

**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, MV<sub>0</sub>, V<sub>0</sub>
- 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** \_\_\_\_\_

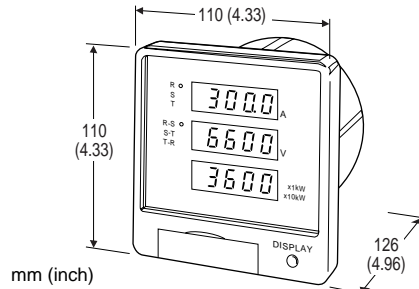
- 0 : None
- 1 : 4 – 20mA DC, 3 points
- 2 : 4 – 20mA DC, 2 points + pulse
- 3 : 4 – 20mA DC, 2 points + reset input
- 4 : RS-485 (MsysNet use only. Consult Factory.)

**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)  
 V<sub>0</sub> = Zero-phase voltage  
 MV<sub>0</sub> = 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 <sup>5</sup>/<sub>16</sub> 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  $\mu$ 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:**  $\geq 30V$

**Frequency:**  $\geq 30V$

**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:**  $\geq 5\%$  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  $\geq 0.3$  sec., input current 5mA

**Reset input:** max. zero-phase voltage and demand; input time  $\geq 0.3$  sec., input current 5mA

## OUTPUT

**■CURRENT OUTPUT:** 4 – 20mA DC

**Load resistance:** 500 $\Omega$  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  $\leq 12000$  pulses/h)

### ■TRANSMISSION OUTPUT (Multi-Meter Protocol)

**Transmission:** conform to RS-485, EIA

**Transmission distance:** 1 kilometer max. ( $\leq 31$  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	1 $\phi$ / 2w	1 – 2	105V
	1 $\phi$ / 3w	1 – N	105V
		2 – N	105V
	3 $\phi$ / 3w	1 – 2	210V
line		110V 220V	
3 $\phi$ / 4w	line phase	110V	0 – 150V
		110 / $\sqrt{3}$ V	0 – 150 / $\sqrt{3}$ V
Watt		110V / 5A 110V / 5A 220V / 5A 220V / 5A	0 – 1 kW (0 – 5 kW) -1 – +1 kW (-0.5 – +0.5 kW) 0 – 2 kW -2 – +2 kW
Var		110V / 5A 110V / 5A 220V / 5A 220V / 5A	0 – lag1 kvar (0 – lag500 var) lead1 – lag1 kvar (lead500 – lag 500 var) 0 – lag2 kvar 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 110.0V 190.5V	0 – 86.6V 0 – 150.0V 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 $\Omega$

**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.

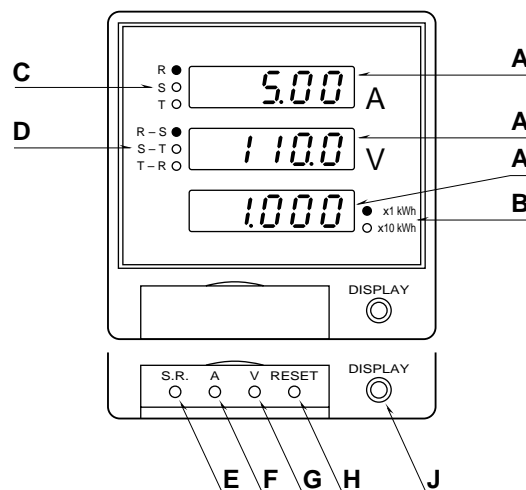
**Insulation resistance:**  $\geq$ 100M $\Omega$  with 500V DC

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

**Surge withstand voltage:** 1.2/50  $\mu$ sec.,  $\pm$ 4.5kV  
(input to output or ground; not applicable 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), $\times$ 1, $\times$ 10 scaling factor ind. LED
Watthours	kWh	5	$\times$ 1, $\times$ 10, $\times$ 100 scaling factor LED
Var	kvar	4	– indicator (lead), $\times$ 1, $\times$ 10 scaling factor ind. LED
Varhours	kvarh	5	$\times$ 1, $\times$ 10, $\times$ 100 scaling factor LED
Power factor	PF	3	– indicator (lead)
Frequency	Hz	3	
Zero-phase voltage	V <sub>0</sub>	4	
Max. zero-phase volt.	MV <sub>0</sub>	4	
Demand	DA	4	Measuring/displaying preset element only
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**

