### Description :

RKP-CMU1 is a fully digitalized control / monitoring unit for the RCP-2000 power system. Equipped with USB, RS-232, and ethernet interface, it can be connected locally to PC to execute the control and monitoring tasks. With built-in 4 configurable relay contacts, users can flexibility monitor specific events or alarms and react suitable action accordingly.

### Features :
* 1U low profile/19-inch rack mounting
* Control and monitor up to 32 RCP-2000 units
* Front panel LCD and buttons for on-site service without PC
* USB-, RS-232 or Ethernet interface for PC connection locally or remote monitoring and control via GSM modem
* Alarm/event log with time and date
* Windows-based PC communication software
* Easy wire connections on rear side
* 4 user programmable relay outputs for traditional remote monitoring or warning
* 3 years warranty

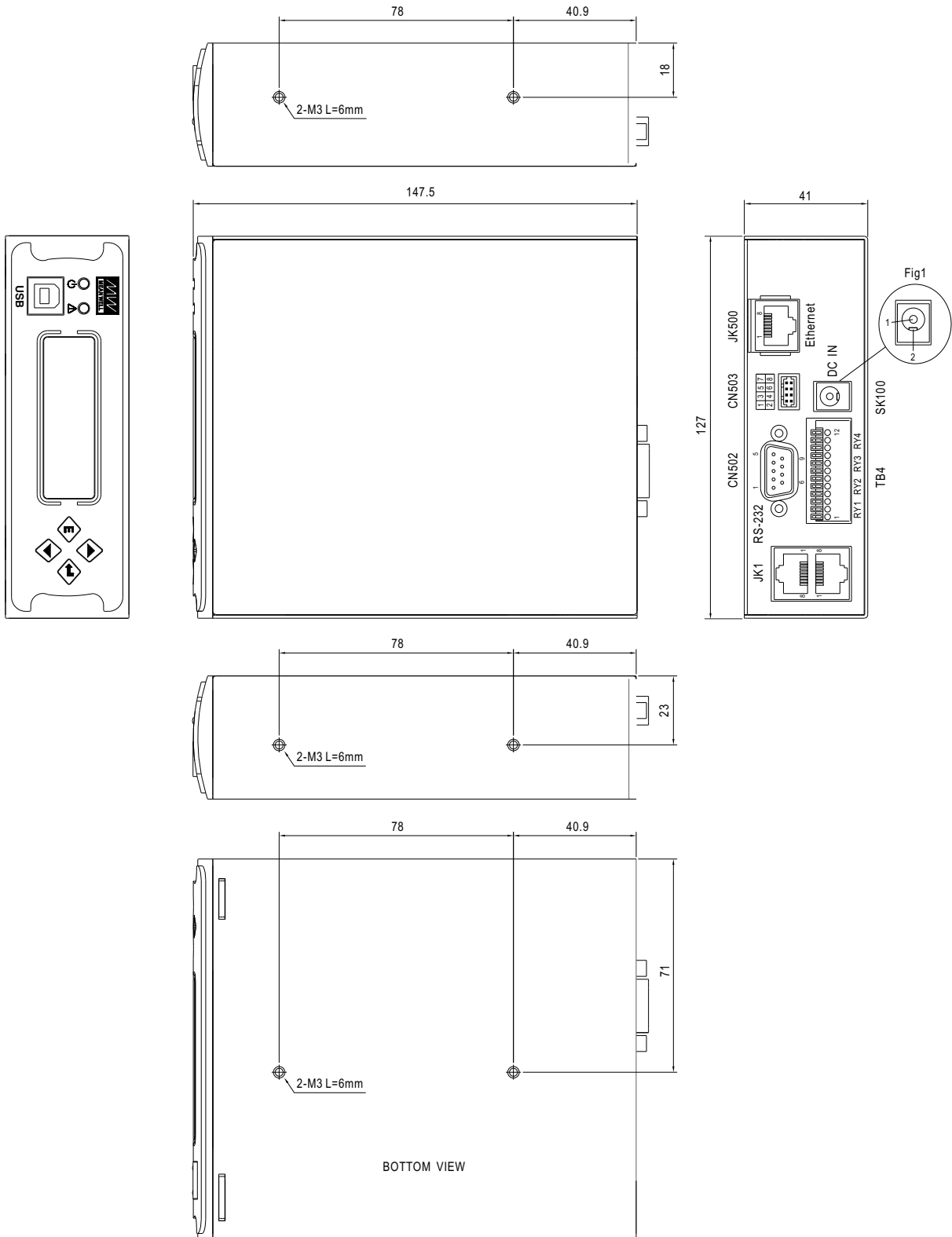### ■SELECTION GUIDE

Single unit: RKP-CMU1

Rack: RKP-1U ☐ -CMU1

I: AC Inlet (IEC320-C20)
T: Terminal block

### SPECIFICATION

| MODEL | | RKP-1U☐-CMU1 | RKP-CMU1 |
|---|---|---|---|
| OUTPUT | DIGITAL METER | Display the DC output voltage, current, and internal temperature of each RCP-2000 unit | |
| | CONTROL OUTPUT | PM Bus signal for each RCP-2000 unit | |
| | LED INDICATOR | Green: Power on        Red:Alarm | |
| | RELAY CONTACT | 4 user programmable relay, relay contact rating(max.): 30V/1A resistive | |
| INPUT | VOLTAGE RANGE   Note.3 | 12 ~ 15VDC | |
| | CURRENT | 1A/12VDC        0.8A/15VDC | |
| | MONITORING INPUTS | PM Bus signal for each RCP-2000 unit | |
