M·SYSTEM CO.,LTD.

Power Transducer Series

MULTI POWER MONITOR
(4 digital displays)

MODEL **53U**

MODEL & SUFFIX CODE SELECTION

53U–1❑❑1–AD4

MODEL

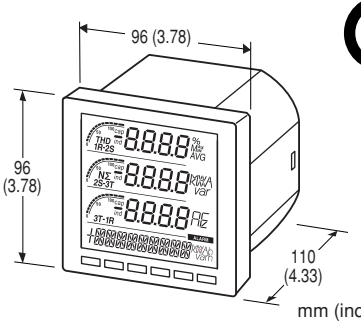
CONFIGURATION
1 : Single-phase / 2-wire and 3-wire, 3-phase / 3-wire and 4-wire

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

CONTACT INPUT
1 : 24V DC
2 : 110V DC

NETWORK INTERFACE
1 : Modbus

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



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

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

ORDERING INFORMATION

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

RELATED PRODUCTS

- PC configurator software (model: 53UCFG)
  Downloadable at M-System's web site: http://www.m-system.co.jp
- PC configurator cable (model: MCN-CON)

GENERAL SPECIFICATIONS

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

Ingress protection
Front panel: Equivalent to IP 50
Terminal block, housing: Equivalent to IP 30

Connection
Voltage input: Connector type terminal block (applicable wire size≤2.5 dia, 0.5 – 3.5 mm^2)
Current input: Screw terminal block (applicable wire size≤2.4 dia, 0.5 – 3.5 mm^2)
Output, power: Connector type terminal block (applicable wire size≤2.4 dia, 0.5 – 2.5 mm^2)

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 to contact output to power

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, ∑
Power factor: 1, 2, 3, ∑
Frequency
Active energy incoming / outgoing: ∑
Reactive energy inductive / capacitive: ∑
Apparent energy: ∑
Active / reactive / apparent power intervals (demand)
Other demands
Hartmonic 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: ≤ U_{LN}^2 / 300kΩ / 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: ≤ $I^2 \cdot 0.01\Omega$ / 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: ≤120% of the rating

Active/reactive power: ≤ ±120% of the rating

Frequency: 45 – 65 Hz

Power factor: ≤ ±1

■CONTACT INPUT: 24V DC or 110V DC (input resistance 6kΩ)

Contact detecting voltage: External 24V DC ±10% or 110V DC ±10%

ON current: ≥1mA (≤24kΩ @24V, ≤110kΩ @110V)

OFF current: ≤0.1mA (≥240kΩ @24V, ≥1.1MΩ @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

Protoocol: Modbus RTU

Media: Shielded twisted-pair cable (CPEV-S 0.9 dia.)

■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 DC

For maximum contact life and noise quenching with inductive 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 kWh/p, kvarh/p, kVAh/p

INSTALLATION

Auxiliary power supply

AC: Operational voltage range 85 – 264V; 47 – 66 Hz; ≤4VA

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×H108×D110 mm (3.78"×4.24"×4.33")

Weight: 300 g (0.66 lbs)

PERFORMANCE

Accuracy

Voltage: ±0.3%*

Current: ±0.3%*

Power: ±0.5%*

Power factor: ±0.5%

Frequency: ±0.1%*

Energy: ±1%

Harmonic contents: ±1%*

Response time: ≤2 seconds (0 – 99%)

Insulation resistance: ≥100MΩ with 500V DC (voltage input to current input to contact input to network interface or configurator jack to contact output to power)

Dielectric strength: 4000V AC @1 minute (voltage input or current input or contact input or network interface or configurator jack 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)

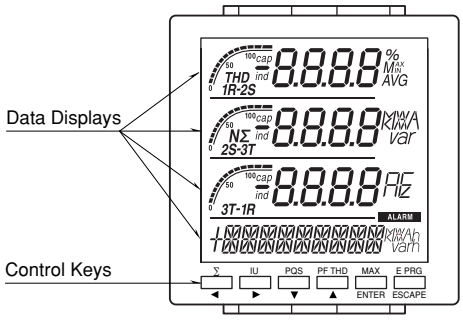
*In percentage of the spans: 480V for voltage, 1A or 5A for current, 7200W (5A) or 1440W (1A) for active power

STANDARDS & APPROVALS

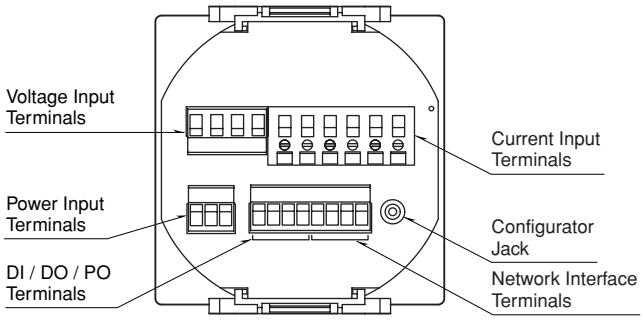
CE conformity: EMC Directive (89/336/EEC)
EMI EN61000-6-4
EMS EN61000-6-2
Low Voltage Directive (73/23/EEC)
EN 61010-1
Installation category III
Pollution degree 2

