Power Meter HC 6000

Introduction

About HC 6000 Power Meter

The HC 6000 is conceptualized and designed to revolutionize the approach to traditional power metering. Each HC 6000 is a compact, electronically advanced and programmable multi-display metering device (MDMD). It is the answer to future generation of electrical metering needs and methodology.

The concept of HC 6000 design is based several principles as follow:

Environmental Impact & Cost Saving

A HC 6000 can replace many units of conventional analog or digital instruments and change over switches (e.g. Amp, Volt, KVA, KW, PF, KWH, KVarH, FQ etc.).

This saves on the wiring material usage and reduces the cost on metering needs.

With the HC 6000 modern and practical MDMD, the front layout of switch boards and control panels are aesthetically refined.

Increase Productivity & Efficiency

The HC 6000 is specifically designed to be compatible with the world's 2 most widely used DIN standard panel instruments (It fits the DIN 92 x 92 mm panel cutout holes).

The HC 6000 is as a MDMD greatly reduced cabling complexity and time. It is also a standardize hardware suitable for either 1 phase 2 wires, 1 phase 3 wires, 3 phase 3 wire or 3 phase 4 wires networks.

Improved Technical Superiority and Reliability

The HC 6000 is endowed with technical specifications, (overload capabilities, accuracy levels, long term stability, readout dependability etc.) far exceeding those of conventional instruments.

To overcome the critiques of digital metering, the HC 6000 MDMD supports a VFD (Vacuum Fluorescent Display) screen with green (naturally comfortable) alphanumeric readouts. This allows visual clarity at long distance yet avoid parallax errors for close range viewing. The multi-display readings can be "damped" through it readout resolution besides the option to manually or automatically prioritize and sequentially view the more than 30 electrical parameters.

To meet future metering environments, the power meter is equipped with a serial port (RS-485 or RS-232), to allow connection to an open architecture computerized network. Running on PC or data acquisition system and complying with Modbus® protocol. The software provides a simple yet practical solution to energy management in factories and plant, small industries, building services, etc.

Parameters Conversion

The microprocessor-based power meter now provides compatibility with the modicon Modbus® system as a standard featured. From the VFD multi-display reading V, A, VA, W, Var, WH, etc. more than 30 power and energy parameters. Via the RS-485 Modbus® communications, including the instant maximum and minimum of all parameters, maximum demand control, time stamping, etc. more than 90 parameters can be achieved by remote monitoring system.

Features

- Over 90 power and energy parameters
- For factory and building automation
- Modbus® RTU protocol
- Maximum 600V
- True RMS conversion
- Instant maximum and minimum
- VFD display clear and long-life
- Build in RTC (real time clock)
- Field programmable PT / CT ratio
- Accuracy up to 0.15%
- Maximum demand control applicable
- Memory for all setup and energy data
- Comprehensive self test diagnostics
- Low input burden 0.1VA (5A / 120V)
- Wide power supply range 80~260V AC / DC
- Compact physical configuration
- Compatible for DIN & ANSI cut out
- 2KV RMS input / output / power isolation

Factory & Building Automation (FA & BA)

The HC 6000 is developed for factory and building automation (FA & BA) applications, more all of power and energy parameters can easily apply to wide range of AC switch-gear or industrial power distribution system for metering.

PLC Modbus Compatible

The Modbus® communications protocol allows information and data to be efficiently transferred between HC 6000 and modicon programmable logic controller (PLC) or other third party Modbus® compatible monitoring and control system. The HC 6000 can also establish a monitoring system just simply adopt an IPC-based centralized master display software. The RTU mode Modbus® protocol with default baud rate 9600 bps, none parity, 8 data bit.

Build-in Real Time Clock (RTC)

HC 6000 is with a build-in RTC (real time clock) that provide the internal time standard and time stamp for all records attached to each maximum and minimum energy measurements. RTC also provided the demand-control time period 15 / 30 minutes for maximum power demand control of utility load shedding.

Memory for all setup and energy data

All of the meter status setting and energy data are retaining in memory while was lost power. HC 6000 records includes the watt-hour that been measured, the record of maximum demand value, date and time, PT and CT ratio, the measured system configuration, displaying setting, and communication related.

Field Programmability

The field programmable HC 6000 is able to set e.g. CT and PT ratio, Modbus® address, communication baud rate, parity, meter's display, etc. either programming by push-bottom or by rear RS-485 / RS-232 communication port from a PC.

Accuracy up to 0.15%

With a well developed conversion, sampling and software compensation technology that make HC 6000 successfully meet the accuracy requirement of modern metering, that voltage and current up to 0.15% and other power up to 0.25%.

