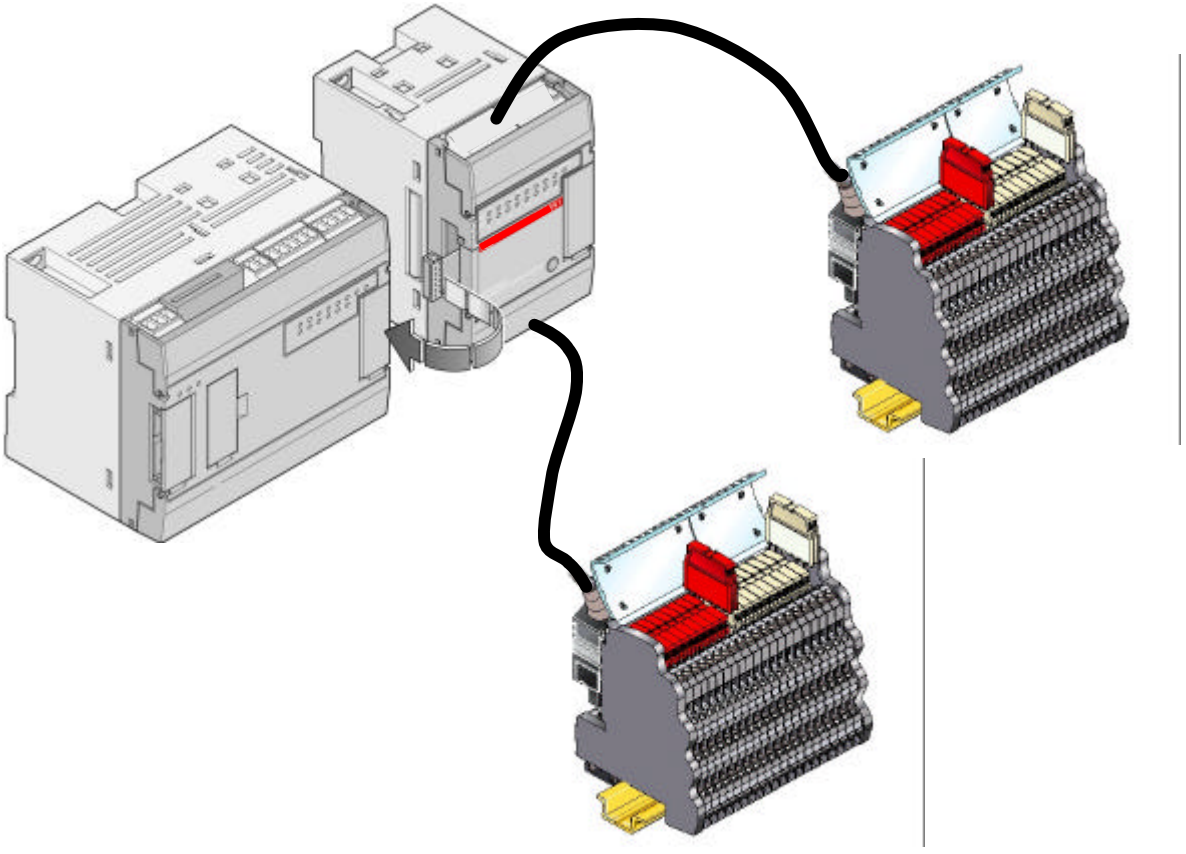
Chapter 15

XC32L1 / XC32L2

XC32L1 and XC32L2



XC32L1 and XC32L2

This chapter wants to describe the general characteristics and operating conditions of XC32L1 and XC32L2 configurable inputs/outputs extension.

1.1 Presentation

The XC32L1 and XC32L2 are used as a configurable channels extension. They allow to extend the configurations with AC31 central units (40/50 series), CS31 extensible remote units (ICMK14F1 / ICMK14N1) or also with MODBUS® extensible remote units (ICMK14F1-M / ICMK14N1-M). They bring flexibility and compact solution with the configurable function and modular function with their great number of inputs / outputs, using the same set of basic components.

The XC32L1 and XC32L2 extensions allow to extend and adapt a distributed I/O architecture on CS31 system bus or on MODBUS® system bus that provide cost effective and flexible and compact solutions for controlling and monitoring I/O signals over a wide area.

1.1.1 General set-up rules

Each XC32L1 and XC32L2 extensions incorporate a specific number of inputs / outputs. Only binary inputs / outputs for XC32L1 and also analog Inputs for XC32L2. What's more it is possible, to configure and adapt all channels in different modes.

The same extensions XC32L1 and XC32L2 can be used on

⇨ With Central units 40 and 50 series.

