

Panel Mounted Multi Power Meter 51-UNIT
MULTI POWER METER
MODEL 51U
MODEL & SUFFIX CODE SELECTION
51U-□□□-□□
MODEL
INPUT (balanced load) *1

- 0** : Single-phase / 2-wire, 105V / 5A AC (P. 5/16) *2
1 : Single-phase / 3-wire, 105V / 210V / 5A AC (P. 7/16)
2 : 3-phase / 3-wire, 220V / 5A AC (P. 10/16)
3 : 3-phase / 3-wire, 110V / 5A AC (P. 10/16)
4 : 3-phase / 4-wire, 110V / $\sqrt{3}$ V / 5A AC (P. 13/16)

DISPLAY ITEMS *3

- A** : A × 3
B : V × 3
C : A × 3, V × 3
D : A × 3, V × 3, kW
E : A × 3, V × 3, kWh
F : A × 3, kW, kWh
G : Hz, PF, kvar
H : V × 3, MV₀, V₀
J : A × 3, DA, MDA
K : A × 3 or DA, MDA, alarm setpoint
L : Hz, PF, kW
M : PF, kW, kWh
N : V × 3, kW, kWh
P : A × 3 or DA or MDA, V × 3, kWh
Q : A × 3, PF, kW
R : A × 3, PF, kvar
S : A × 3 or PF, kW, kWh
T : A × 3, PF, kvarh
U : V × 3, Hz
W : A × 3 or DA or MDA, V × 3, alarm setpoint
X : A × 3, kvar, kvarh
Y : Hz, PF, kWh

OUTPUT

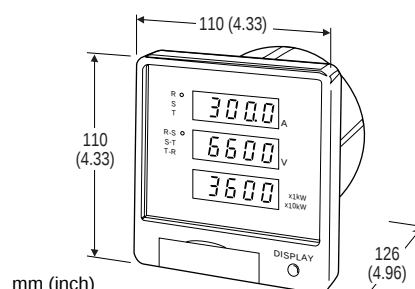
- 0** : None
1 : 4 – 20mA DC, 3 points
2 : 4 – 20mA DC, 2 points + pulse
3 : 4 – 20mA DC, 2 points + reset input
4 : RS-485 (MsysNet use only. Consult Factory.)

AUXILIARY POWER SUPPLY

- M** : 85 – 264V AC
R : 24V DC
P : 110V DC

REMOTE CONTROL

- 1** : 85 – 132V AC or 85 – 143V DC
2 : 20 – 30V DC
3 : 170 – 264V AC


Functions & Features

- Measuring all major factors required for power & energy management
- Transducer combined with 3 displays in one enclosure
- RS-485 or DC current output
- Totalized counter values stored in non-volatile memory
- Occupying less panel space, requiring fewer connection
- Easily replacing standard 110 mm (4 5/16 in.) square size, long scale meter
- Parameters are field-selectable

Application Examples

- Updating conventional power meter to a remote controlled power logger, only with additional transmitter output wiring
- Installed within an industrial piece of electrical equipment

*1 : Some display items or output types are not selectable according to the input type. See the detailed selection guide in the following pages.

*2 : Page No. of the detailed selection guide

*3 : V = Line voltage A = Line current
 kW = Kilowatt kvar = Kilovar
 PF = Power factor Hz = Frequency
 kWh = Kilowatthours kvarh = Kilovarhours
 DA = Demand (current)
 MDA = Maximum demand (current)
 V₀ = Zero-phase voltage
 MV₀ = Maximum zero-phase voltage

DEFAULT SETTING

ITEM	DEFAULT SETTING
CT primary rating	5.00A (element S for demand, time lag 15 min.)
VT primary rating	110.0V or 220.0V, same as input rating
GVT tertiary rating	110.0V
Frequency range	45 – 65 Hz
Pulse out. scaling factor	1 kWh/pulse (kvarh/pulse)
Demand alarm setpoint	100%
RS-485	Address: 01 Transmission speed: 4800 bps

GENERAL SPECIFICATIONS

Construction: 110 mm-square (4 ⁵/₁₆ in.) panel surface, cylindric body

Connection

Input & auxiliary power: M4 screw terminals

Output: M3 screw terminals

Housing material: plastic (black)

Isolation: input to output to power; not isolated between analog outputs

Scaling: primary values for CT and VT; tertiary value for GVT (Inform M-System CT and VT ratios when ordering.)

CT: 5 – 8000A (up to 15000A for Code K)

VT: 110 – 77kV

GVT: 63.5 – 190.5V

Time lag for demand: 0 sec., 30 sec. or 1, 2, 3, 5, 7, 10, 15, 30 min. (default: 15 min.)

Sampling cycle: 400 μ sec. (DO NOT connect a device such like inverters.)

Measurable frequency ranges: 45 – 44 Hz, 55 – 65 Hz, 45 – 65 Hz

Low-end cutout: Display shows 0 for the input less than the following: approx. 1% for current, watt and var; approx. 3% for voltage.

INPUT

VOLTAGE INPUT

(must be balanced with 3-phase connection)

Operational range

Voltage, watt, var, zero-phase voltage: 0 – 100% of rating

Power factor: ≥ 30 V

Frequency: ≥ 30 V

Overload capacity: 200% of rating for 60 sec., 115% for 3 hours

Input burden: 0.3VA/phase

CURRENT INPUT

(may be unbalanced with 3-phase connection)

Operational range

Current, watt, var, demand: 0 – 100% of rating

Power factor: ≥ 5 % of rating

Overload capacity: 4000% of rating for 1 sec., 2000% for 60 sec., 115% for 3 hours

Input burden: 0.1VA/phase

REMOTE CONTROL

Display switching: same functions as the front DISPLAY button does; input time ≥ 0.3 sec., input current 5mA

Reset input: max. zero-phase voltage and demand; input time ≥ 0.3 sec., input current 5mA

OUTPUT

CURRENT OUTPUT: 4 – 20mA DC

Load resistance: 500 Ω maximum

PULSE OUTPUT: totalizing watt in forward flow or var in lag.

Scaling factor: 0.01, 0.1, 1, 10, 100 kWh/pulse (default: 1)

Contact rating: 110V DC @0.1A (resistive load)
110V AC @0.1A (resistive load)

Pulse width time: 100 – 150 msec.
(pulse rate ≤ 12000 pulses/h)

TRANSMISSION OUTPUT (Multi-Meter Protocol)

Transmission: conform to RS-485, EIA

Transmission distance: 1 kilometer max. (≤ 31 units)

Cable: shielded twisted-pair cable (CPEV-S 0.9 dia.)

Terminator: incorporated

DEMAND ALARM CONTACT OUTPUT

Alarm setpoint: 5 – 100%; adjustable in 0.5% increments

Contact rating: 110V DC @0.1A (resistive load)

ON resistance: $\leq 50\Omega$

I/O RANGES

Proportional to 4 – 20mA DC

DISPLAY ITEMS			RATING	INPUT RANGE
Current			5A	0 – 5A
Voltage	1ϕ / 2w	1 – 2	105V	0 – 150V
		1ϕ / 3w	1 – N	105V
	2 – N		105V	0 – 150V
	1 – 2		210V	0 – 300V
	3ϕ / 3w	line	110V	0 – 150V
			220V	0 – 300V
3ϕ / 4w	line phase	110V	0 – 150V	
		110 / $\sqrt{3}$ V	0 – 150 / $\sqrt{3}$ V	
Watt			110V / 5A	0 – 1 kW (0 – 5 kW)
			110V / 5A	-1 – +1 kW (-0.5 – +0.5 kW)
			220V / 5A	0 – 2 kW
			220V / 5A	-2 – +2 kW
Var			110V / 5A	0 – lag1 kvar (0 – lag500 var)
			110V / 5A	lead1 – lag1 kvar (lead500 – lag 500 var)
			220V / 5A	0 – lag2 kvar
			220V / 5A	lead2 – lag2 kvar
Power factor			—	lead 50 – 100 – lag 50 %
Frequency			—	45.0 – 55.0 Hz 55.0 – 65.0 Hz 45.0 – 65.0 Hz
Max. zero-phase voltage			63.5V	0 – 86.6V
			110.0V	0 – 150.0V
			190.5V	0 – 259.8V
Demand			5A	0 – 5A, element S
Maximum demand			5A	0 – 5A, element S

Remarks:

- 1) Values for single-phase connection in brackets.
- 2) Displays are automatically scaled according to the scaling factor settings for VT and CT.
- 3) Reverse or lead flow are displayed with the negative (–) indicator.

