POWER METER

UP 6760

Introduction

The UP 6760 Digital Power Meter is microprocessor-based instrument intended for power and energy measurement. Additional functionality option to provide control function as synchro check. The UP 6760 is an Intelligent Electronic Device (IED) and stores these measured values and setting parameters in internal registers for communication. With the features, high accuracy, fully modularized & plug-in design, and compact size, UP 6760 is very suitable for Electric Utility Substation Automation application.

Features

- ◎ Current input terminal with automatic shorting mechanism
- ◎ Over 90 power and energy parameters
- ◎ Modbus® RTU / DNP3.0 protocol
- ◎ 4-AC current inputs, 5A or 1A (specified when ordering)
- ◎ 4-AC voltage inputs, maximum 300V
- ◎ True RMS conversion
- ◎ 32 sample points per cycle
- ◎ Instant maximum and minimum logger
- ◎ Waveform capture
- ◎ Error message display
- ◎ 200 event logs for all measured quantities
- ◎ Build in RTC (real time clock)
- ◎ Field programmable PT / CT ratio
- ◎ Accuracy up to 0.15%
- ◎ Low input burden 0.5VA (5A / 120V)
- ◎ 2 communication Port, RS-485 + RS-232
- ◎ Wide power supply range 80~260V AC / DC
- ◎ Memory for all setup and energy data
- ◎ Comprehensive self test diagnostic
- ◎ "User Map" speed up communication (indirect accessing data)
- ◎ Synchrocheck
- ◎ Fault current detection (option)
- ◎ 2KV RMS input / output / power isolation
- ◎ Alphanumeric LED display clear and long-life
- ◎ Fully modularized & plug-in type
- ◎ Easy in field maintenance

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Model & Ordering Number

Model : UP 6760

Ordering : UP 6760 – B – 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

Option

N : None

A : Fault current detection

Communication Part

1 : RS-485 + RS-232

Y : Special ordering

Specification

Programmable measurements / accuracy / display readouts

Parameter	Digits	Display (maximum)	Accuracy		Phase 1	Phase 2	Phase 3	Total	Average
			option=N	option=A					
Vx3	4	9.9.9.9. V/KV	0.15% fs	0.25% fs	V1	V2	V3		VE
Ax3	4	9.9.9.9. A/KA	0.15% fs	0.25% fs	A1	A2	A3		AE
Watts	4	9.9.9.9. W/KW/MW/GW	0.25% fs	0.25% fs	W1	W2	W3	W	
Vars	4	9.9.9.9. Var/KVar/MVar/GVar	0.25% fs	0.25% fs	Var1	Var2	Var3	Var	
VA	4	9.9.9.9. VA/KVA/MVA/GVA	0.25% fs	0.5% fs	VA1	VA2	VA3	VAE	
PF	4	1.000	0.25% fs	0.25% fs	PF1	PF2	PF3	PF	
WH	7	9.9.9.9.9.9.9. WH/KWH/MWH/GWH	* 0.25% rd/ PF	** 0.5% rd				WH	
VarH	7	9.9.9.9.9.9.9. VarH/KVarH/MVarH/GVarH	* 0.25% rd/ PF	** 0.5% rd				VarH	
A0	4	9.9.9.9. A/KA	0.5% fs	0.25% fs					
AFx3,AF0	4	9.9.9.9. A/KA	None	1% fs					
Hz	4	70.00	0.03% rd	0.03% rd					
Angle	4	359.9 DG	***	***	DG1	DG2	DG3	DG	

* Accuracy performance range for WH/VarH, PF ≧ 0.5 (-10 to 50℃)
PF = Cos θ for WH ; PF = Sin θ for VarH
Voltage ≧ 60V ; Current ≧ 20% of rating

** Accuracy performance range for WH/VarH, PF ≧ 0.5 (-10 to 50℃)
PF = Cos θ for WH ; PF = Sin θ for VarH
Voltage ≧ 60V ; Current ≧ 10% of rating