⇨ With CS31 extensible remote units. (ICMK14F1 or ICMK14N1)

⇨ With MODBUS® extensible remote units. (ICMK14F1-M or ICMK14N1-M)

Warning : Number of XC32L1/XC32L2 can be used following the type of Central unit or remote units used on configuration:

Limits due to XC32L1 and XC32L2:

⇨ The XC32L1 reserves 2 address places (1 for input and 1 for output)

⇨ The XC32L2 reserves 3 address places (1 for input and 1 for output and 1 for analog input)

Limits due to central units and remote units:

⇨ On central units 40 and 50 series 15 address places available for extensions.

⇨ On CS31 extensible remote units. (ICMK14F1 or ICMK14N1) 8 address places available for extensions.

⇨ On MODBUS® extensible remote units. (ICMK14F1-M or ICMK14N1-M) 10 address places available for extensions.

Conclusion:

	On central units 40/50 series	On CS31 remote units ICMK14F1 or ICMK14N1	On MODBUS â remote units ICMK14F1-M or ICMK14N1-M
Max of XC32L1	6	3	5
Max of XC32L2	5	1*	3

* The limit is only one instead of 2 extensions due to the limit of CS31 exchanged data (The maximum exchanged data is 8 analog inputs and 8 analog outputs)

Possibility to used with XC32L1 and XC32L2 all the other AC31 extensions existing.

1.2 Binary extensions specifications (XC32L1 and XC32L2)

The binary extension units are powered at 5 V by the central unit or extensible remote unit to whom they are connected.

Warning: the extensions must be connected or disconnected without power supply.

Warning: The power supply 24 V d.c. must be present on extension before initialisation of its central unit or remote unit in order to seen the extension in their addressing configuration.

The power supply connection on XC32L1/L2 must be used when the 24 V d.c. power supply is not connect on the pre-wiring cable or when the maximum total input current is greater than 1A on HE10 connector.

	XC 32 L1	**XC 32 L2**
Weight	220 g	220 g
Incorporated binary inputs		
- Number of inputs	32 configurable	24 configurable Channels from 0 to7 are still usable as logical input even if analogs are selected
- Isolation of the inputs/electronic	1500 V a.c.	1500 V a.c.
- Types of inputs	PNP	PNP
- Input voltage:		
Nominal value	24 V d.c.	24 V d.c.
Signal at 0 (IEC 1131-2)	0 to + 5 V	0 to + 5 V
Signal at 1 (IEC 1131-2)	+ 15 to + 30 V	+ 15 to + 30 V
- Input current at 24 V d.c.	4 mA	4 mA
- Filtering time of an input	Configurable Min : 8 ms	Configurable Min : 8 ms
Incorporated outputs		
- Number of outputs	32 transistors	24 transistors Channel 0-7 are not usable as output
- Isolation of the outputs/electronic	1500 V a.c. 1 min	1500 V a.c. 1 min
- Total charging current, under voltage:		
Direct 24 V d.c.		
Resistive load / inrush current		
L / R = 20 ms	0.5 A	0.5 A
L / R = 30 ms	0.5 A / 0.5 Hz	0.5 A / 0.5 Hz
L / R = 40 ms	0.5 A / 0.3 Hz	0.5 A / 0.3 Hz
L / R = 60 ms	0.5 A / 0.2 Hz	0.5 A / 0.2 Hz
Per output couple	0.5 A / 0.1 Hz	0.5 A / 0.1 Hz
- Total charging current	8 A	8 A
- Output leakage current	< 200 µA	< 200 µA
- Output waste voltage	0.5 V to 500 mA max.	0.5 V to 500 mA max.
- Minimum cut-off value	12 V	12 V
- Commutating frequency:		
for resistive loads	100 Hz	100 Hz
- Short circuit and overload protection	Yes: thermal	Yes: thermal
- Surge voltage protection	yes: by transient volt suppressor	yes: by transient volt suppressor
- Output diagnosis	Overload and short circuit	Overload and short circuit

1.3 Analog and counter extensions specifications (only on XC32L2)

The XC32L2 is powered at 5 V by the central unit or extensible remote unit to whom they are connected.

Groups of 4 analog inputs could be select by external switch (0-3 and 4-7). When analog group is not selected it could be completely used as logical input.

If a group of 4 analog inputs is selected and if the whole inputs are not used as analog, they could be used as logical, the only difference is that, input impedance will be the analog value (20kO).

Even if none analog group is selected, the channel 0 to 8 couldn't be used as output.

Counting function is selectable by external switch. Counting values are caught on input words of second analog group (channel 4 to 7) then, when the counters are selected the analog input of second group becomes logical inputs

Warning: the extensions must be connected or disconnected without power supply.