INSTALLATION

Auxiliary power supply

- AC:** operational voltage range 85 – 264V,
50/60 Hz, approx. 5.5VA
- DC:** operational voltage range for R: 24V $\pm$ 10%
or P: 85 – 143V; ripple 10% p-p max.;
approx. 5.5W (approx. 230mA at 24V)

Operating temperature: -10 to +50°C (14 to 122°F)

Operating humidity: 30 to 85% RH (non-condensing)

Grounding: grounding resistance $\leq$ 100 Ω

Mounting: panel flush mounting

Dimensions: W110×H110×D126 mm (4.33"×4.33"×4.96")

Weight: 500 g (1.10 lbs)

PERFORMANCE in percentage of span

Accuracy

Voltage, current: $\pm$ 1.0%

Watt, var: $\pm$ 1.5%

Power factor: $\pm$ 3.0%

Frequency: $\pm$ 0.5%

Demand: $\pm$ 1.5%

Zero-phase voltage: $\pm$ 1.5%

Max. zero-phase voltage: $\pm$ 1.5%

Watthours: $\pm$ 2.0% (load current 5 – 100%, power factor 1.0)
 $\pm$ 2.5% (load current 10 – 100%, power
factor 0.5, lag current)

Varhours: $\pm$ 2.5% (load current 10 – 100%, power factor 0)
 $\pm$ 2.5% (load current 20 – 100%, power factor 0.866)
 $\pm$ 3.0% (load current 10%, power factor 0.866)

Temp. conditioning incl. in the accuracy: 23 $\pm$ 10°C
(73.4 $\pm$ 18°F)

Freq. conditioning incl. in the accuracy: 45 – 65 Hz

Response time: $\leq$ 2 sec. (0 – 100% $\pm$ 1%)

Ripple: 0.5% p-p max.

Auxiliary supply voltage effect: $\pm$ 0.1% over voltage
range

Power failure protection: VT/CT scaling factors,
watthours, max. zero-phase voltage and
demand are stored in non-volatile memory.

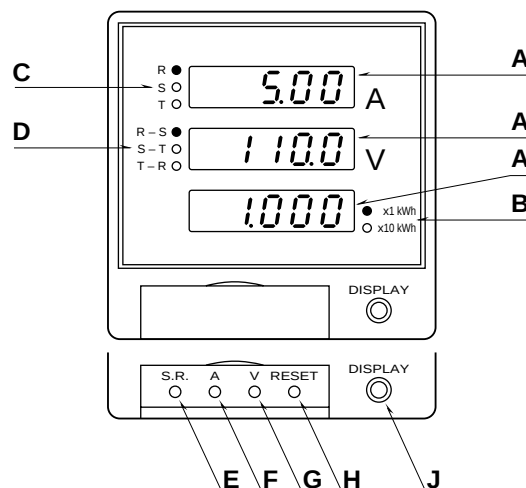
Insulation resistance: $\geq$ 100M Ω with 500V DC

Dielectric strength: 2000V AC @1 minute
(voltage input to current input to trans-
mission section to display switch input to
aux. power to ground terminal)
2000V AC @1 minute
(circuit to ground terminal; not applica-
ble to analog or transmission terminal)

Surge withstand voltage: 1.2/50 μ sec., $\pm$ 4.5kV
(input to output or ground; not applica-
ble to analog or transmission terminal)

FRONT PANEL CONFIGURATION

The front display configuration varies according to
model numbers (display items).



A. Display

LED: 10 mm (.39") 7 segment, orange

Display items:

DISPLAY ITEMS	NO. OF DIGITS	REMARKS
Current A (1, N, 2)	4	Single-phase / 3-wire
A (R, S, T)	4	3-phase / 3-wire or 4-wire
Voltage V (RS, ST, TR)	4	3-phase / 3-wire or 4-wire
V (RN, SN, TN)	4	3-phase / 4-wire
Watt kW	4	– indicator (reverse flow), x1, x10 scaling factor ind. LED
Watthours kWh	5	x1, x10, x100 scaling factor LED
Var kvar	4	– indicator (lead), x1, x10 scaling factor ind. LED
Varhours kvarh	5	x1, x10, x100 scaling factor LED
Power factor PF	3	– indicator (lead)
Frequency Hz	3	
Zero-phase voltage V ₀	4	Measuring/displaying preset element only
Max. zero-phase volt. MV ₀	4	
Demand DA	4	
Max. demand MDA	4	

When values exceed the preset values, corresponding LEDs blink.

B. Multiplication factor: watt, watthours, var or
varhours on the display (A)

C. Line current indicators: Pressing DISPLAY (J) or
"A" (F) button changes lines (elements).

D. Line current indicators: Pressing DISPLAY (J) or
"V" (G) button changes lines.

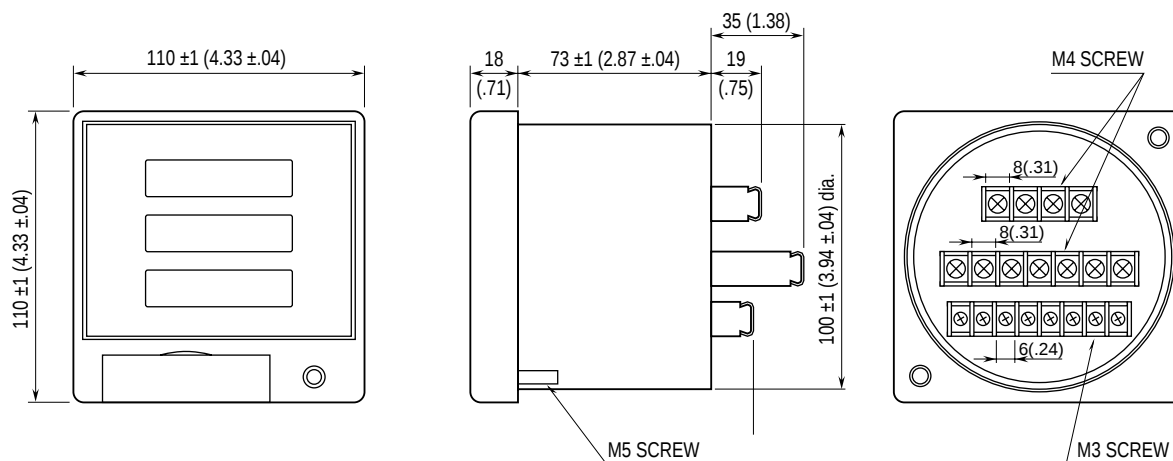
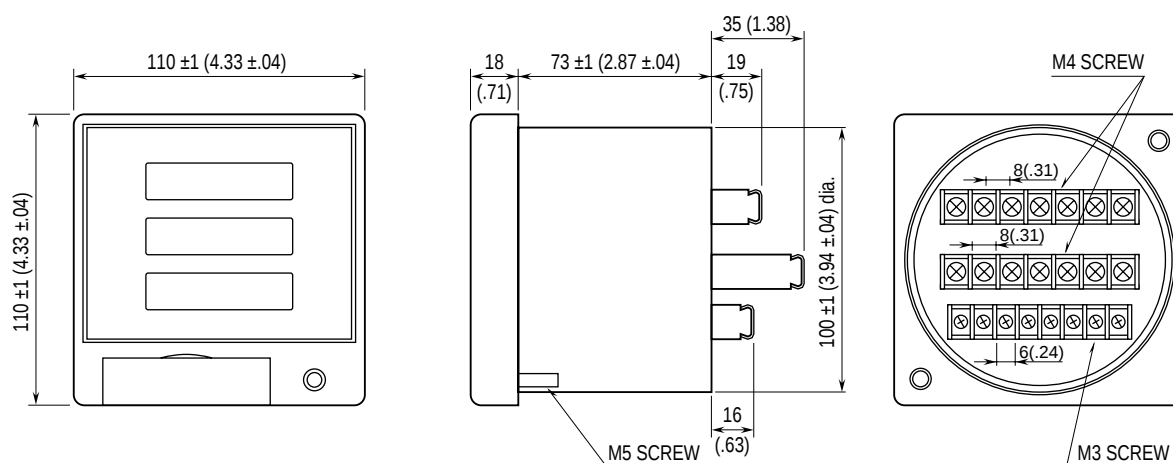
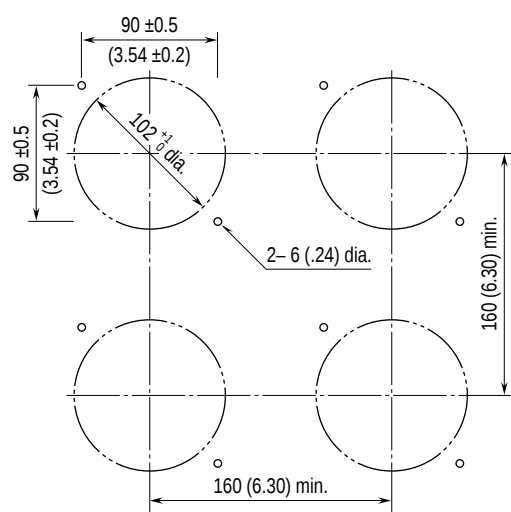
E. Primary rating: indicating the primary rating of
current, voltage, watt or demand