*** $0.2^{\circ} \pm SIN^{-1}$ (0.02 x PF)

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Input

4 - AC Currents (Aa, Ab, Ac, A0)
4 - AC Voltage (Pa, Pb, Pc, Pn for 3-phase input & P1, P2 for separate 1-phase input)
* Range
  Voltage : 10~300 V
  Current : Switch able for CT secondary rating
  Maximum 6A for 5A rating
  Maximum 1.2A for 1A rating
  AFx=20CT (Fault current) ... option
  Frequency : 40~70 Hz

Burden

Voltage < 0.15VA at 300V (or > 1 MΩ)
Current < 0.3VA of rating
* Overload Withstand
  2 CT continuous, 25 CT 2 sec, 50 CT 1 sec

Display

LED / 0.2" / green color, 1 rows of 8 characters

Programmability

* Communication Baud Rate
  1.2K / 2.4K / 4.8K / 9.6K / 19.2K bps
  Device address 1 ~ 254
* Measured Power System
  3P4W / 3P3W / 1P3W / 1P2W
  50 / 60 Hz main frequency
  PT ratio 1.0~5000.0
  CT ratio 1.0~5000.0
  Maximum demand 1-60 minute (A,KW,KVAR,KVA)

Fault Current Detection (Mode 0) ..... option

One Fault-Based-Curve
16 set-point groups (Ip-pu, Mp, Ig-pu, Mg)

Fault Current Detection (Mode 1) ..... option

User definable
4-point Phase time over-current curve
4-point Ground time over-current curve

Waveform Capture

Data Channel : 4 currents, 4 voltages
Sample Rate : 32 points per cycle, length 2 cycle

Maximum / Minimum Logger

20 parameters with time-stamped :
VP1, VP2, VP3, VPE, VPS, VL1, VL2, VL3, VLE, VLS, A1, A2, A3, A0, AE, W, Var, VA, PF, F

Communication Port

RS232 (front panel) : Modbus RTU protocol only
RS485 (rear panel) : Modbus RTU or DNP3.0 protocol

Real Time Clock (RTC)

Maximum deviation 2 sec in 24 hours
Time for Year / Month / Day / Hour / Minute / Second

Dielectric Strength

IEC 255-5
◎2KV AC rms 1 minute between input / output / power
◎2.5KV AC rms 1 minute between case / input
◎2KV AC rms 1 minute between case / power

Impulse and Surge

ANSI / IEEE C37.90.1-1989 (3KV) SWC
IEC 61000-4-12 CLASSⅢ SWC
IEC 61000-4-4 CLASSⅣ SWC
IEC 61000-4-5 CLASSⅣ Impulse

Stability

Temperature range (-10 to +50℃), maximum 100 ppm/℃

Operating Condition

Temperature range -25 to 60℃
RH 10 to 95% non-condensing

Storage Condition

Temperature range -40 to 80℃
RH 10 to 95% non-condensing

Event logger

200 events with time-stamped
status change of switch input
Failure in self-test
Programming access
Fault current recorder ..... option
Power ON / OFF

Power Supply

LO : DC 20~60V
HI : AC 80~260V @ 40~70 Hz, DC 80~330 V
Dissipation maximum 12 VA for AC and 5W for DC

Dimension

208 x 72.6 x 144.6 mm (L x W x H)

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Fault Current Detection Function ..... option

Fault-Based-Curve

One user programmable Fault-Based-Curve can be stored in the UP 6760. This can be used for time over-current detection in the same as IEC, ANSI curves. The custom Fault-Based-Curve has set-points for entering times to fault at the following current levels (I/Ipu) : 1.00 to 1.20 in steps of 0.05 and 1.20 to 6.00 in steps of 0.4, and 6.0 to 20.0 in steps of 2.0. The AIM then converts these points to a continuous curve by linear interpolation between data points.

