Specifications Sheet

VM7000A PAPERLESS RECORDER

OUTLINE

The VM7000A is a paperless recorder that displays measured data on the LCD in real time and stores data in the SD memory card.

The type of input such as thermocouple, resistance temperature detector, DC voltage(current), etc. can be selected for each channel (maximum of 12 channels available).

The data stored in SD memory card can be regenerated on the screen, and with the use of support software supplied the data can also be regenerated on a PC screen.

The data recorded in CSV format can be directly read in a spreadsheet such as Excel, which facilitates the processing on a PC. (The data recorded in binary format cannot be read in.)

FEATURES

■ Easy operation with touch panel providing an intuitive user interface

■ Equipped with large capacity built-in memory

The measuring data can be stored only within the main body for about 3 weeks. (input: 6 channels, data record cycle: 1 sec, file record cycle: 1 day, only the binary form, maximum/minimum value)

■ The SD memory card is adopted as a storage medium.

The SD/SDHC memory card that is the standard of the memory card is adopted for an external storage medium.

■ Multiple display presentations

Depending on the object of measurement, the most suitable display format can be selected from a variety of formats including bar graph display, trend display, digital display, etc.

■ Calculation function

The calculation function in which the data acquired from DI and the communication to say nothing of the arithmetic operation and the account adjusting function of the input can be recorded as measurements is installed.

■ PC support software supplied as standard

Parameter loader software that enables easy display and change of set data and data viewer software that regenerates the data stored in SD memory card are supplied as standard.

■ Compact size and Lightness

150（W）×144（H）×181.8（D）mm （The terminal stand cover is contained.)

About 1.0kg mass （6 channels input, without option）

■ 12 channels recording

22 ranges of thermocouples, 4 ranges of resistance temperature detector and 8 ranges of DC voltage/current input can be recorded in up to 12 channels.

■ Ethernet function as standard

FTP, Web server, SNTP and Modbus TCP function are available.

■ Communication (Option)

RS-485 Modbus communication is available.

SPECIFICATIONS

- Number of input channels :
  3, 6, 9 or 12 channels (can be selected at the time of purchase)
- Input circuit :
  Input mutual isolation.
- Measuring cycle :
  100ms
- Input types :
  DC voltage, DC current (Shunt resistance are fitted in input terminals), thermocouple, resistance temperature detector.
- Selection of input types :
  It can be selected by the menu displayed with front side MENU button.
- Burnout function :
  Provided as standard for thermocouple and mV voltage inputs. (Upscale only)
- CMRR : 140dB or more
- NMRR : 60dB or more
- Allowable source resistance :
  About 0.18 μV/Ω (with burnout).
  5 Ω or less of lead wire resistance of a resistance temperature detector.
- Input filter function :
  Each channel can set it. (First order lag filter)
  Time constant settable in the range from 0 to 99 second.
- Scaling function :
  Possible by DC voltage (current) input.
  Scaling range : -32000 to +32000
  Decimal-point position can be set at any point.
  It is possible to select from among the unit that is the preset or to select it from 20 units (each unit 8 characters or less) that can be made.
- Extraction-of-square-root function :
  Extraction-of-square-root operation is performed to the input value of each channel.
- Calculation function :
  Calculation channels : 36 channels
  Arithmetic operation, general operation, and integration operation and F value operation are possible for each operation channel.
  F value calculation function :
  F value (fatality value of the bacillus by heat pasteurization) is calculated from measurement temperature for every channel.
  The content of the calculation can be set only by the parameter loader software (standard, attached personal computer software).

