

MULTI POWER MONITOR
 (4 digital displays)

 MODEL **53U**
MODEL & SUFFIX CODE SELECTION
53U-1□□□-AD4

MODEL

CONFIGURATION

- 1 : Single-phase / 2-wire and 3-wire,
3-phase / 3-wire and 4-wire

INPUT

- 1 : 480V AC / 1A
2 : 480V AC / 5A

CONTACT INPUT

- 0 : None *1
1 : 24V DC *2
2 : 110V DC *2

*1. 'External Interface' codes 1, 4 and 5 Not selectable.

*2. 'External Interface' codes 2, 3, 6, 7, 8 and 9 Not selectable.

EXTERNAL INTERFACE

- 1 : Modbus, Do × 1, Di × 1
2 : 4 – 20mA DC × 4
3 : 1 – 5V DC × 4
4 : 4 – 20mA DC × 2, Do × 1, Di × 1
5 : 1 – 5V DC × 2, Do × 1, Di × 1
6 : 4 – 20mA DC × 2, Do × 2
7 : 1 – 5V DC × 2, Do × 2
8 : Modbus, Do × 3
9 : Do × 4

AUXILIARY POWER SUPPLY

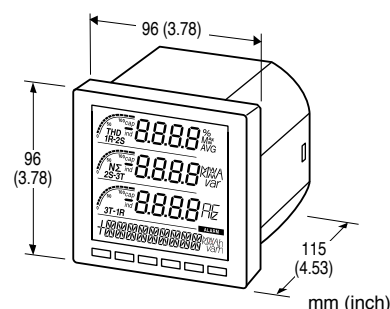
AD4 : 100 – 240V AC / 110 – 240V DC (universal)

ORDERING INFORMATION

Specify code number. (e.g. 53U-1211-AD4)

RELATED PRODUCTS

- PC configurator cable (model: MCN-CON)
- PC configurator software (model: 53UCFG)
- PC Recorder Light software for the 53U
(model: MSR128LUx)

 Software downloadable at M-System's web
 site: <http://www.m-system.co.jp>

Functions & Features

- Measures simultaneously several variables of a heavy-current power system: current, voltage, active, reactive and apparent power, active and reactive energy, power factor, frequency, etc.
- All measured values, counter values, display mode, setting data are stored in the non-volatile memory at the power off
- Conversion factors, system configuration, interval times are programmable using the front keys
- Open collector output for alarm or energy count

Typical Applications

- Multi-functional power monitor incorporated in an electric device: saves space, wiring works, and cost

GENERAL SPECIFICATIONS
Construction: 96-mm square (1/4 DIN size) panel flush mounted

Degree of protection
Front panel: IP 50

Terminal block, housing: IP 30

Connection
Voltage input: Connector type terminal block
 (applicable wire sizes ≤ 2.5 dia, 0.5 – 3.5 mm²)

Current input: Screw terminal block
 (applicable wire sizes ≤ 2.4 dia, 0.5 – 3.5 mm²)

Output, power: Connector type terminal block
 (applicable wire sizes ≤ 2.4 dia, 0.5 – 2.5 mm²)

Configuration: Single phase/2-wire and 3-wire, 3-phase/3-wire balanced/unbalanced load, 3-phase/4-wire balanced/unbalanced load

Housing material: Flame-resistant resin (gray)

Isolation: Voltage input to current input to contact input to network interface or configurator jack or analog output to contact output* to power

*Between each contact output except for External Interface code 8.