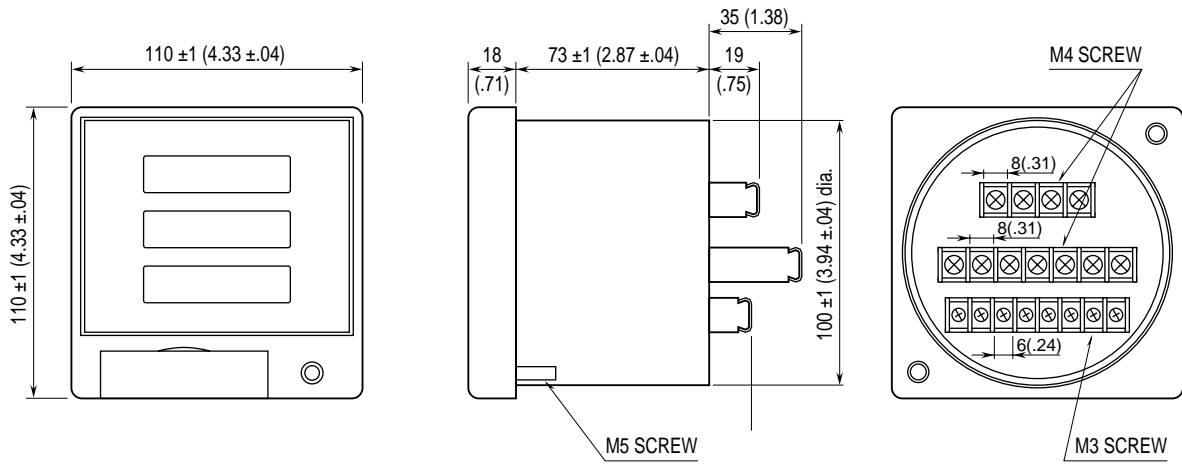
**G. Line voltage switch**

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

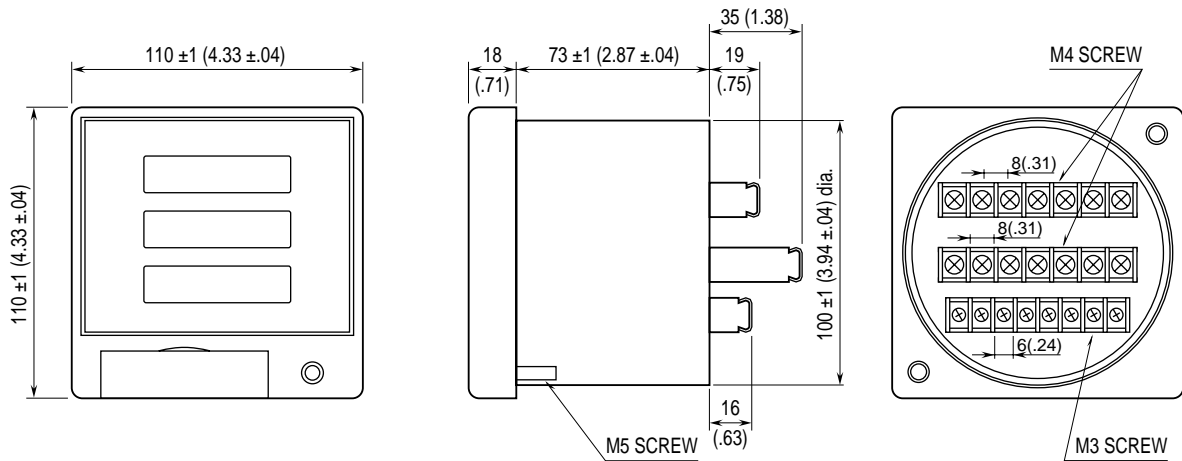
**J. Display:** changing display items, turning the light on or off; same as the Dis. input via output terminals

**EXTERNAL DIMENSIONS mm (inch)**

**■SINGLE-PHASE / 2-WIRE or 3-WIRE, 3-PHASE / 3-WIRE CONNECTION**

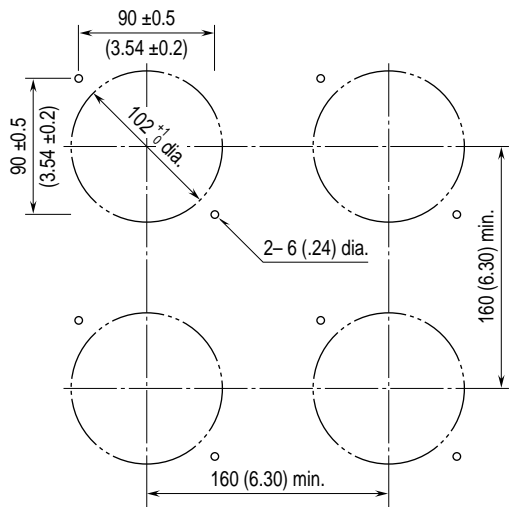


**■3-PHASE / 4-WIRE CONNECTION**



**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 / 5AAC

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

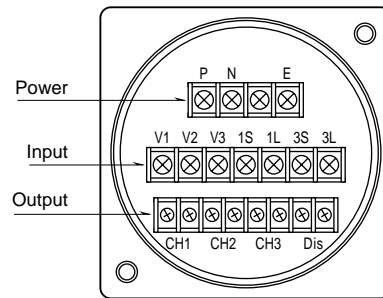
2 : 20 – 30V DC

3 : 170 – 264V AC

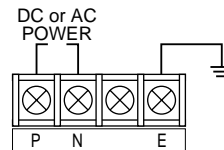
## ORDERING INFORMATION

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

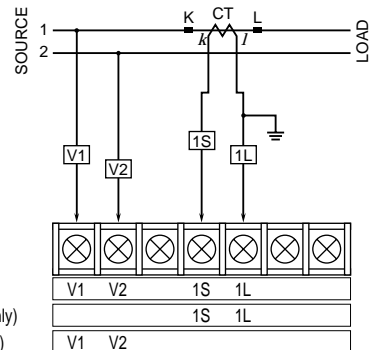
## CONNECTION DIAGRAM



### POWER



### INPUT

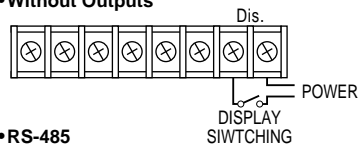


#### Suffix Codes

C, D, E, F, N, P, W  
 J, K (measuring current only)  
 U (measuring voltage only)

### OUTPUT

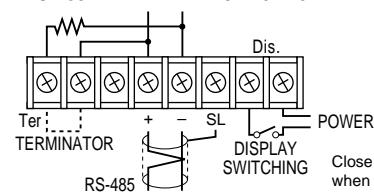
#### Without Outputs



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

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

#### RS-485



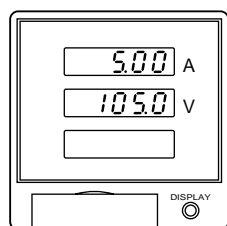
• 4 – 20mA DC, 2 points  
 + reset input  
 (See the following pages.)