MEASUREMENT RANGE

Code	Type	Measuring range	Max. resolution	Measurement accuracy	Notes
000	mV	-10.00 ～ +10.00	10μV	±(0.1%+1digit)	*1 0～400℃: ±4% 400～800℃±(0.15%+1digit) *2 0～200℃: ±(0.15%+1digit)
001	mV	0.00 ～ +20.00	10μV		
002	mV	0.00 ～ +50.00	10μV		
003	V	-0.200 ～ +0.200	1mV		
004	V	-1.000 ～ +1.000	1mV		
005	V	-10.00 ～ +10.00	10mV		
006	V	0.000 ～ +5.000	1mV		
007	mA	4.00 ～ 20.00	0.01mA		
008	B *1	0.0 ～ 1820.0	0.1℃		
009	R1 *2	0.0 ～ 1760.0	0.1℃		
010	R2 *2	0.0 ～ 1200.0	0.1℃		
011	S *2	0.0 ～ 1760.0	0.1℃		
012	K1	-200.0 ～ 1370.0	0.1℃	±(0.1%+1digit) However, -200.0 to 0.0 ℃ is ±(0.15%+1digit).	*3 1～20K: ±(0.5%+1digit) 20～50K: ±(0.3%+1digit) *4 0～300℃: ±(1.5%+1digit) 300～800℃: ±(0.8%+1digit)
013	K2	-200.0 ～ 600.0	0.1℃		
014	K3	-200.0 ～ 300.0	0.1℃		
015	E1	-200.0 ～ 800.0	0.1℃		
016	E2	-200.0 ～ 300.0	0.1℃		
017	E3	-200.0 ～ 150.0	0.1℃		
018	J1	-200.0 ～ 1100.0	0.1℃		
019	J2	-200.0 ～ 400.0	0.1℃		
020	J3	-200.0 ～ 200.0	0.1℃		
021	T1	-200.0 ～ 400.0	0.1℃		
022	T2	-200.0 ～ 200.0	0.1℃		
023	C	0.0 ～ 2320.0	0.1℃	±(0.1%+1digit)	
024	Au-Fe *3	1.0 ～ 300.0	0.1K	±(0.2%+1digit)	
025	N	0.0 ～ 1300.0	0.1℃	±(0.1%+1digit)	
026	PR40-20 *4	0.0 ～ 1880.0	0.1℃	±(0.2%+1digit)	
027	PL Ⅱ	0.0 ～ 1390.0	0.1℃	±(0.1%+1digit)	
028	U	-200.0 ～ 400.0	0.1℃	±(0.1%+1digit) However, -200.0 to 0.0℃ is ±(0.15%+1digit)	
029	L	-200.0 ～ 900.0	0.1℃		
030	Pt100-1	-200.0 ～ 650.0	0.1℃	±(0.1%+1digit)	
031	Pt100-2	-200.0 ～ 200.0	0.1℃		
032	JPt100-1	-200.0 ～ 630.0	0.1℃		
033	JPt100-2	-200.0 ～ 200.0	0.1℃		

[Caution] Accuracy in reference condition. Reference junction compensation accuracy is not included in digital display accuracy.

- Reference junction compensation accuracy :
  R,S,B,PR40-20,Au-Fe : ±1℃
  K,E,J,T,C,N,PL Ⅱ,U,L : ±0.5℃

- Reference condition :
  Ambient temperature : 23 ± 2 ℃
  Ambient humidity : 55 ± 10 %RH
  Supply voltage : 85 to 264 VAC
  Power supply frequency : 50/60 Hz ± 1 %
  Warmup time : 30 min or more after power on