	XC 32 L2
- Number of analog inputs	8 (4+4)
- Number of counters	4
- Filtering of 50 / 60 Hz	Yes
- Maximum power dissipation	1 W
- Weight	200 g
Analog inputs	**Voltage**
- Nominal range:	0…10 V
- Maximum values	+30 V
- Isolation of inputs / electronic	1500 V
- Resolution	10 bits
- Min resolution at input (± 1LSB)	+ 10 mV
- Full scale precision	≤+/- 2 %
- Word value range read by the central unit	0…32767
- Input impedance	20 KΩ
- Acquisition time including filtering time for all channels	16 ms *
- Diagnosis	No
Fast Counter (Inputs 10 and 11)	
- Number of counter	2
- Max frequency	25 kHz
Slow counter (Inputs 8 and 9)	
- Number of counter	2
- Max frequency	5,5 kHz
- Counting type (fast or slow)	Pulse, Frequency (recovery time 100ms or 1s) Individually selectable

1.4 Programming and configuration with XC32L1 and XC32L2

The following variables must be used inside programming software in order to manage XC32L1 or XC32L2:

- **With AC31GRAF programming software:**

XC32L1 Ixx.00 up to Ixx+1.15 for binary inputs

Oxx.00 up to Oxx+1.15 for binary outputs

XC32L2 Ixx.00 up to Ixx+1.15 for binary inputs

(Ixx.08 and Ixx.09 are used for the slow counters 5kHz and Ixx.10 and Ixx.11 are used for Fast counter 25kHz)

Oxx.08 up to Oxx+1.15 for binary outputs

IWxx.00 up to IWxx.07 for analog inputs and counters

(Slow counters 5.5 kHz are read on IWxx.04 and IWxx.05 and Fast counters 25 kHz are read on IWxx.06 and IWxx.07)

- **With 907AC1131 programming software:**

XC32L1 %IX0xx.00 up to %IX0xx+1.15 for binary inputs

%QX0xx.00 up to %QX0xx+1.15 for binary outputs

XC32L2 %IX0xx.00 up to %IX0xx+1.15 for binary inputs

(%IX0xx.08 and %IX0xx.09 are used for the slow counters 5kHz and %IX0xx.10 and %IX0xx.11 are used for Fast counter 25kHz)

%QX0xx.08 up to %QX0xx+1.15 for binary outputs

%IW10xx.00 up to %IW10xx.07 for analog inputs and counters

(Slow counters 5.5 kHz are read on %IW10xx.04 and %IW10xx.05 and Fast counters 25 kHz are read on %IW10xx.06 and %IW10xx.07)

The function blocks CONFIO1, CONFIO4 or CONFIO8 must be used to configure the counters in frequency meter mode and they must be used also to configure the filtering time of binary or analog inputs.

XC32L1 and XC32L2 – Ability to change the filtering time of binary inputs.

XC32L2 – Ability to configure the counters in standard or frequency meter mode 100ms or 1s

Do not used all parameters of CONFIO,

- ENA Available on XC32L1 or XC32L2.
  The function block is processed when ENA is on the rising edge 0 -> 1

- CHAN0 Available on XC32L1 or XC32L2.
  In order to configure the filtering time for analog or binary inputs, choose the variable IWxx.00, all channels of extension will be affected by this parameter.
  In order to configure the counters, the following analog inputs must be used independently for each counter, Iwxx.04, Iwxx.05, Iwxx.06 or Iwxx.07.

- Type0 Available only on XC32L2.
  In case of configuration of counter,
  Value = 0 initialization of counter value in standard mode.
  Value = 1 configuration of counter in standard mode. (Default setting)
  Value = 2 configuration of counter in frequency meter (Time base = 100ms)
  Value = 3 configuration of counter in frequency meter (Time base = 1s)

- DOT0 Not used on XC32L1 or XC32L2.