F. Line current switch

G. Line voltage switch

H. Reset: resetting the max. zero-phase voltage or
max. demand; same as the external reset
input via output terminals

J. Display: changing display items, turning the light
on or off; same as the Dis. input via
output terminals

EXTERNAL DIMENSIONS mm (inch)**■SINGLE-PHASE / 2-WIRE or 3-WIRE, 3-PHASE / 3-WIRE CONNECTION****■3-PHASE / 4-WIRE CONNECTION****MOUNTING REQUIREMENTS mm (inch)****■PANEL CUTOUT**

Panel Thickness: 1 to 5.5 mm (.04 - .22 in.)

Specifications subject to change without notice.

SINGLE-PHASE / 2-WIRE CONNECTION

MODEL **51U-0**

MODEL & SUFFIX CODE SELECTION

51U-0□□-□□

MODEL

INPUT (balanced)

0 : Single-phase / 2-wire, 105V / 5A AC

DISPLAY ITEMS

C : A, V

D : A, V, kW

E : A, V, kWh

F : A, kW, kWh

J : A, DA, MDA

K : A or DA, MDA, alarm setpoint

N : V, kW, kWh

P : A or DA or MDA, V, kWh

U : V, Hz

W : A or DA or MDA, V, alarm setpoint

V = Line voltage

A = Line current

kW = Kilowatt

kWh = Kilowatthours

Hz = Frequency

DA = Demand (current)

MDA = Maximum demand (current)

OUTPUT (selectable display items codes)

0 : None (J K W with reset input)

1 : 4 – 20mA DC, 3 points (C D U)

2 : 4 – 20mA DC, 2 points + pulse (E F N P)

3 : 4 – 20mA DC, 2 points + reset input (J)

4 : RS-485 (all codes selectable except K W)

AUXILIARY POWER SUPPLY

M : 85 – 264V AC

R : 24V DC

P : 110V DC

REMOTE CONTROL

1 : 85 – 132V AC or 85 – 143V DC

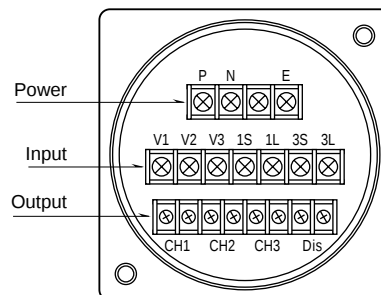
2 : 20 – 30V DC

3 : 170 – 264V AC

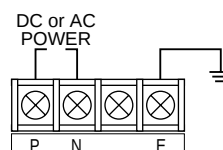
ORDERING INFORMATION

Specify code number. (e.g. 51U-0D4-M1)

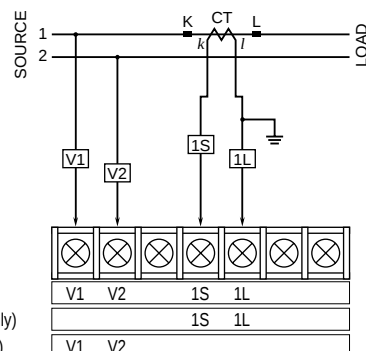
CONNECTION DIAGRAM



POWER



INPUT



Suffix Codes

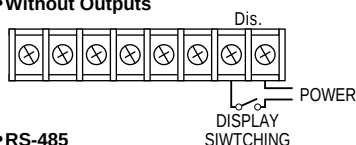
C, D, E, F, N, P, W

J, K (measuring current only)

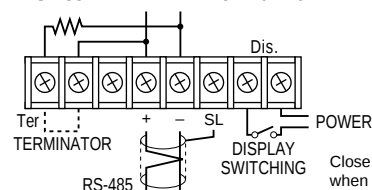
U (measuring voltage only)

OUTPUT

Without Outputs



RS-485



• 4 – 20mA DC, 3 points
(See the following pages.)

• 4 – 20mA DC, 2 points
+ pulse 1 point
(See the following pages.)

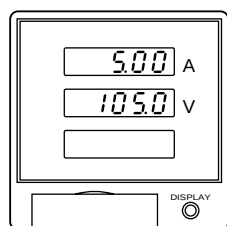
• 4 – 20mA DC, 2 points
+ reset input
(See the following pages.)

Close across the terminator
when the unit is located at
the end of transmission line.

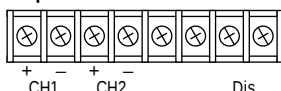
DISPLAY ITEMS & OUTPUTS

Items shown in brackets can be displayed when you change settings.

Suffix Code: C

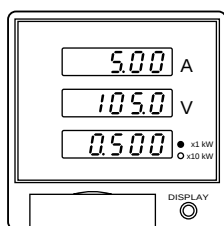


•Output Connection

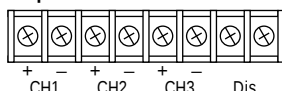


TERM.	ITEMS
CH1	A
CH2	V
Dis.	Display switch. inp.

Suffix Code: D

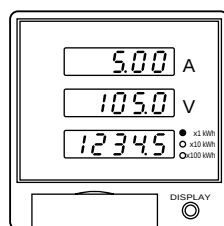


•Output Connection

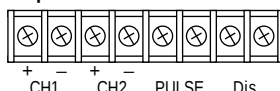


TERM.	ITEMS
CH1	A
CH2	V
CH3	0 – 0.5 kW (-0.5 – +0.5 kW)
Dis.	Display switch. inp.

