 on page 105 lists the connectors present on the IOBUS-HBS.

Figure 52 Front view of a filled, open IOCHAS-0001S

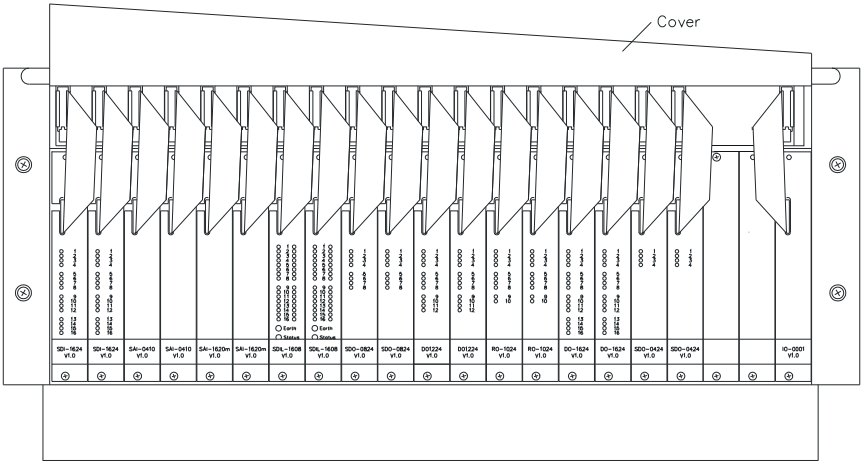


Figure 53 Front view of a filled, closed IOCHAS-0001S

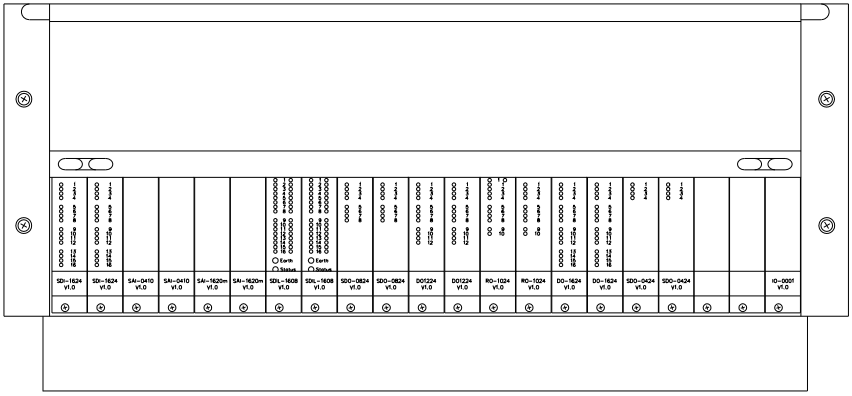
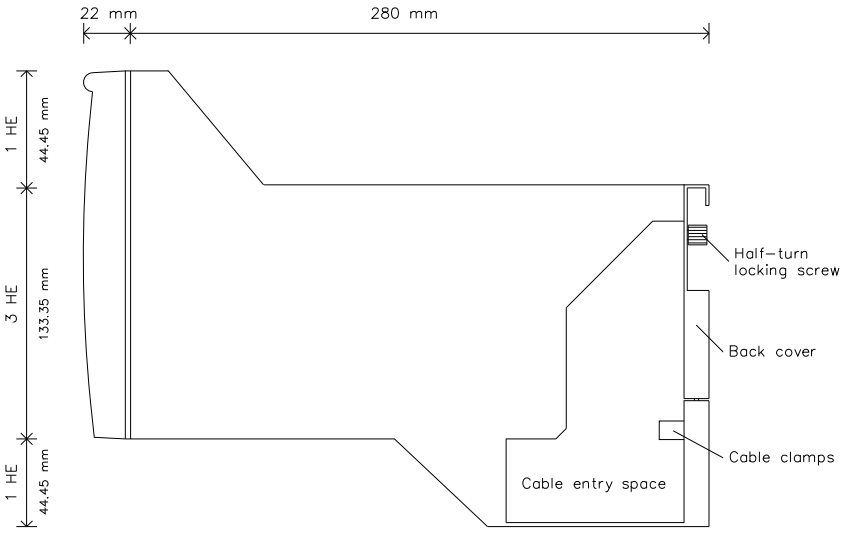


Table 11 Connectors on the IOBUS-HBS

Connector	Amount	Description	See
Flatcable connector	18	Connectors for IO modules, located at slot 1 to 18	“Input modules” on page 289 “Output modules” on page 343
Flatcable connector	1	Connector for IO extender IO-0001, slot 21	“IO-0001” on page 479
20-pin flatcable assembly	1	Flatcable to the connector on the middle of the IO-0001 module	“IO-0001” on page 479