Measured variables**Voltage:** 1 – N, 2 – N, 3 – N, 1 – 2, 2 – 3, 3 – 1**Current:** 1, 2, 3, N**Average current:** 1, 2, 3**Active / reactive / apparent power:** 1, 2, 3, Σ **Power factor:** 1, 2, 3, Σ **Frequency****Active energy incoming / outgoing:** Σ **Reactive energy inductive / capacitive:** Σ **Apparent energy:** Σ **Active / reactive / apparent power intervals (demand)****Other demands****Harmonic contents:** 2nd to 31st**Max. and min. values**

- **DISPLAY:** LCD with LED backlight
(LED OFF timer available)
Signed: 4 digits, 3 lines
Energy: 9 digits, 1 line
Bargraph: 3 points

INPUT**Frequency:** 50 / 60 Hz (45 – 65 Hz)• **Voltage Input****Rated voltage****Line-to-line (delta voltage):** 480V**Line-neutral (phase voltage):** 277V**Consumption VA:** $\leq U_{LN}^2 / 300k\Omega$ / phase**Overload capacity:** 200% of rating for 10 sec.,
120% continuous**Selectable primary voltage range:** 50 – 400 000 V• **Current Input****Rated current:** 1A or 5A**Consumption VA:** $\leq I^2 \cdot 0.01\Omega$ / phase**Overload capacity:** 4000% of rating for 1 sec., 2000% for 4
sec., 120% continuous**Selectable primary current range:** 1 – 20 000 A**Operational range****Voltage, current, apparent power:** $\leq 120\%$ of the rating**Active/reactive power:** $\leq \pm 120\%$ of the rating**Frequency:** 45 – 65 Hz**Power factor:** $\leq \pm 1$

- **CONTACT INPUT:** 24V DC or 110V DC
(input resistance 6k Ω)

Contact detecting voltage: External 24V DC $\pm 10\%$ or
110V DC $\pm 10\%$ **ON current:** $\geq 1mA$ ($\leq 24k\Omega$ @24V, $\leq 110k\Omega$ @110V)**OFF current:** $\leq 0.1mA$ ($\geq 240k\Omega$ @24V, $\geq 1.1M\Omega$ @110V)**Contact detecting time:** 10 – 1000 msec.Contact status can be monitored on the Modbus; usable to
reset energy count or to update average (demand) value**OUTPUT**■ **NETWORK INTERFACE****Transmission:** Half-duplex, asynchronous, no procedure**Interface:** Conforms to EIA RS-485**Max. transmission distance:** 500 meters**Baud rate:** 1.2 – 38.4 kbps**Max. number of nodes:** 31 (except the master)**Protocol:** Modbus RTU**Media:** Shielded twisted-pair cable (CPEV-S 0.9
dia.)■ **DC CURRENT OUTPUT:** 4 – 20mA DC**Load resistance:** 270 Ω maximum**■ **DC VOLTAGE OUTPUT:** 1 – 5V DC**Load resistance:** 5000 Ω minimum****Measurands converted into analog output: Voltage,
Current, Active / reactive / apparent power, Power factor,
Frequency, Harmonic contents■ **OPEN COLLECTOR**

Programmable for either alarm or energy count.

Max. rated load: 130V DC @50mA**Continuous rated load:** 130V DC @30mA**Saturation voltage:** 1.5V DCFor maximum contact life and noise quenching with induc-
tive loads, external protection is recommended.**Measurands applicable to alarm:** Voltage, current, current
intervals, neutral current, frequency, energy,
energy intervals
(ON delay, deadband and other parameters
are selectable)**Measurands applicable to count:** Energy;
Pulse rate selectable within
0.1 – 10 000.0 kWh/p, kvarh/p, kVAh/p**INSTALLATION****Power input****AC:** Operational voltage range 85 – 264V
47 – 66 Hz; $< 8VA$ **DC:** Operational voltage range 99 – 264V
 $< 4W$; ripple 10% p-p max.**Operating temperature:** -10 to +55°C (14 to 131°F)**Storage temperature:** -20 to +80°C (-4 to +176°F)**Operating humidity:** 90% RH max. (non-condensing)**Mounting:** Panel flush mounting**Dimensions:** W96×H96×D115 mm (3.78"×3.78"×4.53")**Weight:** 300 g (0.66 lbs)

PERFORMANCE

Accuracy (at 23°C ±10°C or 73.4°F ±18°F, 45 – 65 Hz)

Voltage: ±0.3%***

Current: ±0.3%***

Power: ±0.5%***

Power factor: ±0.5%

Frequency: ±0.1%***

Energy: ±1%

Harmonic contents: ±1%***

Analog output: Accuracy of assigned measurand or
±0.2%, whichever is greater.