FRONT & REAR VIEWS

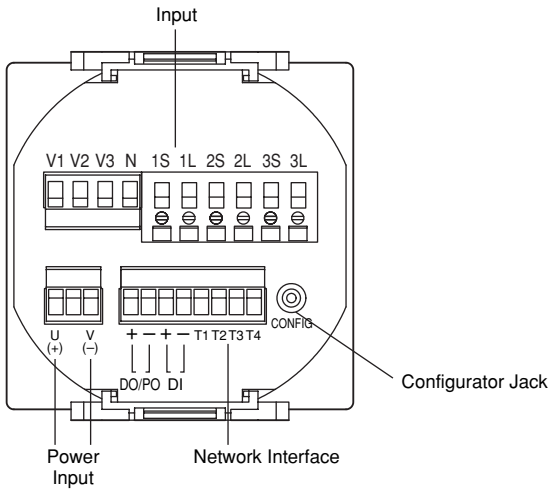
■FRONT VIEW

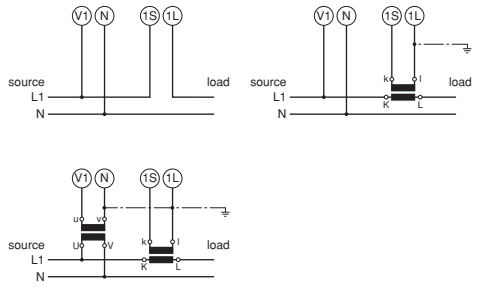
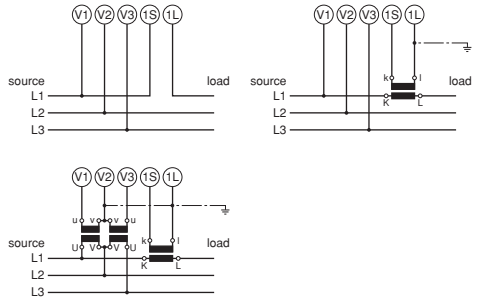
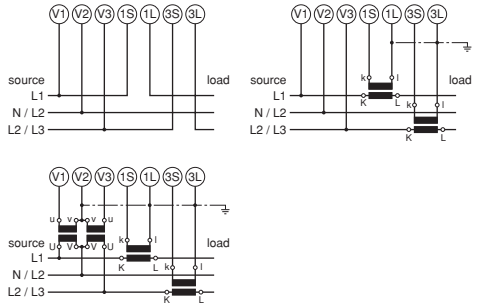


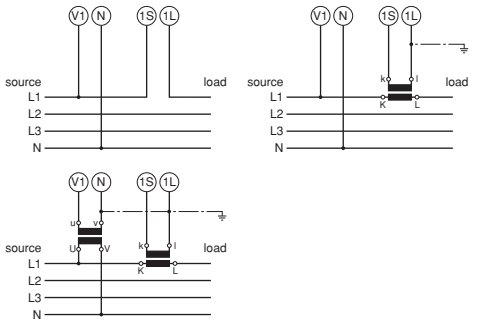
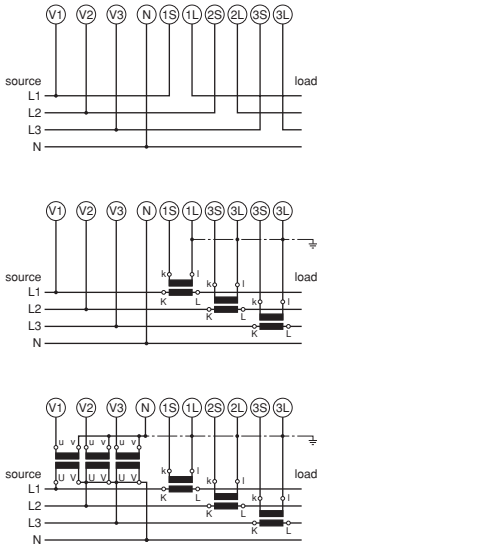
■REAR VIEW