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

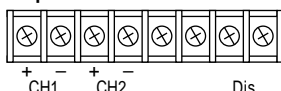
## DISPLAY ITEMS & OUTPUTS

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

**Suffix Code: C**

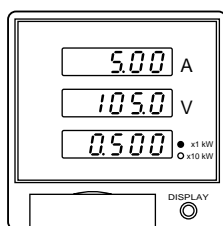


•Output Connection



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

**Suffix Code: D**

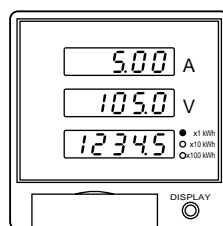


•Output Connection

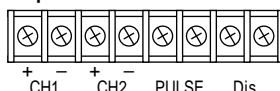


TERM.	ITEMS
CH1	A
CH2	V
CH3	0 – 0.5 kW (-0.5 – +0.5 kW)
Dis.	Display switch. inp.

**Suffix Code: E**

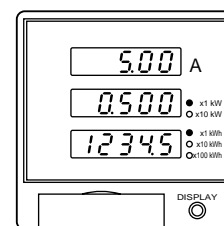


•Output Connection

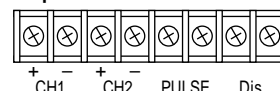


TERM.	ITEMS
CH1	A
CH2	V
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: F**

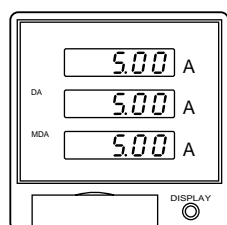


•Output Connection



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

**Suffix Code: J**

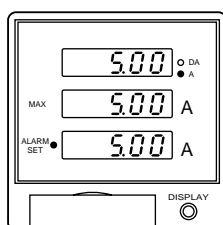


•Output Connection

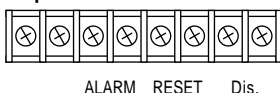


TERM.	ITEMS
CH1	A
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

**Suffix Code: K**

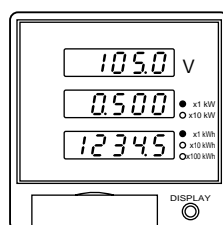


•Output Connection

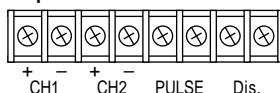


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

**Suffix Code: N**

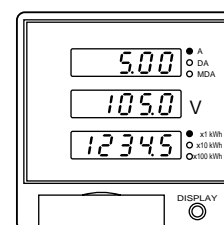


•Output Connection

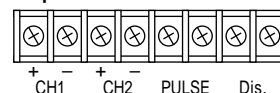


TERM.	ITEMS
CH1	V
CH2	0 – 0.5 kW (-0.5 – +0.5 kW)
CH1/CH2 (A)	
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: P**

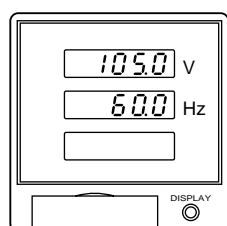


•Output Connection

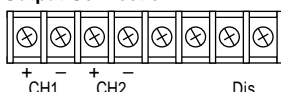


TERM.	ITEMS
CH1	A
CH2	V
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: U**

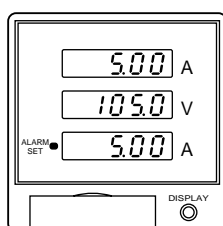


•Output Connection



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.

Specifications subject to change without notice.

# 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

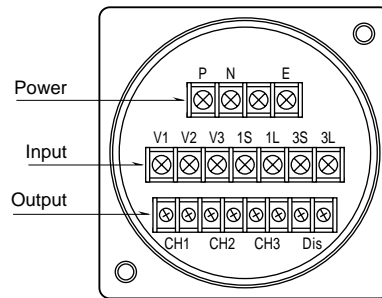
2 : 20 – 30V DC

3 : 170 – 264V AC

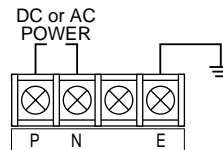
## ORDERING INFORMATION

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

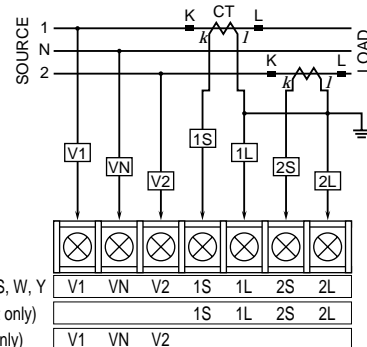
## CONNECTION DIAGRAM



### POWER



### INPUT



### Suffix Codes

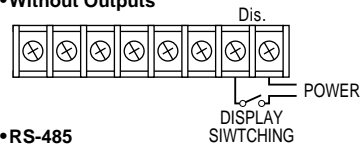
C, D, E, F, L, M, N, P, Q, S, W, Y

A, J, K (measuring current only)

B, U (measuring voltage only)

### OUTPUT

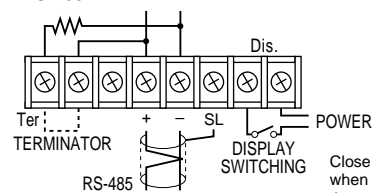
#### Without Outputs



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

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

#### RS-485



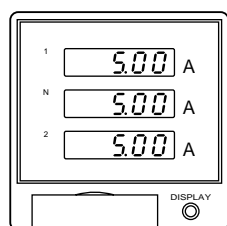
• 4 – 20mA DC, 2 points  
+ reset input  
(See the following pages.)