Comprehensive System Integration

The HC 6000 now provides the Modbus® (are compatible with the modicon system as a standard feature for comprehensive system integration. The PLC compatible RS-485 / RS-232 Modbus® communication protocol allows information and data to be efficiently transferred between bower HC 6000 and modicon programmable logic controller (PLC) existing RTU Power SCADA system and DCS system or other information or software backup please contact Hsiang Cheng Electric Corp. or representative sales department.

Power Meter HC 6000

Model & Ordering Number

Model : HC 6000

Order :   HC 6000 - A - 5.0A - H - 1 - N

Version ────────────┘

Current Input ──────────┘

1.0A
5.0A
7.5A

Power ──────────┘

H : AC 80-260V, DC 80-330V
L : DC 20-60V

N : None
Y : Special Ordering

Communication Port
1 : RS-485
2 : RS-232
Y : Special Ordering

Specification

Programmable measurements / Accuracy / Display readouts

Param.	Digits	Display (maximum)	Accuracy	Phase1	Phase2	Phase3	Total	Average
V x 3	5 (or 4)	9.9.9.9.9. V / KV	0.15% fs	V1	V2	V3		V_E
A x 3	5 (or 4)	9.9.9.9.9. A / KA	0.15% fs	A1	A2	A3		A_E
Watts	5 (or 4)	9.9.9.9.9. W / KW / MW / GW	0.25% fs	W1	W2	W3	W	
Vars	5 (or 4)	9.9.9.9.9. Var / KVar / MVar / GVar	0.25% fs	Var1	Var2	Var3	Var	
VA	5 (or 4)	9.9.9.9.9. VA / KVA / MVA / GVA	0.25% fs	VA1	VA2	VA3	VA_E	
PF	4	0.9999	0.25% fs	PF1	PF2	PF3	PF	
WH	8	9.9.9.9.9.9.9.9. WH / KWH / MWH	0.8% rd				WH	
VarH	8	9.9.9.9.9.9.9.9. VarH / KVarH / MVarH	1% rd				VarH	
I0	5 (or 4)	9.9.9.9.9. A / KA	0.5% fs					
Hz	5 (or 4)	70.000	0.03% rd					

- Accuracy : Corresponding to each auto-range scale
- VL1 / VL2 / VL3 : Line to line voltage
  VP1 / VP2 / VP3 : Line to neutral voltage
- PF1 / PF2 / PF3 : Related conversion elements
- I0 (neutral current, only for 3 phase 4 wires)

- Accuracy performance range for WH / VarH / PF
  $\cos\theta$: 1-0.5 for WH / PF
  $\sin\theta$: 1-0.5 for VarH
  Voltage $\geq$ 75V, Current $\geq$ 0.5A
- Phase rotation
  SEQ POST : positive sequence
  SEQ NEG : negative sequence

Power Meter HC 6000

Input

⊙ Range

Voltage : 10 - 600V

Current : suitable for CT secondary rating (optional)

  Maximum 6A for 5A rating

  Maximum 1.2A for 1A rating

Frequency 40 - 70Hz

⊙ Burden

Voltage < 0.4VA at 600V

  < 0.04VA at 150V

Current < 0.1VA at 5A

Overload rating

Current	Voltage
2 x rated continuous	750V continuous
10 x rated 30 seconds	1000V 10 seconds
25 x rated 2 seconds	1200V 3 seconds
50 x rated 1 seconds	

Measured system

⊙ Suitable for 3 phase 4 wires / 3 phase 3 wires / single phase 2 & 3 wires / 3 phase balance

⊙ Select by input wiring & software configuration

Programmability

⊙ Software accessible / password lock

⊙ System selection : 3 phase 4 wires / 3 phase 3 wires / 1 phase 2 & 3 wires and 3 phase balance

⊙ PT : 1 - 5000.0 ; CT : 1 - 2000.0

⊙ Readout display control

5 or 4 digit / auto scan or manual selection / scanning time

⊙ Maximum demand 1 - 60 min

⊙ Maximum and minimum of instant measurement

⊙ Communication

Baud rate 1200 / 2400 / 4800 / 9600 / 19200

Parity (even or odd) / None

Address setting 1 - 254

⊙ Calibration : software with password lock

⊙ Memory : all of energy date and status setting

Communication port

RS485 (standard) ; RS232 (option)