Response time: ≤2 seconds (0 – 99%)

≤3 seconds for frequency and harmonic
contents

Insulation resistance: ≥100MΩ with 500V DC

(voltage input to current input to contact
input to network interface or configurator
jack or analog output to contact output****
to power)

Dielectric strength: 4000V AC @1 minute

(voltage input or current input or contact in-
put or network interface or configurator jack
or analog output or contact output to power)
2500V AC @1 minute

(voltage input to current input to contact
input to contact output to network interface
or configurator jack or analog output)

2000V AC @1 minute (between each contact
output except for External Interface code 8)

***In percentage of the spans: 480V for voltage, 1A or 5A
for current, 4155W (5A) or 831W (1A) for active power

****Between each contact output except for External
Interface code 8.

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EN 61000-6-4 (EMI)

EN 61000-6-2 (EMS)

Low Voltage Directive (73/23/EEC)

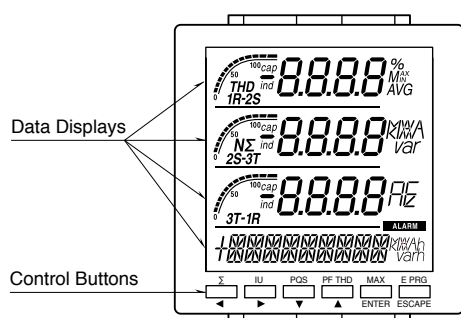
EN 61010-1

Installation category III

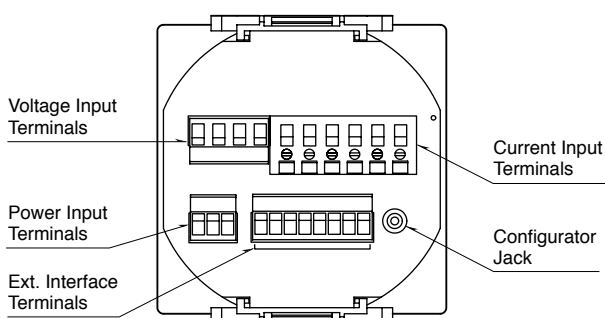
Pollution degree 2

FRONT & REAR VIEWS

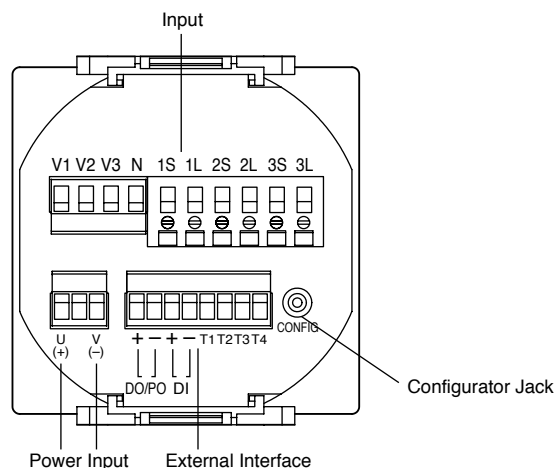
FRONT VIEW



REAR VIEW

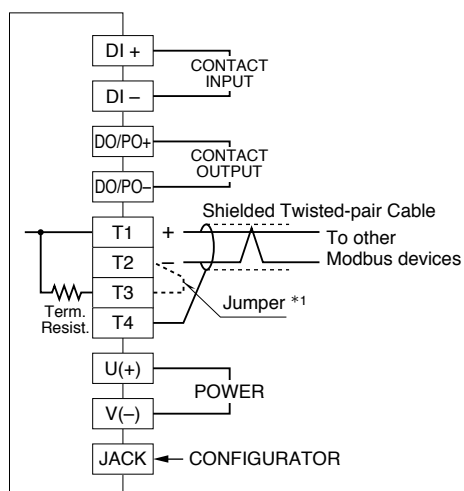


TERMINAL CONNECTIONS

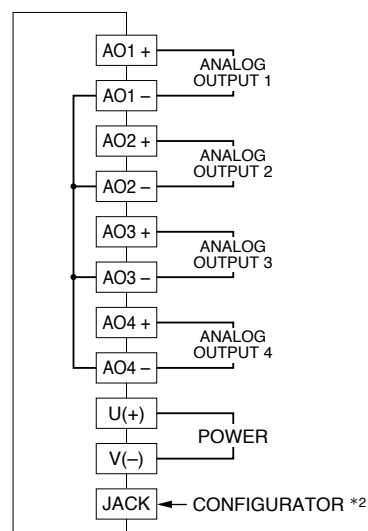


System / Application	Terminal
