AC 31 technical documentation

Chapter 20

ICMK-CS31 remote unit

ICMK-CS31 remote unit

ICMK-CS31 remote unit

This chapter wants to describe the general characteristics and operating conditions of ICMK-CS31 remote unit on CS31 system bus.

1.1 Presentation

The ICMK-CS31 with its appropriated extensions is used to replace the 30 series CS31 remote units and it is able to replace them with same behaviour and above all without user program modification, only new wiring will be necessary.

Warning: The ICMK-CS31 will not be able to replace all case of application, depending on configuration and central unit types used. It is very important before all modification on the application or un-cabling of the remote units, to check and record all configuration, electrical connections and dip-switches on ECZ plug in base and also dip-switches on the rear of analog remote units and to check in this documentation all restriction by type of remote unit.

1.1.1 General set-up rules

The ICMK-CS31 is product based on ICMK14F1 remote unit from AC31 series.

The ICMK-CS31 remote unit incorporate specific binary inputs used for configuration in order to adapt it to 30 series CS31 remote units must be replaced.

There are no outputs available on ICMK-CS31.

The ICMK-CS31 remote unit is connected on CS31 system bus and used a CS31 protocol.

The ICMK-CS31 remote unit will have the same CS31 address that the 30 series CS31 remote unit must be replaced on CS31 bus.

The extensions used with the ICMK-CS31 remote unit are the same that with AC31 series.

Warning: Take care with dimension of new configuration ICMK-CS31 remote unit + extensions, because it takes up more space than 30 series CS31 remote unit must be replaced. (see part Dimension)

1.1.2 Cabling of CS31 bus

The CS 31 bus is a RS 485 serial interface and consists of a shielded twisted pair.

The ICMK-CS31 remote unit may be connected at any point of the bus:

- Bus 1 on bus 1

- Bus 2 on bus 2

- Shielding (preferably braided) on terminal 3 of terminal block

The bus should be terminated with a 120 Ω 1/4 W resistance connected to the bus extremities.

ICMK-CS31 remote unit

The front of the unit

Enlargement of item 9 without cover

ICMK-CS31 remote unit

1.1.3 The front (see Figure)

1 - Location for the DIN rail

2 - Plate fixture with unit earthing

3 - Lock for DIN rail mounting

4 - Location for external dual connector

5 - Location for the cabling connectors:

    - of 24 V d.c. output power for the inputs
     (available only for the remote units with 120 / 230 V a.c. power)

    - of the inputs used for configuration of ICMK-CS31

6 - Visualization set for the status of the 8 inputs / 6 outputs

7 - Location of the connector for the connection of input/output extensions

8 - Location of the cabling connectors:

    - for the power supply

9 - Location of the addressing rotate selectors (see enlargement)

10 - Unit status visualization area:

    - POWER: power on

    - RUN: Blinking indicates the valid message received

    - ERR: On indicates error(s) present and blinking indicates configuration action

Enlargement of item 9 without cover (see Figure)

1 - Rotate switch for addressing, reserved for decade selection

2 - Screwdriver for settings adjustments

3 - Rotate switch for addressing, reserved for unit selection

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1.2 General operating conditions

The ICMK-CS31 remote unit is 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
Tolerances for mains voltages		
- 24 V d.c.		19.2 to 30 V (- 20%, + 25%)
- 120 V a.c. (50 / 60 Hz)		97.75 to 126.5 V (- 18,5%, + 5,5%)
- 230 V a.c. (50 / 60 Hz)		195.5 to 253 V (- 15%, + 10%)

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Creepage distances and clearances	IEC 664 and DIN VDE0160
Insulation test	IEC 1131-2
Electromagnetic compatibility Immunity tests against: - Electrostatic discharge - Radiated fields - Fast transient bursts - High energy pulse - Conducted high frequencies	 IEC 1000-4-2 (level 3) IEC 1000-4-3 (level 3) IEC 1000-4-4 (level 3) IEC 1000-4-5 IEC 1000-4-6 (level 3)
Voltage drops and short power cutoffs - D.C. power supply - A.C. power supply	 Duration of the power cutoffs: $\leq$ 10 ms Time between 2 voltage drops: $\geq$ 1 s Duration of the power cutoffs: $\leq$ 20 ms Time between 2 voltage drops: $\geq$ 1 s
Clearance	IEC 664-664A DIN VDE 0160
Dielectric test	IEC 1131-2
Mountings - DIN rail - Screw fittings	 35 mm 4 mm diameter screw (M4)

Connections
 - Connectors
 - Wires section for:
   Earth
 	
   Inputs
 	
   Outputs
 	
   Power supply
 	
   Bus
 	
 - Screws tightening torque
	
	 Removable terminal blocks (2.5 mm²)
	
	 Rigid or multi-conductor wire AWG 14 (1.95 mm²)
	 Rigid or multi-conductor wire AWG 18 (0.96 mm²) to AWG 14 (1.95 mm²)
	 Rigid or multi-conductor wire AWG 14 (1.95 mm²)
	 Rigid or multi-conductor wire AWG 14 (1.95 mm²)
	 Twisted pair AWG 24 (0.22 mm²) to AWG 18 (0.8 mm²)
	 0.5 Nm (given as an indication only)

Serial interface - For CS31 System bus	 RS 485

ICMK-CS31 remote unit

1.3 Technical specifications

Products	Description	References
ICMK-CS31-24VDC	With 8 isolated inputs 24 V d.c used for configuration of ICMK-CS31 24 V d.c. power supply.	1SBP260056R1001
ICMK-CS31-120/230VAC	With 8 isolated inputs 24 V d.c used for configuration of ICMK-CS31 120 / 230 V a.c. power supply.	1SBP260057R1001

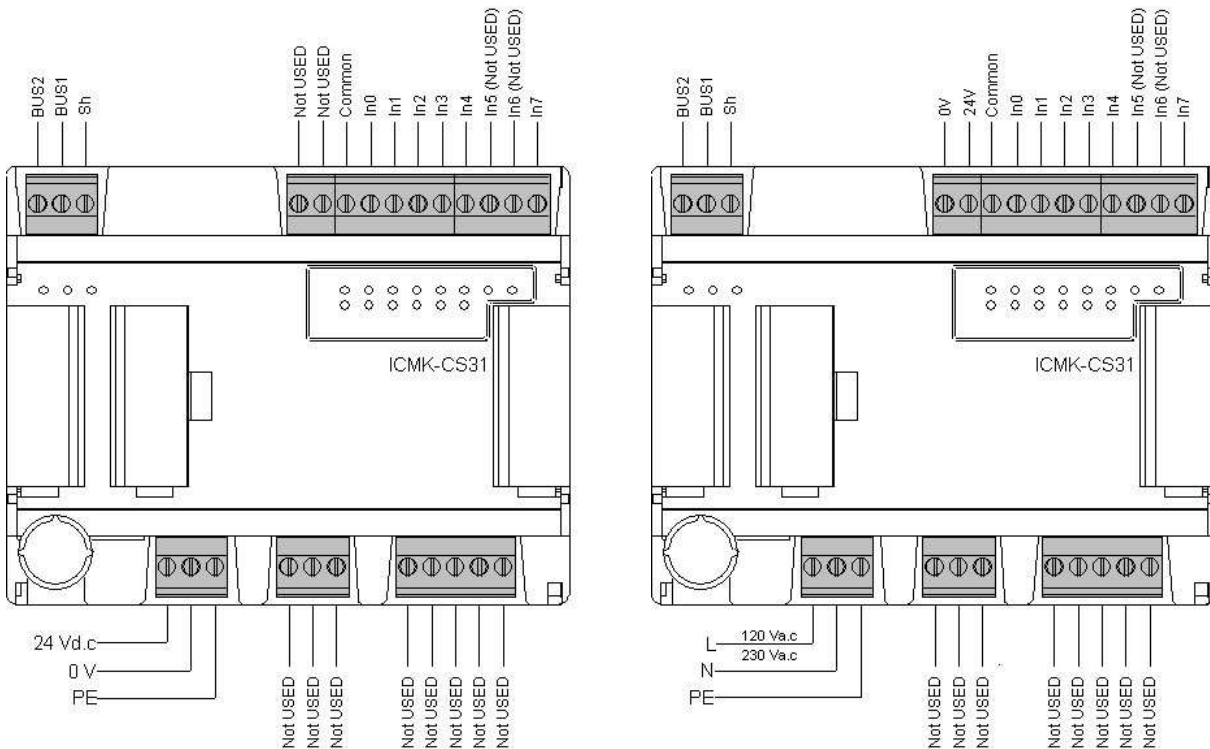|	ICMK-CS31 24 V d.c.	ICMK-CS31 120 / 230 V a.c.
Width x Height x Depth (in mm)	120 x 93 x 84	120 x 93 x 84
Weight	400 g	800 g
Power supply		
- Mains voltage:		
Nominal value	24 V d.c.	120 / 230 V a.c.
Admissible range	19.2 to 30 V	97.75 to126.5 V 195.5 to 253 V
- Consumption:		
Unit alone (typical)	80 mA	30 mA
Maximum configuration (typical)	400 mA	100 mA
- Polarity reversal protection	yes	-
- 24 V d.c. isolated power for inputs:	no	yes
Range of voltage value	-	19.2 to 30 V
Max. Output current	-	400 mA
Short circuit protection	-	yes
- Dissipation	5 W	10 W
Incorporated binary inputs		
- Number of inputs for configuration	8	8
- Isolation of the inputs / electronic	1500 V a.c.	1500 V a.c.
- Input types	PNP and NPN	PNP and NPN
- 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.:		
Inputs Ixx.02 to Ixx.07	7 mA	7 mA
Inputs Ixx.00 and Ixx.01	9 mA	9 mA
- Minimum filtering time	5 ms	5 ms
- Cable length:		
unshielded	300 m	300 m
shielded	500 m	500 m

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1.4 Configuration operation with ICMK-CS31 module

1.4.1 Configuration inputs setup on ICMK-CS31 remote unit

The inputs of ICMK-CS31 remote unit are used to define the different formats according to the extension type, in order to replace the 30 series CS31 remote units.