Modbus® RTU protocol

Display

VFD / 0.28" / green color, 3 rows of 9 alphanumerics

RTC

Maximum deviation 5 sec in 24 hours

Time for year / month / date / hour / minute / sec

Dielectric strength

IEC 255-5

2KV AC rms 1 minute between input / output / power

Impulse and surge test

ANSI / IEEE C37.90.1-1989 (3KV) SWC test

IEC 255-22-1 class III SWC test

IEC 255-22-4 class IV (IEC 801-4) SWC test

IEC 255-5 1.2 x 50us (5KV) impulse test

Stability

Temperature range -25 to +55°C,

Maximum 100 ppm / °C

Long term stability 0.15% drift maximum per year

Operating condition

Temperature range -25 to +60°C,

RH 20 - 95% non-condensed

Storage condition

Temperature range -25 to +70°C,

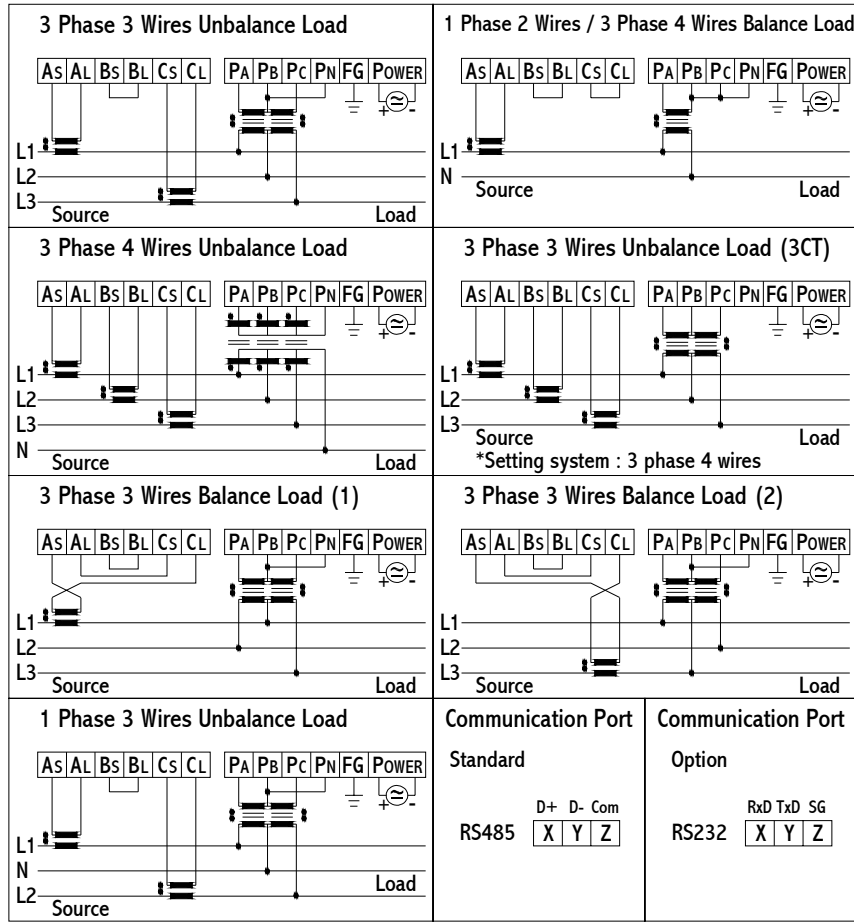RH 20 - 95% non-condensed

Power supply

AC 80 - 260V, 40 - 70 Hz, DC 80 - 330V

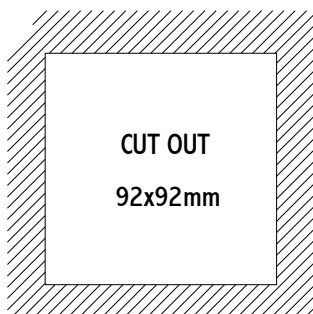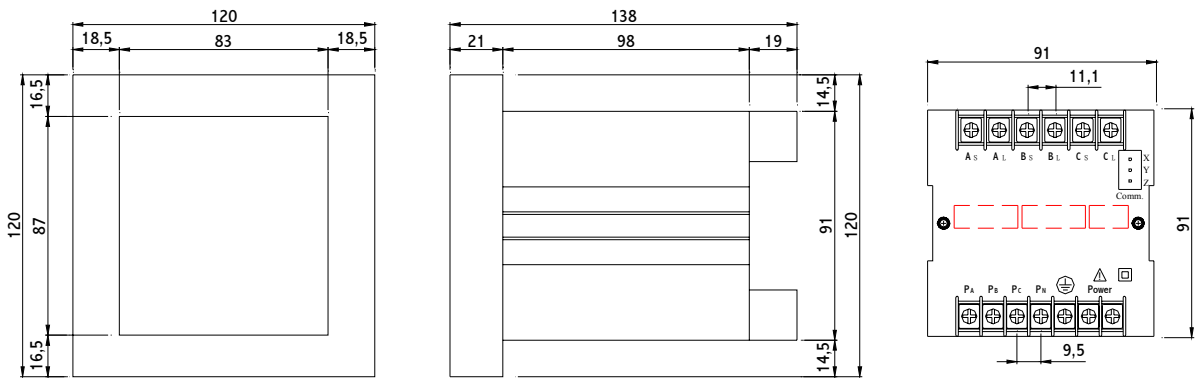DC 20 - 60V (option)