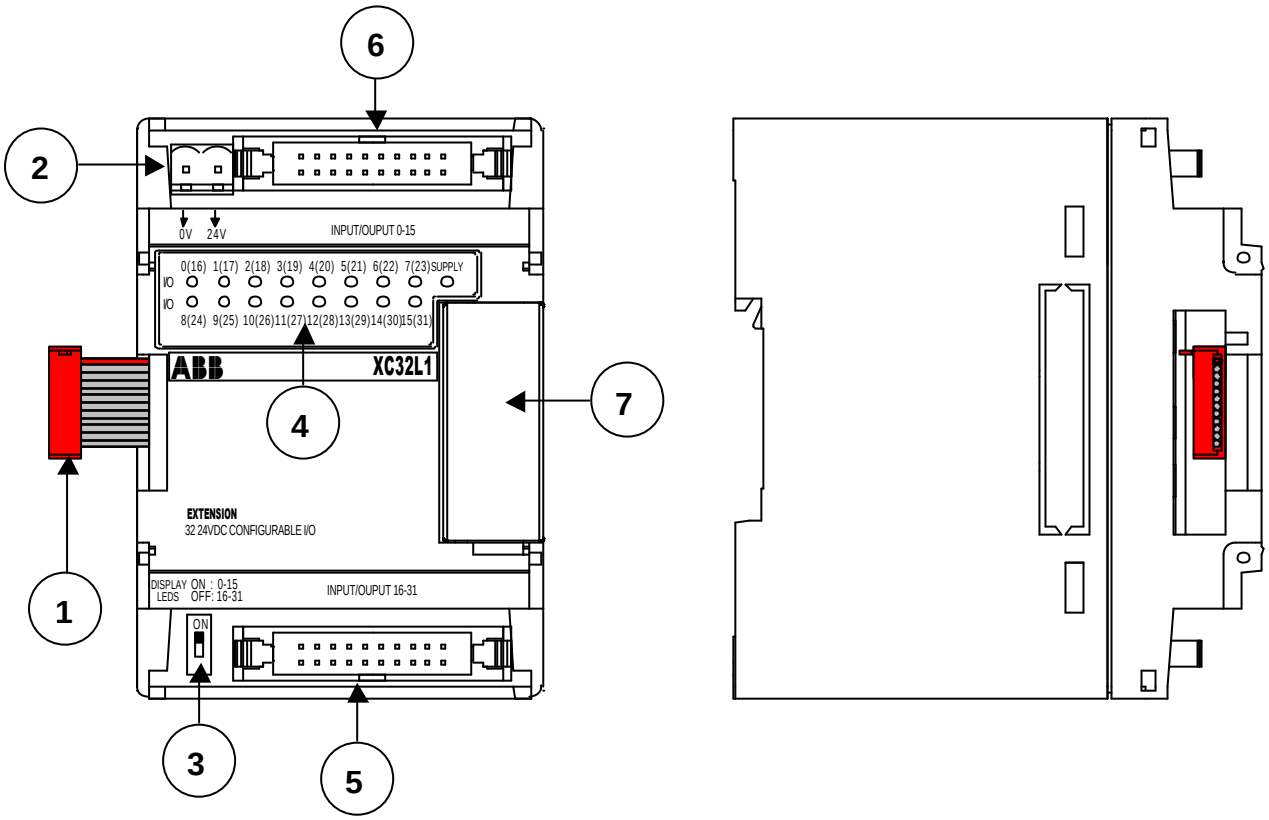
- OFFS0 Not used on XC32L1 or XC32L2.

- MULT0 Not used on XC32L1 or XC32L2.

- FILT0 Available on XC32L1 or XC32L2.
  All channels of extension will be affected by this parameter
  Value = 0 configuration without filtering time for analog inputs XC32L2.
  Value = 8 up to 99 configuration filtering time (in ms) for binary inputs for XC32L1 or XC32L2. (Default setting = 8ms)
  Value = 160 configuration without filtering time for analog inputs XC32L2.
  Value = 192 configuration filtering time for analog inputs (60Hz filter)
  Value = 224 configuration filtering time for analog inputs (50Hz filter)

1.5 Description

1.5.1 XC32L1 description



1- Connector for connection to the central unit / CS31 or MODBUS® remote unit or to the last input / output extension connected to the central unit / CS31 or MODBUS® remote unit.

2- External power supply 24 V d.c.

3- Switch to display the channels (0 to 15 or 16 to 31).