Suffix Code: E

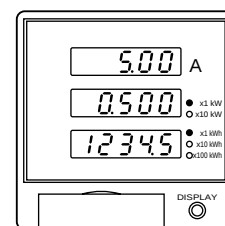


•Output Connection

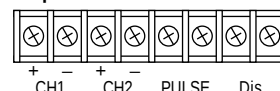


TERM.	ITEMS
CH1	A
CH2	V
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

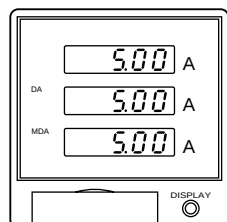


•Output Connection

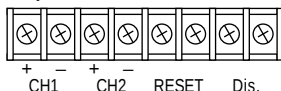


TERM.	ITEMS
CH1	A
CH2	0 – 0.5 kW (-0.5 – +0.5 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: J

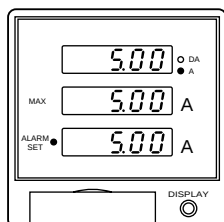


•Output Connection

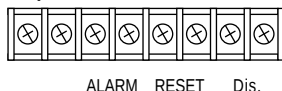


TERM.	ITEMS
CH1	A
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: K

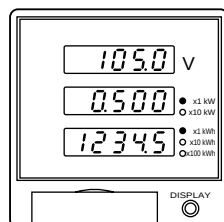


•Output Connection

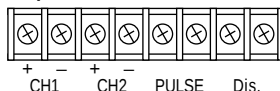


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: N

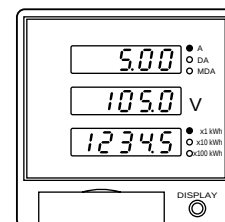


•Output Connection

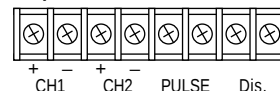


TERM.	ITEMS
CH1	V
CH2	0 – 0.5 kW (-0.5 – +0.5 kW)
CH1/CH2	(A)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P

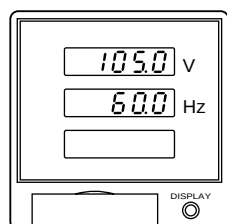


•Output Connection

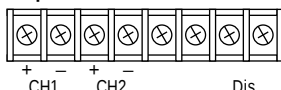


TERM.	ITEMS
CH1	A
CH2	V
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: U

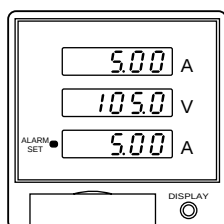


•Output Connection

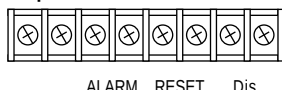


TERM.	ITEMS
CH1	V
CH2	Hz
Dis.	Display switch. inp.

Suffix Code: W



•Output Connection



TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

SINGLE-PHASE / 3-WIRE CONNECTION

MODEL **51U-1**

MODEL & SUFFIX CODE SELECTION

51U-1□□-□□

MODEL

INPUT (balanced)

1 : Single-phase / 3-wire, 105V / 210V / 5A AC

DISPLAY ITEMS

A : A × 3

B : V × 3

C : A × 3, V × 3

D : A × 3, V × 3, kW

E : A × 3, V × 3, kWh

F : A × 3, kW, kWh

J : A × 3, DA, MDA

K : A × 3 or DA, MDA, alarm setpoint

L : Hz, PF, kW

M : PF, kW, kWh

N : V × 3, kW, kWh

P : A × 3 or DA or MDA, V × 3, kWh

Q : A × 3, PF, kW

S : A × 3 or PF, kW, kWh

U : V × 3, Hz

W : A × 3 or DA or MDA, V × 3, alarm setpoint

Y : Hz, PF, kWh

V = Line voltage

A = Line current

kW = Kilowatt

kWh = Kilowatthours

PF = Power factor

Hz = Frequency

DA = Demand (current)

MDA = Maximum demand (current)

OUTPUT (selectable display items codes)

0 : None (J K W with reset input)

1 : 4 – 20mA DC, 3 points (A B C D L Q U)

2 : 4 – 20mA DC, 2 points + pulse (E F M N P)

3 : 4 – 20mA DC, 2 points + reset input (J)

4 : RS-485 (all codes selectable except K W)

AUXILIARY POWER SUPPLY

M : 85 – 264V AC

R : 24V DC

P : 110V DC

REMOTE CONTROL

1 : 85 – 132V AC or 85 – 143V DC

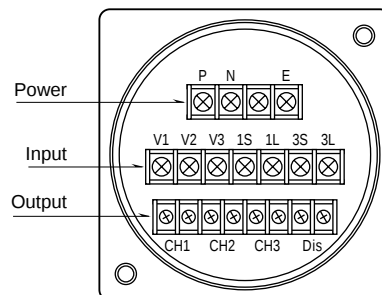
2 : 20 – 30V DC

3 : 170 – 264V AC

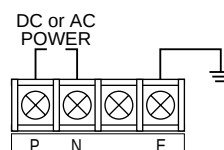
ORDERING INFORMATION

Specify code number. (e.g. 51U-1D4-M1)

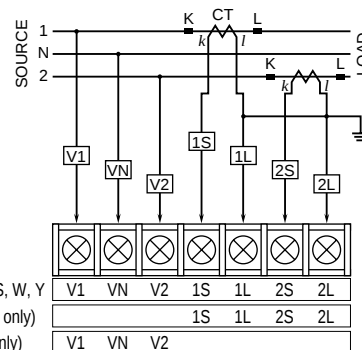
CONNECTION DIAGRAM



POWER



INPUT



Suffix Codes

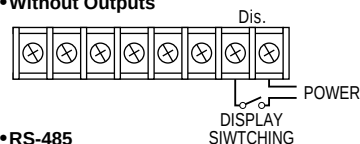
C, D, E, F, L, M, N, P, Q, S, W, Y

A, J, K (measuring current only)

B, U (measuring voltage only)

OUTPUT

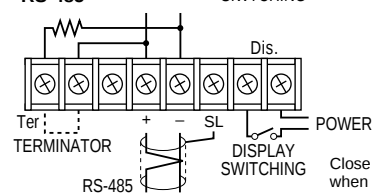
Without Outputs



• 4 – 20mA DC, 3 points
(See the following pages.)

• 4 – 20mA DC, 2 points
+ pulse 1 point
(See the following pages.)

RS-485



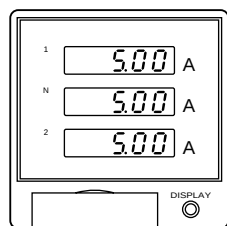
• 4 – 20mA DC, 2 points
+ reset input
(See the following pages.)

Close across the terminator
when the unit is located at
the end of transmission line.

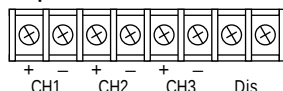
DISPLAY ITEMS & OUTPUTS

Items shown in brackets can be displayed when you change settings.

Suffix Code: A

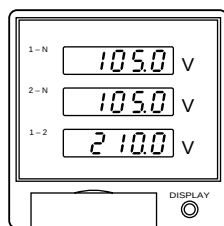


•Output Connection

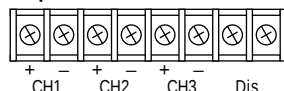


TERM.	ITEMS
CH1	A1
CH2	A _N
CH3	A ₂
Dis.	Display switch. inp.

Suffix Code: B

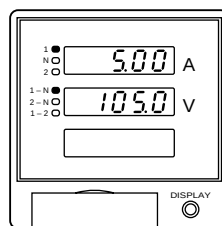


•Output Connection

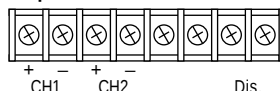


TERM.	ITEMS
CH1	V _{1N}
CH2	V _{2N}
CH3	V ₁₂
Dis.	Display switch. inp.

Suffix Code: C

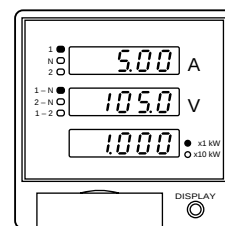


•Output Connection

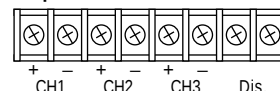


TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	V _{1N} (V _{2N} , V ₁₂)
Dis.	Display switch. inp.