Dissipation maximum 12VA for AC and 6 watts for DC

Mounting / Dimension

Panel type mounting

Size : 120 x 120 x 130.5mm

Cut out : 92 x 92mm

Wiring

3 Phase 3 Wires Unbalance Load	1 Phase 2 Wires / 3 Phase 4 Wires Balance Load
As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 L2 L3 Source Load	As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 N Source Load
3 Phase 4 Wires Unbalance Load	**3 Phase 3 Wires Unbalance Load (3CT)**
As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 L2 L3 N Source Load	As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 L2 L3 Source Load *Setting system : 3 phase 4 wires
3 Phase 3 Wires Balance Load (1)	**3 Phase 3 Wires Balance Load (2)**
As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 L2 L3 Source Load	As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 L2 L3 Source Load

1 Phase 3 Wires Unbalance Load	Communication Port	Communication Port
As AL Bs BL Cs CL PA PB Pc PN FG POWER L1 N L2 Source Load	**Standard** RS485 D+ D- Com X Y Z	**Option** RS232 RxD TxD SG X Y Z

Dimension

120
18,5   83   18,5
16,5
120   87
16,5

138
21   98   19
14,5
91   120
14,5

91
11,1
As AL Bs BL Cs CL   X Y Z Comm.
PA Ps Pc PN   ⚠ ▢ Power
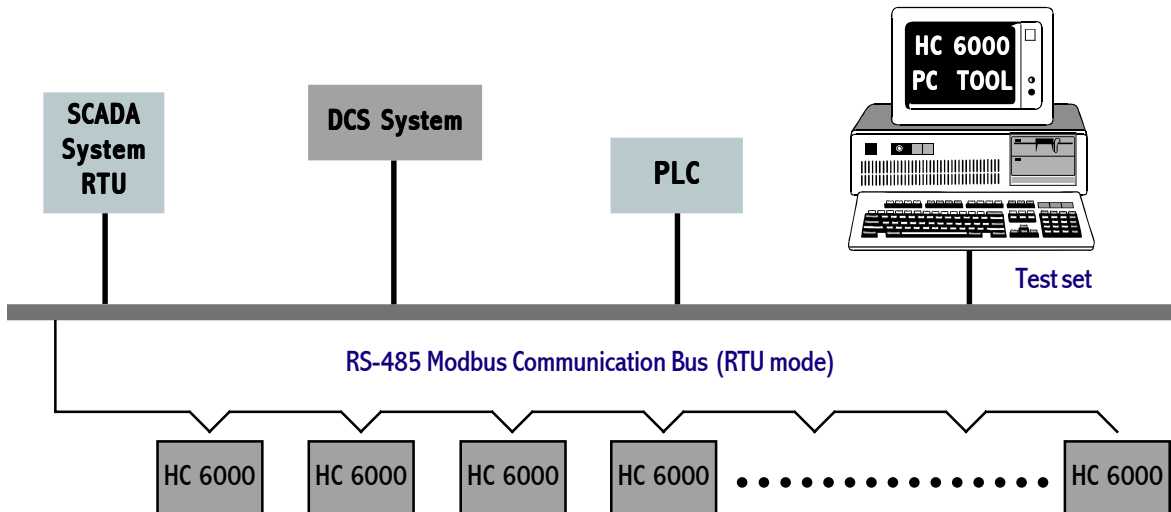9,5
91

CUT OUT
92x92mm

Applications

The HC 6000 PC TOOL a utility program that can help user to connect to "HC 6000 Power Meter" rapidly. The HC 6000 PC TOOL, provided with every HC 6000 meter, allows easy access to all meter setup information and actual values via a personal computer running Windows 95/98 and one of the PC's communication ports - COM1 or COM2. The user can :

- Program / Modify setup information
- Load / save setup information files from / to disk
- Read actual "Basic" value (current / voltage / power / frequency)
- Read actual "statistics" value (maximum / minimum / time of maximum / time of minimum)

The "HC 6000 PC TOOL" can be used "stand-alone", without a HC 6000 meter, to create or edit HC 6000 meter setup information files.

Communication Wiring