Single phase / 2-wire	Two diagrams show the connection for a single-phase 2-wire system. The first diagram shows terminals V1, N, 1S, 1L connected to source L1 and N, with load connected to 1S and 1L. The second diagram shows terminals V1, N, 1S, 1L connected to source L1 and N, with load connected to 1S and 1L, and a ground connection to the N terminal.
Three phase / 3-wire, balanced load	Two diagrams show the connection for a three-phase 3-wire system with a balanced load. The first diagram shows terminals V1, V2, V3, 1S, 1L connected to source L1, L2, L3, and load. The second diagram shows terminals V1, V2, V3, 1S, 1L connected to source L1, L2, L3, and load, with a ground connection to the 1S terminal.
Single phase / 3-wire	Two diagrams show the connection for a single-phase 3-wire system. The first diagram shows terminals V1, N, V2, 1S, 1L, 2S, 2L connected to source L1, N, L2, and load. The second diagram shows terminals V1, N, V2, 1S, 1L, 2S, 2L connected to source L1, N, L2, and load, with a ground connection to the N terminal.
Three phase / 4-wire, unbalanced load	Two diagrams show the connection for a three-phase 4-wire system with an unbalanced load. The first diagram shows terminals V1, V2, V3, N, 1S, 1L, 2S, 2L, 3S, 3L connected to source L1, L2, L3, N, and load. The second diagram shows terminals V1, V2, V3, N, 1S, 1L, 2S, 2L, 3S, 3L connected to source L1, L2, L3, N, and load, with a ground connection to the N terminal.