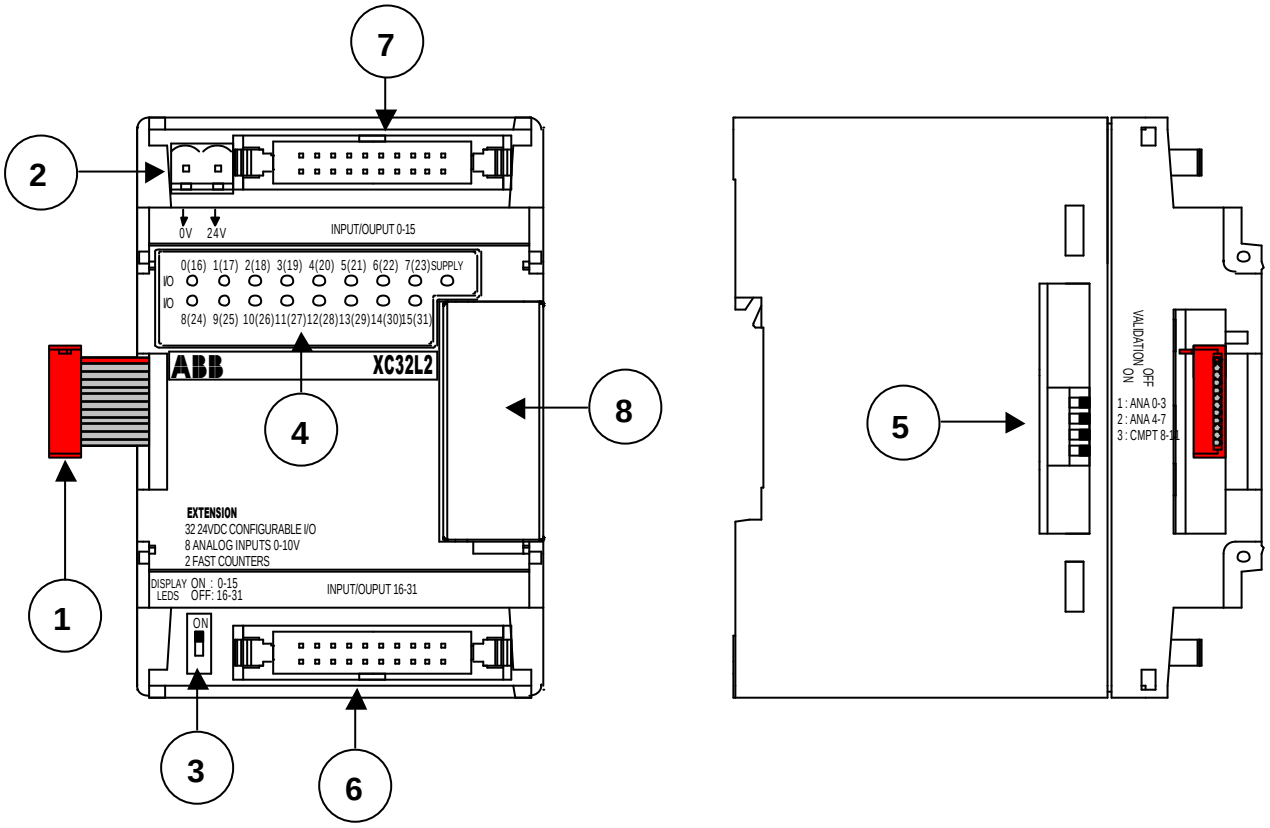
4- Visualization of channels (0 to 15 or 16 to 31).

5- HE10 connector to connect the channels 16 to 31.

6- HE10 connector to connect the channels 0 to 15.

7- Location of the connector for the supplementary input / output extensions.

1.5.2 XC32L2 description



1- Connector for connection to the central unit / CS31 or MODBUS® remote unit or to the last input / output extension connected to the central unit / CS31 or MODBUS remote unit.

2- External power supply 24 V d.c.

3- Switch to display the channels (0 to 15 or 16 to 31).

4- Visualization of channels (0 to 15 or 16 to 31).

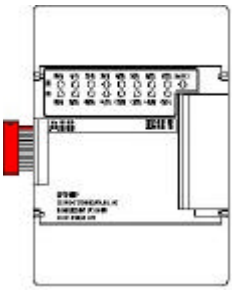
5- Switches to configure the channels as analog inputs or counter format.

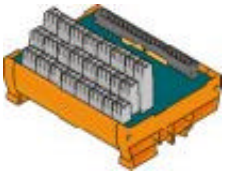
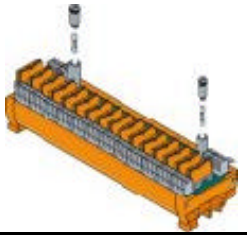
6- HE10 connector to connect the channels 16 to 31.

7- HE10 connector to connect the channels 0 to 15.

8- Location of the connector for the supplementary input / output extensions

1.6 Connection description with XC32L1 and XC32L2



With HE10/20 cable to free wires	With HE10/20 cable to Omniconnect connector 20 points			
Customer solution 	Interfast MS		Interfast	
	Connection interfaces 16 channels	Decoupling interfaces 16 channels	Connection interfaces 16 channels	Decoupling interfaces 16 channels
				

In order to eliminate testing and reduce the PLC wiring time, and also have possibility to configure input / output channels, use a pre-wiring and pre-tested cables to connect easily XC32L1 / XC32L2 to control equipment.