- **IN0** - Input 0: With binary module, used to limit the number of inputs. 0 up to 7

  With analog module, used to select the mode corresponding to CPU

  With temperature module, used to limit the value for ICST08A7

- **IN1** - Input 1: Used only to select the ICST08A7 and ICST08A8 remote units

- **IN2** - Input 2: Used only to select the ICST08A9 remote unit

- **IN3** - Input 3: With temperature module, used to select the mode

- **IN4** - Input 4: With analog module, used to limit the value at the positive value

  With temperature module, used to select 3 wires for sensor

- **IN5** - Input 5: Not used (reserved)
- **IN6** - Input 6: Not used (reserved)

- **IN7** - Input 7: Used to valid the highest zone of channels (xx.08 up to xx.15)

1.4.2 Electrical connection of ICMK-CS31 remote unit

ICMK-CS31-24VDC – 1SBP260056R1001   **ICMK-CS31-120/230VAC – 1SBP260057R1001**
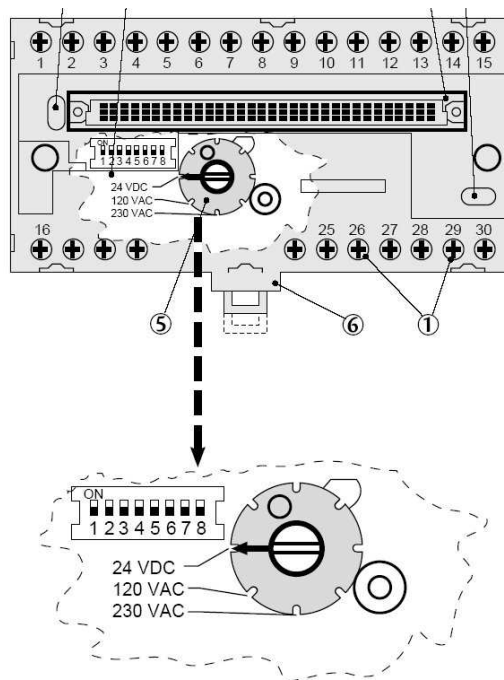
ICMK-CS31 remote unit

1.5 Procedure of replacement of 30 series CS31 remote units

Warning: It is very important before all modification on the application or un-cabling of the remote units, to check and record all configuration, electrical connections and dip-switches on ECZ plug in base and also dip-switches on the rear of analog remote units.

1.5.1 Verification of hardware configuration on the existing ECZ plug in base: (for all remote units)

Before first of all, the most important will be to check and record the position of dip-switches of ECZ plug in base, all remote unit series 30 are mounted on ECZ plug in base.

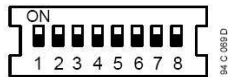Dip switches are used for different function:

ICMK-CS31 remote unit
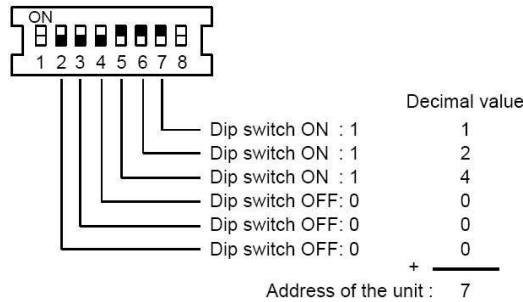
1.5.1.1 Addressing of remote unit:

The dip-switches 2 to 7 are used to set the address of the remote units on the bus.

The address of the unit is obtained by the addition of the binary values of the 2 to 7 when in the "ON" position. The result obtained is the decimal address of the unit.

Dip switch	2	3	4	5	6	7
Decimal value	32	16	8	4	2	1

Example for address = 7

The slave number of the ICMK-CS31 remote units is given by the rotative switches situated beneath the first cover on the front face. Each switch can be set to 0 to 9. The switch 1 is for tens and the switch 3 is for units.

Warning: The address of ICMK-CS31 remote unit should have the same address that the CS31 remote unit must be replaced.

1.5.1.2   Selection of the lowest or highest zone of channels:

The dip-switch 8 is used to select the lowest or highest zone of channels of the remote units.

⇨ When in "OFF" position, depending type of remote units, (xx = address of the remote unit)

The selection channels is (xx.00 up to xx.07) or (xx.00 up to xx.15)

⇨ When in "ON" position, depending type of remote units, (xx = address of the remote unit)

The selection channels is (xx.08 up to xx.15) or (xx.08 up to xx.15 and xx+1.00 up to xx+1.07)

This option is realised in ICMK-CS31 remote unit with its input IN7.

Warning: The function of dip-switch 1 is not possible with ICMK-CS31 remote unit.

This dip-switch 1 was only used with remote unit ICSC08L1 and ICFC16L1

⇨ When in "ON" position, all channels are set on outputs only.

⇨ When in "OFF" position, the function of the each channel is configured by the user program.
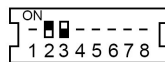

1.5.1.3   Configuration for the range of bits used within a word: (analog format)

The dip-switches 2 and 3 are used to determine the range of bits used within a word.
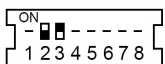
Three different options can be configured.

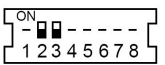1)   Configuration most significant byte (analog format ± 32767)

	2	3
ON	X	
OFF		X

```
ON
  ■ ■ - - - - - -
  1 2 3 4 5 6 7 8
```


2)   Configuration least significant byte (analog format 255)

	2	3
ON		X
OFF	X	

```
ON
  ■ ■ - - - - - -
  1 2 3 4 5 6 7 8
```


3)   Configuration (analog format ± 4095)

	2	3
ON		
OFF	X	X

```
ON
  ■ ■ - - - - - -
  1 2 3 4 5 6 7 8
```


4)   Configuration as binary remote unit for ICSM06A6

	2	3
ON	X	X
OFF		

```
ON
  ■ ■ - - - - - -
  1 2 3 4 5 6 7 8
```


Warning: These options are realised in ICMK-CS31 remote unit with its input **IN0** apart from the **format 255** (2) for analog remote units (this format, for instance, could be used with T200 central unit) and configuration as a binary remote unit for ICSM06A6 (4).

1.5.2   Verification of hardware configuration on the analog remote units:

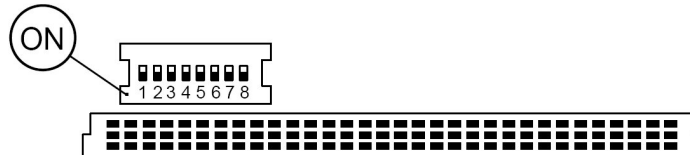Before first of all, the most important will be to check and record the position of dip-switches of 30 series analog remote units, the dip-switches are accessible on the rear of remote unit.

These dip-switches are present on the following analog remote units:

(ICSE08A6, ICSE08B5 and ICSA04B5)

1.5.2.1   ICSE08A6 and ICSE08B5 analog remote units:

The selection between current and voltage format depends on position of dip-switches on the rear of remote unit.

One dip-switch is for one channel.

⇨ When in "ON" position, the format selected is current.

⇨ When in "OFF" position, the format selected is voltage.

This option is realised on XE08B5 extension (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.5.2.2   ICSA04B5 analog remote unit:

The selection between current and voltage format depends on position of dip-switches on the rear of remote unit.

Two dip-switches are for one channel.

The cabling on ECZ determines after that the choice current or voltage

dip switch	output current	output voltage
OFF / ON	0 … 16 mA*	± 10 V
OFF / ON	4 … 20 mA	± 10 V
OFF / ON	4 … 25 mA*	± 12.5 V
OFF / ON	0 … 20 mA	± 12.5 V

Warning: Only the formats ± 10V, 0…20mA and 4…20mA are available with ICMK-CS31 remote unit. If another format is selected, it will not possible to replace the CS31 analog remote unit without hardware and user program modifications.

This option is realised on XM06B5 extensions (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.5.3   Verification of hardware configuration on the 30 series analog input remote units: (Temperature type)

Before first of all, the most important will be to check and record the electrical connection of temperature sensors on ECZ plug in base, in order to select 2 or 3 wires connection.

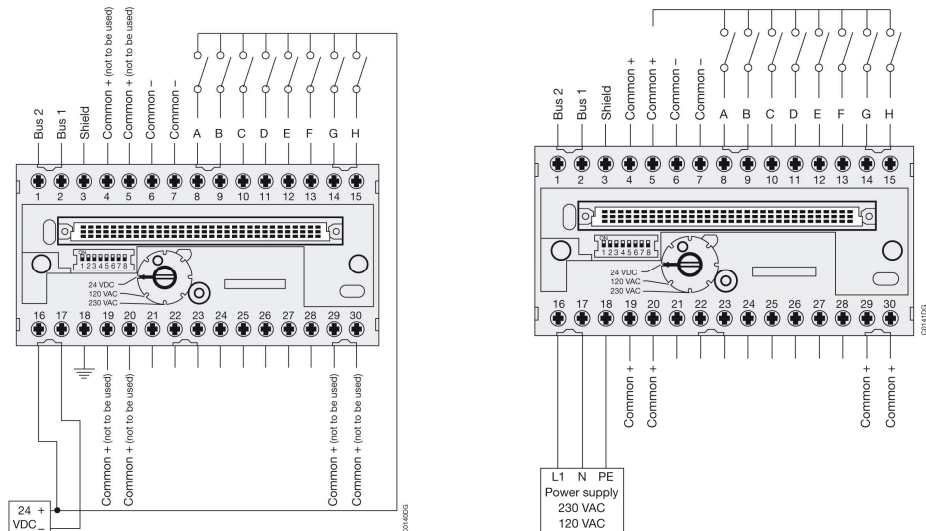This option is realised in ICMK-CS31 remote unit with its input **IN4**.

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1.6 Replacement of CS31 binary input remote units:

1.6.1 ICSI 08 D1   Binary non isolated input unit with 8 input channels for 24 V d.c.

FPR 331 5101 R1012   **24 V d.c.**

FPR 331 5101 R0016   **230 V a.c.**

FPR 331 5101 R0014   **120 V a.c.**

1.6.1.1   Electrical connection

1.6.1.2   Replacement by ICSMK-CS31 + one extension XI16E1

1.6.1.3   Configuration of inputs of ICMK-CS31

Necessary: Input 0 - **(IN0)** => in order to limit the number of inputs. 0 up to 7

Option: Input 7 - (**IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.6.1.4   Restriction or limit

It is not possible to use the function block CS31CO to configure the option open circuit detection "cut wire" and to modify the delay of inputs (5ms).