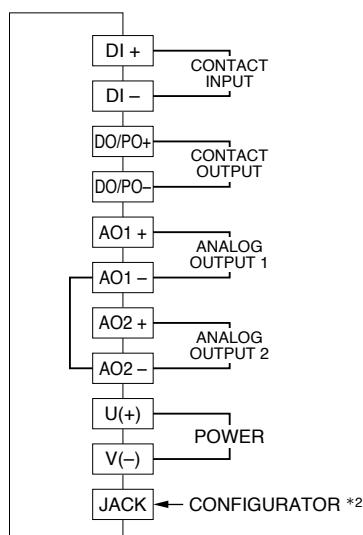
■ EXTERNAL INTERFACE CODE: 1



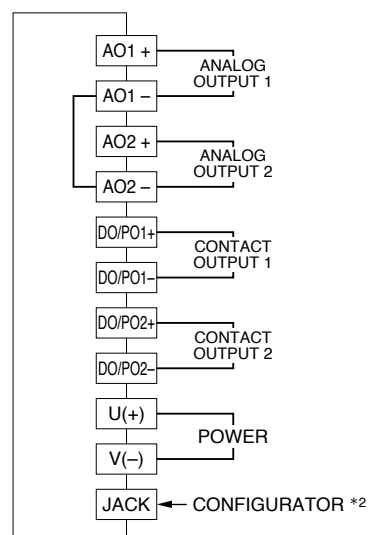
■ EXTERNAL INTERFACE CODE: 2



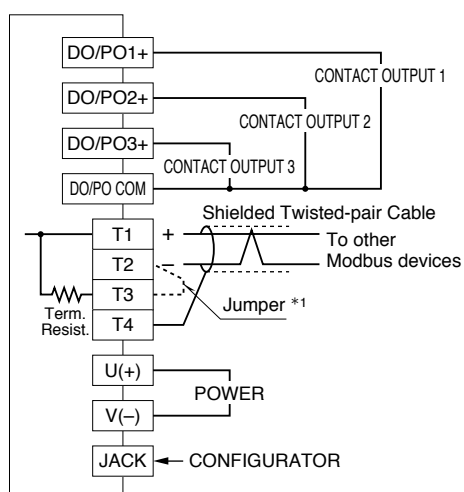
■ EXTERNAL INTERFACE CODE: 4, 5



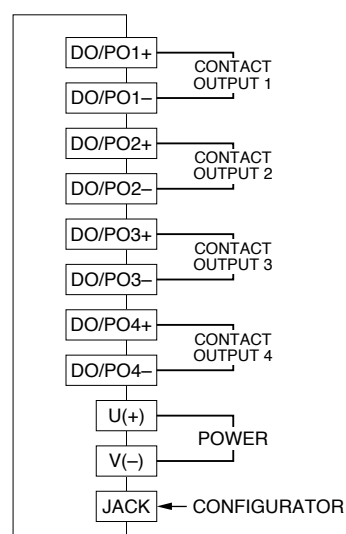
■ EXTERNAL INTERFACE CODE: 6, 7



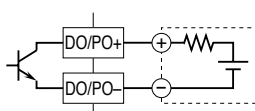
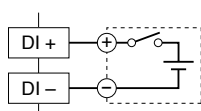
■ EXTERNAL INTERFACE CODE: 8



■ EXTERNAL INTERFACE CODE: 9



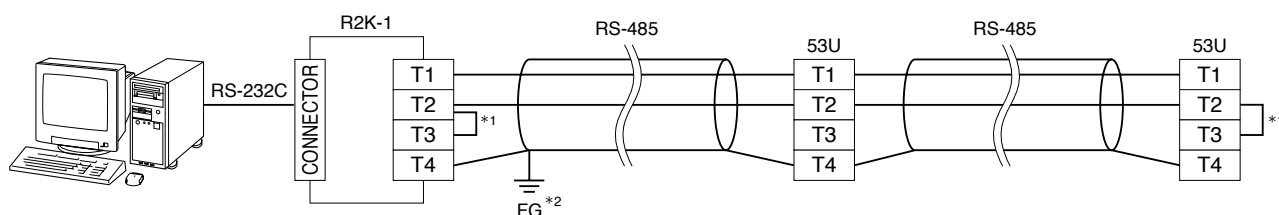
• Contact Input Connection E.g. • Contact Output Connection E.g.



*1. When the device is located at the end of a transmission line via twisted-pair cable, (when there is no cross-wiring), close across the terminal T2 – T3 with a leadwire.

When the device is not at the end, no shortcircuit wire is required.
*2. Analog output may momentarily fluctuate while the configurator cable is left connected.