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

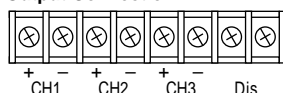
## DISPLAY ITEMS & OUTPUTS

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

Suffix Code: A

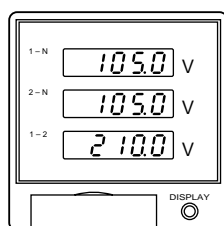


•Output Connection

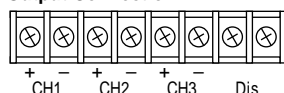


TERM.	ITEMS
CH1	A <sub>1</sub>
CH2	A <sub>N</sub>
CH3	A <sub>2</sub>
Dis.	Display switch. inp.

Suffix Code: B

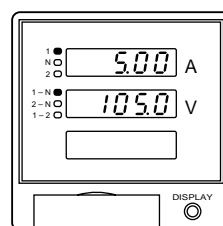


•Output Connection



TERM.	ITEMS
CH1	V <sub>1N</sub>
CH2	V <sub>2N</sub>
CH3	V <sub>12</sub>
Dis.	Display switch. inp.

Suffix Code: C

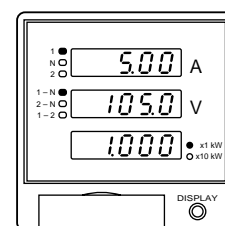


•Output Connection

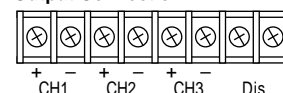


TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
Dis.	Display switch. inp.

Suffix Code: D

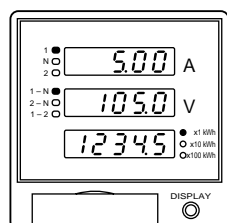


•Output Connection

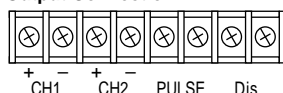


TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
CH3	0 - 1 kW (-1 - +1 kW)
Dis.	Display switch. inp.

Suffix Code: E

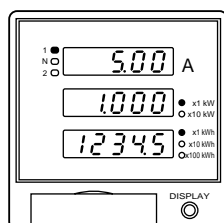


•Output Connection

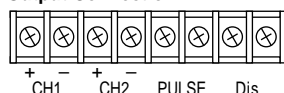


TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

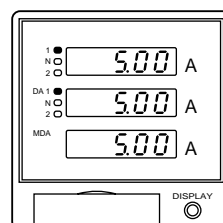


•Output Connection



TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	0 - 1 kW (-1 - +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: J

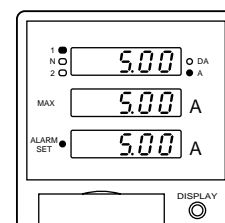


•Output Connection



TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: K

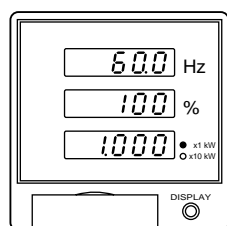


•Output Connection

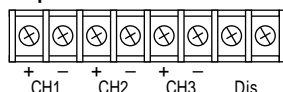


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

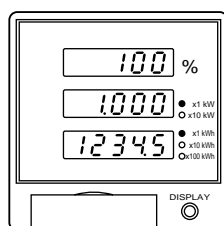


•Output Connection

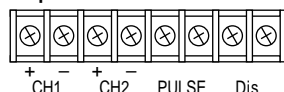


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 - 1 kW (-1 - +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

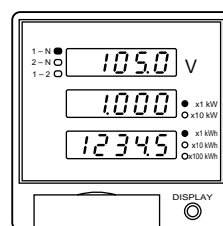


•Output Connection

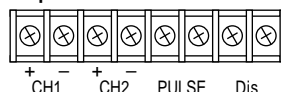


TERM.	ITEMS
CH1	PF
CH2	0 - 1 kW (-1 - +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: N

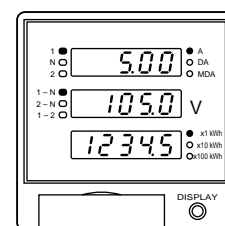


•Output Connection

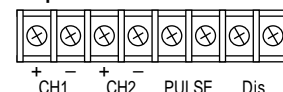


TERM.	ITEMS
CH1	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
CH2	0 - 1 kW (-1 - +1 kW)
CH1/CH2	(A <sub>1</sub> , A <sub>N</sub> , A <sub>2</sub> )
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P



•Output Connection

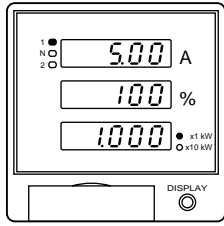


TERM.	ITEMS
CH1	A <sub>1</sub> (A <sub>N</sub> , A <sub>2</sub> )
CH2	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

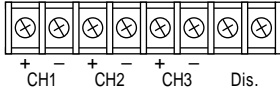
Specifications subject to change without notice.