Figure 54 Side view of the IOCHAS-0001S



Technical data

General	Type number[1]:	FS-IOCHAS-0001S FC-IOCHAS-0001S
	Approvals:	CE, UL, CSA, TUV, FM
Power	5V-R:	35 mA (IO-0001 slot 21)
Dimensions	Height:	1 + 3 + 1 HE for first IO chassis 4 HE for every next IO chassis see Figure 54 on page 106 44.5 + 133.4 + 44.5 mm 1.75 + 5.25 + 1.75 in
	Width:	482.6 mm, 19 in
	Depth:	280 mm, 11 in
	Weight:	8,5 kg

1 FS-type modules are non conformal coated modules.
FC-type modules are conformal coated modules.

IOCHAS-0001R

IO chassis for redundant IO modules (Safety Manager)

Description

The IOCHAS-0001R is a chassis for up to 9 pairs of redundant IO modules.

It consists of the following components:

Table 12 Components of the FS-IOCHAS-0001R[1] V1.0

Component	Amount	Description	See
IO housing	1	19 inch mechanical case including cover plates for up to 18 IO modules	page 108
FS-IOB-0001R[1]	1	IO Backplane for redundant IO	page 109
FS-IO-0001[1] V1.0	2	IO Extender modules, slot 20 and 21	page 479
FS-IOBUS-HBR[1] V1.0	1	Horizontal IO bus backplane for redundant IO	page 113
Blind front	1	Located at slot 19	

1 FS-type modules are non conformal coated modules.

Table 13 Components of the FC-IOCHAS-0001R[1] CCV1.0

Component	Amount	Description	See
IO housing	1	19 inch mechanical case including cover plates for up to 18 IO modules	page 108
FS-IOB-0001R	1	IO Backplane for redundant IO	page 109
FC-IO-0001[1] CCV1.0	2	IO Extender modules, slot 20 and 21	page 479
FC-IOBUS-HBR[1] CCV1.0	1	Horizontal IO bus backplane for redundant IO	page 113
Blind front	1	Located at slot 19	

1 FC-type modules are conformal coated modules. Conformal coated modules have the letters ‘CC’ preceding the version number.

Figure 55 Front view of an empty IOCHAS-0001R

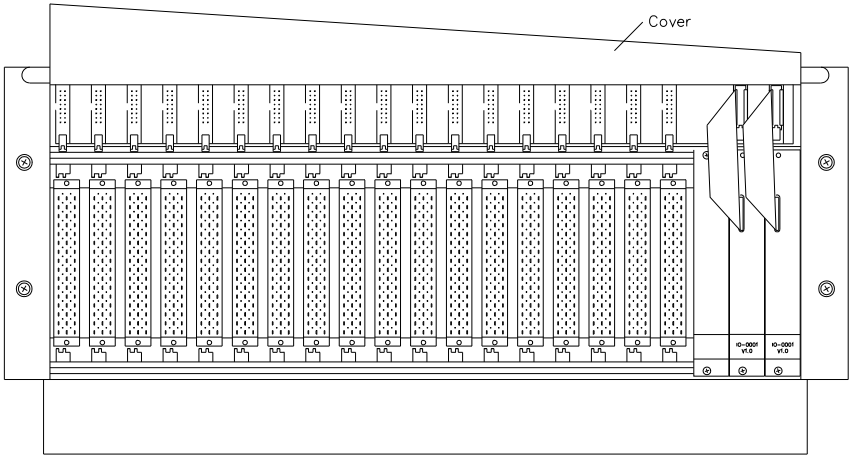


Figure 55 on page 108 shows the front side of an empty IOCHAS-0001R with the front cover raised.

A 19" chassis has 21 slots for modules (each 4TE wide). These slots are numbered 1 to 21, starting at the left-hand side of the chassis. In the IOCHAS-0001R, slots 1 to 18 are available for IO modules. They are configured in pairs.

The IO modules in the odd numbered slots (and the IO-0001 in slot 20) are controlled by Control Processor 1.
The IO modules in the even numbered slots (and the IO-0001 in slot 21) are controlled by Control Processor 2.

Slot 19 cannot be used.

Slot 20 and slot 21 contain the IO-0001 modules.
The IOB-0001R provides the 18 IO-connectors in the middle of the chassis.
The IOBUS-HBR provides the 18 flatcable-connectors in the top of the chassis.

IO Housing

The IO housing is specifically designed for Safety Manager.