(I/Ipu)	Fault Time Tfbc (ms)	(I/Ipu)	Fault Time Tfbc (ms)	(I/Ipu)	Fault Time Tfbc (ms)
1.00	0-65535	2.80	0-65535	6.00	0-65535
1.05	0-65535	3.20	0-65535	8.00	0-65535
1.10	0-65535	3.60	0-65535	10.0	0-65535
1.15	0-65535	4.00	0-65535	12.0	0-65535
1.20	0-65535	4.40	0-65535	14.0	0-65535
1.60	0-65535	4.80	0-65535	16.0	0-65535
2.00	0-65535	5.20	0-65535	18.0	0-65535
2.40	0-65535	5.60	0-65535	20.0	0-65535

Fault-Alarm-Curve

The required Fault-Alarm-Curve is established by programming a Pickup Current and a Curve Multiplier. The Pickup Current is the threshold current at which the fault detection starts timing, range from 0.05 to 20.00 CT. The Curve Multiplier allows shifting of the programmed base curve in the vertical time direction, range from 0.00 to 100.00. The formula is :

T = M * Tfbc (at I/Ipu)

Where

T = Fault Alarm Time (ms)

M = Curve Multiplier

Tfbc = Fault Base Time (ms) at I/Ipu

I = Input Current

Ipu = Pickup Current

Set-point Group

In UP 6760, the set-points (Ip-pu, Mp) are used for all three phase time over-current detection, and the set-points (Ig-pu, Mg) are used for ground time over-current detection only. Sixteen user programmable set-point groups (Ip-pu, Mp, Ig-pu, Mg) (G_00 to G_15) can be stored in UP 6760. (In other word, there are 16 phase fault-alarm- curves and 16 ground fault-alarm-curves.) Via communications, host can select the active set-point group remotely, and the active group no, the active Ip-pu, the active Mp, the active Ig-pu, and the active Mg value can be read-back.