DISPLAY

- Display unit :
  5.7-inch TFT color LCD（320×240 pixels）
  The brightness can be adjusted.
  (notes)
  In the liquid crystal display, there might be a pixel that always is lit or turned off.
  Please understand it is not a breakdown beforehand though the brightness of the screen might look uneven by the characteristic of the liquid crystal.
- Display Color :
  Selectable from 16 colors
- Display language :
  Japanese/English can be selected from a set screen.
- Back light life
  50,000 hours
- Display group :
  Group number : Main record 6, Sub record 1
  Channel number : 12 channels or less can be set to each group.
- Real-time trend display :
  The present measurement data is displayed in a chart.
  Direction : The upper and lower sides or right and left.
  A digital display or non-display and the scale display or non-display can be selected.
  Display renewal period : 1 sec
- Historical-trend display :
  The past measurement data is displayed in a chart.
  Direction : The upper and lower sides or right and left.
  A digital display or non-display and the scale display or non-display can be selected.
- Bar graph display :
  The present measurement data is displayed by a lengthwise direction bar graph.
  Display renewal period : 1 sec
- Digital display :
  A present measuring data (numerical value) is expanded and displayed. Alarm occurrence No. is displayed.
  Display renewal period : 1 sec
- Event history :
  An alarm history, self-diagnostics report are displayed.
- Communication history :
  Communication history is displayed.
- Parametrical expression/setting :
  An information set screen is displayed with a front MENU button.
- Tag display :
  The number of characters which can be displayed : A maximum of 8 characters

OPERATION BUTTONS

- The number of buttons :
  3 pieces (It is possible to operate it by opening the cover under the front side).
- Function :
  REC : Start/stop of record
  MENU : Various setting screens are displayed.
  FUNC : The function allocated beforehand is executed.

RECORDING FUNCTION

- External recording medium :
  SD memory card (it corresponds to the SD/SDHC specification)
- Internal memory : Capacity of about 100MB
- Storage capacity :
  SD specification : A maximum of 2GB
  SDHC specification : A maximum of 32GB
- Record method :
  Record is started by turning on a REC button.
  It records by a new file name for every recording start.
- Main record :
  Each channel data of six groups of the main record set in the display group is recorded.
  The contents of record are trend data, event data.
- Sub record :
  Each channel data of the sub record set in the display group is recorded..
  The contents recorded are only trend data.
  It is possible to select it from "synchronize with the main record", " when an alarm occurs", and "when DI is input" as a condition of recording.
- Data record cycle :
  The cycle when data is recorded can be selected for 1 sec to 60 min. Only the sub record can select the data logging cycle of 100ms.
- File record cycle :
  First of all, recorded data is stored in an internal memory. When the memory is filled or the record stops, it is written in the SD memory card.
  The data storage period of one recorder file can be chosen in the range for 1 hour to one year.
- Trend data :
  The method of preserving the measuring data sampled at the record cycle can select the following.
  - Mean value
  - Instantaneous value
  - Minimum value and the maximum value
- Other recorded data :
  Alarm information and a message
- Data record capacity :
  The time indicated in the table below can be recorded for the following conditions.
  [Conditions]
  - Number of inputs : 6 channels
  - File record cycle : One day
  - Record data format : Binary
  - Record type : maximum / minimum value record
  - With no events, such as an alarm and a message

SD memory card capacity	2GB				
File record cycle	1 hour			1 day	
Data record cycle	1 sec	2 sec	5 sec	10 sec	1 min
Record possible capacity (approx.)	1.0 year	1.4 years	1.8 years	14.0 years	33.7 years

* The record exceeding the product-life cycle is not guaranteed.

- Memory activity capacity display :
  The remaining capacity of the internal memory or the SD memory card is indicated by the percent on the screen.
  When the recording region of SD memory card is lost, it can be chosen whether record is suspended or old data is eliminated and a record is continued.
- SD memory card :

SD memory card that can be used :
- Made by Panasonic : 1 to 32 GB
- Made by Sandisk : 1 to 32 GB
Please purchase at a computer shop etc.