Suffix Code: D

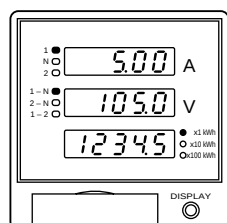


•Output Connection

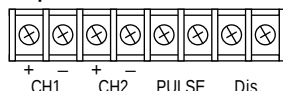


TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	V _{1N} (V _{2N} , V ₁₂)
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: E

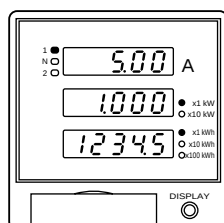


•Output Connection

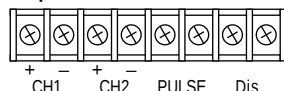


TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	V _{1N} (V _{2N} , V ₁₂)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

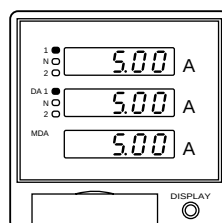


•Output Connection



TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: J

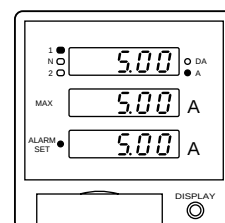


•Output Connection

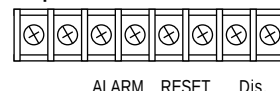


TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: K

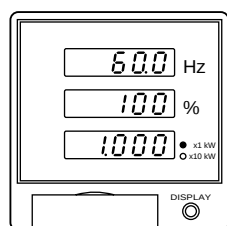


•Output Connection

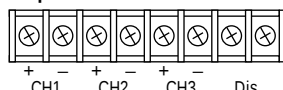


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

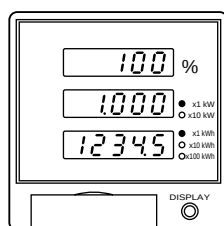


•Output Connection

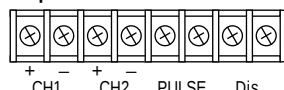


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

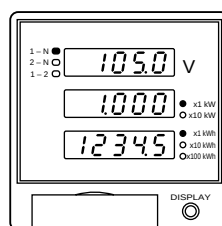


•Output Connection

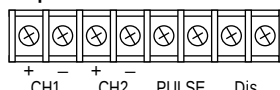


TERM.	ITEMS
CH1	PF
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: N

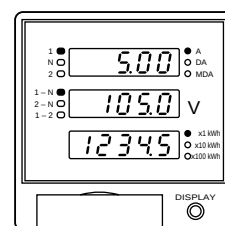


•Output Connection

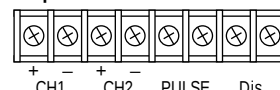


TERM.	ITEMS
CH1	V _{1N} (V _{2N} , V ₁₂)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(A1, A _N , A ₂)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P



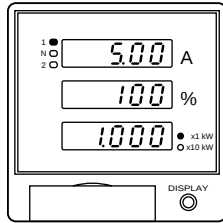
•Output Connection



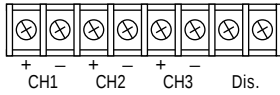
TERM.	ITEMS
CH1	A1 (A _N , A ₂)
CH2	V _{1N} (V _{2N} , V ₁₂)
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

Specifications subject to change without notice.

Suffix Code: Q

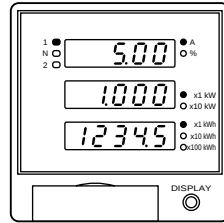


•Output Connection

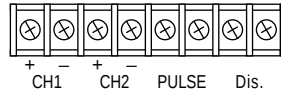


TERM.	ITEMS
CH1	A ₁ (A _N , A ₂)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: S

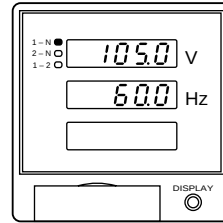


•Output Connection

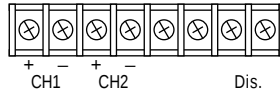


TERM.	ITEMS
CH1	A ₁ (A _N , A ₂)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: U

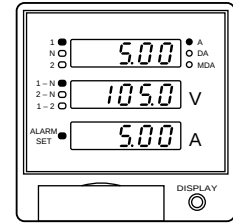


•Output Connection



TERM.	ITEMS
CH1	V _{1N} (V _{2N} , V ₁₂)
CH2	Hz
Dis.	Display switch. inp.

Suffix Code: W

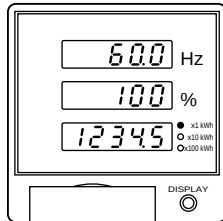


•Output Connection

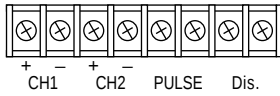


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: Y



•Output Connection



TERM.	ITEMS
CH1	Hz
CH2	PF
PULSE	kWh
Dis.	Display switch. inp.

THREE-PHASE / 3-WIRE CONNECTION

MODEL **51U-2 / 51U-3**

MODEL & SUFFIX CODE SELECTION

51U-□□□-□□

MODEL

INPUT (balanced)

2 : Three-phase / 3-wire, 220V / 5A AC

3 : Three-phase / 3-wire, 110V / 5A AC

DISPLAY ITEMS

A : A × 3

B : V × 3

C : A × 3, V × 3

D : A × 3, V × 3, kW

E : A × 3, V × 3, kWh

F : A × 3, kW, kWh

G : Hz, PF, kvar

H : V × 3, MV₀, V₀

J : A × 3, DA, MDA

K : A × 3 or DA, MDA, alarm setpoint

L : Hz, PF, kW

M : PF, kW, kWh

N : V × 3, kW, kWh

P : A × 3 or DA or MDA, V × 3, kWh

Q : A × 3, PF, kW

R : A × 3, PF, kvar

S : A × 3 or PF, kW, kWh

T : A × 3, PF, kvarh

U : V × 3, Hz

W : A × 3 or DA or MDA, V × 3, alarm setpoint

X : A × 3, kvar, kvarh

Y : Hz, PF, kWh

V = Line voltage

A = Line current

kW = Kilowatt

kvar = Kilovar

PF = Power factor

Hz = Frequency

kWh = Kilowatthours

kvarh = Kilovarhours

DA = Demand (current)

MDA = Maximum demand (current)

V₀ = Zero-phase voltageMV₀ = Maximum zero-phase voltage

OUTPUT (selectable display items codes)

0 : None (H J K W with reset input)

1 : 4 – 20mA DC, 3 points (A B C D G L Q R U)

2 : 4 – 20mA DC, 2 points + pulse
(E F M N P S T X Y)

3 : 4 – 20mA DC, 2 points + reset input (H J)

4 : RS-485 (all codes selectable except K W)

AUXILIARY POWER SUPPLY

M : 85 – 264V AC

R : 24V DC

P : 110V DC

REMOTE CONTROL

1 : 85 – 132V AC or 85 – 143V DC

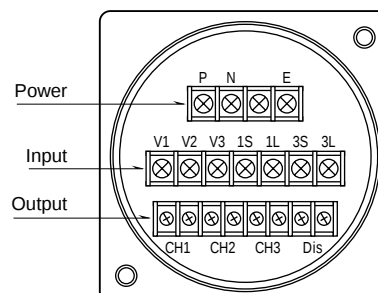
2 : 20 – 30V DC

3 : 170 – 264V AC

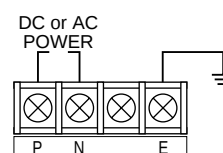
ORDERING INFORMATION

Specify code number. (e.g. 51U-2D4-M1)

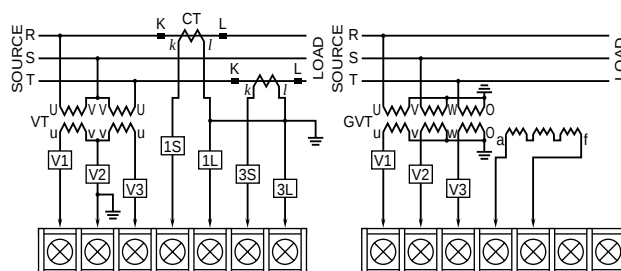
CONNECTION DIAGRAM



■ POWER



■ INPUT



Suffix Codes

V1	V2	V3	1S	1L	3S	3L
----	----	----	----	----	----	----

C, D, E, F, G, L, M, N, P, Q, R, S, T, W, X, Y

1S	1L	3S	3L
----	----	----	----

A, J, K (measuring current only)

V1	V2	V3
----	----	----

B, U (measuring voltage only)

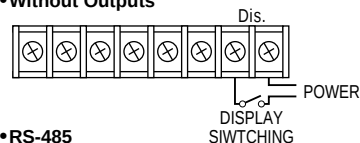
V1	V2	V3	G1	G4
----	----	----	----	----

H (measuring max. zero-phase voltage)

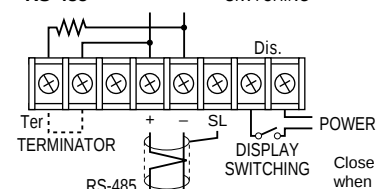
220V AC can be directly connected to V1, V2 and V3 terminals without VT.