**Suffix Code: Q**

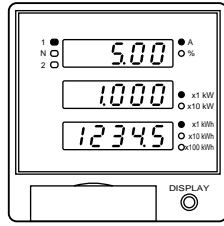


**•Output Connection**

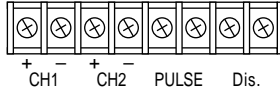


TERM.	ITEMS
CH1	A1 (AN, A2)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

**Suffix Code: S**

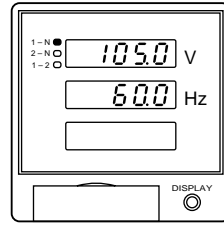


**•Output Connection**

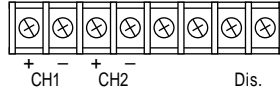


TERM.	ITEMS
CH1	A1 (AN, A2)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: U**

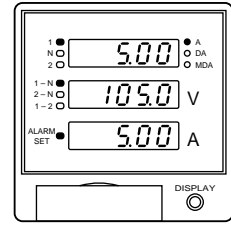


**•Output Connection**



TERM.	ITEMS
CH1	V <sub>1N</sub> (V <sub>2N</sub> , V <sub>12</sub> )
CH2	Hz
Dis.	Display switch. inp.

**Suffix Code: W**

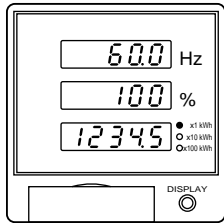


**•Output Connection**

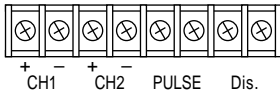


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

**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, MV<sub>0</sub>, V<sub>0</sub>

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)

V<sub>0</sub> = Zero-phase voltageMV<sub>0</sub> = 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

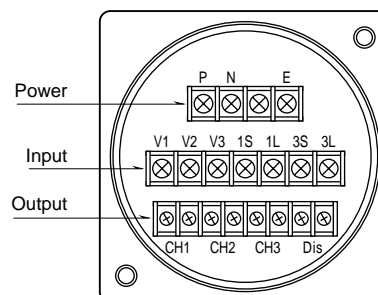
2 : 20 – 30V DC

3 : 170 – 264V AC

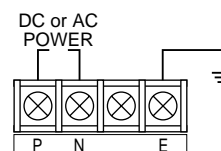
## ORDERING INFORMATION

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

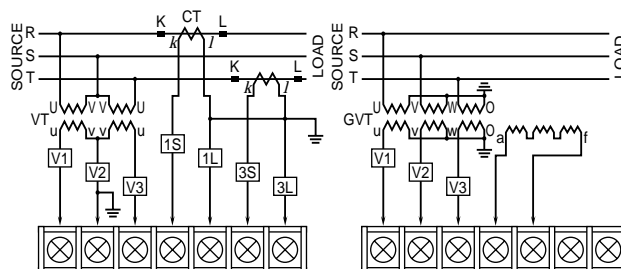
## CONNECTION DIAGRAM



### ■ POWER



### ■ INPUT



#### Suffix Codes

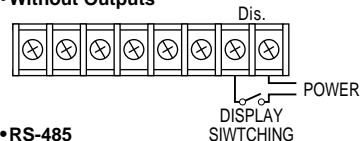
V1	V2	V3	1S	1L	3S	3L
C, D, E, F, G, L, M, N, P, Q, R, S, T, W, X, Y						
1S 1L 3S 3L						
A, J, K (measuring current only)						
V1 V2 V3						
B, U (measuring voltage only)						

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

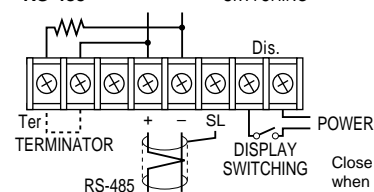
#### • Without Outputs



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

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

#### • RS-485



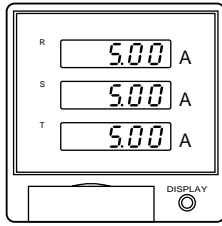
• 4 – 20mA DC, 2 points  
+ reset input  
(See the following pages.)

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

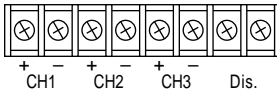
## DISPLAY ITEMS & OUTPUTS

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

Suffix Code: A

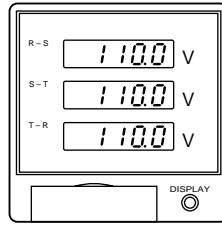


•Output Connection

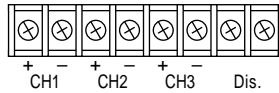


TERM.	ITEMS
CH1	AR
CH2	As
CH3	AT
Dis.	Display switch. inp.

Suffix Code: B

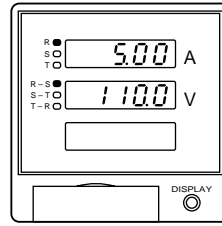


•Output Connection

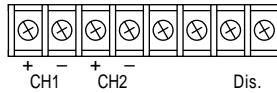


TERM.	ITEMS
CH1	VRS
CH2	VST
CH3	VTR
Dis.	Display switch. inp.

Suffix Code: C

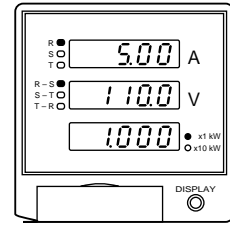


•Output Connection

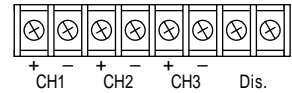


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
Dis.	Display switch. inp.

Suffix Code: D

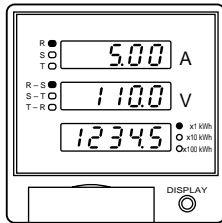


•Output Connection

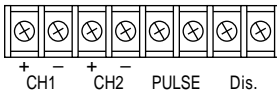


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
CH3	0 - 1 kW (-1 - +1 kW)
Dis.	Display switch. inp.