- Data format :
It is possible to select it from either of method of the binary or binary + CSV data. (It is not possible to switch while recording. CSV data is readable in Excel etc.)
CSV format : About 120 bytes per one sampling (at the time of 6 channels input, and the maximum / the minimum record).
Binary format : about 30 bytes (at the time of a six-channel input, and the maximum / the minimum record)

ALARM FUNCTION

- Set number :
A maximum of four points can be set as each channel.
- Type of alarm :
High and low limits, fault
- Display :
It displays on a digital display screen at the time of an alarm occurrence.
A red line is displayed at the right of the horizontal trend screen or it displays it downward on the vertical trend screen.
- Hysteresis :
It is possible to set it with 0 to 100% of the input range.
- Alarm output :
Common alarm output :
One output (open collector output)
Contact rating : 30V DC, 20mA/1 point

ETHERNET (10BASE-T)

■ HTTP server
- Measured-value display :
Measurements and the alarm situation of each channel are displayed.

■ FTP server
- File download :
Download of the recorder file stored at SD memory card is possible.
- File deletion :
Deletion of the recorder file saved at SD memory card is possible.
- Access authentication :
The access privilege to FTP server is attested.

■ Modbus TCP
- Data reading :
Reading measurements and the setting is possible by the Modbus TCP protocol.
- Data writing :
A part of setting can be written by the Modbus TCP protocol.

■ SNTP
- SNTP client function :
It is possible to synchronize time with the time of SNTP server.

POWER SUPPLY

- Rated supply voltage :
100 to 240V AC
- Working voltage range :
85 to 264V AC
- Power supply frequency :
50/60Hz (common use)
- Power consumption :

Supply voltage	Consumption	
	Normal	LCD off*
AC100V	15VA or less	12VA or less
AC240V	25VA or less	22VA or less

* When the backlight is turned off by the function of turning off LCD.

STRUCTURE

- Mounting method :
Panel embedding anchoring (vertical panel)
- Mounting posture :
Zero to 30 back, right-and-left horizontal
- Anchoring panel thickness : 2 to 7 mm
- Construction material : Porycarbonate Glass 10%, UL94-V0
- Color : Black
- Dimension : 150(W) x144(H) x181.8 (D) mm
- Mass : About 1.0kg (6 channels)
- External terminal block : M3.5 screw-thread terminal

NORMAL OPERATING CONDITION

- Supply voltage : 85 to 264V AC
- Ambient temperature : 0 to 50 ℃
- Ambient humidity : 20 to 80%RH
- Warmup time : 30 min or more after power on

OTHERS

- Clock :
Accuracy - Less than ±50ppm (monthly difference about 2 min)
However, the error at the time of power-source ON/OFF is not included.
- Memory backup :
A parameter is saved at an internal flash memory.
A clock is backed up with a built-in lithium cell (battery life - about five years at the time of no turning on electricity).
- Insulation resistance :
20MΩ (500V DC during each terminal-earth)
- Withstand voltage :
Between input terminals -- For [500V AC] 1 min
Between power supply terminal and G terminal -- For [2000V AC] 1 min
Between input terminal and G terminal -- For [500V AC] 1 min

ADAPTATION SPECIFICATION

- CE :
EMC directive : EN61326-1 adaptation
Low Voltage Directive : EN61010-1 adaptation
- Protection-against-dust / water proof specification :
JIS C0920 IP65 (front panel) Conformity

TRANSPORTATION / STORAGE CONDITIONS

- Temperature : -10 to 60 ℃
- Humidity : 5 to 90 %RH
- Oscillation : It is below 2.45 m/s^2 10 to 60 Hz.

- Impact : Below 249 m/s^2 (packed state)

ADDITIONAL FUNCTION (OPTION)

■ Communication

Mounting of RS-485 communication module is possible.
(the 8th figure of model code "1")

- Communication function :
  - Electrical specifications : EIA RS-485 conformity
  - Protocol: Modbus RTU
  - Communication mode : two-wire-system half-duplex, start-stop synchronous
  - Data format : Data length : 8 bits
  - Stop bit : 1 bit
  - Parity : even/odd/nothing
  - Transmission speed : 9600 bps
  - The number of Maximum connection: 32 (including master device), Multidrop
  - Communication distance : A maximum of 500 m (total extension)

■ DI/DO (the 9th figure of model code "1")

Only one card with the DI input in 9 points and the DO outputs in 12 points can be mounted.
However, if the number of inputs is 12 channels, it cannot be mounted at the time of a relay output card choice.

