## Chapter 14

# ICMK14F1-M / ICMK14N1-M

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# ICMK14F1-M and ICMK14N1-M

This chapter wants to describe the general characteristics and operating conditions of ICMK14F1-M and ICMK14N1-M remote inputs and outputs on MODBUS® system bus.

## 1.1 Presentation

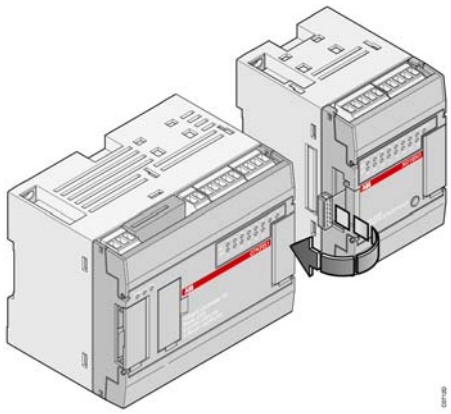
The ICMK14F1-M and ICMK14N1-M are used as a decentralised inputs and outputs on the MODBUS® system bus. It brings accessibility to beginners and experienced automation users alike, for any application with 14 to 200 inputs / outputs, using the same set of basic components.

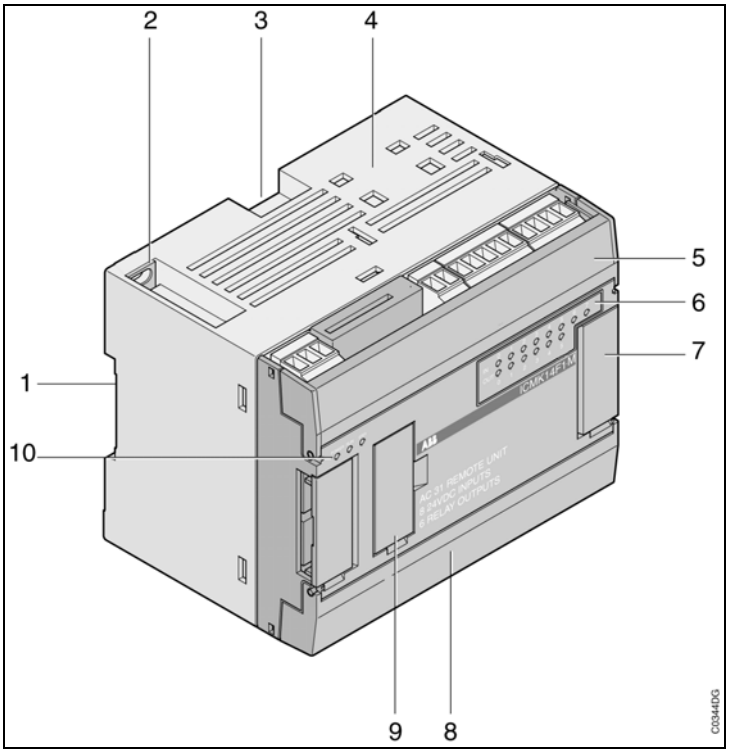
The ICMK14F1-M and ICMK14N1-M modules allow a distributed I/O architecture on MODBUS® system bus that provide cost effective and flexible solutions for controlling and monitoring I/O signals over a wide area.

### 1.1.1 General set-up rules

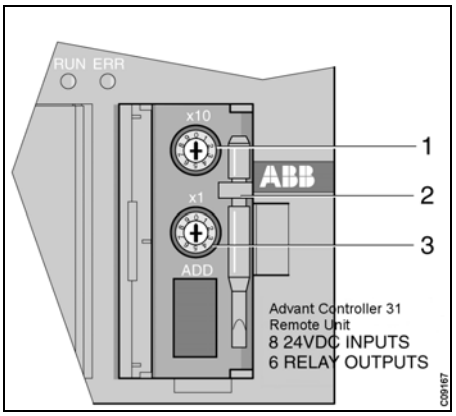
Each ICMK14F1-M and ICMK14N1-M remote units incorporate a specific number of binary inputs / outputs. And it is possible, to increase this number of binary or analog inputs / outputs, by addition of different extensions directly connect to the ICMK14F1-M and ICMK14N1-M remote modules.

These extensions are the same that used with Central units 40 and 50 series.