Suffix Code: E

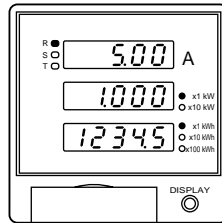


•Output Connection

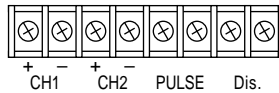


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

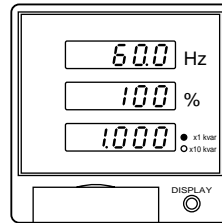


•Output Connection

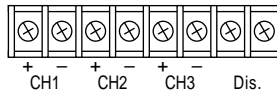


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 - 1 kW (-1 - +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: G

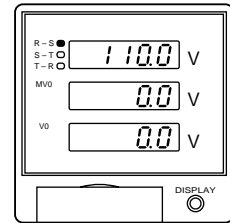


•Output Connection

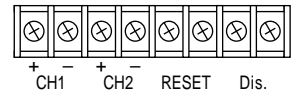


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 - lag1 kvar (lead1 - lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: H

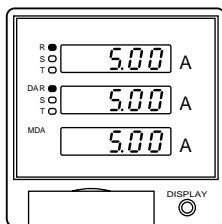


•Output Connection

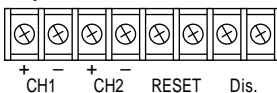


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	MV0
RESET	MV0 ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: J

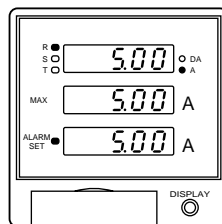


•Output Connection

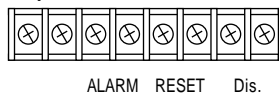


TERM.	ITEMS
CH1	AR (As, AT)
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: K

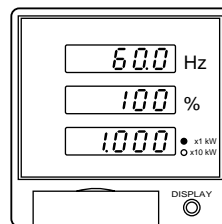


•Output Connection

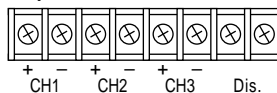


TERM.	ITEMS
ALARM	DA alarm output
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

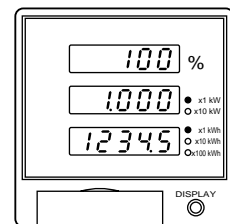


•Output Connection

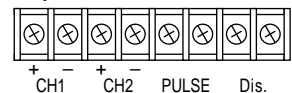


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 - 1 kW (-1 - +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

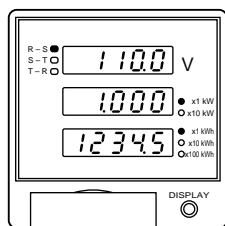


•Output Connection



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

**Suffix Code: N**

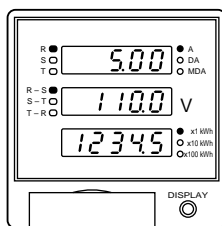


**•Output Connection**



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**

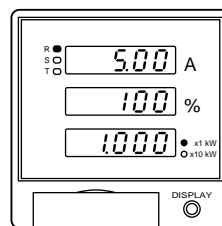


**•Output Connection**

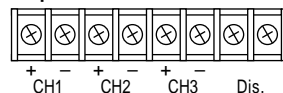


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	VRS (VST, VTR)
CH1/CH2	(DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: Q**

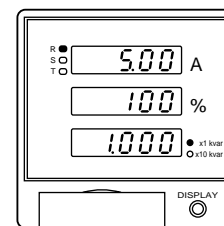


**•Output Connection**

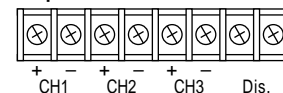


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

**Suffix Code: R**

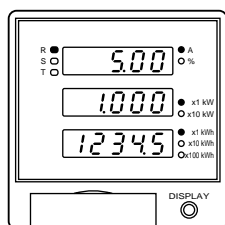


**•Output Connection**

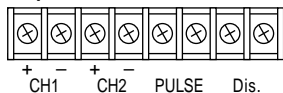


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

**Suffix Code: S**

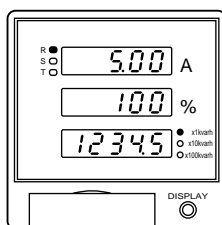


**•Output Connection**

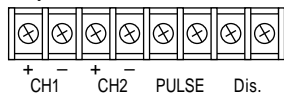


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: T**

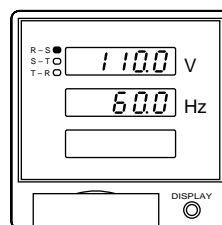


**•Output Connection**

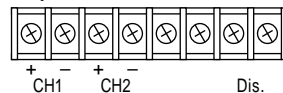


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	PF
PULSE	kvarh
Dis.	Display switch. inp.

**Suffix Code: U**

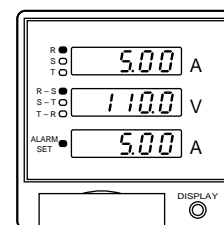


**•Output Connection**



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

**Suffix Code: W**

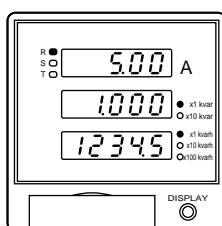


**•Output Connection**



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

**Suffix Code: X**

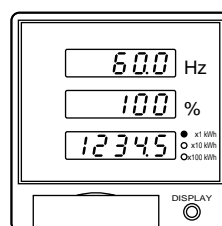


**•Output Connection**

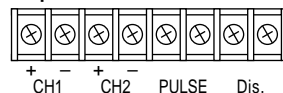


TERM.	ITEMS
CH1	AR (AS, AT)
CH2	0 – lag1 kvar (lead1 – lag1 kvar)
PULSE	kvarh
Dis.	Display switch. inp.