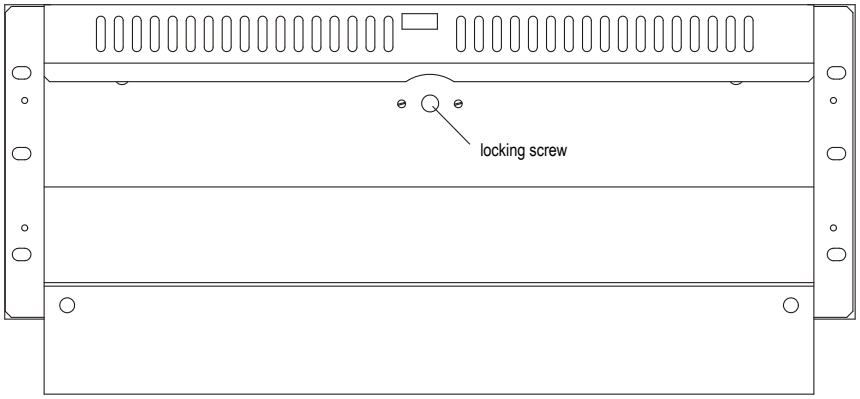
It is a 19" based housing.

A cover plate assembly at the front of the chassis shields the flatcables of the IO modules. This cover can be swung upwards to access the flatcables. To swing the cover upwards, unlock it by moving the two locking slides horizontally towards

the middle of the chassis. The backside of the IO cover assembly provides room for a tag number assignment drawing.

The backside of the IO housing is covered by an IO back cover plate that can be removed by rotating the half-turn locking screw anti-clockwise (see Figure 56 on page 109).

Figure 56 Back view of a closed IOCHAS-0001R



Attention

The IO back cover plate will be completely removed from the IO chassis after the locking screw has been turned. Be careful not to drop it.

IO cable clamp support (with tie wrap) at the back of the IO housing leads all cables towards the side of the IO chassis.

Figure 61 on page 114 shows a side view of the IOCHAS-0001R.

IO Backplane for redundant IO: IOB-0001R

The front of the IOB-0001R backplane is visible in the middle of Figure 55 on page 108.

Figure 57 on page 110 shows the back of the IOCHAS-0001R with the back-cover removed.

Table 14 on page 110 describes the connectors on the IOB-0001R.

Figure 57 back view of an open IOCHAS-0001R

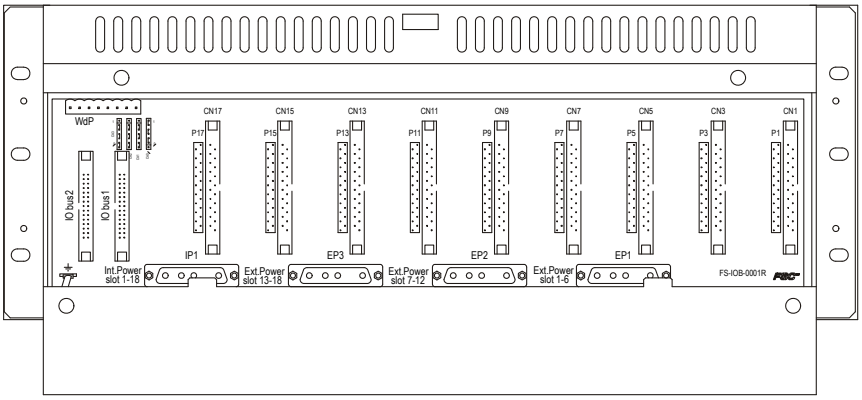


Table 14 Connectors on the IOB-0001R

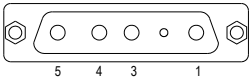
Connector	Amount	Description	See
Front side			
48-pin female chassis connector	18	For IO modules, slot 1 to 18	“Input modules” on page 289 “Output modules” on page 343
48-pin female chassis connector	2	For IO extender IO-0001, slot 20 and 21	“IO-0001” on page 479
Back side			
IO bus1	1	For IOBUS-CPIO (IO bus to Control Processor 1)	“IOBUS-CPIO” on page 491
IO bus2	1	For IOBUS-CPIO (IO bus to Control Processor 2)	“IOBUS-CPIO” on page 491
CN1, CN3, CN5, CN7, CN9, CN11, CN13, CN15 and CN17	9	For system interconnection cables SICC-0001/Lx or SICP-0001/Lx, slot 1, 3, 5, 7, 9, 11, 13, 15 and 17	“SICC-0001/Lx” on page 715 “SICP-0001/Lx” on page 718
P1, P3, P5, P7, P9, P11, P13, P15 and P17	9	For IO converter modules, slot 1, 3, 5, 7, 9, 11, 13, 15, and 17	“Input converter modules” on page 321 “Output converter modules” on page 407
IP1	1	For internal power, slot 1 to 18	Cable: FS-PDC-IOIP1, see “PDC-IOxPx” on page 809