| FUNCTION | DISPLAY | LCD 16x2 Alphanumeric Matrix Display / PC Web Page Display | |
| | MONITOR | Output Voltage / Load Current / Temperature / Input Voltage | |
| | CONTROL | Output Voltage, Current Limit, ON/OFF | |
| | COMM. INTERFACE | USB, RS-232, Ethernet | |
| ENVIRONMENT | WORKING TEMP.   Note.1 | -25 ~ +70℃ | |
| | WORKING HUMIDITY | 20 ~ 90% RH non-condensing | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +85℃, 10 ~ 95% RH | |
| | VIBRATION | 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes | |
| SAFETY & EMC | SAFETY STANDARDS | UL60950-1, TUV EN60950-1 approved | Design refer to TUV EN60950-1 |
| | WITHSTAND VOLTAGE  Note.2 | I/P-O/P:3KVAC    I/P-FG:1.5KVAC    O/P-FG:0.7KVDC | O/P-FG:0.7KVDC |
| | ISOLATION RESISTANCE  Note.2 | I/P-O/P, I/P-FG,O/P-FG:100M Ohms / 500VDC / 25℃ / 70% RH | O/P-FG:100M Ohms / 500VDC / 25℃ / 70% RH |
| | EMC EMISSION | Compliance to EN55022 (CISPR22) Conduction Class B, Radiation Class A ; EN61000-3-2,-3 | |
| | EMC IMMUNITY | Compliance to EN61000-4-2,3,4,5,6,8,11, EN61000-6-1(EN50082-2), light industry level, criteria A | |
| OTHERS | MTBF | 110.5K hrs min.    MIL-HDBK-217F (25℃) | |
| | DIMENSION | 486.6*350.8*44mm (L*W*H) | 147.5*127*41mm (L*W*H) |
| | PACKING | 4.4Kg; 3pcs/14.2Kg/2.67CUFT | 0.8Kg; 16pcs/13.8Kg/0.79CUFT |
| NOTE | | 1. LCD may freeze under -10℃.<br>2. SK100 and all of signal connectors (except CN502, CN503, and USB port) are considered as O/P.<br>3. Recommended use MEAN WELL power adaptor series: GS12, GS15, GS18, GE12, GE18. | |