**Suffix Code: Y**



**•Output Connection**



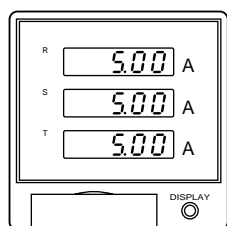
TERM.	ITEMS
CH1	Hz
CH2	PF
PULSE	kWh
Dis.	Display switch. inp.



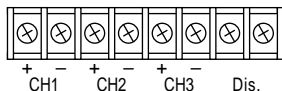
## DISPLAY ITEMS & OUTPUTS

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

Suffix Code: A

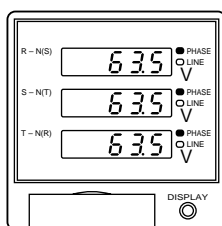


## •Output Connection

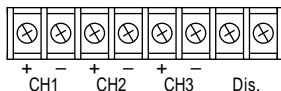


TERM.	ITEMS
CH1	AR
CH2	As
CH3	AT
Dis.	Display switch. inp.

Suffix Code: B

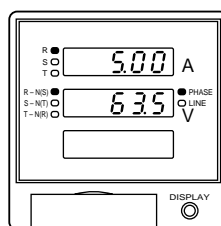


## •Output Connection

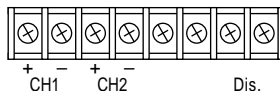


TERM.	ITEMS
CH1	VRS
CH2	VST
CH3	VTR
CH1/2/3	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: C

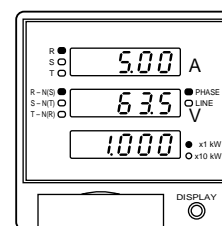


## •Output Connection

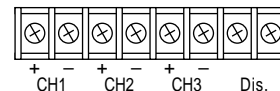


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: D

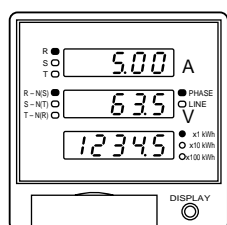


## •Output Connection

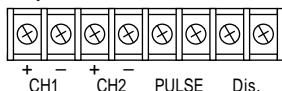


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
CH3	0 - 1 kW (-1 - +1 kW)
CH1/2/3	(VRN, VSN, VTN)
Dis.	Display switch. inp.

Suffix Code: E

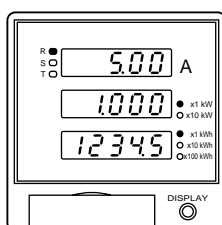


## •Output Connection

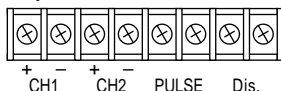


TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: F

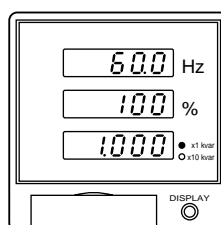


## •Output Connection

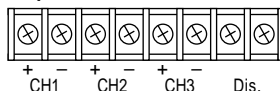


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 - 1 kW (-1 - +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: G

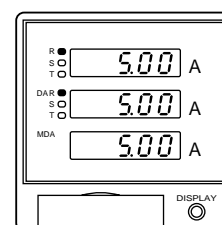


## •Output Connection

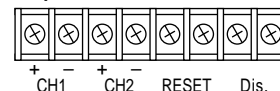


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 - lag1 kvar (lead1 - lag1 kvar)
Dis.	Display switch. inp.

Suffix Code: J

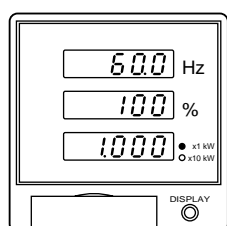


## •Output Connection

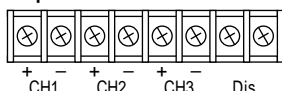


TERM.	ITEMS
CH1	AR (As, AT)
CH2	DA (MDA)
RESET	MDA ext. reset inp.
Dis.	Display switch. inp.

Suffix Code: L

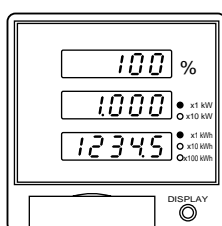


## •Output Connection

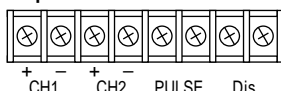


TERM.	ITEMS
CH1	Hz
CH2	PF
CH3	0 - 1 kW (-1 - +1 kW)
Dis.	Display switch. inp.

Suffix Code: M

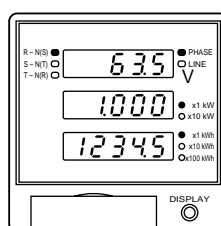


## •Output Connection

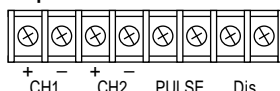


TERM.	ITEMS
CH1	PF
CH2	0 - 1 kW (-1 - +1 kW)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: N

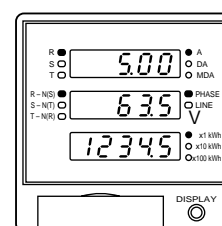


## •Output Connection

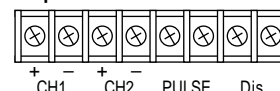


TERM.	ITEMS
CH1	VRS (VST, VTR)
CH2	0 - 1 kW (-1 - +1 kW)
CH1/CH2	(AR, As, AT) (VRN, VSN, VTN)
PULSE	kWh
Dis.	Display switch. inp.