**The front of the unit**




**Enlargement of item 9 without cover**

### 1.1.2 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
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
    - for the outputs
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, reserved for unit selection

## 1.2 General operating conditions

The ICMK14F1-M and ICMK14N1-M remote 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 |
| **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%) |

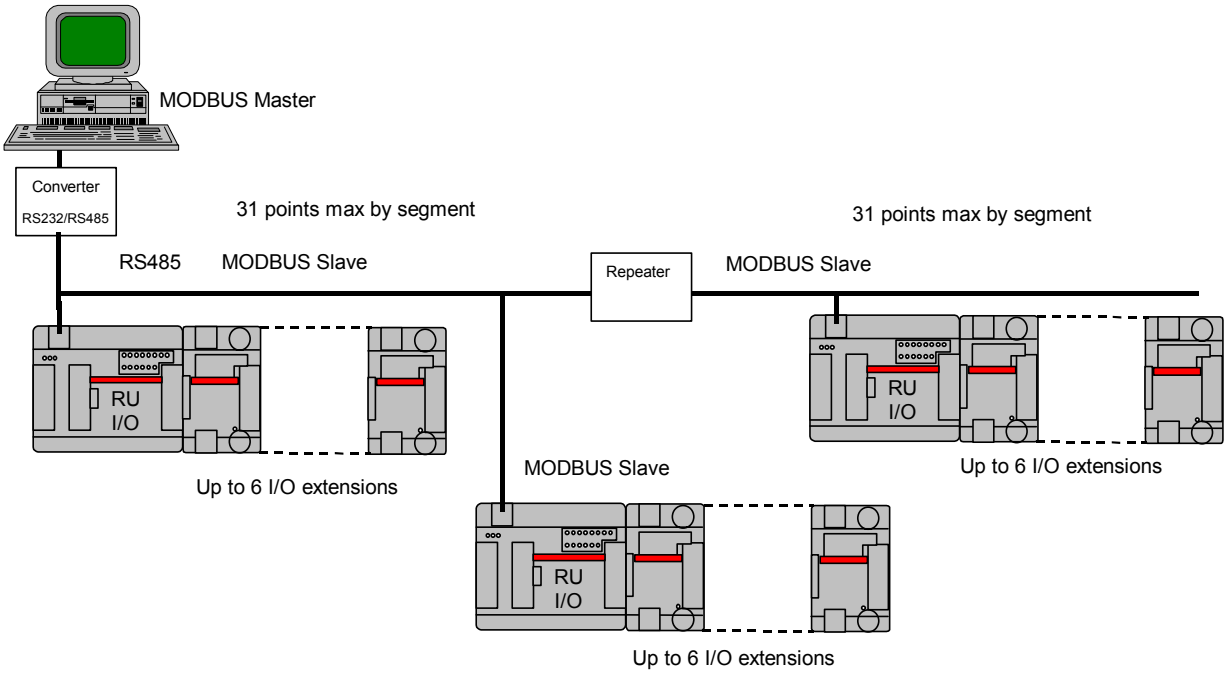
| | |
|---|---|
| **Creepage distances and clearances** | IEC 664 and DIN VDE0160 |
| **Insulation test** | IEC 1131-2 |
| **Electromagnetic compatibility** | |
| Immunity tests against: | |
| - Electrostatic discharge | IEC 1000-4-2 (level 3) |
| - Radiated fields | IEC 1000-4-3 (level 3) |
| - Fast transient bursts | IEC 1000-4-4 (level 3) |
| - High energy pulse | IEC 1000-4-5 |
| - Conducted high frequencies | IEC 1000-4-6 (level 3) |
| **Voltage drops and short power cutoffs** | |
| - D.C. power supply | Duration of the power cutoffs: ≤ 10 ms<br>Time between 2 voltage drops: ≥ 1 s |
| - A.C. power supply | Duration of the power cutoffs: ≤ 20 ms<br>Time between 2 voltage drops: ≥ 1 s |
| **Clearance** | IEC 664-664A<br>DIN VDE 0160 |
| **Dielectric test** | IEC 1131-2 |
| **Mountings** | |
| - DIN rail | 35 mm |
| - Screw fittings | 4 mm diameter screw (M4) |
| **Connections** | |
| - Connectors | Removable terminal blocks (2.5 mm²) |
| - Wires section for: | |
| Earth | Rigid or multi-conductor wire AWG 14 (1.95 mm²) |
| Inputs | Rigid or multi-conductor wire AWG 18 (0.96 mm²) to AWG 14 (1.95 mm²) |
| Outputs | Rigid or multi-conductor wire AWG 14 (1.95 mm²) |
| Power supply | Rigid or multi-conductor wire AWG 14 (1.95 mm²) |
| Bus | Twisted pair AWG 24 (0.22 mm²) to AWG 18 (0.8 mm²) |
| - Screws tightening torque | 0.5 Nm (given as an indication only) |
| **Serial interface** | |
| - For MODBUS System bus | RS 485 |