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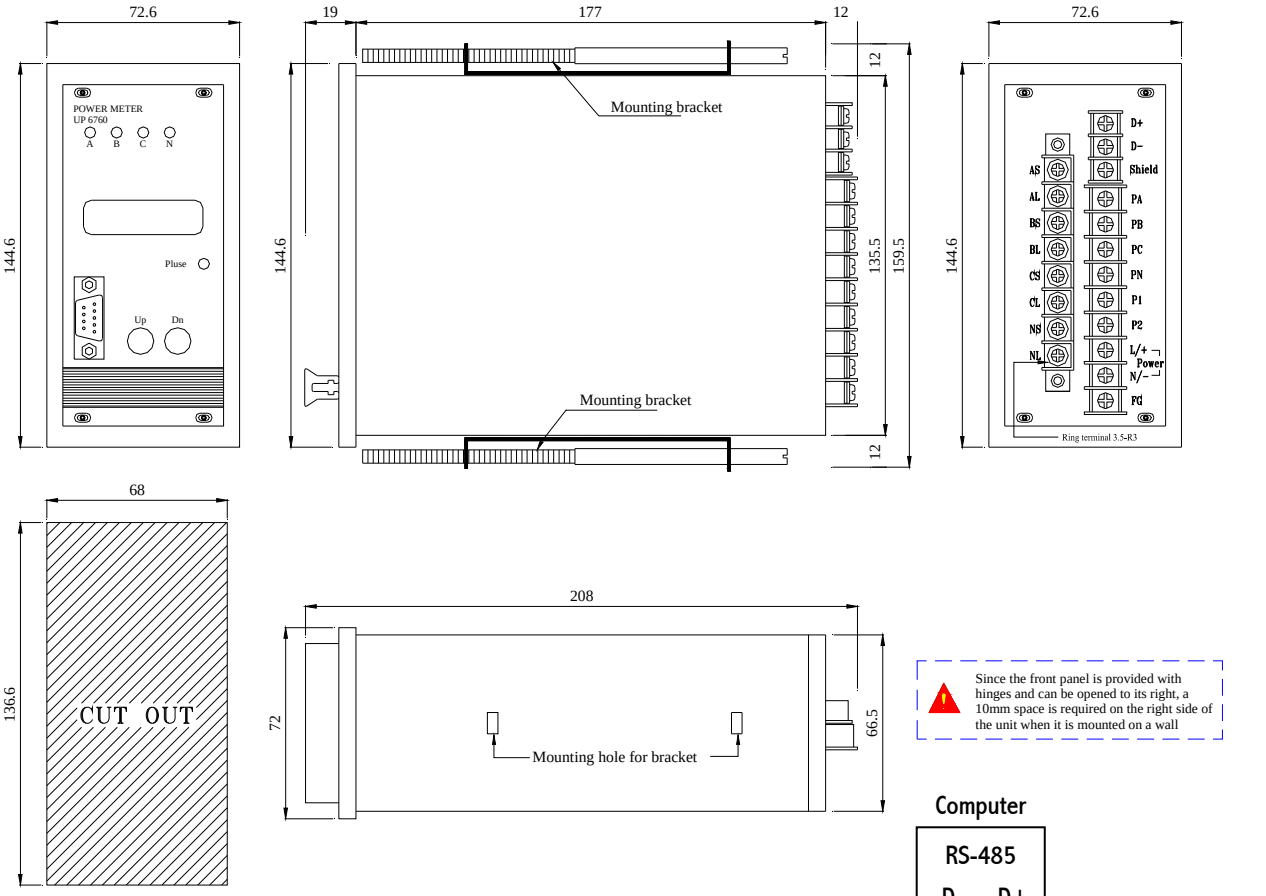
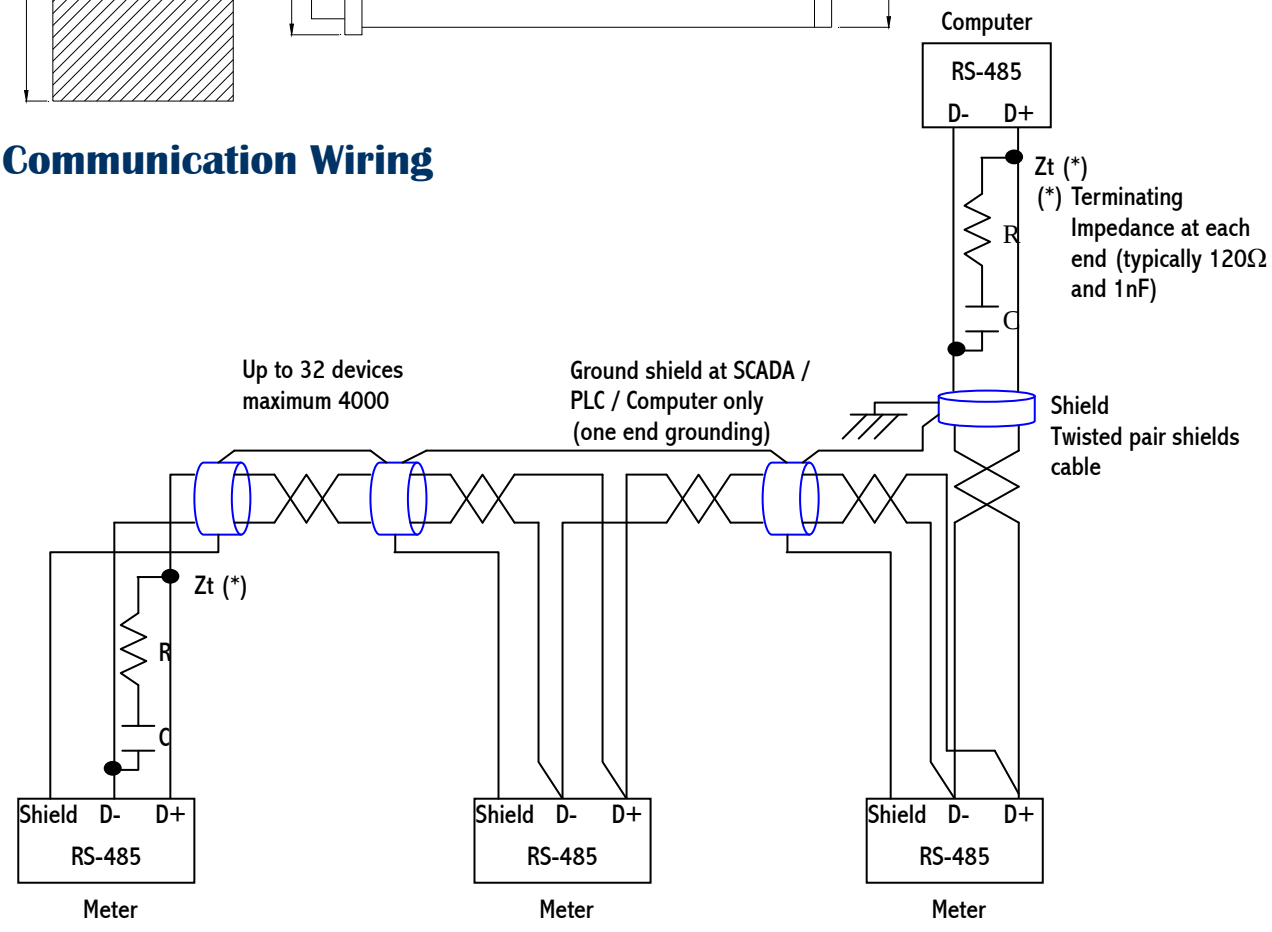
Dimension