1.6.2   ICSI 08 E1   Binary isolated input unit with 8 input channels for 24 V d.c.

FPR 331 6101 R1012	**24 V d.c.**
FPR 331 6101 R0016	**230 V a.c.**
FPR 331 6101 R0014	**120 V a.c.**

1.6.2.1   Electrical connection

1.6.2.2   Replacement by ICSMK-CS31 + one extension XI16E1

1.6.2.3   Configuration of inputs of ICMK-CS31

Necessary: Input 0 - **(IN0)** => in order to limit the number of inputs. 0 up to 7

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.6.2.4   Restriction or limit

It is not possible to use the function block CS31CO to modify the delay of inputs (5ms).
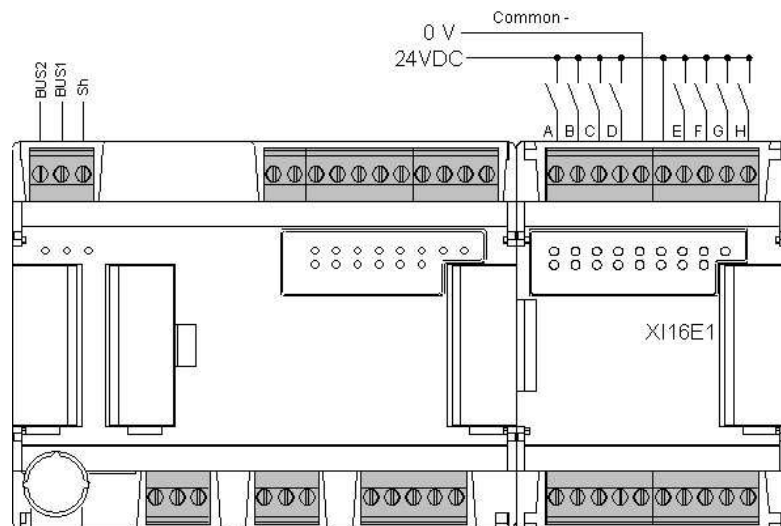
1.6.3   ICSI 16 D1   Binary non isolated input unit with 16 input channels for 24 V d.c.

> **FPR 331 5101 R1032   24 V d.c.**
> **FPR 331 5101 R0036   230 V a.c.**
> **FPR 331 5101 R0034   120 V a.c.**

1.6.3.1   Electrical connection

1.6.3.2   Replacement by ICSMK-CS31 + one extension XI16E1

1.6.3.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

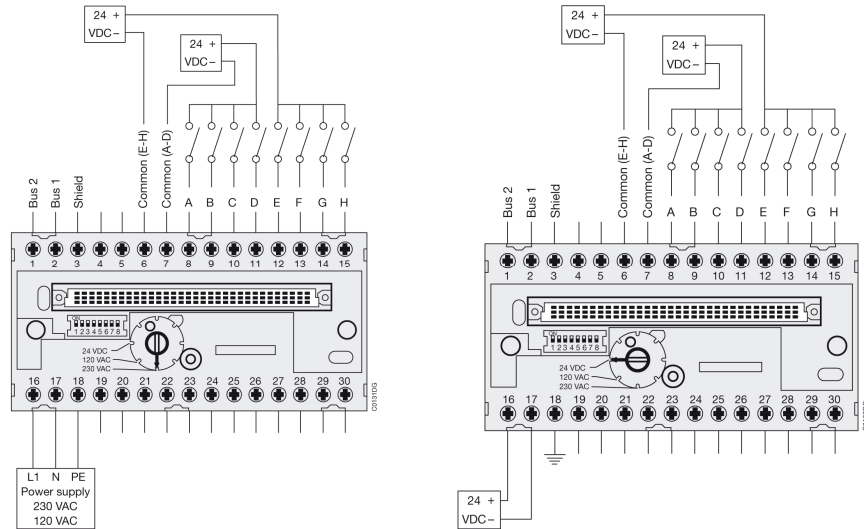### 1.6.3.4   Restriction or limit

It is not possible to use the function block CS31CO to configure the option open circuit detection "cut wire" and to modify the delay of inputs (5ms).

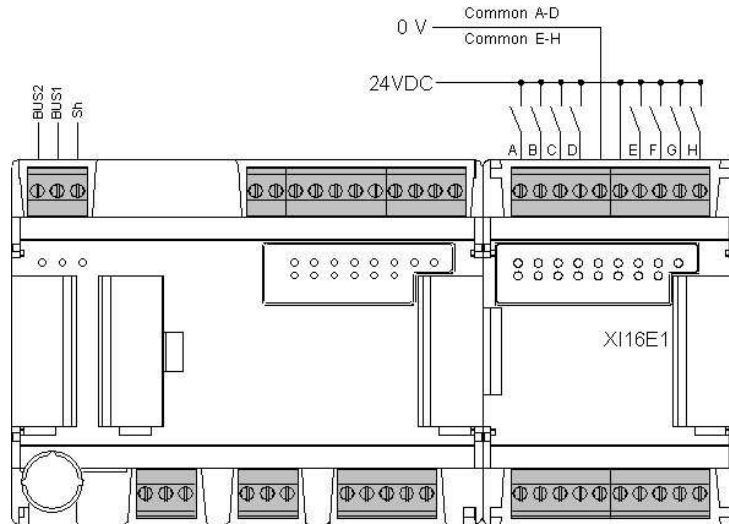**1.6.4   ICSI 16 E1   Binary isolated input unit with 16 input channels for 24 V d.c.**

> **FPR 331 6101 R1032   24 V d.c.**
> **FPR 331 6101 R0036   230 V a.c.**
> **FPR 331 6101 R0034   120 V a.c.**

1.6.4.1   Electrical connection

1.6.4.2   Replacement by ICSMK-CS31 + one extension XI16E1

1.6.4.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)
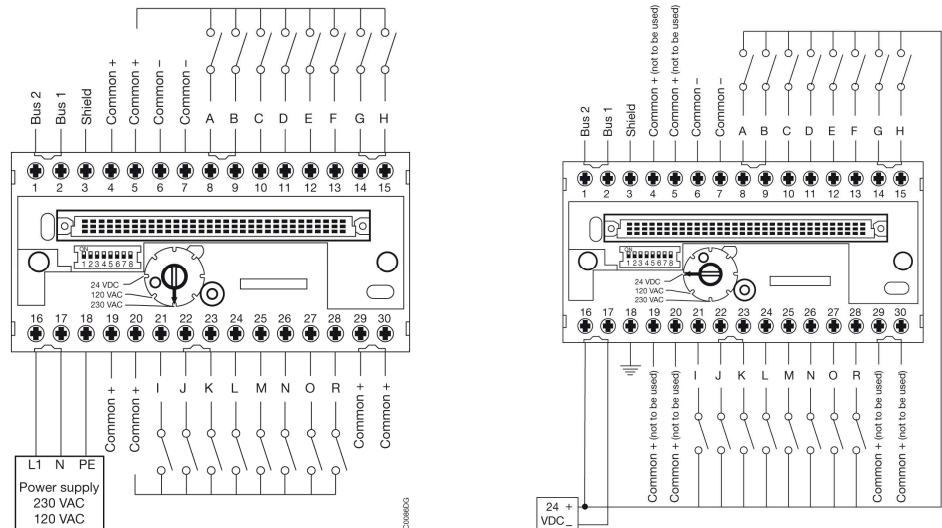
1.6.4.4   Restriction or limit

It is not possible to use the function block CS31CO to modify the delay of inputs (5ms).
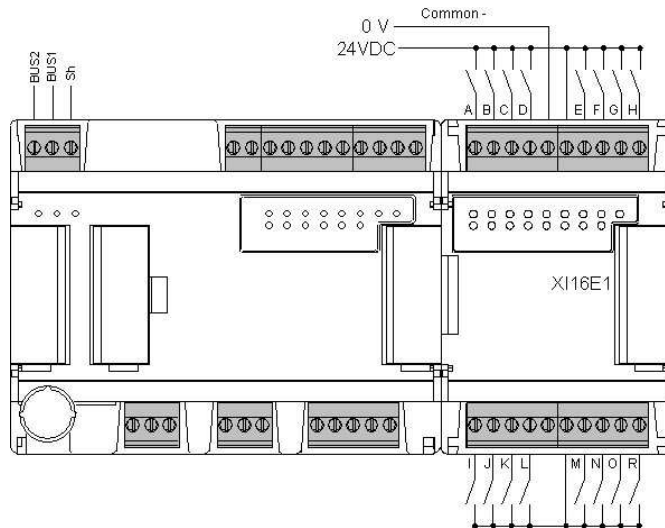
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1.7   Replacement of CS31 binary output remote units:

1.7.1   ICSO 08 R1   Binary output unit with 8 relay output channels 2 A

FPR 331 2101 R1022	**24 V d.c.**	
FPR 331 2101 R0026	**230 V a.c.**	
FPR 331 2101 R0024	**120 V a.c.**	

1.7.1.1   Electrical connection

1.7.1.2   Solution with 2 independent commons:
Replacement by ICSMK-CS31 + one extension XO08R1

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1.7.1.3 **Solution with 8 independent commons:**
Replacement by ICSMK-CS31 + one extension XO08R2

1.7.1.4 **Configuration of inputs of ICMK-CS31**

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)
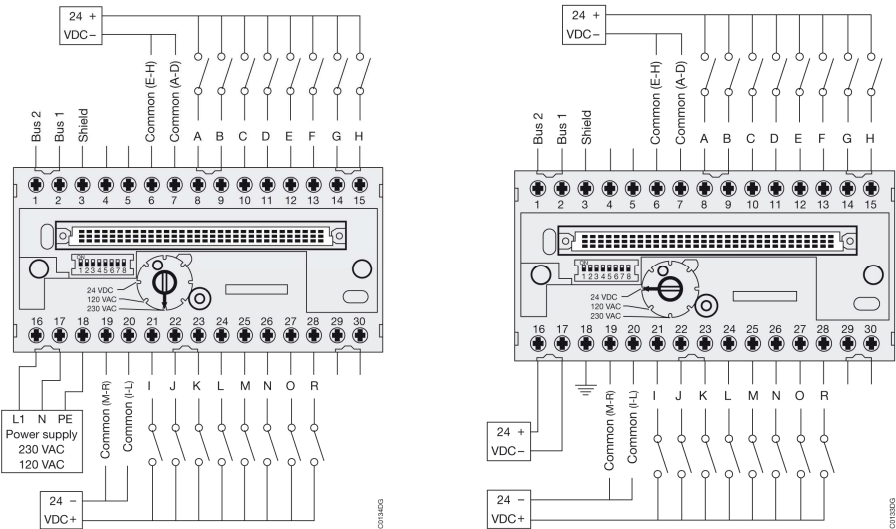
1.7.1.5 **Restriction or limit**

There is not any restriction or limit, all functions are assured

1.7.2   ICS0 08 Y1   Binary output unit with 8 transistor output channels 24 V d.c. 2 A

FPR 331 1101 R1022	**24 V d.c.**
FPR 331 1101 R0026	**230 V a.c.**
FPR 331 1101 R0024	**120 V a.c.**

1.7.2.1   Electrical connection

1.7.2.2   Replacement by ICSMK-CS31 + one extension XO08Y1

1.7.2.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.7.2.4   Restriction or limit

The fault indication "Power off" is not managed by ICMK-CS31

The level of short circuit is lower than with ICSO08Y1

If the external 24 V d.c. power supply is not connected, the green led "Power" is blinking.