Different solutions can be use by customer as interface module with Interfast range:

- Connection preassembled modules for interfacing the XC32L1 / XC32L2 to control equipment. Select a 16 channels module with single to four wire circuits. Interface modules available with features to enhance the design including fuses, switches, plugs, and test points. These are available with screw or spring connection.
- Decoupling relay and opto-coupler interface module provide circuit isolation and safety between XC32L1 / XC32L2 and control equipment. Select a preassembled module containing 16 relays and opto-couplers. These are available with screw or spring connection. Pluggable and non removable relay, 1SPDT, 2 SPDT, with fused outputs, 16 relay outputs, or pluggable and non removable input and output opto-couplers 16 inputs and 16 outputs.
- Also possibility to create a customer interface assembly. Select individual modular terminal blocks Interfast MS, which offer additional features with a wide choice of internal pin out connections, and the ability to accept different plug in functions.
- For total customization, select an interfast MS modular terminal block, which accepts function plugs including strap, fuse, relay, input and output opto-couplers.

For all more information:

See Main catalogue “Pre-wiring system for PLC’s Interfast” – 1SNC127001C0206

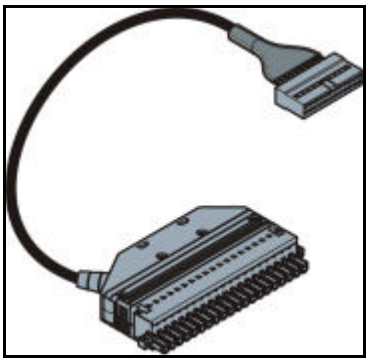
1.6.1 Cabling: Coordination table

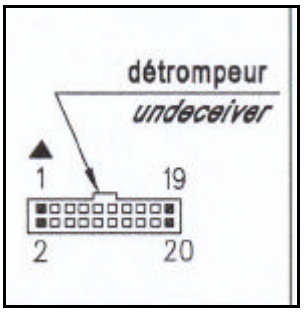
HE10 Connector	OMNICONNECT Connector	Marking Interfast	XC32L1 Binary		XC32L2 Binary	
			Upper cable	Lower cable	Upper cable	Lower cable
1	2	01	Ixx.00 / Oxx.00	Ixx+1.00 / Oxx+1.00	Ixx.00	Ixx+1.00 / Oxx+1.00
2	3	02	Ixx.01 / Oxx.01	Ixx+1.01 / Oxx+1.01	Ixx.01	Ixx+1.01 / Oxx+1.01
3	4	03	Ixx.02 / Oxx.02	Ixx+1.02 / Oxx+1.02	Ixx.02	Ixx+1.02 / Oxx+1.02
4	5	04	Ixx.03 / Oxx.03	Ixx+1.03 / Oxx+1.03	Ixx.03	Ixx+1.03 / Oxx+1.03
5	6	05	Ixx.04 / Oxx.04	Ixx+1.04 / Oxx+1.04	Ixx.04	Ixx+1.04 / Oxx+1.04
6	7	06	Ixx.05 / Oxx.05	Ixx+1.05 / Oxx+1.05	Ixx.05	Ixx+1.05 / Oxx+1.05
7	8	07	Ixx.06 / Oxx.06	Ixx+1.06 / Oxx+1.06	Ixx.06	Ixx+1.06 / Oxx+1.06
8	9	08	Ixx.07 / Oxx.07	Ixx+1.07 / Oxx+1.07	Ixx.07	Ixx+1.07 / Oxx+1.07
9	12	09	Ixx.08 / Oxx.08	Ixx+1.08 / Oxx+1.08	Ixx.08 / Oxx.08	Ixx+1.08 / Oxx+1.08
10	13	10	Ixx.09 / Oxx.09	Ixx+1.09 / Oxx+1.09	Ixx.09 / Oxx.09	Ixx+1.09 / Oxx+1.09
11	14	11	Ixx.10 / Oxx.10	Ixx+1.10 / Oxx+1.10	Ixx.10 / Oxx.10	Ixx+1.10 / Oxx+1.10
12	15	12	Ixx.11 / Oxx.11	Ixx+1.11 / Oxx+1.11	Ixx.11 / Oxx.11	Ixx+1.11 / Oxx+1.11
13	16	13	Ixx.12 / Oxx.12	Ixx+1.12 / Oxx+1.12	Ixx.12 / Oxx.12	Ixx+1.12 / Oxx+1.12
14	17	14	Ixx.13 / Oxx.13	Ixx+1.13 / Oxx+1.13	Ixx.13 / Oxx.13	Ixx+1.13 / Oxx+1.13
15	18	15	Ixx.14 / Oxx.14	Ixx+1.14 / Oxx+1.14	Ixx.14 / Oxx.14	Ixx+1.14 / Oxx+1.14
16	19	16	Ixx.15 / Oxx.15	Ixx+1.15 / Oxx+1.15	Ixx.15 / Oxx.15	Ixx+1.15 / Oxx+1.15
17	1	A	+24V	+24V	+24V	+24V
18	10	B	0V	0V	0V	0V
19	11	C	+24V	+24V	+24V	+24V
20	20	D	0V	0V	0V	0V