Table 14 Connectors on the IOB-0001R *(continued)*

Connector	Amount	Description	See
EP1	1	For external power, slot 1 to 6	Cable: FS-PDC-IOEP1, see "PDC-IOxPx" on page 809
EP2	1	For external power, slot 7 to 12	Cable: FS-PDC-IOEP2, see "PDC-IOxPx" on page 809
EP3	1	For external power, slot 13 to 18	Cable: FS-PDC-IOEP3, see "PDC-IOxPx" on page 809
CA0 to CA3	4	Jumpers for defining the IO chassis address	"Address settings" on page 481
WdP	1	For watchdog and 5 V power signal, connects to Controller backplane	"Controller backplane CPB-0001" on page 91 Cable: PDC-IOR05, see "PDC-IOR05" on page 840.

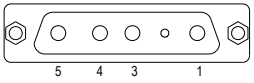
Pin allocation

The back view and pin allocation of the Internal Power connector IP1 is:



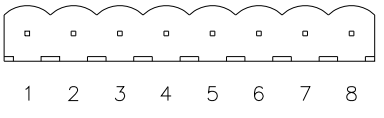
	IP1
1	IP slot 1, 3, 5, 7, 9, 11, 13, 15 and 17
3	0 V
4	0 V
5	IP slot 2, 4, 6, 8, 10, 12, 14, 16 and 18

The back view and pin allocation of the External Power connectors EP1, EP2 and EP3 are:



	EP3	EP2	EP1
1	EP slot 13, 15, 17	EP slot 7, 9, 11	EP slot 1, 3, 5
3	0 V	0 V	0 V
4	0 V	0 V	0 V
5	EP slot 14, 16, 18	EP slot 8, 10, 12	EP slot 2, 4, 6

The back view and pin allocation of the WdP connector is:

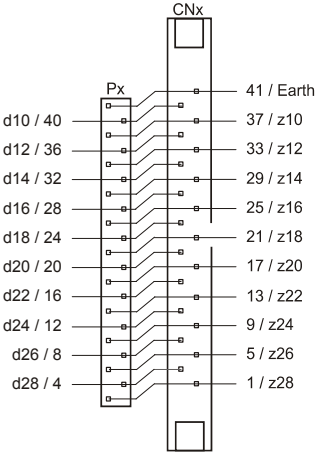


	WdP
1	5V of CP2, slot 2, 4, 6, 8, 10, 12, 14, 16, 18 and 21
2	WD of CP2, slot 2, 4, 6, 8, 10, 12, 14, 16 and 18
3	ground
4	nc
5	nc
6	ground
7	5V of CP1, slot 1, 3, 5, 7, 9, 11, 13, 15, 17 and 20
8	WD of CP1, slot 1, 3, 5, 7, 9, 11, 13, 15 and 17

The pin allocation of each respective input and output module can be found in the module datasheet.

Figure 58 on page 112 shows the pin mapping from an IO chassis connector at the front to both a SIC cable (CNx) connector and a converter (Px) connector at the back of the IO Chassis.

Figure 58 Pin mapping from IO connector to SIC cable (CNx) and converter (Px) connector



Horizontal IO bus backplane for redundant IO: IOBUS-HBR

Figure 55 on page 108 shows the IOBUS-HBR (in the top of the chassis).

Figure 59 on page 113 shows a front view of a filled IOCHAS-0001R with the cover opened.

Figure 60 on page 113 shows a front view of a filled IOCHAS-0001R with the cover closed.

Table 15 on page 114 lists the connectors on the IOBUS-HBR.