1.7.3   ICS0 16 N1   Binary output unit with 16 transistor output channels 24 V d.c. 0.5 A

FPR 331 3101 R1052	24 V d.c.
FPR 331 3101 R0056	230 V a.c.
FPR 331 3101 R0054	120 V a.c.

1.7.3.1   Electrical connection

1.7.3.2   Replacement by ICSMK-CS31 + one extension XO16N1

1.7.3.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)
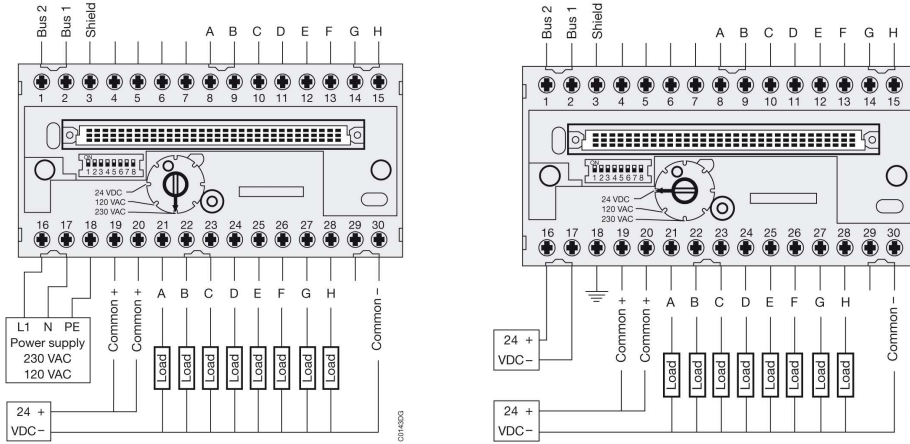
1.7.3.4   Restriction or limit

The fault indication "Power off" is not managed by ICMK-CS31

The detection level of short circuit is lower than with ICSO16N1 (0.5 A instead of 2 A).

If the external 24 V d.c. power supply is not connected, the green led "Power" is blinking.

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1.8   Replacement of CS31 binary input and output remote units:

1.8.1   ICSK 20 F1   Binary input/output unit with12 input channels for 24 V d.c. and 8 relay output channels.

FPR 332 7101 R1202	24 V d.c.
FPR 332 7101 R0206	230 V a.c.
FPR 332 7101 R0204	120 V a.c.

1.8.1.1   Electrical connection

1.8.1.2   Solution with 2 independent commons:
Replacement by ICSMK-CS31 + two extensions (XI16E1 + XO08R1)

1.8.1.3   **Solution with 8 independent commons:**
Replacement by ICSMK-CS31 + two extensions (XI16E1 + XO08R2)

1.8.1.4   **Configuration of inputs of ICMK-CS31**

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.8.1.5   **Restriction or limit**

There is not any restriction or limit, all functions are assured

1.8.2   ICSC 08 L1   Binary input/output unit with 8 channels as a 24 V d.c. input or 24 V d.c. 0.5 A transistor output

FPR 332 9101 R1082	24 V d.c.
FPR 332 9101 R0086	230 V a.c.
FPR 332 9101 R0084	120 V a.c.

1.8.2.1   Electrical connection

1.8.2.2   Replacement by ICSMK-CS31 + one extension XC08L1

1.8.2.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.8.2.4   Restriction or limit

Inputs: It is not possible to use the function block CS31CO to configure the option open circuit detection "cut wire" and to modify the delay of inputs (5ms).

Outputs: The   fault   indication   "Power   off"   is   not   managed   by   ICMK-CS31
The detection level of short circuit is lower than with ICSC08L1 (0.5 A instead of 2 A).
If the external 24 V d.c. power supply is not connected, the green led "Power" is blinking.
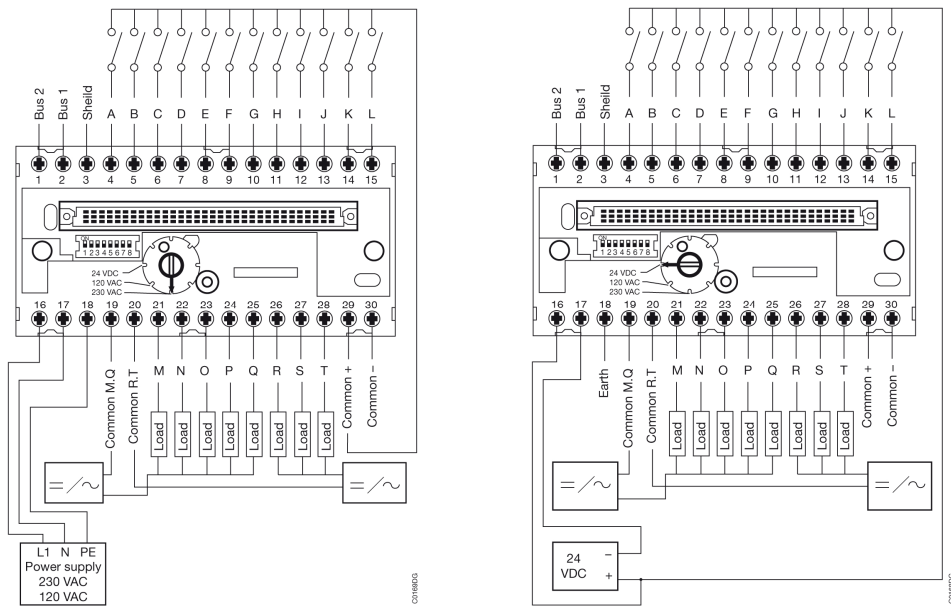
It is not possible to configure all channels in outputs, in order to allow using again the same address for an input unit, like with Dip switch N°1 on the plug-in base ECZ.

1.8.3   ICFC 16 L1   Binary input/output unit with 16 channels as 24 V d.c. input or 24 V d.c. 0.5 A transistor output.

FPR 332 9101 R1062   24 V d.c.

1.8.3.1   Electrical connection

1.8.3.2   Replacement by ICSMK-CS31 + two extensions XC08L1

1.8.3.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15 and xx+1.00 up to xx+1.07)
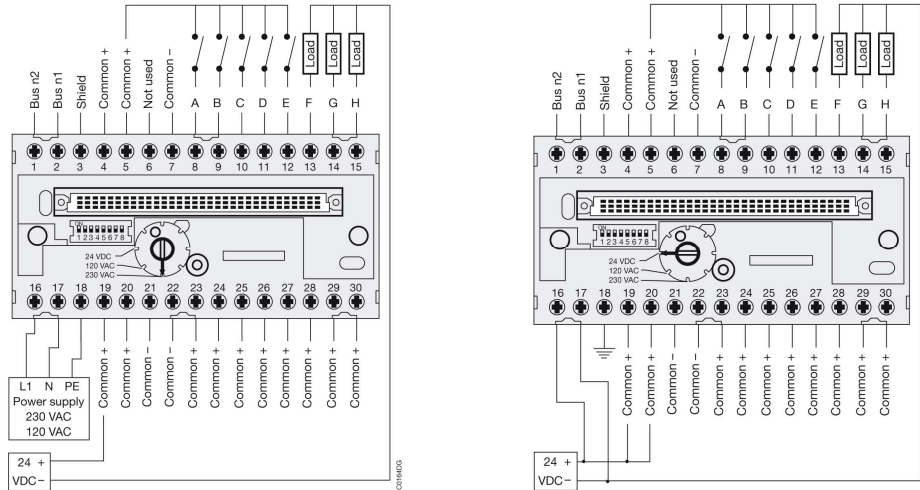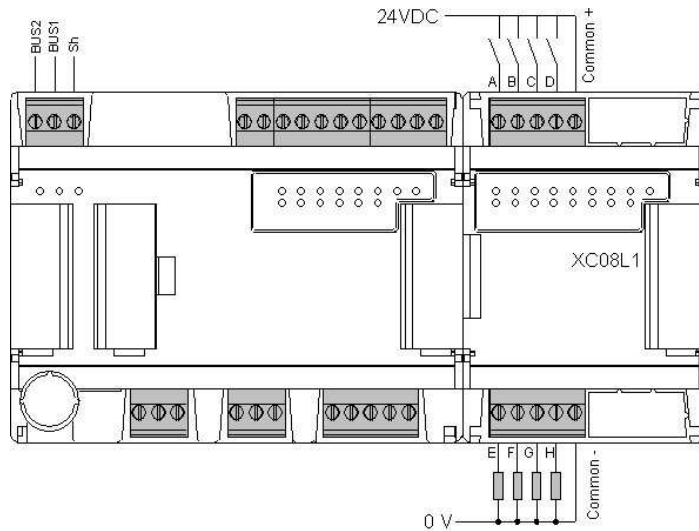
1.8.3.4   Restriction or limit

Inputs: It is not possible to use the function block CS31CO to configure the option open circuit detection "cut wire" and to modify the delay of inputs (5ms).