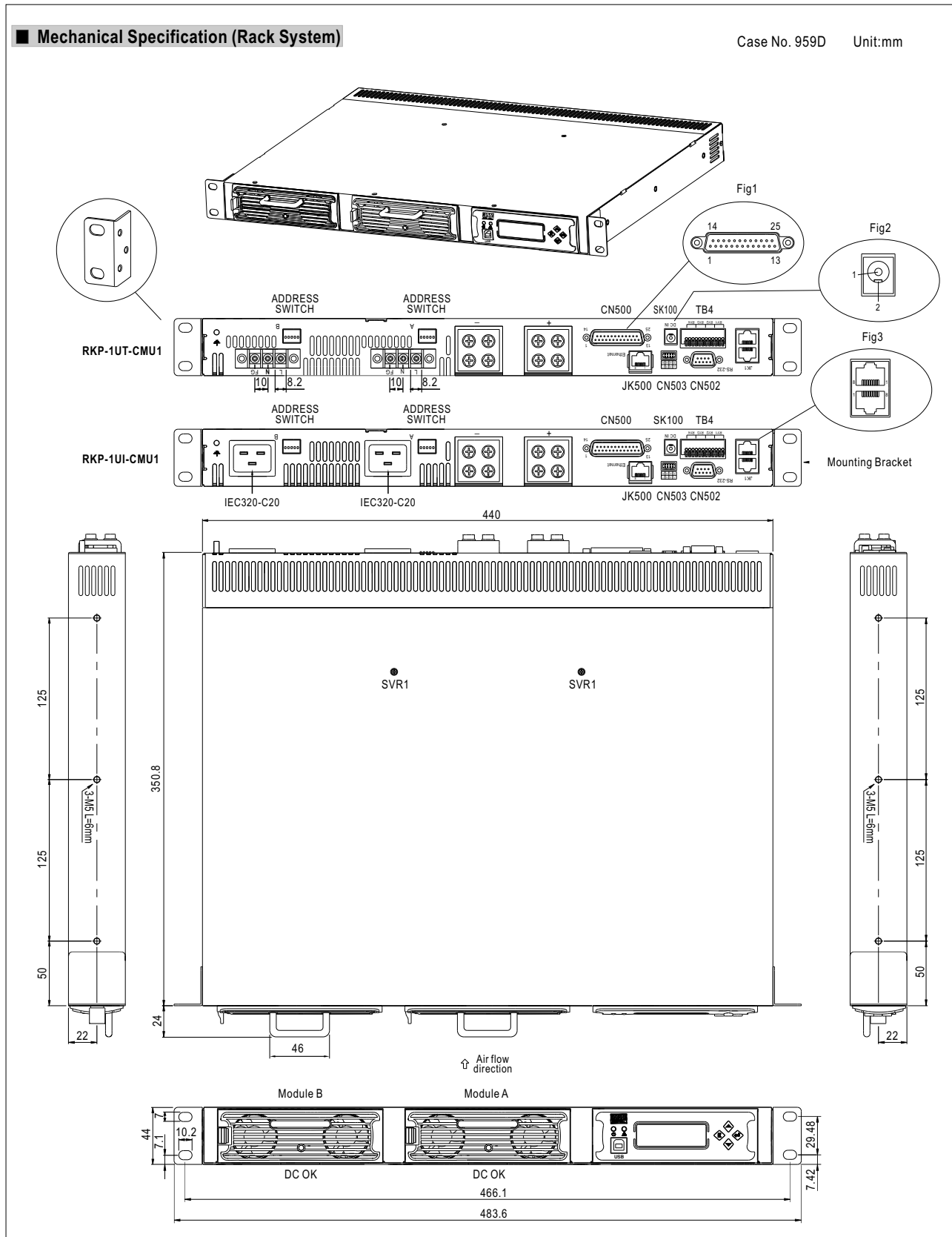■ **Mechanical Specification (Single Unit)**

Case No. 959A    Unit:mm



BOTTOM VIEW

Fig1

USB

Ethernet
JK500
DC IN
CN503
SK100
CN502
TB4
RS-232
RY1 RY2 RY3 RY4
JK1

78    40.9    18

147.5

127    41

78    40.9    23

78    40.9    71

2-M3 L=6mm

## ■ Mechanical Specification (Rack System)

Case No. 959D    Unit:mm



Fig1

Fig2

Fig3

RKP-1UT-CMU1

ADDRESS SWITCH    ADDRESS SWITCH    CN500  SK100  TB4

10  8.2    10  8.2    JK500  CN503 CN502

RKP-1UI-CMU1

ADDRESS SWITCH    ADDRESS SWITCH    CN500  SK100  TB4

IEC320-C20    IEC320-C20    JK500  CN503 CN502

Mounting Bracket

440

350.8

125    125

125    125

3-M5 L=6mm    3-M5 L=6mm

50    50

24

22    22

46

SVR1    SVR1

⇧ Air flow direction

Module B    Module A

44    7    10.2    29.48

7.1

DC OK    DC OK    7.42

466.1

483.6

## ■ CN500 Pin No. Assignment

Connector Pin No. Assignment(CN500) : D-Type Right Angle 25 positions

| Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|---|---|---|---|
| 1 | ON/OFF-A | 6 | FAN FAIL-A | 11 | T-ALARM-B | 16~21 | N.C. |
| 2 | AC-OK-A | 7 | ON/OFF-B | 12 | FAN FAIL-B | 22 | +S |
| 3 | DC-OK-A | 8 | AC-OK-B | 13 | +5V-AUX | 23 | -S |
| 4 | PV-A | 9 | DC-OK-B | 14 | +12V-AUX | 24 | +V |
| 5 | T-ALARM-A | 10 | PV-B | 15 | GND-AUX | 25 | -V |