Figure 59 Front view of a filled, open IOCHAS-0001R

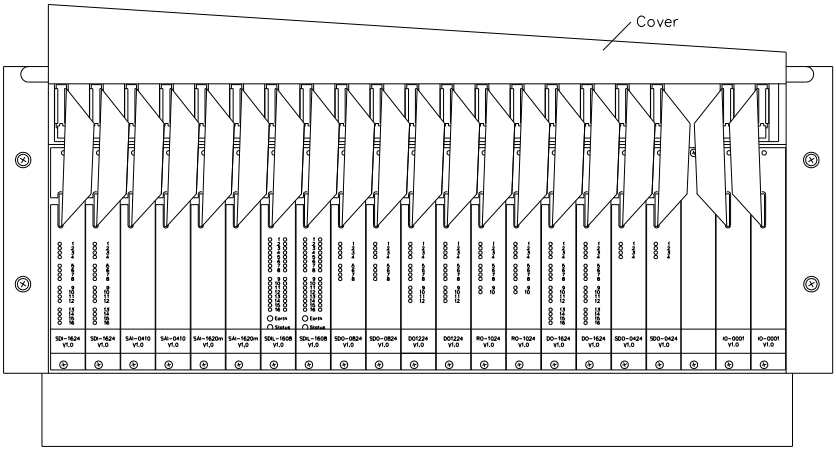


Figure 60 Front view of a filled, closed IOCHAS-0001R

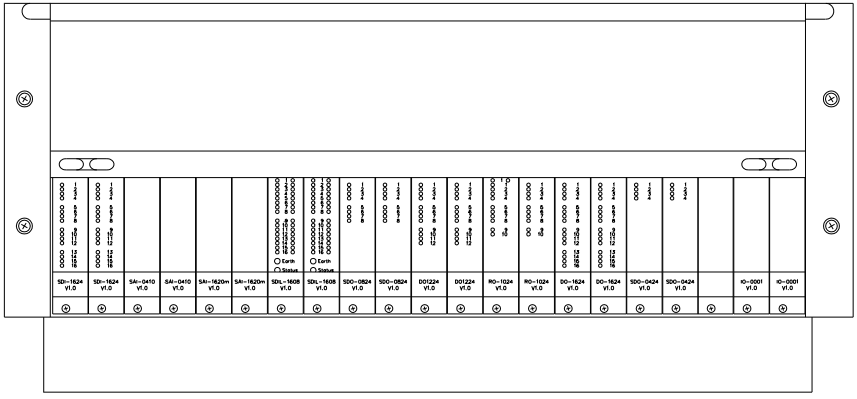
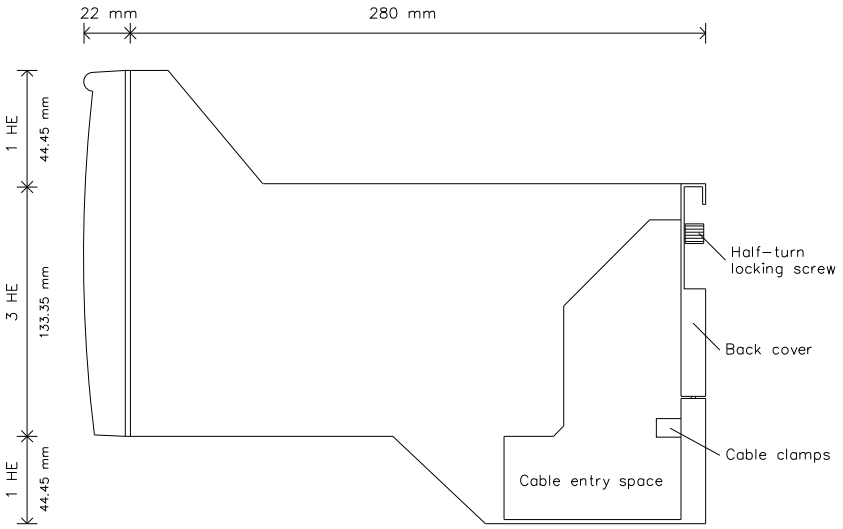


Table 15 Connectors on the IOBUS-HBR

Connector	Amount	Description	See
Flatcable connector	18	Connectors for IO modules, slot 1 to 18	“Input modules” on page 289 “Output modules” on page 343
Flatcable connector	2	Connector for IO extender IO-0001, slot 20 and 21	“IO-0001” on page 479
10-pin flatcable assembly	2	Flatcables to the connectors on the middle of the IO-0001 modules	“IO-0001” on page 479

Figure 61 Side view of the IOCHAS-0001R



Technical data

General	Type number[1]:	FS-IOCHAS-0001R FC-IOCHAS-0001R
	Approvals:	CE, UL, CSA, TUV, FM
Power	5V-1:	35 mA (IO-0001 slot 20)
	5V-2:	35 mA (IO-0001 slot 21)
Dimensions	Height:	1 + 3 + 1 HE for first IO chassis 4 HE for every next IO chassis see Figure 61 on page 114 44.5 + 133.4 + 44.5 mm 1.75 + 5.25 + 1.75 in
	Width:	482.6 mm, 19 in
	Depth:	280 mm, 11 in
	Weight:	8,5 kg

1 FS-type modules are non conformal coated modules.
FC-type modules are conformal coated modules.