Outputs: The fault indication "Power off" is not managed by ICMK-CS31 The detection level of short circuit is lower than with ICFC16L1 (0.5 A instead of 2 A). If the external 24 V d.c. power supply is not connected, the green led "Power" is blinking.
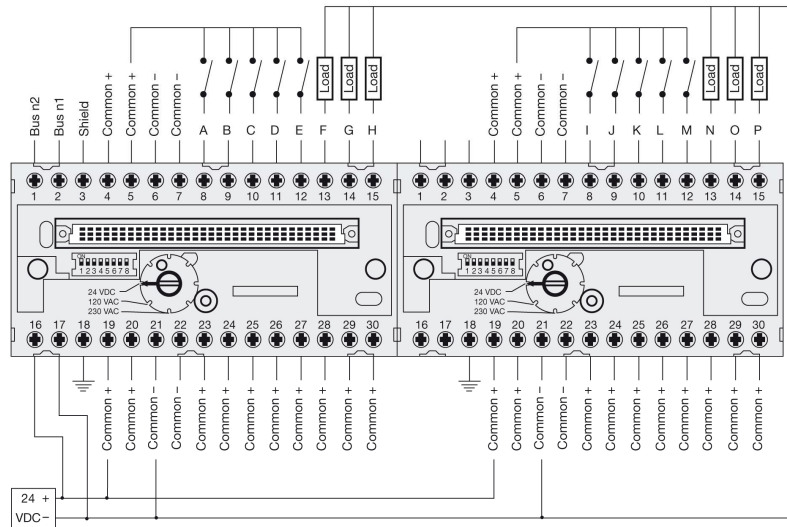
It is not possible to configure all channels in outputs, in order to allow using again the same address for an input unit, like with Dip switch N°1 on the plug-in base ECZ.
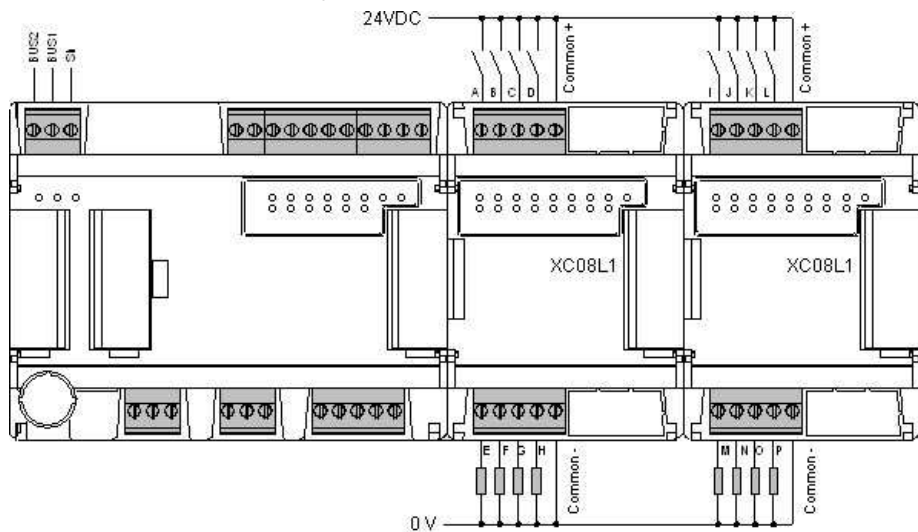
ICMK-CS31 remote unit

1.8.4   ICSK 20 N1   Binary input/output unit with12 input channels for 24 V d.c. and 8 transistor output channels 24 V d.c. 0.5A.

FPR 333 1001 R1202	24 V d.c.
FPR 333 1001 R0206	230 V a.c.
FPR 333 1001 R0204	120 V a.c.

1.8.4.1   Electrical connection

1.8.4.2   Replacement by ICMK-CS31 + two extensions (XI16E1+XO08Y1)

1.8.4.3   Configuration of inputs of ICMK-CS31

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

1.8.4.4   Restriction or limit

The detection level of short circuit is lower than with ICSK20N1 (0.5 A instead of 2 A).

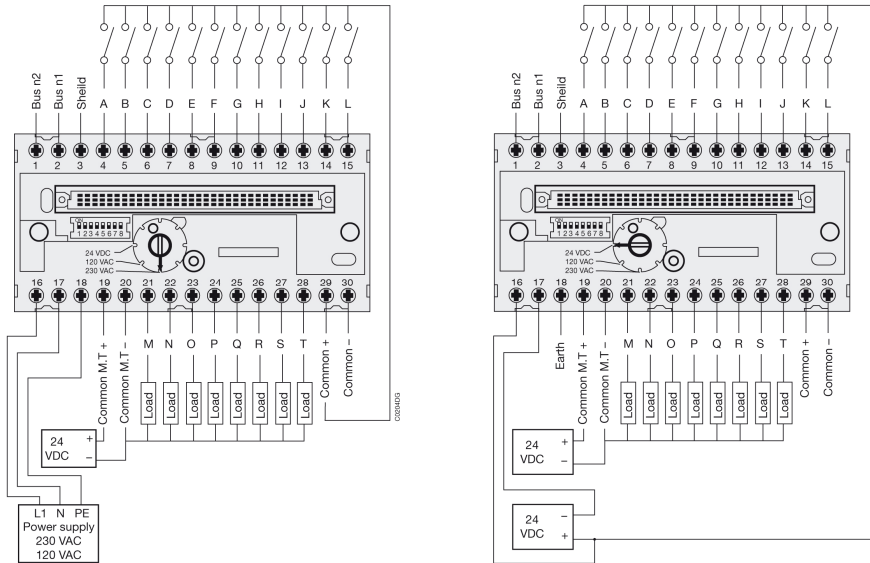If the external 24 V d.c. power supply is not connected, the green led "Power" is blinking.

1.9 Replacement of CS31 analog input remote units:

1.9.1 ICSE 08 A6 Analog input unit with 8 input channels 8 bits.

FPR 334 5601 R1012	24 V d.c.
FPR 334 5601 R0016	230 V a.c.
FPR 334 5601 R0014	120 V a.c.

1.9.1.1 Electrical connection

1.9.1.2 Replacement by ICMK-CS31 + one extension XE08B5

1.9.1.3 Configuration of inputs of ICMK-CS31

Input 0 - **(IN0 = 0)** => to select the format ± 32767

Input 4 - **(IN4 = 1)** => to limit at the positive value (0...10V or 0.20 mA)

<u>Option</u>: Input 0 - **(IN0 = 1)** => to select the format ± 4095

<u>Option</u>: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XE08B5 extension (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.9.1.4 Restriction or limit

The Format 255 is not available.

The output +10V provided (Terminals 15 and 30 on ECZ plug in base) is not available.

1.9.2   ICSE 08 B5   Analog input unit with 8 input channels 12 bits.

FPR 334 6501 R1012	24 V d.c.	
FPR 334 6501 R0016	230 V a.c.	
FPR 334 6501 R0014	120 V a.c.	

1.9.2.1   Electrical connection

1.9.2.2   Replacement by ICMK-CS31 + one extension XE08B5

1.9.2.3   Configuration of inputs of ICMK-CS31

Input 0 - **(IN0 = 0)** => to select the format ± 32767

Option: Input 0 - **(IN0 = 1)** => to select the format ± 4095

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XE08B5 extension (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.9.2.4   Restriction or limit

The Format 255 is not available.

The voltage format ±5 V is not available.

In current format, the inputs are limited to 0-20 mA instead ±20 mA.

ICMK-CS31 remote unit

1.9.3   ICST 08 A8   Analog input unit with 8 input for Pt100 sensors 8 bits (2 or 3 wires). [-50°C … +150° C]

FPR 333 5801 R1012   24 V d.c.
FPR 333 5801 R0016   230 V a.c.
FPR 333 5801 R0014   120 V a.c.

1.9.3.1   Electrical connection

1.9.3.2   Solution for temperature sensor with 2 wires
Replacement by ICMK-CS31 + one extension XE08B5

1.9.3.3   Solution for temperature sensor with 3 wires
Replacement by ICMK-CS31 + two extensions XE08B5

1.9.3.4   Configuration of inputs of ICMK-CS31

Input 0 - **(IN0 = 0)** => to select temperature range [-50℃ … +150℃]

Input 1 - **(IN1 = 1)** => to select the ICST08A8 remote units

Option: Input 3 - **(IN3 = 0)** => to select the range for least significant byte

Option: Input 3 - **(IN3 = 1)** => to select the range for most significant byte

Option: Input 4 - **(IN4 = 1)** => to select the 3 wires for sensor connection

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XE08B5 extensions (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

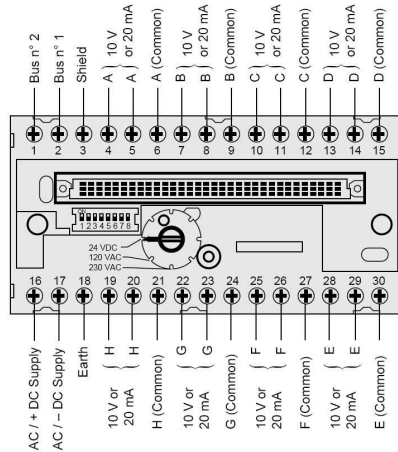### 1.9.3.5   Restriction or limit

Only PT100 format must be selected and configured on XE08B5 extension.

Warning: If the option with 3 wires sensor is selected, two channels will be used by sensor.

Warning: If different type of sensors (2 or 3 wires) are used on the same extension, the input 4 must be **(IN4 = 1)** => to select the 3 wires option and the value of sensor will be read on the second channel used in case of 2 wires connections.

ICMK-CS31 remote unit

1.9.4   ICST 08 A9   Analog input unit with 8 input for Pt100 sensors 8 bits (2 or 3 wires). [0℃ … +300℃]
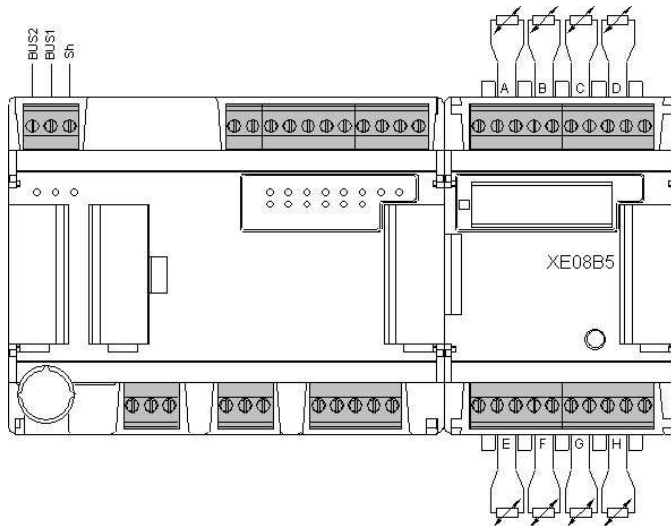
        FPR 333 5901 R1012   24 V d.c.
        FPR 333 5901 R0016   230 V a.c.
        FPR 333 5901 R0014   120 V a.c.