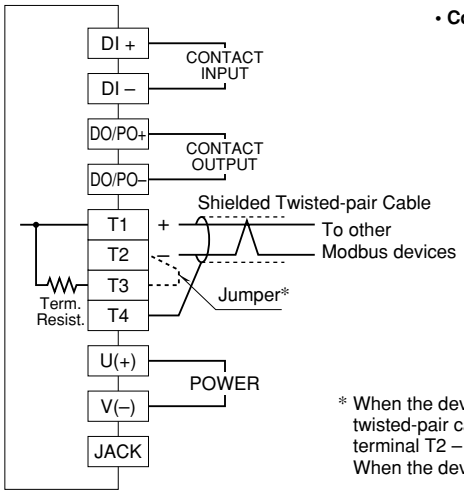
TERMINAL CONNECTIONS



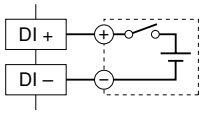
System / Application	Terminal
Single phase / 2-wire	
Three phase / 3-wire, balanced load	
Single phase / 3-wire Three phase / 3-wire, unbalanced load	

System / Application	Terminal
Three phase / 4-wire, balanced load	
Three phase / 4-wire, unbalanced load	

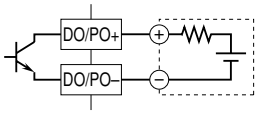
No need of grounding for a low voltage circuit.



• Contact Input Connection Example



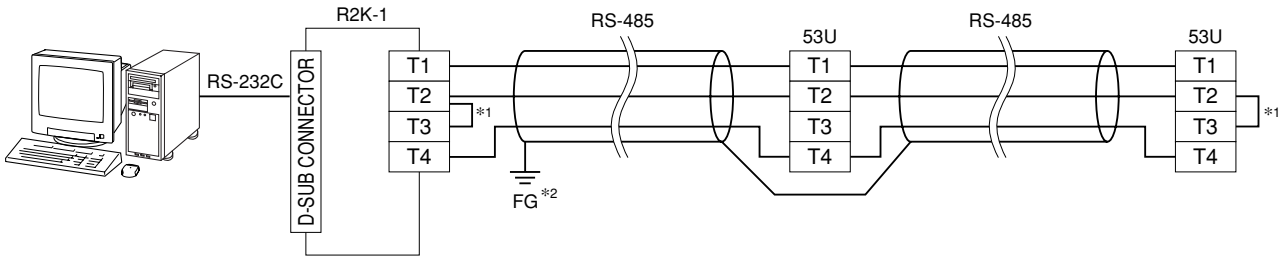
• Contact Output Connection Example



* 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 the attached jumper pin (or with a leadwire). When the device is not at the end, remove the jumper pin.

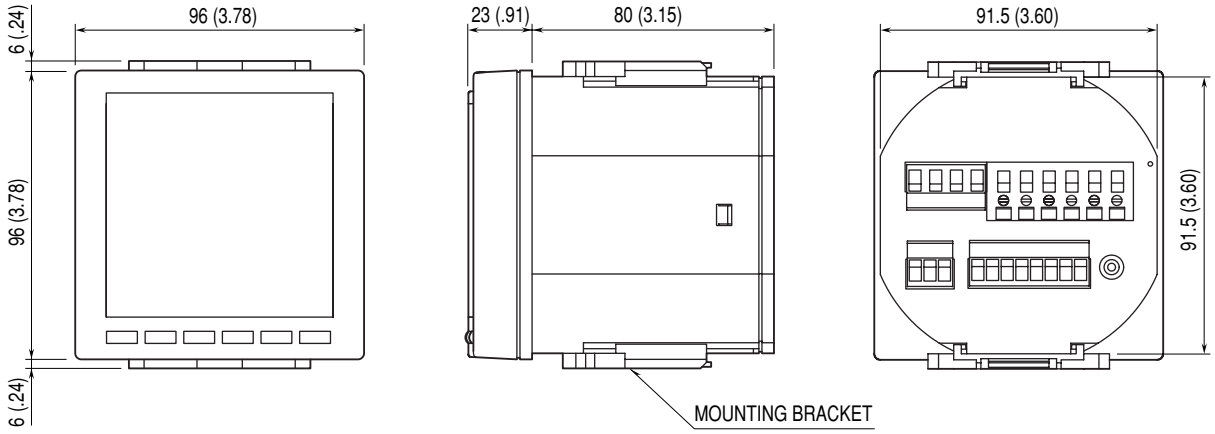
Specifications subject to change without notice.

MODBUS WIRING CONNECTION



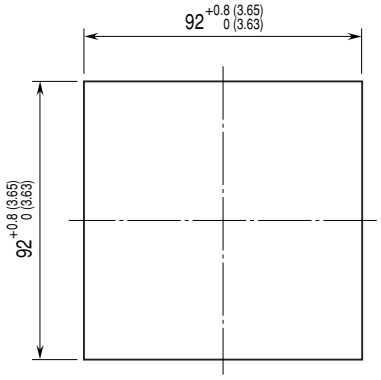
*1. Internal terminating resistor is used when the device is at the end of a transmission line.
*2. Install shield cables to all sections and ground them at single point.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)



MOUNTING REQUIREMENTS mm (inch)

■PANEL CUTOUT



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

SYSTEM CONFIGURATION EXAMPLE