Suffix Code: P



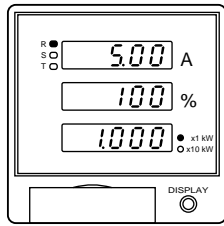
## •Output Connection



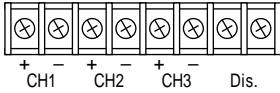
TERM.	ITEMS
CH1	AR (As, AT)
CH2	VRS (VST, VTR)
CH1/CH2	(VRN, VSN, VTN) (DA, MDA)
PULSE	kWh
Dis.	Display switch. inp.

Specifications subject to change without notice.

**Suffix Code: Q**

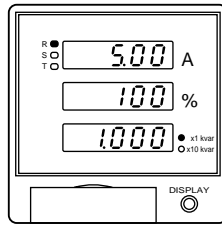


**•Output Connection**

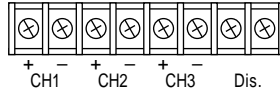


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
CH3	0 – 1 kW (-1 – +1 kW)
Dis.	Display switch. inp.

**Suffix Code: R**

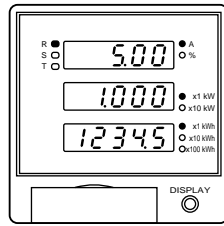


**•Output Connection**

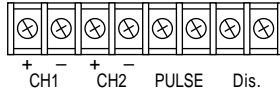


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
CH3	0 – lag1 kvar (lead1 – lag1 kvar)
Dis.	Display switch. inp.

**Suffix Code: S**

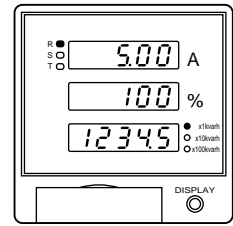


**•Output Connection**

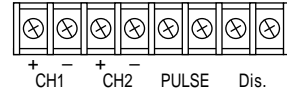


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 – 1 kW (-1 – +1 kW)
CH1/CH2	(PF)
PULSE	kWh
Dis.	Display switch. inp.

**Suffix Code: T**

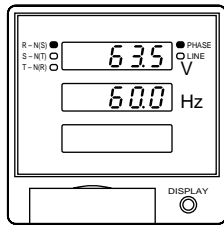


**•Output Connection**

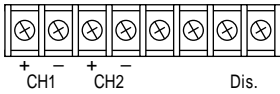


TERM.	ITEMS
CH1	AR (As, AT)
CH2	PF
PULSE	kvarh
Dis.	Display switch. inp.

**Suffix Code: U**

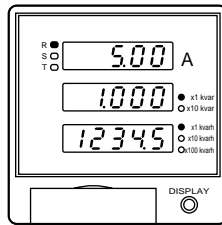


**•Output Connection**

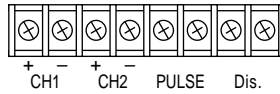


TERM.	ITEMS
CH1	Vrs (Vst, Vtr)
CH2	Hz
CH1/CH2	(Vrn, Vsn, Vtn)
Dis.	Display switch. inp.

**Suffix Code: X**

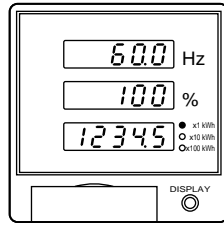


**•Output Connection**

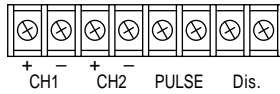


TERM.	ITEMS
CH1	AR (As, AT)
CH2	0 – lag1 kvar (lead1 – lag1 kvar)
PULSE	kvarh
Dis.	Display switch. inp.

**Suffix Code: Y**

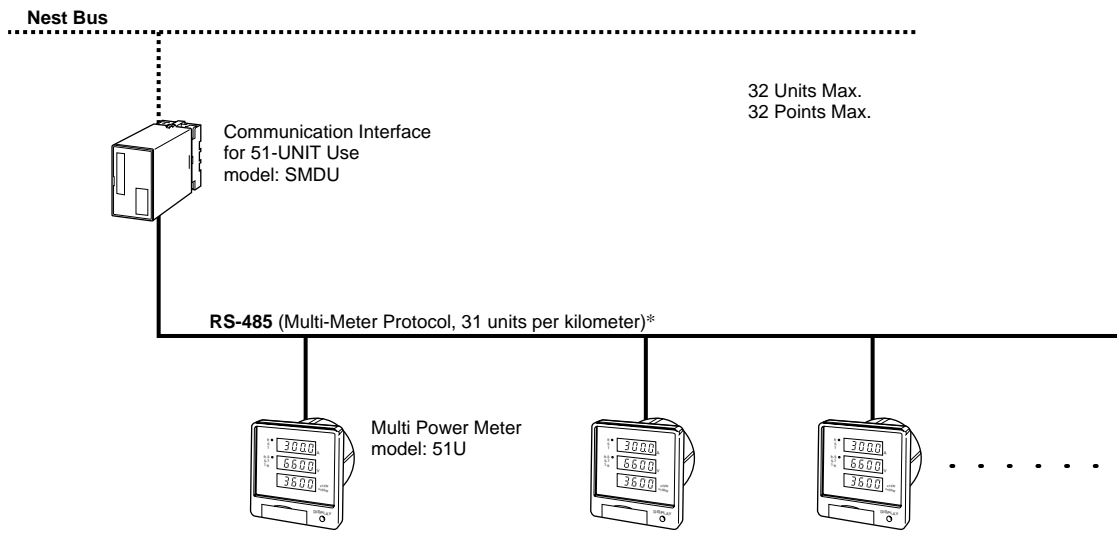


**•Output Connection**



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

**SYSTEM CONFIGURATION EXAMPLE**



\*MsysNet use only. Consult Factory.