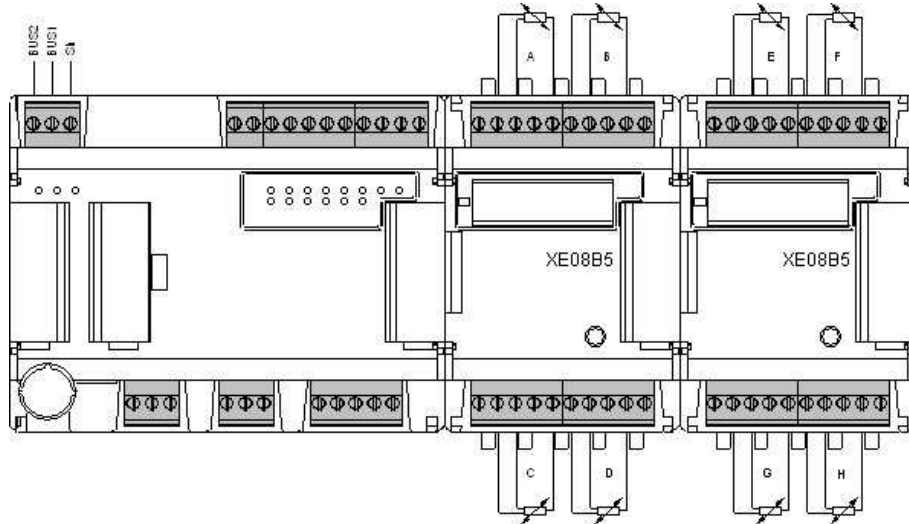   **1.9.4.1   Electrical connection**

          1.9.4.2   Solution for temperature sensor with 2 wires
                Replacement by ICMK-CS31 + one extension XE08B5

ICMK-CS31 remote unit

1.9.4.3   **Solution for temperature sensor with 3 wires**
          Replacement by ICMK-CS31 + two extensions XE08B5

1.9.4.4   **Configuration of inputs of ICMK-CS31**

Input 2 - **(IN2 = 1)** => to select the ICST08A9 remote units

Option: Input 3 - **(IN3 = 0)** => to select the range for least significant byte

Option: Input 3 - **(IN3 = 1)** => to select the range for most significant byte

Option: Input 4 - **(IN4 = 1)** => to select the 3 wires for sensor connection

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XE08B5 extensions (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.9.4.5   **Restriction or limit**

Only PT100 format must be selected and configured on XE08B5 extension.

Warning: If the option with 3 wires sensor is selected, two channels will be used by sensor.
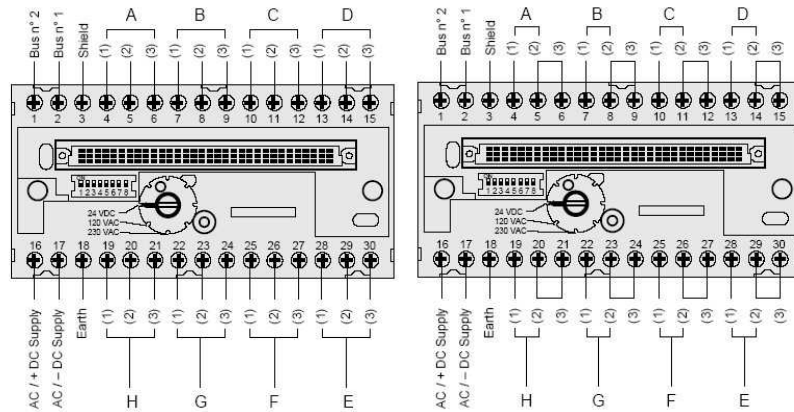
Warning: If different type of sensors (2 or 3 wires) are used on the same extension, the input 4 must be **(IN4 = 1)** => to select the 3 wires option and the value of sensor will be read on the second channel used in case of 2 wires connections.
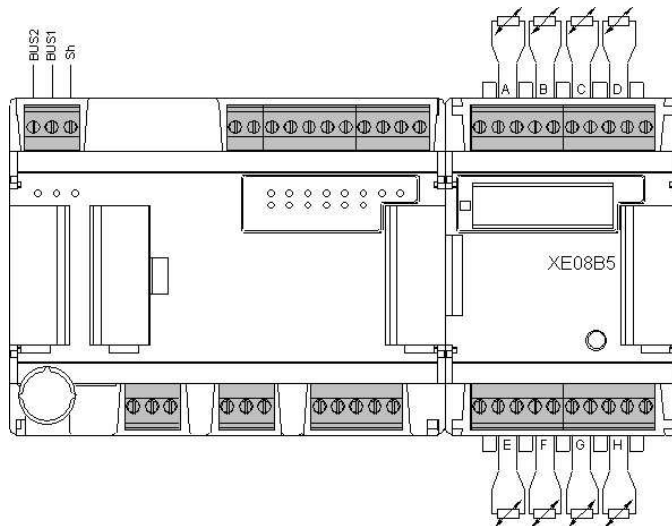
ICMK-CS31 remote unit

1.9.5   ICST 08 A7   Analog input unit with 8 input for Pt100 sensors 8 bits (2 or 3 wires). [-20°C … +30°C]

          FPR 333 5701 R1012   24 V d.c.

          FPR 333 5701 R0016   230 V a.c.

          FPR 333 5701 R0014   120 V a.c.

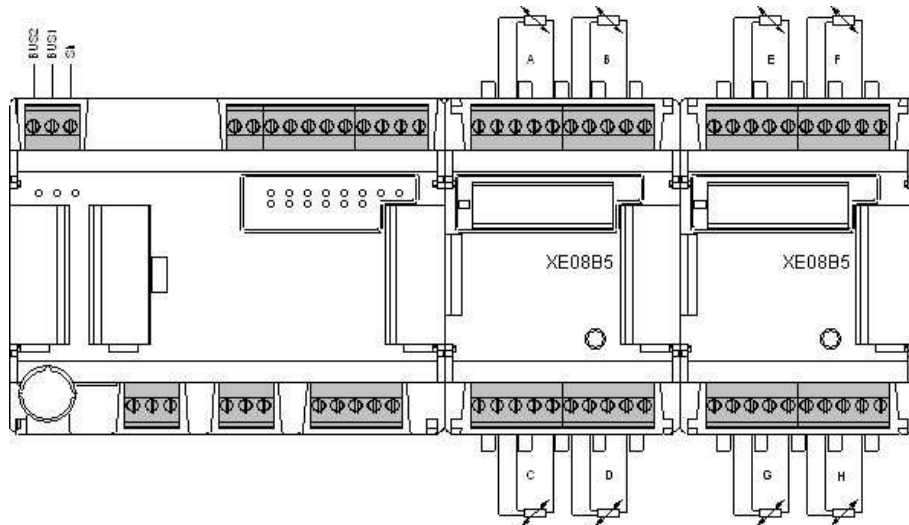   **1.9.5.1   Electrical connection**

               1.9.5.2   Solution for temperature sensor with 2 wires

                             Replacement by ICMK-CS31 + one extension XE08B5

ICMK-CS31 remote unit

1.9.5.3   **Solution for temperature sensor with 3 wires**
              Replacement by ICMK-CS31 + two extensions XE08B5

1.9.5.4   **Configuration of inputs of ICMK-CS31**

Input 0 - **(IN0 = 1)** => to select temperature range [-20°C … +30°C]

Input 1 - **(IN1 = 1)** => to select the ICST08A7 remote units

<u>Option</u>: Input 3 - **(IN3 = 0)** => to select the range for least significant byte

<u>Option</u>: Input 3 - **(IN3 = 1)** => to select the range for most significant byte

<u>Option</u>: Input 4 - **(IN4 = 1)** => to select the 3 wires for sensor connection

<u>Option</u>: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XE08B5 extensions (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.9.5.5   **Restriction or limit**

Only PT100 format must be selected and configured on XE08B5 extension.

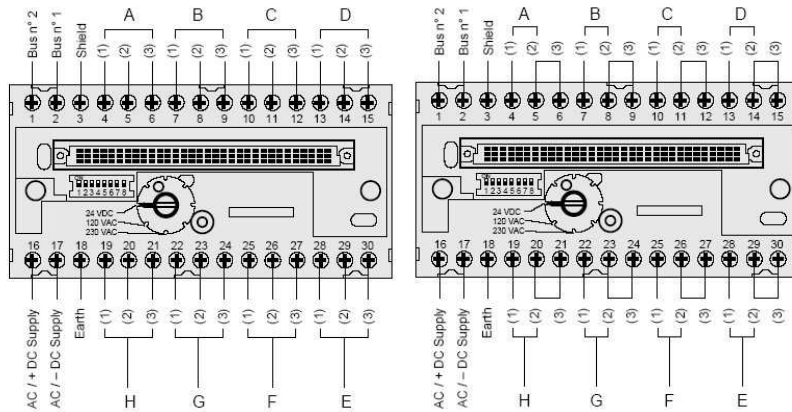**Warning**: If the option with 3 wires sensor is selected, two channels will be used by sensor.

Warning: If different type of sensors (2 or 3 wires) are used on the same extension, the input 4 must be **(IN4 = 1)** => to select the 3 wires option and the value of sensor will be read on the second channel used in case of 2 wires connections.
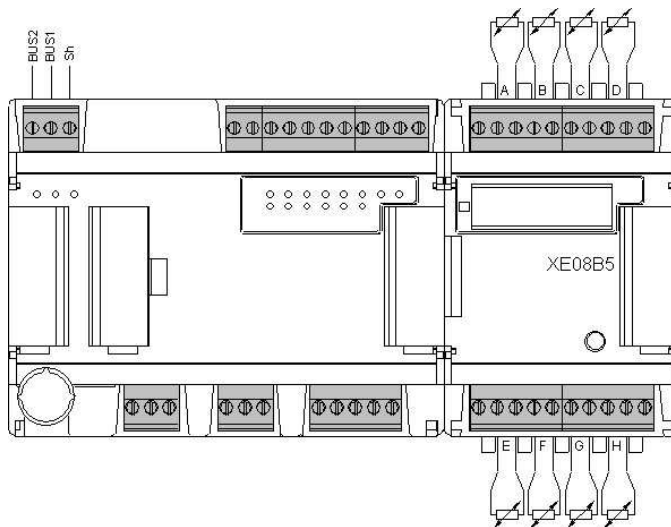
ICMK-CS31 remote unit

1.10 Replacement of CS31 analog output remote units:

1.10.1   ICSA 04 B5   Analog output unit with 4 current/voltage outputs channels 12 bits.

FPR 334 1501 R1042   24 V d.c.

FPR 334 1501 R0046   230 V a.c.

FPR 334 1501 R0044   120 V a.c.

1.10.1.1   Electrical connection

1.10.1.2   Replacement by ICMK-CS31 + two extensions XM06B5

1.10.1.3   Configuration of inputs of ICMK-CS31

Input 0 - **(IN0 = 0)** => to select the format ± 32767

Option: Input 0 - **(IN0 = 1)** => to select the format ± 4095

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XM06B5 extensions (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.10.1.4   Restriction or limit

The Format 255 is not available.