- Connection type : Connector (40 pins, DI/DO mixture)
- Insulation resistance : More than 500V DC 20MΩ (between each terminal and G terminal)
- Withstand voltage : 500V AC 10mA 1min (between each terminal and G terminal)
- DI input :
  - Dry contact input (9 points)
  - Rating : Photo-coupler actuation 12V DC about 3mA/1 point
  - The following control is possible according to the contact input (500ms or more of ON/OFF pulse periods).
    - (1) Start/stop of main and sub record
    - (2) Message setting
    - (3) Integrated value reset
    - (4) LCD backlight ON/OFF control
- DO output :
  - Open collector output (12 points)
  - Contact rating : 30V DC 20mA/1 point
  - Assignment is possible as an alarm output.

■ Relay output card (the 9th figure of model code "2")

Only one card with the output of the relay of 6 points can be mounted.
However, if the number of inputs is 12 channels, it cannot be mounted at the time of a DI/DO card choice.
Assignment is possible as an alarm output.

- Connection type : Terminal Block (M3.5 screw)
- Contact capacity : 3A/250VAC, 3A/30V DC
  - however, 3A / 1 common and a total - the thing below 9A.
- Insulated mode : Photo-coupler insulation
- Insulation resistance :
  - More than 500V DC 20MΩ
  - (between relay terminals and G terminal)
- Withstand voltage :
  - 2000V AC 10mA 1min
  - (between relay terminals and G terminal)

SUPPORT SOFTWARE

In two kinds of support software, it is par and attached.

- A support model is a PC/AT compatible machine.
- An action with a hand made PC or a shop brand personal computer cannot be guaranteed.
- Disk unit :
  - The CD-ROM drive corresponding to Windows XP/Vista
- Capacity of hard disk drive :
  - 500 MB or more of the minimum availability
- OS : Windows XP/Vista
- Printer :
  - The printer and printer driver corresponding to Windows XP/Vista.

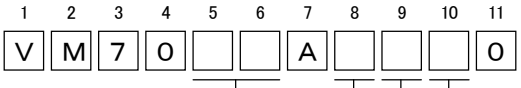
■ Parameter loader software

- The main functions :
  - It is software to set the parameter of the recorder. A set content is stored on the SD memory card, and it is possible to read with the recorder.

■ Data viewer software

- The main functions :
  - It is the software which reproduces the record data saved at SD memory card on a personal computer.
  - A historical-trend display and an event display are equipped.
  - Data can be outputted to a CSV file.

MODEL CODE NUMBER



digit	Specifications	code
5-6	<Number of input channels >	
	03	03
	06	06
	09	09
	12[*1]	12

<Option>

8	<Communication>	
	None	0
	RS-485	1
9	<Input/Output>	
	None	0
	DI/DO[*2]	1
	Relay output	2
10	<Test certificate>	
	None	0
	Japanese	1
	English	2

(Notes)
[*1] If the 12 channels of inputs are chosen, the DI/DO card and Relay output card of an option cannot be chosen.
[*2] The cable is not attached to DI/DO of option. Please purchase the DI/DO cable of option item if necessary.

STANDARD ACCESSORY

Item		Quantity
Panel mounting bracket		2
CD-ROM	PC support software Instruction manual (Japanese/English)	1
Panel packing for front water proof		1

(Note) SD memory card is not attached.
Please purchase in a personal computer shop etc.

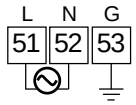
OPTION ITEM

Item	Code
Shunt resistance for a direct-current input (250 Ω ± 0.1 %)	HMSU3081A11
The terminator for RS-485 (200 Ω)	WMSU0303A01
DI/DO cable (1 m)	WMSU0468A01
DI/DO cable (3 m)	WMSU0468A02

Tarminal Arrangement

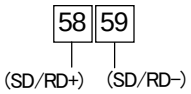
When there is no optional card (DI/DO card, Relay output card)
All terminals are M3.5 screws.