■ OUTPUT

•Without Outputs

•4 – 20mA DC, 3 points
(See the following pages.)•4 – 20mA DC, 2 points
+ pulse 1 point
(See the following pages.)

•RS-485

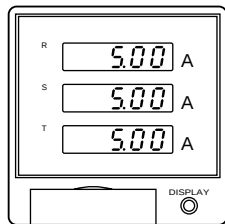
•4 – 20mA DC, 2 points
+ reset input
(See the following pages.)

Close across the terminator when the unit is located at the end of transmission line.

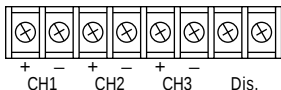
DISPLAY ITEMS & OUTPUTS

Items shown in brackets can be displayed when you change settings.

Suffix Code: A

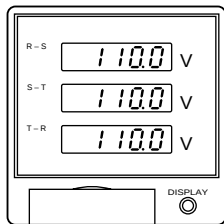


•Output Connection

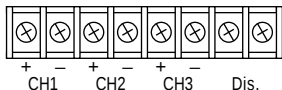


TERM.	ITEMS
CH1	AR
CH2	AS
CH3	AT
Dis.	Display switch. inp.

Suffix Code: B

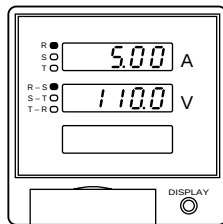


•Output Connection

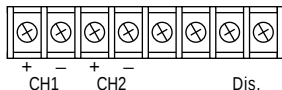


TERM.	ITEMS
CH1	VRS
CH2	VST
CH3	VTR
Dis.	Display switch. inp.

Suffix Code: C

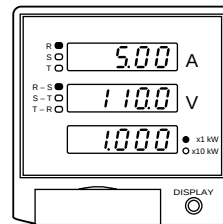


•Output Connection

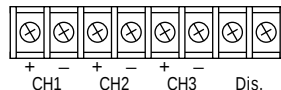


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	VRS (VST, VTR)
Dis.	Display switch. inp.

Suffix Code: D

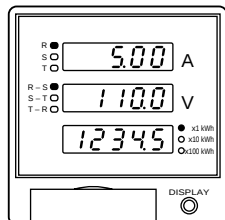


•Output Connection

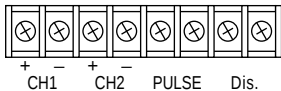


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	VRS (VST, VTR)
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: E

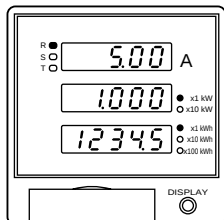


•Output Connection

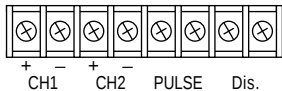


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	VRS (VST, VTR)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

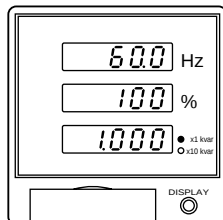


•Output Connection

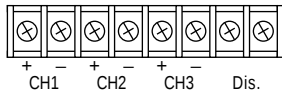


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: G

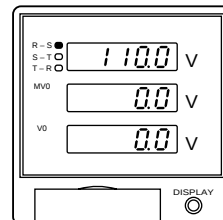


•Output Connection

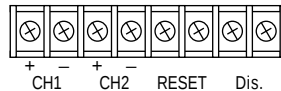


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: H

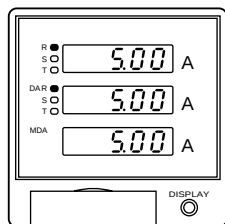


•Output Connection

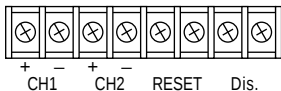


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	MV0
RESET	MV0 ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: J

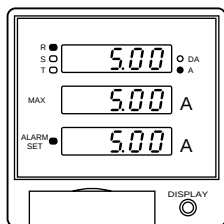


•Output Connection

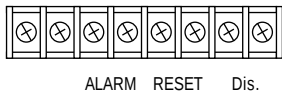


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: K

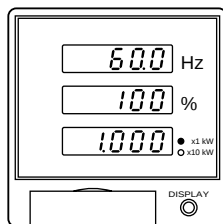


•Output Connection

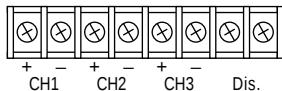


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

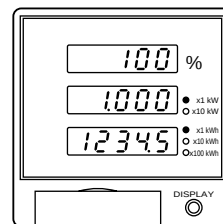


•Output Connection

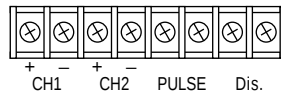


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

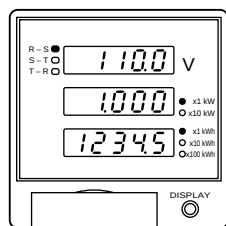


•Output Connection

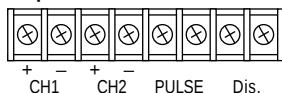


TERM.	ITEMS
CH1	PF
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: N

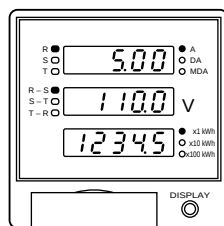


•Output Connection

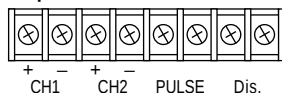


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(AR, AS, AT)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P

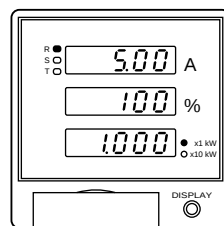


•Output Connection

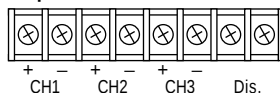


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	VRS (VST, VTR)
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: Q

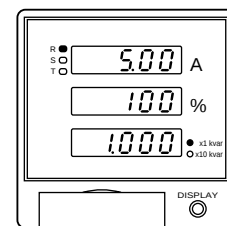


•Output Connection

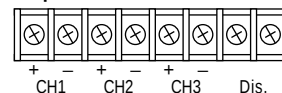


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: R

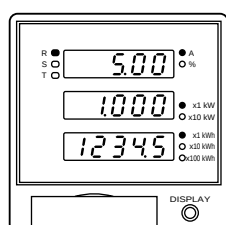


•Output Connection

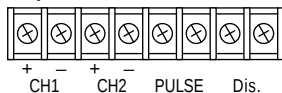


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: S

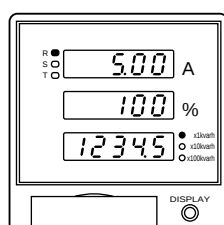


•Output Connection

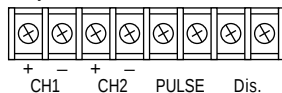


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: T

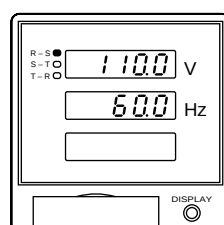


•Output Connection

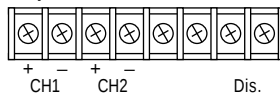


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
PULSE	kvarh
Dis.	Display switch. inp.