HE10 Connector	OMNICONNECT Connector	Marking Interfast	XC32L2 with 8 Analog Inputs		XC32L2 with 4 Analog inputs and 4 Counters	
			Upper cable	Lower cable	Upper cable	Lower cable
1	2	01	Ixx,00 and IWxx.00	Ixx+1.00 / Oxx+1.00	Ixx,00 and IWxx.00	Ixx+1.00 / Oxx+1.00
2	3	02	Ixx,01 and IWxx.01	Ixx+1.01 / Oxx+1.01	Ixx,01 and IWxx.01	Ixx+1.01 / Oxx+1.01
3	4	03	Ixx,02 and IWxx.02	Ixx+1.02 / Oxx+1.02	Ixx,02 and IWxx.02	Ixx+1.02 / Oxx+1.02
4	5	04	Ixx,03 and IWxx.03	Ixx+1.03 / Oxx+1.03	Ixx,03 and IWxx.03	Ixx+1.03 / Oxx+1.03
5	6	05	Ixx,04 and IWxx.04	Ixx+1.04 / Oxx+1.04	Ixx.04	Ixx+1.04 / Oxx+1.04
6	7	06	Ixx,05 and IWxx.05	Ixx+1.05 / Oxx+1.05	Ixx.05	Ixx+1.05 / Oxx+1.05
7	8	07	Ixx,06 and IWxx.06	Ixx+1.06 / Oxx+1.06	Ixx.06	Ixx+1.06 / Oxx+1.06
8	9	08	Ixx,07 and IWxx.07	Ixx+1.07 / Oxx+1.07	Ixx.07	Ixx+1.07 / Oxx+1.07
9	12	09	Ixx.08 / Oxx.08	Ixx+1.08 / Oxx+1.08	Ixx,08/Oxx,08 and IWxx.04	Ixx+1.08 / Oxx+1.08
10	13	10	Ixx.09 / Oxx.09	Ixx+1.09 / Oxx+1.09	Ixx,09/Oxx,09 and IWxx.05	Ixx+1.09 / Oxx+1.09
11	14	11	Ixx.10 / Oxx.10	Ixx+1.10 / Oxx+1.10	Ixx,10/Oxx,10 and IWxx.06	Ixx+1.10 / Oxx+1.10
12	15	12	Ixx.11 / Oxx.11	Ixx+1.11 / Oxx+1.11	Ixx,11/Oxx,11 and IWxx.07	Ixx+1.11 / Oxx+1.11
13	16	13	Ixx.12 / Oxx.12	Ixx+1.12 / Oxx+1.12	Ixx.12 / Oxx.12	Ixx+1.12 / Oxx+1.12
14	17	14	Ixx.13 / Oxx.13	Ixx+1.13 / Oxx+1.13	Ixx.13 / Oxx.13	Ixx+1.13 / Oxx+1.13
15	18	15	Ixx.14 / Oxx.14	Ixx+1.14 / Oxx+1.14	Ixx.14 / Oxx.14	Ixx+1.14 / Oxx+1.14
16	19	16	Ixx.15 / Oxx.15	Ixx+1.15 / Oxx+1.15	Ixx.15 / Oxx.15	Ixx+1.15 / Oxx+1.15
17	1	A	+24V	+24V	+24V	+24V
18	10	B	0V	0V	0V	0V
19	11	C	+24V	+24V	+24V	+24V
20	20	D	0V	0V	0V	0V

1.6.2 With HE10/20 cable to Omniconnect connector 20 points. (0.14mm^2 – 26 AWG)

2 cables are necessary by extension XC32L1 or XC32L2

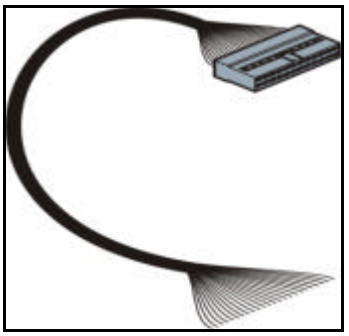


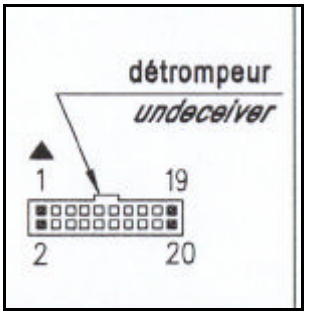


Marking on HE10/20pts connector	Wires color	Marking on Omniconnect connector
1	White	2
2	Brown	3
3	Green	4
4	Yellow	5
5	Grey	6
6	Pink	7
7	Blue	8
8	Red	9
9	Black	12
10	Purple	13
11	Grey – Pink	14
12	Red – Blue	15
13	White – Green	16
14	Brown – Green	17
15	White – Yellow	18
16	Yellow – Brown	19
17	White – Grey	1
18	Grey – Brown	10
19	White – Pink	11
20	Pink – Brown	20