## 1.3 Technical specifications

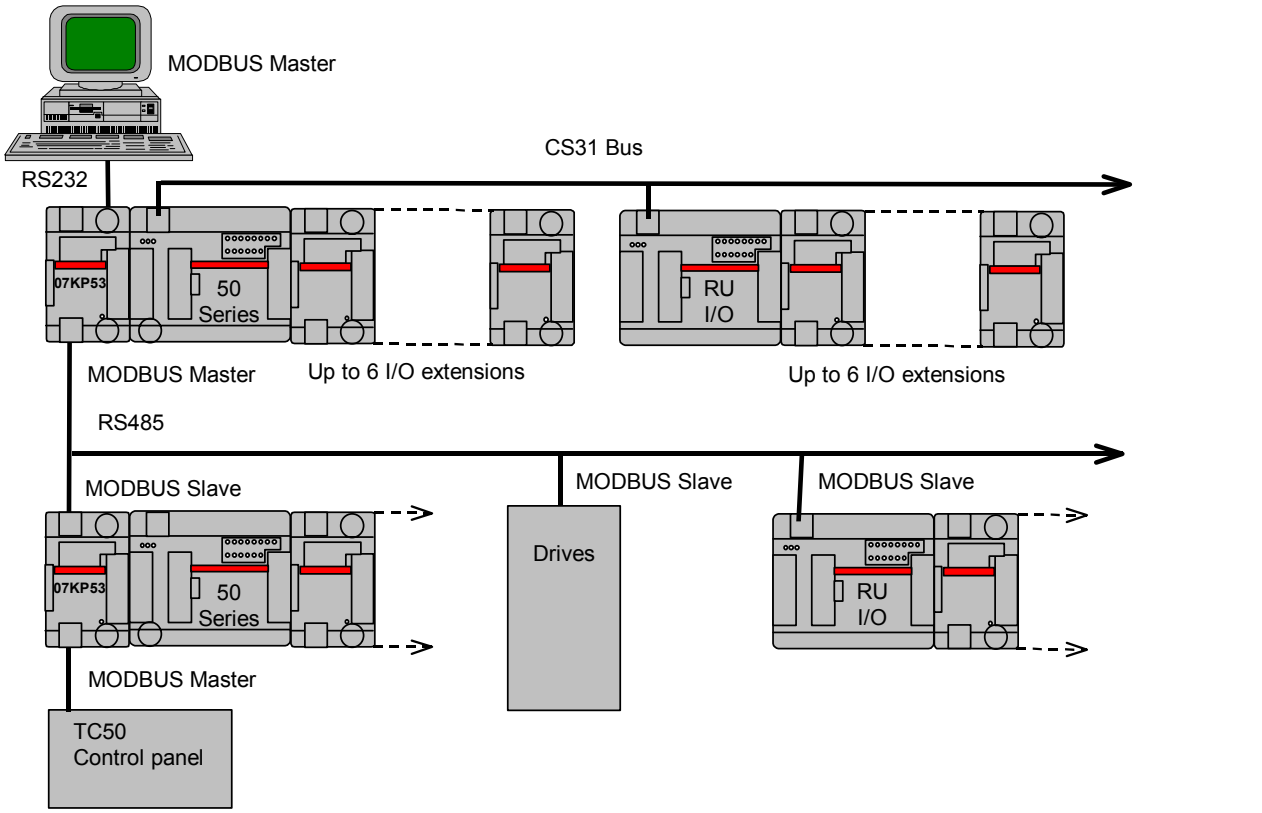
| Products | Description | References |
|---|---|---|
| ICMK 14 F1 -M 24VDC | With 8 isolated inputs 24 V d.c<br>and 6 relay outputs 250 V a.c. / 2A<br>24 V d.c. power supply. | 1SBP260053R1001 |
| ICMK 14 F1 -M 120/230VAC | With 8 isolated inputs 24 V d.c<br>and 6 relay outputs 250 V a.c. / 2A<br>120 / 230 V a.c. power supply. | 1SBP260054R1001 |
| ICMK 14 N1 -M 24VDC | With 8 isolated inputs 24 V d.c<br>and 6 transistor outputs 24 V d.c / 0.5 A<br>24 V d.c. power supply. | 1SBP260055R1001 |