Since the front panel is provided with hinges and can be opened to its right, a 10mm space is required on the right side of the unit when it is mounted on a wall

Communication Wiring



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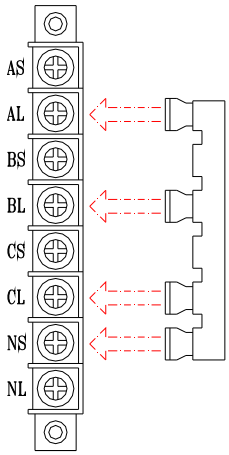
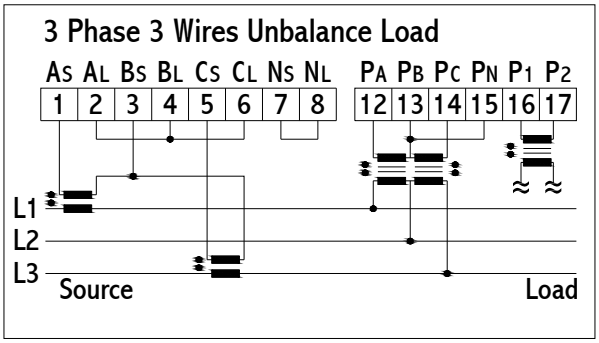
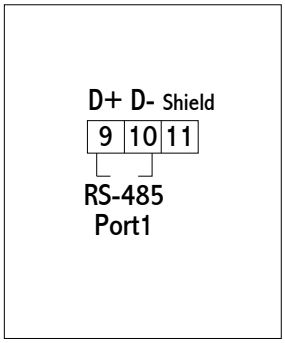
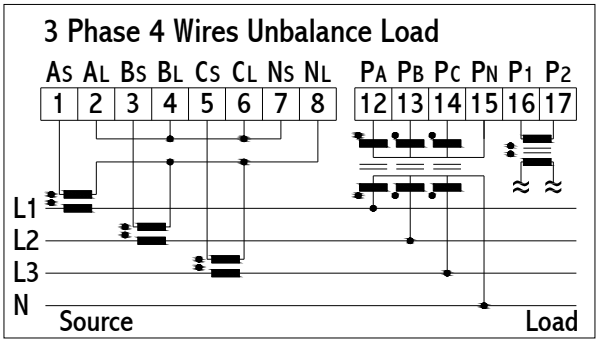
Wiring

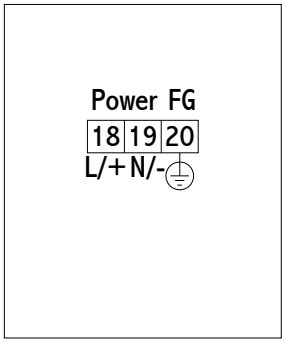
3 phase 4 wires











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