The voltage format ±12.5 V (or current format 4-25mA) is not available.

ICMK-CS31 remote unit

1.11 Replacement of CS31 analog input and output remote units:

1.11.1 ICSM 06 A6 Analog unit with 4 current/voltage inputs and 2 outputs current/voltage channels 8 bits.

FPR 335 0601 R1062	**24 V d.c.**
FPR 335 0601 R0066	**230 V a.c.**
FPR 335 0601 R0064	**120 V a.c.**

1.11.1.1 Electrical connection

1.11.1.2 Replacement by ICMK-CS31 + one extension XM06B5

1.11.1.3 Configuration of inputs of ICMK-CS31

Input 0 - **(IN0 = 0)** => to select the format ± 32767

Option: Input 0 - **(IN0 = 1)** => to select the format ± 4095

Input 4 - **(IN4 = 1)** => to limit the value at the positive value

Option: Input 7 - **(IN7 = 1)** => to valid the highest zone of channels (xx.08 up to xx.15)

Necessary to configure the XM06B5 extension (added on ICMK-CS31 remote unit) channel by channel with position of its dip-switch and push button on the front face.

1.11.1.4 Restriction or limit

Not possible to use the XM06B5 as a binary remote unit

ICMK-CS31 remote unit

1.12 Replacement of CS31 AC input remote units:

1.12.1   ICS 08 E3   Binary isolated input unit with 8 input channels for 120 Va.c.
         ICS 08 E4   Binary isolated input unit with 8 input channels for 230 Va.c.

           FPR 331 6301 R0014   120 V a.c.

           FPR 331 6401 R0016   230 V a.c.

1.12.1.1   Electrical connection

1.12.1.2   Replacement by ICSMK-CS31 + one extension XI16E1 + one hardness + one universal interface equipped with 8 a.c. optocoupler plugs.

ICMK-CS31 remote unit

1.12.1.3   Configuration of inputs of ICMK-CS31

Necessary: Input 0 - **(IN0)** => in order to limit the number of inputs. 0 up to 7

Option: Input 7 - (**IN7 = 1**) => in order to valid the inputs (xx.08 up to xx.15)

1.12.1.4   Restriction or limit

It is not possible to use the function block CS31CO to configure the option open circuit detection "cut wire" and to modify the delay of inputs (5ms).

1.12.1.5   Optocoupler interface + harness

In order to adapt the 24 V d.c. inputs from XI16E1 to a.c. inputs, it is necessary to use optocoupler interfaces equipped with a.c. plugs + prewiring harness between XI16E1 and the interface.

See Main catalogue "Pre-wiring system for PLC's Interfast" – 1SNC127001C0206

Cable with Omniconnect connector   + Universal interface 8 channels + Accessories - plugs
     1 x LA200/AC31-ABB/OMN12/636   1 x BUNI 12-L   1 x strap plug ST1
                                                                          1 x strap plug ST2
                                                                          8 x input optocoupler plugs
                                                                    (BNMS T115V-1 or BNMS T230V-1)

For Interfast product references see § 1.14 references

Wiring diagram

1.13 Reminder on AC31 Analog extensions use (XM06B5 or XE08B5)

1.13.1   Technical specifications of the analog extension

The analog extensions are powered at 5 V and 24 V d.c. by the ICMK-CS31 remote unit to which they are connected. The connection between the extension and the ICMK-CS31 is effectuated with the cable situated on the left side of the extension.

The analog value with a customized format of each channel is displayed on a 4 digit display.

The channel number is selected by the push button on the front side.

The PT 100 probes connected to the XM 06 B5 or XE 08 B5 extensions may be the 2 wire, 3 wire sensors

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

Warning: In the configuration current 4 – 20 mA, the sensor should be able to provide 20 mA with min 10 V d.c. Moreover, the input is not protected against voltage between 10 up to 18 V d.c. and can give an error or destroy the input.

Warning: the function block CS31CO doesn't configure XM06B5 or XE08B5. The configuration of these extensions is realised with their dip-switch and push button.

Warning: the function blocks CONFIO cannot be used to configure the channels.

Warning: Only PT 100 must be used on XM06B5 and XE08B5 extensions

	XM 06 B5	XE 08 B5
- Number of analog inputs	4	8
- Number of analog outputs	2	-
- Number of displayed internal values		-
- Filtering of 50 / 60 Hz	yes	yes
- Transfer time of the analog I/O	120 ms */ 50 ms	220 ms *
- Maximum power dissipation	3 W	3 W
- Weight	200 g	200 g

ICMK-CS31 remote unit

1 - Location for the DIN rail

2 - Plate fixture with unit earthing

3 - Lock for DIN rail mounting

4 - Location for external dual connector

5 - Location of the connectors for the input cabling

6 - Visualization of the channel number and the associated analog value

7 - Location of the connector for the supplementary extensions

8 - Push button to select or configure the channels

9 - Location of the connectors for the inputs or outputs cabling

10 - Connector for connection to the ICMK-CS31 remote unit or another extension

11 - Switches to configure the channels as current, voltage or temperature

1 - Sign of the value

2 - Value

3 - Channel identification

4 - Dot of the value

ICMK-CS31 remote unit

Dip switches configuration on XM 06 B5

Dip switches configuration on XE 08 B5

ICMK-CS31 remote unit

1.13.2 Configuration of analog extensions

The channel type can be configured.

The channel type has to be chosen between voltage (-/+ 10 V), current (0-20mA or 4-20mA) or temperature measurement Pt100 2 or 3 wires. This configuration is selected channel by channel with the position of a dip switch, and the push button on the front plate.

It is also possible to change the filtering: the better choice is 50 Hz or standard

1.13.3 Hardware configuration

1.13.3.1 Dip switches on the left side of the extension.

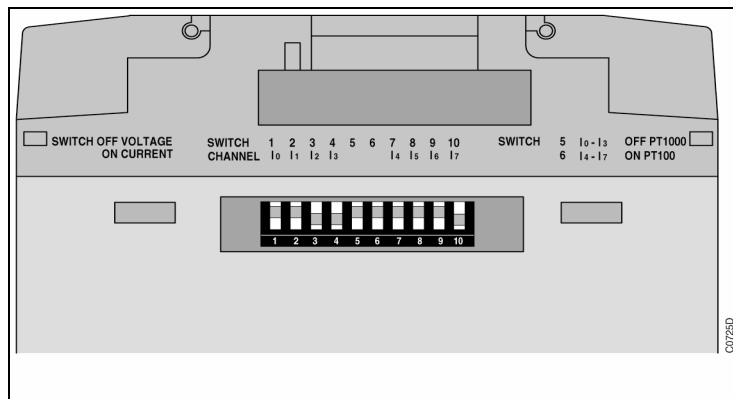|		
Dip switch N°1 for input 0	OFF	voltage or Pt100
	ON	current
Dip switch N°2 for input 1	OFF	voltage or Pt100
	ON	current
Dip switch N°3 for input 2	OFF	voltage or Pt100
	ON	current
Dip switch N°4 for input 3	OFF	voltage or Pt100
	ON	current
Dip switch N°5	ON	current source is set to 2.5mA f or Pt100
		(Used for channels 0 to 3)

Warning: The XM06B5 product can be deliver with a dip switch component with 6 dip switches, in this case, the dip switch N°6 will be without functionality.

In case of 8 analog inputs extension XE08B5

Dip switch N°7 for input 4	OFF	voltage or Pt100
	ON	current
Dip switch N°8 for input 5	OFF	voltage or Pt100
	ON	current
Dip switch N°9 for input 6	OFF	voltage or Pt100
	ON	current
Dip switch N°10 for input 7	OFF	voltage or Pt100
	ON	current
Dip switch N°6	ON	current source is set to 2.5mA fo r Pt100
		(Used for channels 4 to 7)

1.13.3.2   Push button description

The push button is used to choose the channel to display the value.

The value is always displayed according to the selected format.

Channel numbers are scrolled every time the push button is pressed.

For XM06B5 extension, the 2 analog outputs have the number 4 and 5

The display is tested (all segments ON) after each revolution without 50 Hz filtering.

The 50 Hz filtering type can be selected when the push button is pressed for 5 seconds when the segments test, the other choice must be not used with ICMK-CS31.

This choice of 50 Hz mode is selected for all channels of module. When you chose a filtering configuration you increase the acquisition time (5 seconds) of all channels.

8888 8	
FA5⊦	**← Must not be used**
60H	**← Must not be used**
50H	
888F 8	
FA5F	**← Must not be used**
60HF	**← Must not be used**
50HF	

The mode degree Fahrenheit can be selected by push button.

When the choice is selected, release the push button for 5 seconds and the new filtering is stored in the EEPROM

1.13.3.3 Standard display format

The channel type can also be set with the push button.

The configuration mode is set when the push button is pressed for 10 seconds.