## ■ JK1 Pin No. Assignment

Connector Pin No. Assignment(JK1) : RJ45 8 positions

| Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|---|---|
| 1 | DA | 4 | CONTROL | 7 | SCL |
| 2 | DB | 5 | NC | 8 | GND-AUX |
| 3 | -V | 6 | SDA | | |

## ■ CN502 Pin No. Assignment

Connector Pin No. Assignment(CN502) : D-type Male 9 positions

| Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|
| 1,4,6,7,8,9 | NC | 3 | TXD |
| 2 | RXD | 5 | GND-FG |

## ■ CN503 Pin No. Assignment

Connector Pin No. Assignment(CN503) : HRS DF11-8DP-2DS or equivalent

| Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|
| 1 | D-IN1 | 5 | D-IN3 |
| 2,4,6,8 | GND-FG | 7 | D-IN4 |
| 3 | D-IN2 | | |

## ■ JK500 Pin No. Assignment

Connector Pin No. Assignment(JK500) : RJ45 8 position

| Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|
| 1 | TX+ | 4,5,7,8 | NC |
| 2 | TX- | 6 | RX- |
| 3 | RX+ | | |

## ■ TB4 Pin No. Assignment

Connector Pin No. Assignment(TB4) : DECA MX422-25412 or equivalent

| Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|---|---|---|---|
| 1 | Relay1-NO | 4 | Relay2-NO | 7 | Relay3-NO | 10 | Relay4-NO |
| 2 | Relay1-NC | 5 | Relay2-NC | 8 | Relay3-NC | 11 | Relay4-NC |
| 3 | Relay1-COM | 6 | Relay2-COM | 9 | Relay3-COM | 12 | Relay4-COM |

## ■ SK100 Pin No. Assignment

Connector Pin No. Assignment(SK100): Schurter 4840.2201 or equivalent

| Pin No. | Assignment | Pin No. | Assignment |
|---|---|---|---|
| 1 | +VIN | 2 | -VIN |

## ■ CN500 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---|---|---|
| 1,7 | ON/OFF | Each unit can separately turn the output on and off by electrical signal or dry contact between ON/OFF A,B(pin 1,7) and +5V-AUX(pin 13). Short: ON, Open:OFF. (Note.2) |
| 2,8 | AC-OK | Low : When the input voltage is ≧87Vrms. High : when the input voltage in ≦75Vrms. (Note.2) |
| 3,9 | DC-OK | High : When the Vout ≦80±5%. Low : When Vout ≧80±5%. (Note.2) |
| 4,10 | PV | Connection for output voltage trimming. The voltage can be trimmed within its defined range. (Note.1) |
| 5,11 | T-ALARM | High : When the internal temperature (TSW1 or TSW2 open) exceeds the limit of temperature alarm. Low : When the internal temperature (TSW1 or TSW2 short) under the limit temperature.  (Note.2) |
| 6,12 | FAN FAIL | High : When the internal fan fail. Low : When the internal fan is normal. (Note.2) |
| 13 | +5V-AUX | Auxiliary voltage output, 4.5 ~ 5.5V, referenced to GND-AUX (pin 15). The maximum load current is 0.3A. This output has the built-in "Oring diodes" and is not controlled by the remote ON/OFF control. |
| 14 | +12V-AUX | Auxiliary voltage output, 10.8 ~ 13.2V, referenced to GND-AUX (pin 15). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by the remote ON/OFF control. |
| 15 | GND-AUX | Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V). |
| 16~21 | N.C. | Not used. |
| 22 | +S | Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V. |
| 23 | -S | Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V. |
| 24 | +V | Positive output voltage. For local sense use only, can't be connected directly to the load. |
| 25 | -V | Negative output voltage. For local sense use only, can't be connected directly to the load. |

## ■ JK1 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---|---|---|
| 1,2 | DA,DB | Differential digital signal for parallel control. (Note.1) |
| 3 | -V | Negative output voltage. For parallel control, can't be connected directly to the load. |
| 4 | CONTROL | Remote ON/OFF control pin used in the PMBus interface. (Note.2) |
| 5 | NC | Not use. |
| 6 | SDA | Serial Data used in the PMBus interface. (Note.2) |
| 7 | SCL | Serial Clock used in the PMBus interface. (Note.2) |
| 8 | GND-AUX | Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V). |

Note.1: Non-isolated signal, referenced to the output terminals (-V).
Note.2: Isolated signal, referenced to GND-AUX.