Suffix Code: U

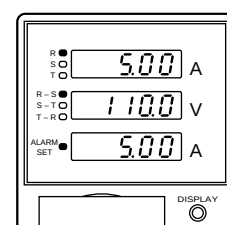


•Output Connection



TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	Hz
Dis.	Display switch. inp.

Suffix Code: W

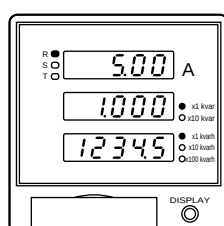


•Output Connection

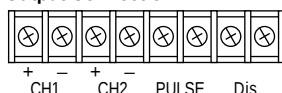


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: X

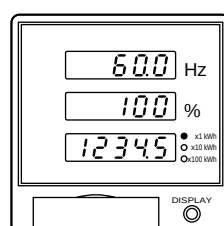


•Output Connection

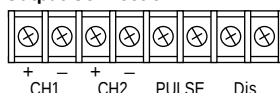


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	0 – lag1 kvar (lead1 – lag1 kvar)
PULSE	kvarh
Dis.	Display switch. inp.

Suffix Code: Y



•Output Connection



TERM.	ITEMS
CH1	Hz
CH2	PF
PULSE	kWh
Dis.	Display switch. inp.

THREE-PHASE / 4-WIRE CONNECTION

MODEL **51U-4**

MODEL & SUFFIX CODE SELECTION

51U-4□□-□□

MODEL

INPUT (balanced)

4 : 3-phase / 4-wire, 110V / $\sqrt{3}$ V / 5A AC

DISPLAY ITEMS

A : A × 3

B : V × 3

C : A × 3, V × 3

D : A × 3, V × 3, kW

E : A × 3, V × 3, kWh

F : A × 3, kW, kWh

G : Hz, PF, kvar

J : A × 3, DA, MDA

L : Hz, PF, kW

M : PF, kW, kWh

N : V × 3, kW, kWh

P : A × 3 or DA or MDA, V × 3, kWh

Q : A × 3, PF, kW

R : A × 3, PF, kvar

S : A × 3 or PF, kW, kWh

T : A × 3, PF, kvarh

U : V × 3, Hz

X : A × 3, kvar, kvarh

Y : Hz, PF, kWh

V = Line voltage

A = Line current

kW = Kilowatt

kvar = Kilovar

PF = Power factor

Hz = Frequency

kWh = Kilowatthours

kvarh = Kilovarhours

DA = Demand (current)

MDA = Maximum demand (current)

V₀ = Zero-phase voltage

MV₀ = Maximum zero-phase voltage

OUTPUT (selectable display items codes)

0 : None (J with reset input)

1 : 4 – 20mA DC, 3 points (A B C D G L Q R U)

2 : 4 – 20mA DC, 2 points + pulse
(E F M N P S T X Y)

3 : 4 – 20mA DC, 2 points + reset input (J)

4 : RS-485

AUXILIARY POWER SUPPLY

M : 85 – 264V AC

R : 24V DC

P : 110V DC

REMOTE CONTROL

1 : 85 – 132V AC or 85 – 143V DC

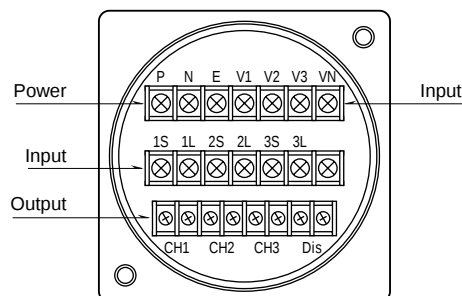
2 : 20 – 30V DC

3 : 170 – 264V AC

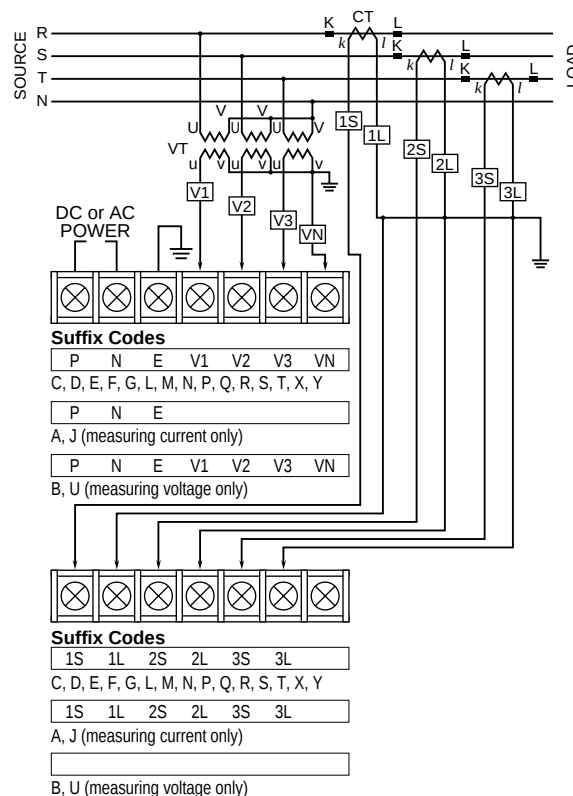
ORDERING INFORMATION

Specify code number. (e.g. 51U-4D4-M1)

CONNECTION DIAGRAM

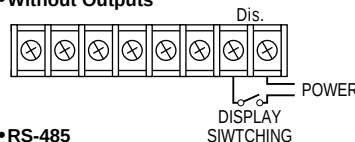


POWER & INPUT



OUTPUT

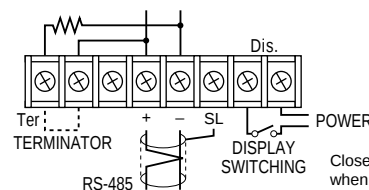
Without Outputs



• 4 – 20mA DC, 3 points
(See the following pages.)

• 4 – 20mA DC, 2 points
+ pulse 1 point
(See the following pages.)

RS-485



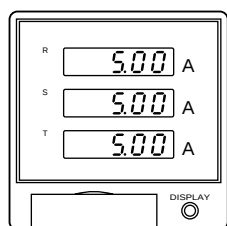
• 4 – 20mA DC, 2 points
+ reset input
(See the following pages.)

Close across the terminator
when the unit is located at
the end of transmission line.

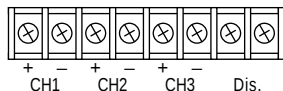
DISPLAY ITEMS & OUTPUTS

Items shown in brackets can be displayed when you change settings.

Suffix Code: A

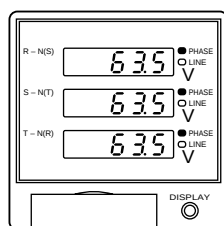


•Output Connection

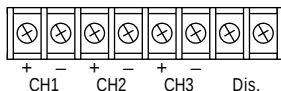


TERM.	ITEMS
CH1	Ar
CH2	As
CH3	At
Dis.	Display switch. inp.