Power Supply Terminal



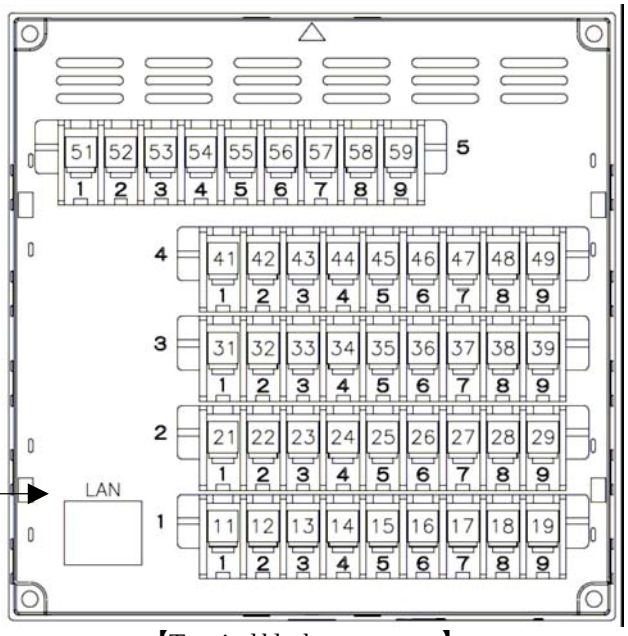
COM. ALM.

RS-485（option） Terminal



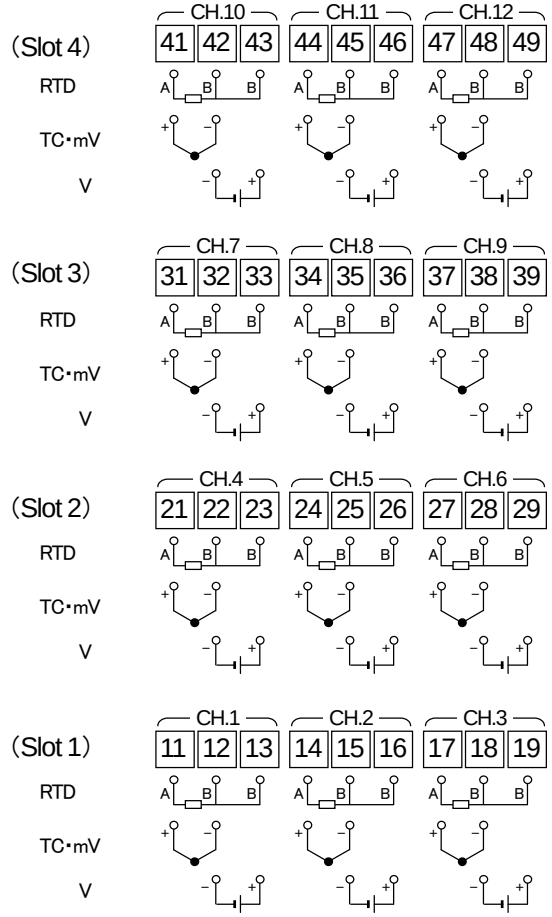
Ethernet

(Note) In the case of an end station, please connect a terminator.



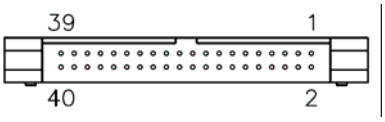
【Terminal block arrangement】

Input Terminals



(Notes) The terminal block of a channel without an input is not mounted by a model code.
For example, in the case of the 9 channels of inputs, there is no Terminal block of 41 to 49.
In the case of the DC current input, please connect optional shunt resistance to the DC voltage input terminal.