## ■ CN502 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---|---|---|
| 1,4,6,7,8,9 | NC | Not used. |
| 2 | RXD | Receive data used in the RS-232 interface. |
| 3 | TXD | Transmit data used in the RS-232 interface. |
| 4 | GND-FG | RS-232 common GND. This signal connects to FG and isolated from -V and GND-AUX. |

## ■ CN503 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---|---|---|
| 1,3,5,7 | D-IN1 D-IN2 D-IN3 D-IN4 | The isolated digital input signal and referenced to GND-FG. Open form GND-FG or +5V : Logic "1" input to RKP-CMU1 short to GND-FG or 0V : Logic "0" input to RKP-CMU1 |
| 2,4,6,8 | GND-FG | Common GND for D-IN. This signal connects to FG and isolated from -V and GND-AUX. |

## ■ JK500 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---|---|---|
| 1,2 | TX+/TX- | Transmit data used in the Ethernet interface. |
| 3,6 | RX+/RX- | Receive data used in the Ethernet interface. |
| 4,5,7,8 | NC | Not used. |

## ■ TB4 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---------|----------|-------------|
| 1,4,7,10 | Relay-NO | Normal-open contact of programmable relay. |
| 2,5,8,11 | Relay-NC | Normal-close contact of programmable relay. |
| 3,6,9,12 | Relay-COM | Common for NO/NC contact. |

Note: Relay contact rating (max.) : 30V/1A resistive.

## ■ SK100 IN/OUT Connector pins function description

| Pin No. | Function | Description |
|---------|----------|-------------|
| 1 | +VIN | Positive input voltage for RKP-CMU1. |
| 2 | -VIN | Negative input voltage for RKP-CMU1. |

## ■ Function Manual

### 1.Communication interface

RKP-CMU1 can control and monitor RCP-2000 parameter via PMBus communication, and PC can manage the whole system by using USB, RS232, or Ethernet to connect to RKP-CMU1.

USB

PMBus

RS-232

Ethernet
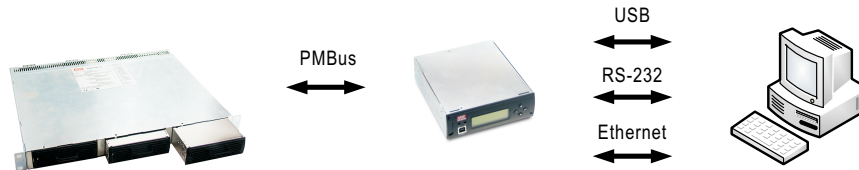
### 2.RCP-2000 Monitoring and control

RKP-CMU1 can monitor parameter of RCP-2000 such as output voltage, output current, internal temperature, status, serial number, and firmware version. It also can turn RCP-2000 on/off together or separately by using "ON/OFF" pin in CN500 or PMBus "CONTROL" pin in JK1 or PMBus "OPERATION" command, shows below. By using PMBus, output voltage and over load protection of RCP-2000 are adjustable.

| RKP-1U<br>ON/OFF pin | PMBus<br>CONTROL pin | PMBus<br>OPERATION command | RCP-2000<br>Output status |
|---------------------|---------------------|---------------------------|--------------------------|
| Connect to +5V-AUX | Open | 80h (ON) | ON |
| Connect to +5V-AUX | Connect to +5V-AUX | 80h (ON) | ON |
| Open | Open | 80h (ON) | OFF |
| Open | Connect to +5V-AUX | 80h (ON) | ON |
| Don't care | Don't care | 00h (OFF) | OFF |

### 3.Real time clock, Data Log and Event Log

RKP-CMU1 has a build-in real time clock data to display actual date/time and for log time stamp. The data logger is designed to store operating data when the systems works. It has 1000 recodes and the interval of log is programmable from 1 to 60 minutes. The event log store system condition when alarm occur and remove. There are 600 records in event log.