| | ICMK 14 F1-M<br>24 V d.c. | ICMK 14 F1-M<br>120 / 230 V a.c. | ICMK 14 N1-M<br>24 V d.c. |
|---|---|---|---|
| **Width x Height x Depth (in mm)** | 120 x 93 x 84 | | |
| **Weight** | 400 g | 800 g | 400 g |
| **Power supply** | | | |
| - Mains voltage: | | | |
| Nominal value | 24 V d.c. | 120 / 230 V a.c. | 24 V d.c. |
| Admissible range | 19.2 to 30 V | 97.75 to126.5 V<br>195.5 to 253 V | 19.2 to 30 V |
| - Consumption: | | | |
| Unit alone (typical) | 80 mA | 30 mA | 80 mA |
| Maximum configuration (typical) | 400 mA | 100 mA | 400 mA |
| - Polarity reversal protection | yes | - | yes |
| - 24 V d.c. isolated power for inputs: | no | yes | no |
| Range of voltage value | - | 19.2 to 30 V | - |
| Max. Output current | - | 400 mA | - |
| Short circuit protection | - | yes | - |
| - Dissipation | 5 W | 10 W | 6 W |
| **Incorporated binary inputs** | | | |
| - Number of inputs | 8 | 8 | 8 |
| - Isolation of the inputs / electronic | 1500 V a.c. | 1500 V a.c. | 1500 V a.c. |
| - Input types | PNP and NPN | PNP and NPN | PNP and NPN |
| - Input voltage: | | | |
| Nominal value | 24 V d.c. | 24 V d.c. | 24 V d.c. |
| Signal at 0 (IEC 1131-2) | 0 to + 5 V | 0 to + 5 V | 0 to + 5 V |
| Signal at 1 (IEC 1131-2) | + 15 to + 30 V | + 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 | 7 mA |
| Inputs Ixx.00 and Ixx.01 | 9 mA | 9 mA | 9 mA |
| - Minimum filtering time | 5 ms | 5 ms | 5 ms |
| - Cable length: | | | |
| unshielded | 300 m | 300 m | 300 m |
| shielded | 500 m | 500 m | 500 m |

| | ICMK 14 F1 -M<br>24 V d.c. | ICMK 14 F1 -M<br>120 / 230 V a.c. | ICMK 14 N1 -M<br>24 V d.c. |
|---|---|---|---|
| **Incorporated outputs** | | | |
| - Number of outputs | 6 relays | 6 relays | 6 transistors |
| - Isolation of the outputs / electronic | 1500 Vrms<br>1 min | 1500 Vrms<br>1 min | 1500 V a.c. |
| - Total charging current, under voltage: | . | | |
| direct 24 V d.c.<br>resistive load / inrush current<br>L / R = 20 ms<br>L / R = 30 ms<br>L / R = 40 ms<br>L / R = 60 ms | 2 A / 5 A<br>2 A<br>1 A<br>0.6 A<br>0.35 A | 2 A / 5 A<br>2 A<br>1 A<br>0.6 A<br>0.35 A | 1 A for Oxx.00 and Oxx.01 and 0.5 A for other outputs |
| alternate 24 to 230 V a.c. | 2 A AC-1<br>0.5 A AC-15 | 2 A AC-1<br>0.5 A AC-15 | |
| - Total charging current | 6 x 2 A | 6 x 2 A | 4 x 0.5 A<br>+ 2 x 1 A |
| - Output leakage current | | | < 200 μA |
| - Output waste voltage | | | 0.2 V to<br>500 mA max. |
| - Minimum cut-off values | 10 mA under<br>12 V d.c. | 10 mA under<br>12 V d.c. | 12 V |
| - Breaking power under 120 V a.c.<br>(contact rating code B300) (UL) | 2 A | 2 A | |
| - Breaking power under 250 V a.c.<br>(contact rating code B300) (UL) | 2 A (1.5 A<br>according<br>to UL) | 2 A (1.5 A<br>according<br>to UL) | |
| - Number of common | 2 (2+4) | 2 (2+4) | |
| - Commutating frequency : | | | |
| for resistive loads | < 1 Hz | < 1 Hz | < 5 kHz |
| for inductive loads | < 0.2 Hz | < 0.2 Hz | |
| for lamps | < 0.2 Hz | < 0.2 Hz | |
| - Number of switches: | | | |
| for AC-1 | 1 million | 1 million | - |
| for AC-15 | 100 000 | 100 000 | |
| - Short circuit and overload<br>protection | envisage<br>externally | envisage<br>externally | yes: thermic |
| - Surge voltage protection | envisage<br>externally | envisage<br>externally | yes :<br>by transient<br>volt. suppressor |
| - Outputs diagnosis | - | - | overload and<br>short circuit |
| - Cable length: | | | |
| unshielded | 150 m | 150 m | 150 m |
| shielded | 500 m | 500 m | 500 m |




**Network with only I/O remote units ICMK14F1-M or ICMK14N1-M**




**Network with multifunction modules and I/O remote units ICMK14F1-M or ICMK14N1-M**