Suffix Code: B

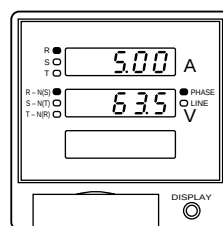


•Output Connection

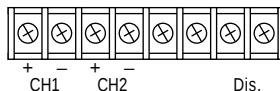


TERM.	ITEMS
CH1	VRS
CH2	VST
CH3	VTR
CH1/2/3	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: C

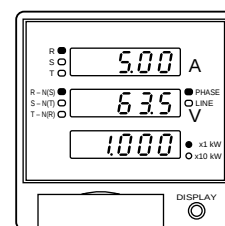


•Output Connection

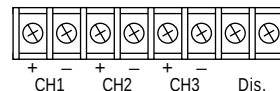


TERM.	ITEMS
CH1	Ar (As, At)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: D

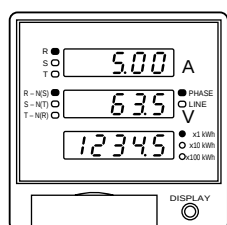


•Output Connection

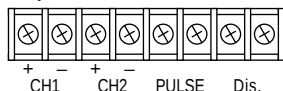


TERM.	ITEMS
CH1	Ar (As, At)
CH2	VRS (VST, VTR)
CH3	0 – 1 kW (-1 – +1 kW)
CH1/2/3	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: E

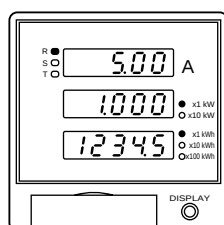


•Output Connection

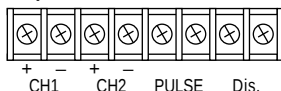


TERM.	ITEMS
CH1	Ar (As, At)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

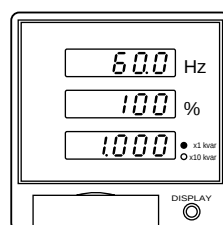


•Output Connection

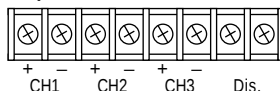


TERM.	ITEMS
CH1	Ar (As, At)
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: G

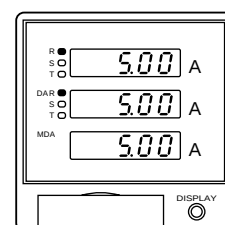


•Output Connection

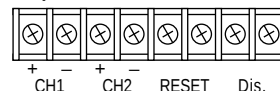


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: J

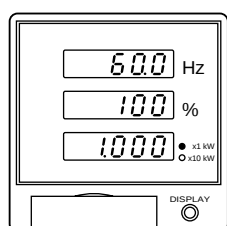


•Output Connection

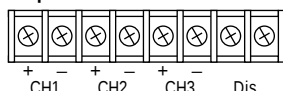


TERM.	ITEMS
CH1	Ar (As, At)
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

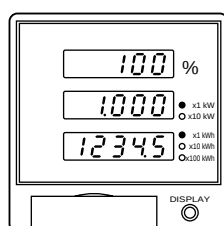


•Output Connection

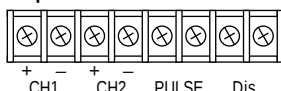


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

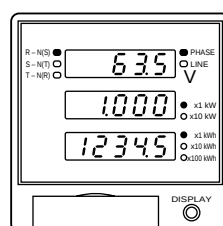


•Output Connection

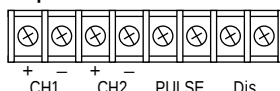


TERM.	ITEMS
CH1	PF
CH2	0 – 1 kW (-1 – +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: N

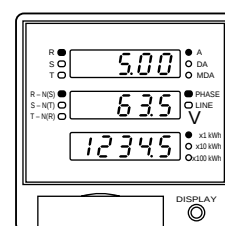


•Output Connection

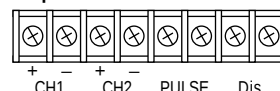


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(Ar, As, At) (VRN, VSN, VTN)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P



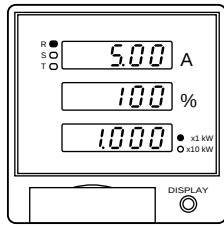
•Output Connection



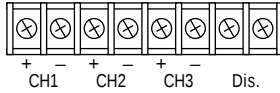
TERM.	ITEMS
CH1	Ar (As, At)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN) (DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

Specifications subject to change without notice.

Suffix Code: Q

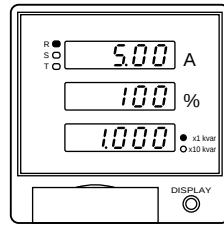


•Output Connection

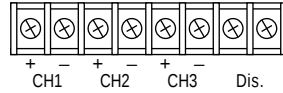


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

Suffix Code: R

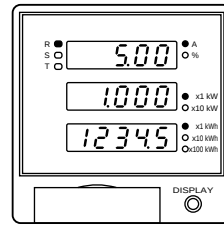


•Output Connection

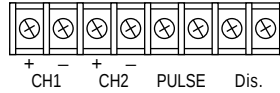


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: S

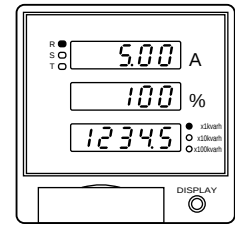


•Output Connection

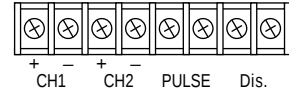


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: T

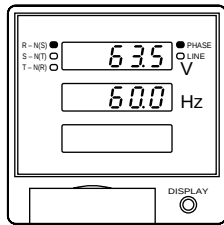


•Output Connection

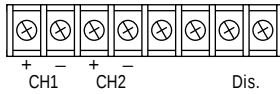


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
PULSE	kvarh
Dis.	Display switch. inp.

Suffix Code: U

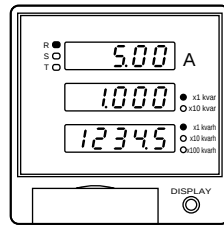


•Output Connection

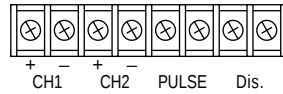


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	Hz
CH1/CH2	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: X

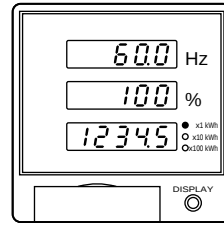


•Output Connection

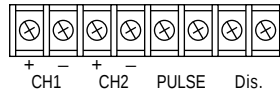


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 – lag1 kvar (lead1 – lag1 kvar)
PULSE	kvarh
Dis.	Display switch. inp.

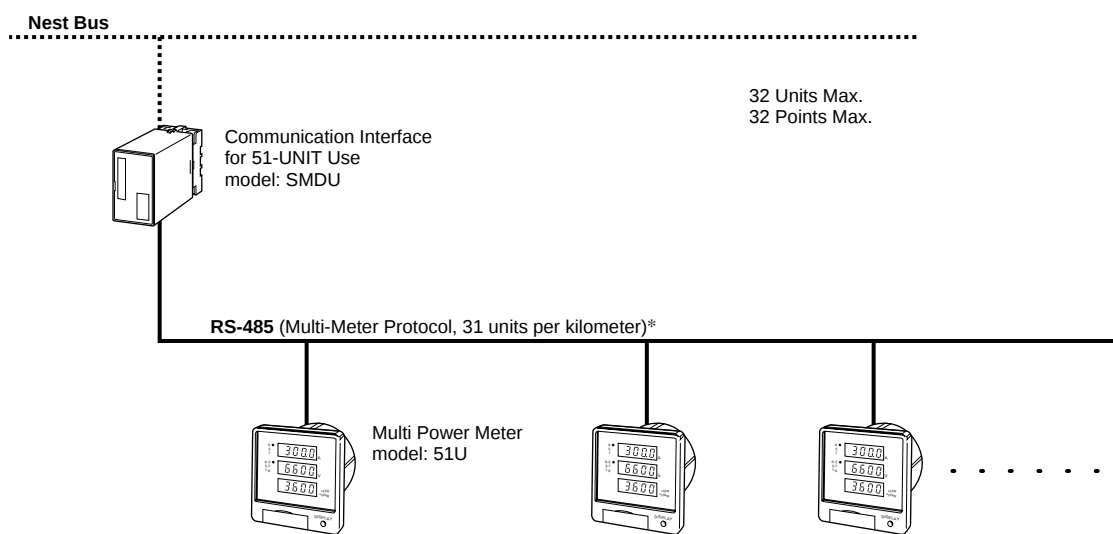
Suffix Code: Y



•Output Connection



TERM.	ITEMS
CH1	Hz
CH2	PF
PULSE	kWh
Dis.	Display switch. inp.

SYSTEM CONFIGURATION EXAMPLE

*MsysNet use only. Consult Factory.