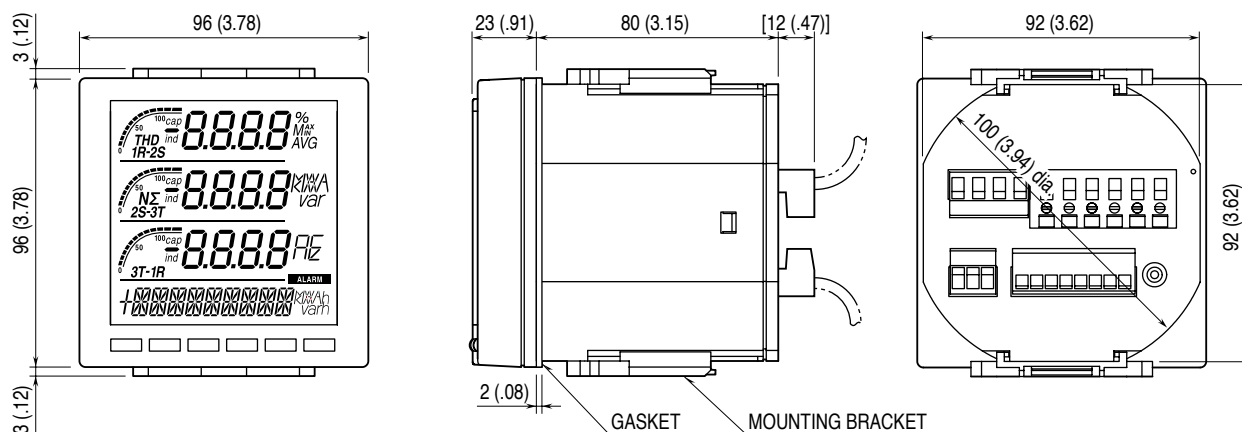
MODBUS WIRING CONNECTION



*1. Internal terminating resistor is used when the device is at the end of a transmission line.

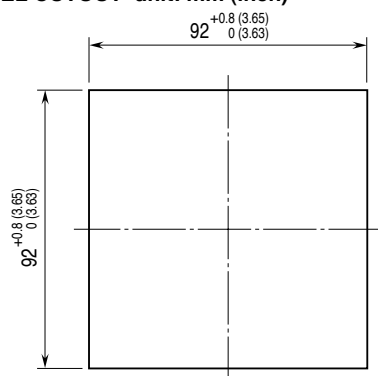
*2. Install shield cables to all sections and ground them at single point.

EXTERNAL DIMENSIONS unit: mm (inch)



MOUNTING REQUIREMENTS

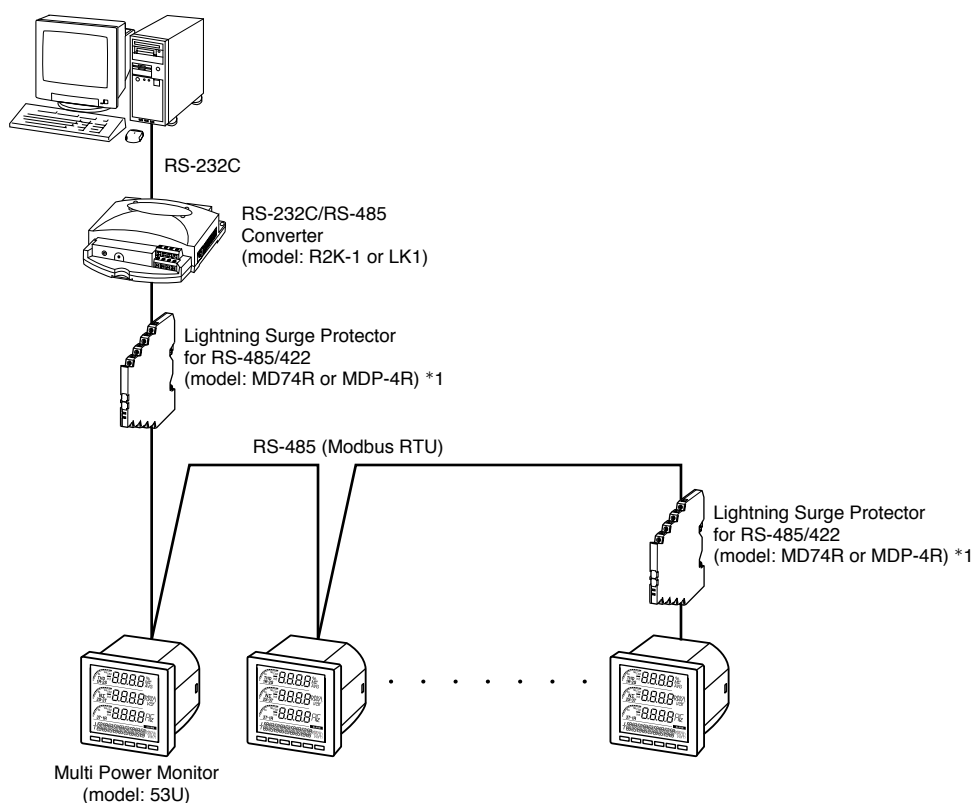
■ PANEL CUTOUT unit: mm (inch)