1.6.3 With HE10/20 cable to free wires with ferrules (0.14mm^2 – 26 AWG)

2 cables are necessary by extension XC32L1 or XC32L2





Marking on HE10/20pts connector	Wires color
1	White
2	Brown
3	Green
4	Yellow
5	Grey
6	Pink
7	Blue
8	Red
9	Black
10	Purple
11	Grey – Pink
12	Red – Blue
13	White – Green
14	Brown – Green
15	White – Yellow
16	Yellow – Brown
17	White – Grey
18	Grey – Brown
19	White – Pink
20	Pink – Brown

1.7 General operating conditions

The XC32L1 and XC32L2 configurable units were developed according to the European EC directives, the main national and international IEC 1131-1 and IEC 1131-2 standards and the EN61131-2 product standard concerning automation devices.

Ambient conditions	
- Temperature:	
operation: horizontal	0°C to + 55°C
vertical	0°C to + 40°C
storage	- 40°C to + 75°C
transport	- 25°C to + 75°C
- Humidity:	DIN 40040 class F without condensation
annual average	≤ 75%
up to 30 days per year	95%
occasionally	85%
- Atmospheric pressure:	DIN 40050
operation	≥ 800 hPA (≤ 2000 m)
storage	≥ 600 hPA (≤ 3500 m)
Mechanical data	
- Protection index	IP20
- Unit	UL V2
- Vibration stress	CEI68-2-6 test Fc
- Shock stress	CEI68-2-27 test Ea
Creepage distances and clearances	IEC 664 and DIN VDE0160
Insulation test	IEC 1131-2
Electromagnetic compatibility	
Immunity tests against:	
- Electrostatic discharge	IEC 1000-4-2 (level 3)
- Radiated fields	IEC 1000-4-3 (level 3)
- Fast transient bursts	IEC 1000-4-4 (level 3)
- High energy pulse	IEC 1000-4-5
- Conducted high frequencies	IEC 1000-4-6 (level 3)
Clearance	IEC 664-664A DIN VDE 0160
Dielectric test	IEC 1131-2
Mountings	
- DIN rail	35 mm
- Screw fittings	4 mm diameter screw (M4)

1.8 References

Products	Description	References
XC32L1	Binary extension With 32 channels configurable for inputs or transistor outputs 24 V d.c. / 0.5 A	1SBP260110R1001
XC32L2	Binary and analog extension With 24 channels configurable for inputs or transistor outputs 24 V d.c. / 0.5 A and 8 analog inputs 0-10 V d.c.	1SBP260111R1001
LA100/HE10-20/OMN20/661	HE10/20 cable to Omniconnect connector - length: 1meter	1SNA**039000**R**02**00
LA150/HE10-20/OMN20/661	HE10/20 cable to Omniconnect connector - length: 1.5 meters	1SNA**039001**R**27**00
LA200/HE10-20/OMN20/661	HE10/20 cable to Omniconnect connector - length: 2 meters	1SNA**039002**R**20**00
LA300/HE10-20/OMN20/661	HE10/20 cable to Omniconnect connector - length: 3 meters	1SNA**039004**R**22**00
LA500/HE10-20/OMN20/661	HE10/20 cable to Omniconnect connector - length: 5 meters	1SNA**039006**R**24**00
LAF100/HE10-20/UNI/662	HE10/20 cable to free wires Length: 1 meter	1SNA**039007**R**06**00
LAF150/HE10-20/UNI/662	HE10/20 cable to free wires Length: 1.5 meters	1SNA**039007**R**06**00
LAF200/HE10-20/UNI/662	HE10/20 cable to free wires Length: 2 meters	1SNA**039007**R**06**00
LAF300/HE10-20/UNI/662	HE10/20 cable to free wires Length: 3 meters	1SNA**039007**R**06**00
LAF500/HE10-20/UNI/662	HE10/20 cable to free wires Length: 5 meters	1SNA**039007**R**06**00

1.9 Dimensions (in mm)