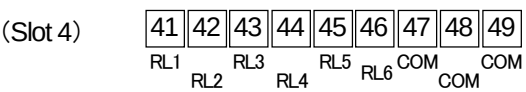
In the case of with a DI/DO card (option)
A slot 4 (Terminal Block part of the above figures 41 to 49) serves as a connector.
(Use connector: Made by HIROSE ELECTRIC HIF3BA-40PA-2.54DS(71))
DI : Dry contact input (9 points)
DO : Open collector output (12 points)



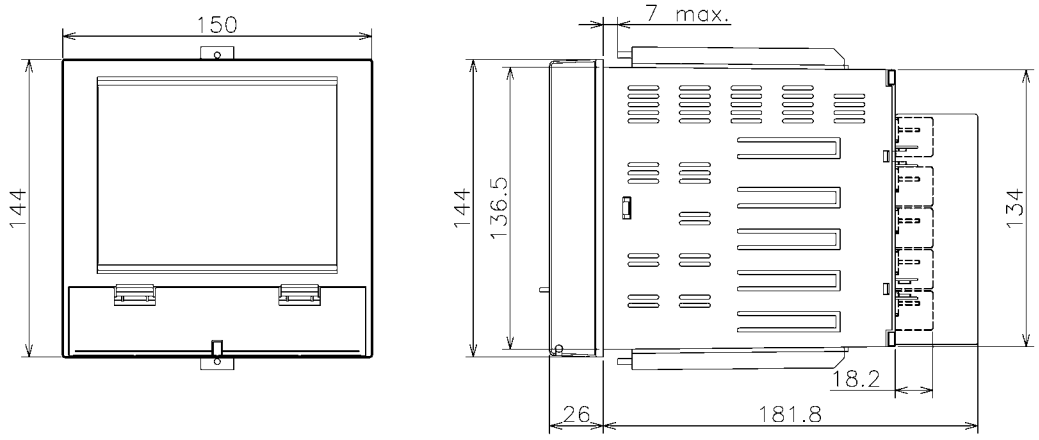
Pin No.	Signal	Pin No.	Signal
1	DI1	21	DO1
2	DI2	22	DO2
3	DI3	23	DO3
4	DI4	24	DO4
5	DI5	25	DO5
6	DI6	26	DO6
7	DI7	27	DO7
8	DI8	28	DO8
9	DI9	29	DO9
10	NC	30	DO10
11	NC	31	DO11
12	NC	32	DO12
13	DI_COM	33	DO_COM
14	DI_COM	34	DO_COM
15	DI_COM	35	DO_COM
16	DI_COM	36	DO_COM
17	DI_COM	37	DO_COM
18	DI_COM	38	DO_COM
19	DI_COM	39	DO_COM
20	DI_COM	40	DO_COM

In the case of with a relay output card (option)
All terminals are M3.5 screws.

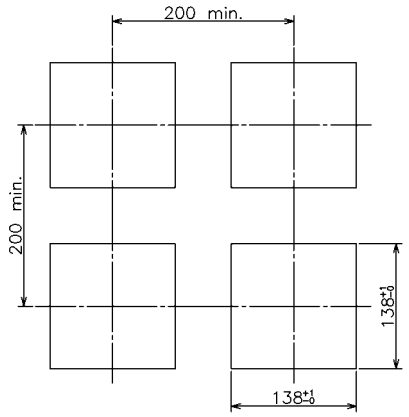
Contact capacity :
3A/250VAC、3A/30V DC
however, 3A/1 comon a total -- thing below 9A.



DIMENSIONS （Unit = mm）



< Panel Cutout >



Note 1) Windows XP/Vista, Excel are the registered trademarks of Microsoft Corporation of the U.S.A.

Note 2) Modbus is the registered trademark of Schneider Electric.

Note 3) Ethernet is the registered trademark of Xerox Corporation.

Printed in Japan Jul. 2009