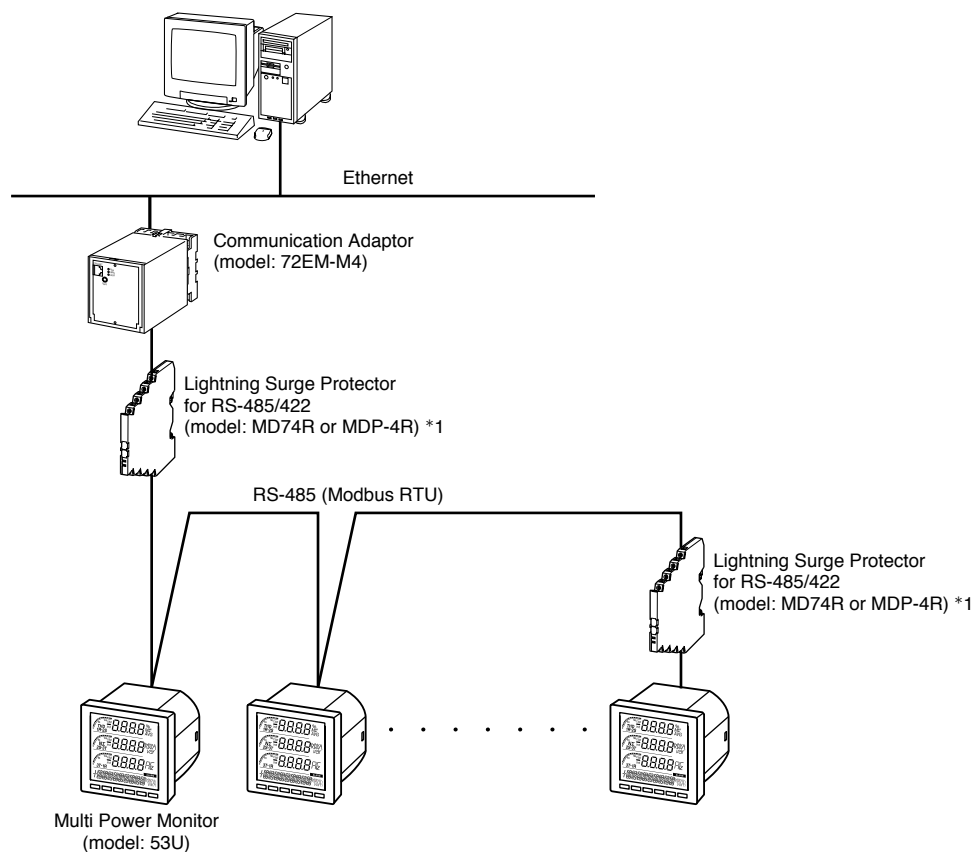
Panel thickness : 2 to 15 mm (0.08 to 0.59 inch)

SYSTEM CONFIGURATION EXAMPLES

■ RS-485 / RS-232C



■ RS-485 / ETHERNET



*1. Insert lightning surge protectors recommended in this example if necessary.