### 4.Programmable relay

There are 4 relays and each relay has normal open, normal close and common contact in terminal block. Their active conditions are programmable for flexible application, like charger and generator control, shows below.

| Function | Sub-function | PSU | Parameter |
|----------|--------------|-----|-----------|
| Alarm | 1.Any alarm<br>2.OVP<br>3.OLP<br>4.Short circuit<br>5.OTP<br>6.High Temperature<br>7.AC fail<br>8.Fan lock<br>9.PMBus error | N/A | N/A |

| Function | Sub-function | | PSU | Parameter |
|---|---|---|---|---|
| PSU ON | 1.Immediately | | PSU0~ 31 | 0 sec. |
| | 2.Delay | | | 1 ~ 600 sec. |
| PSU OFF | 1.Immediately | | PSU0~ 31 | 0 sec. |
| | 2.Delay | | | 1 ~ 600 sec. |
| Digital input | D-IN1 ~ D-IN4 | | N/A | N/A |

**5.PMBus communication interface**

RKP-CMU1 integrates PMBus into RCP-2000 control. The supported PMBus commands are shown below.

| Command Code | Command Name | Transaction Type | # of data Bytes | Description |
|---|---|---|---|---|
| 01h | OPERATION | R/W Byte | 1 | Remote ON/OFF control |
| 02h | ON_OFF_CONFIG | Read Byte | 1 | ON/OFF function configuration |
| 19h | CAPABILITY | Read Byte | 1 | Capabilities of a PMBus device |
| 20h | VOUT_MODE | R Byte | 1 | Define data format for output voltage (format: Linear, N= -9) |
| 21h | VOUT_COMMAND | R Word | 2 | Output voltage setting value (format: Linear, N= -9) |
| 22h | VOUT_TRIM | R/W Word | 2 | Output voltage trimming value (format: Linear, N= -9) |
| 46h | IOUT_OC_FAULT_LIMIT | R/W Word | 2 | Output overcurrent setting value |
| 47h | IOUT_OC_FAULT_RESPONSE | R Byte | 1 | Define protection and response when an output overcurrent fault occurred |
| 79h | STATUS_WORD | R Word | 2 | Summary status reporting |
| 7Ah | STATUS_VOUT | R Byte | 1 | Output voltage status reporting |
| 7Bh | STATUS_IOUT | R Byte | 1 | Output current status reporting |
| 7Ch | STATUS_INPUT | R Byte | 1 | AC inpit voltage status reporting |
| 7Dh | STATUS_TEMPERATURE | R Byte | 1 | Temperature status reporting |
| 80h | STATUS_MFR_SPECIFIC | R Byte | 1 | Manufacture specific status reporting |
| 81h | STATUS_FANS_1_2 | R Byte | 1 | Fan1 and 2 status reporting |
| 88h | READ_VIN | R Word | 2 | AC input voltage reading value (format: Linear, N=-1) |
| 8Bh | READ_VOUT | R Word | 2 | Output voltage reading value (format: Linear, N= -9) |
| 8Ch | READ_IOUT | R Word | 2 | Output current reading value (format: Linear, N= -3) |
| 8Dh | READ_TEMPERATURE_1 | R Word | 2 | Temperature 1 reading value (format: Linear, N= -3) |
| 90h | READ_FAN_SPEED_1 | R Word | 2 | Fan speed 1 reading value (format: Linear, N= 4) |
| 91h | READ_FAN_SPEED_2 | R Word | 2 | Fan speed 2 reading value (format: Linear, N= 4) |
| 98h | PMBUS_REVISION | R Byte | 1 | The compliant revision of the PMBus (default: 11h for Rev. 1.1) |
| 99h | MFR_ID | Block Read | 12 | Manufacturer's name |
| 9Ah | MFR_MODEL | Block Read | 12 | Manufacturer's model name |
| 9Bh | MFR_REVISION | Block Read | 6 | Firmware revision |
| 9Ch | MFR_LOCATION | Block R/W | 3 | Manufacturer's factory location |
| 9Dh | MFR_DATE | Block R/W | 6 | Manufacture date. (format: YYMMDD) |
| 9Eh | MFR_SERIAL | Block R/W | 12 | Product serial number |