The display starts to blink and the current format is displayed (the factory settings is -/+10V)
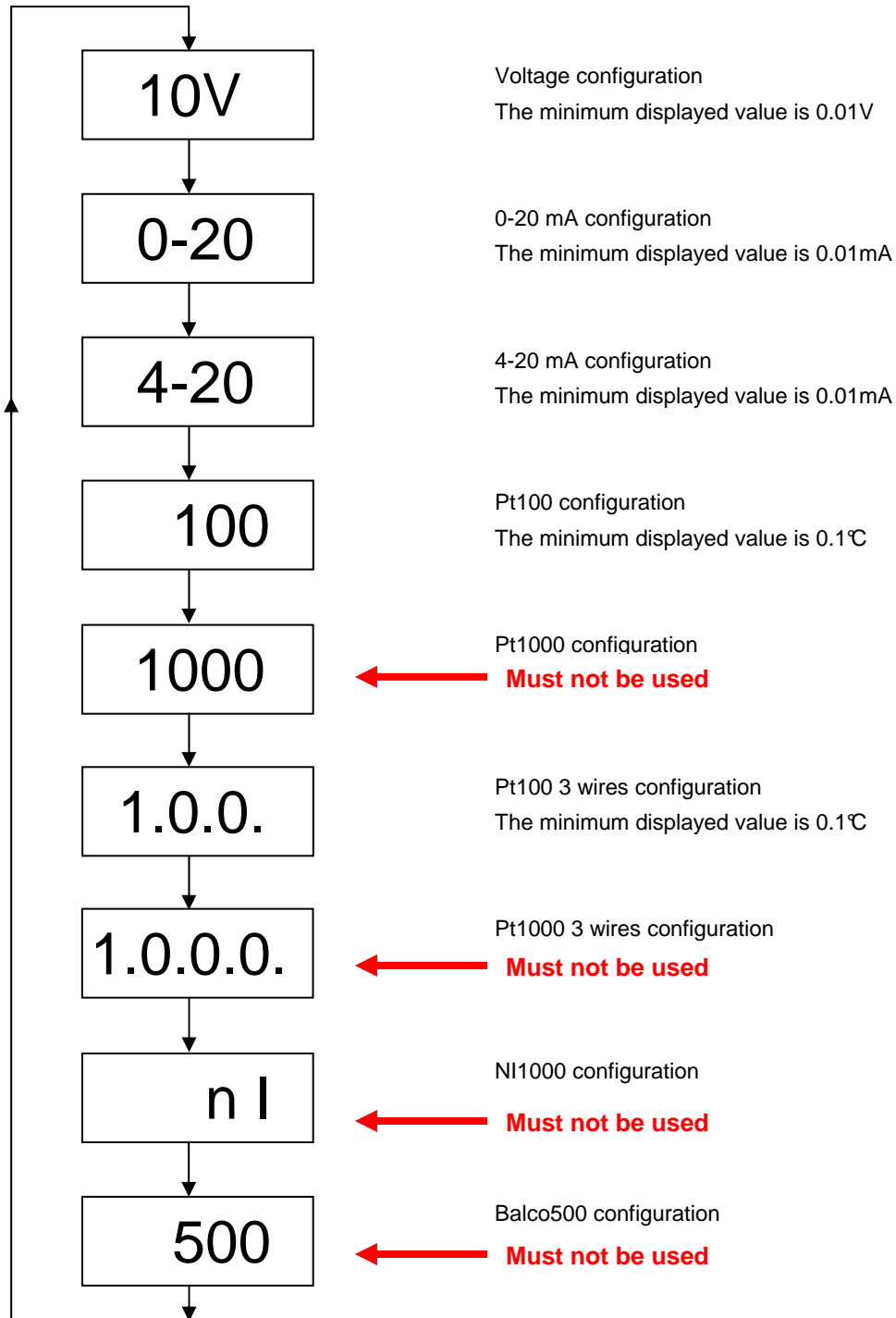
Display	Description
10V	Voltage configuration — The minimum displayed value is 0.01V
0-20	0-20 mA configuration — The minimum displayed value is 0.01mA
4-20	4-20 mA configuration — The minimum displayed value is 0.01mA
100	Pt100 configuration — The minimum displayed value is 0.1°C
1000	Pt1000 configuration — ← **Must not be used**
1.0.0.	Pt100 3 wires configuration — The minimum displayed value is 0.1°C
1.0.0.0.	Pt1000 3 wires configuration — ← **Must not be used**
n I	NI1000 configuration — ← **Must not be used**
500	Balco500 configuration — ← **Must not be used**

When the push button is not pressed during 10 seconds, the configuration mode is closed and the display value mode is again active

The configuration is stored in an internal EEPROM and it is saved in case of power fail.

ICMK-CS31 remote unit

1.14 References

1.14.1 ICMK-CS31 remote unit:

Products	Description	References
ICMK-CS31-24VDC	With 8 isolated inputs 24 V d.c used for configuration of ICMK-CS31 24 V d.c. power supply.	1SBP260056R1001
ICMK-CS31-120/230VAC	With 8 isolated inputs 24 V d.c used for configuration of ICMK-CS31 120 / 230 V a.c. power supply.	1SBP260057R1001

1.14.2 Extensions:

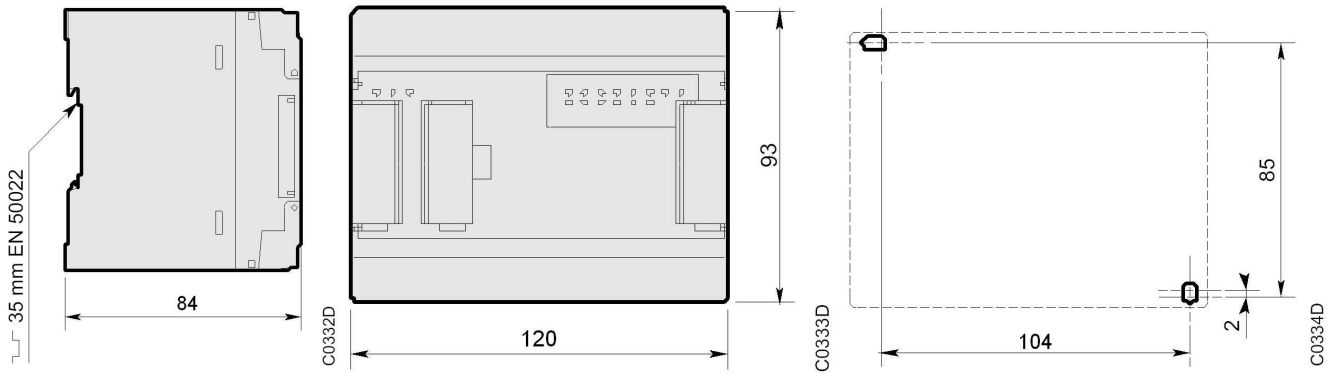| Products	Description	References
XI 16 E1	Binary extension with 16 isolated inputs 24 V d.c.	1SBP260100R1001
XO 08 R1	Binary extension with 8 relay outputs 250 V a.c. / 2 A	1SBP260101R1001
XC 08 L1	Binary extension with 8 channels configurable for inputs or transistor outputs 24 V d.c. / 0.5 A	1SBP260102R1001
XO 16 N1	Binary extension with 16 transistor outputs 24 V d.c. / 0.5 A	1SBP260105R1001
XO 08 Y1	Binary extension with 8 transistor outputs 24 V d.c. / 2 A	1SBP260108R1001
XO 08 R2	Binary extension with 4 NO relay outputs 250 V a.c. / 2 A and 4 NO/NF relay outputs 250 V a.c. / 3 A	1SBP260109R1001
XM 06 B5	Analog extension with 4 inputs configurable for current / voltage / Pt 100 / Pt 1000 and 2 outputs configurable for current / voltage resolution 12 bits	1SBP260103R1001
XE 08 B5	Analog extension with 8 inputs configurable for current / voltage / Pt 100 / Pt 1000 resolution 12 bits	1SBP260106R1001

1.14.3 Interfast + accessories:

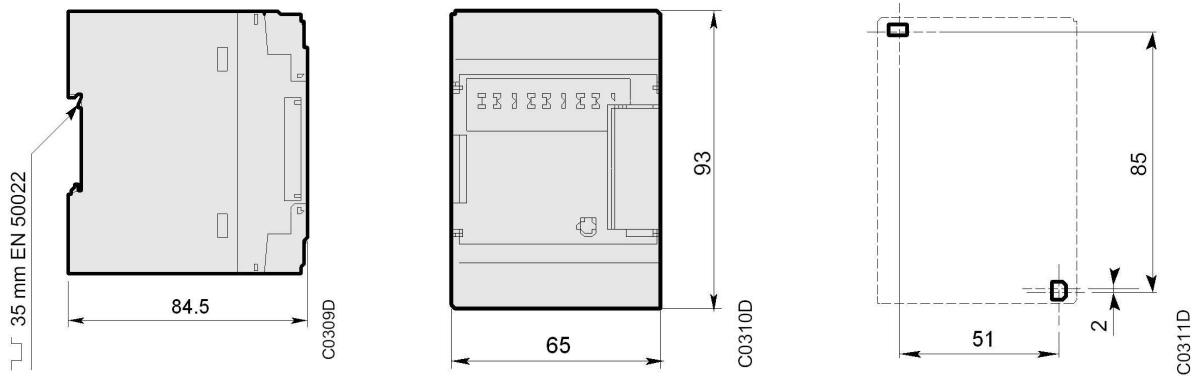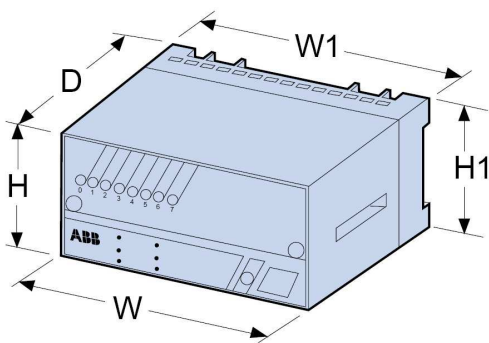| Products	Description	References
BUNI 12-L	Universal interface with 8 channels with screw-clamp connection Omniconnect product range with Led for power on.	1SNA631177R2100
BNMS T115V-1	Input optocoupler plug – 115 V a.c.	1SNA031804R1100
BNMS T230V-1	Input optocoupler plug – 230 V a.c.	1SNA031805R1200
BNMS ST1	Strap plug type ST1	1SNA031829R1100
BNMS ST2	Strap plug type ST2	1SNA031830R1600
LA200/AC31-ABB/OMN12/636	PLC board with built-in connector / cable with Omniconnect connector - 2m (Reference with IEC cables)	1SNA036918R1700
	PLC board with built-in connector / cable with Omniconnect connector - 2m (Reference with UL cables)	1SNA036918R1000

ICMK-CS31 remote unit

1.15 Dimensions (in mm)

1.15.1 ICMK-CS31 remote unit

84   120   93   85   104   2   C0332D   C0333D   C0334D   35 mm EN 50022

1.15.2 Extensions

84.5   65   93   85   51   2   C0309D   C0310D   C0311D   35 mm EN 50022

1.15.3 <u>Reminder</u>: 30 series remote units

W1   D   H1   H   W
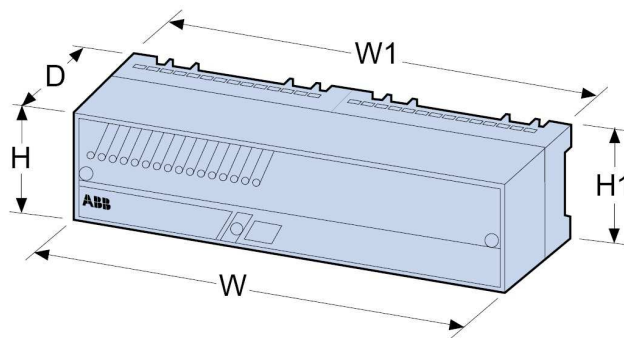
W= 120   W1= 123
H= 60   H1= 64
D= 115

ICFC16L1-24VDC

W1   D   H1   H   W

W= 244   W1= 246
H= 60   H1= 64
D= 80