PW636i
Universal Test System

PONOVO POWER CO., LTD.
www.relaytest.com

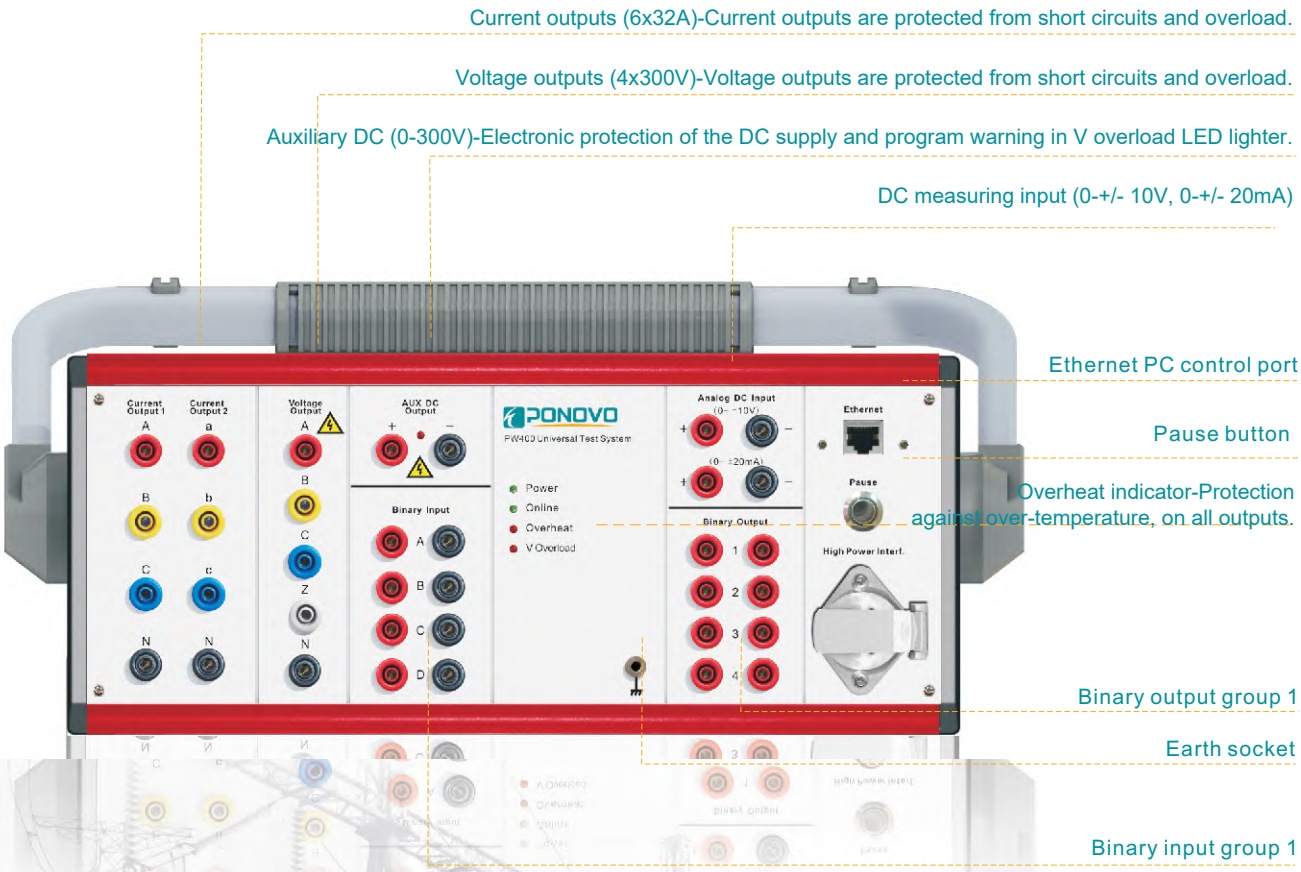
PW636i Relay tester

Universal testing system PW636i (6*32A, 4*300V) can test all types of protective relays, including modern IEC61850 based relays. Other test works, such as transducer, energy meter, indication meter, etc., can also be done easily. It's the ideal test device for all power utilities, power plants, relay manufactures, panel manufactures, research institutes, Universalities, testing companies, etc.

Product Features

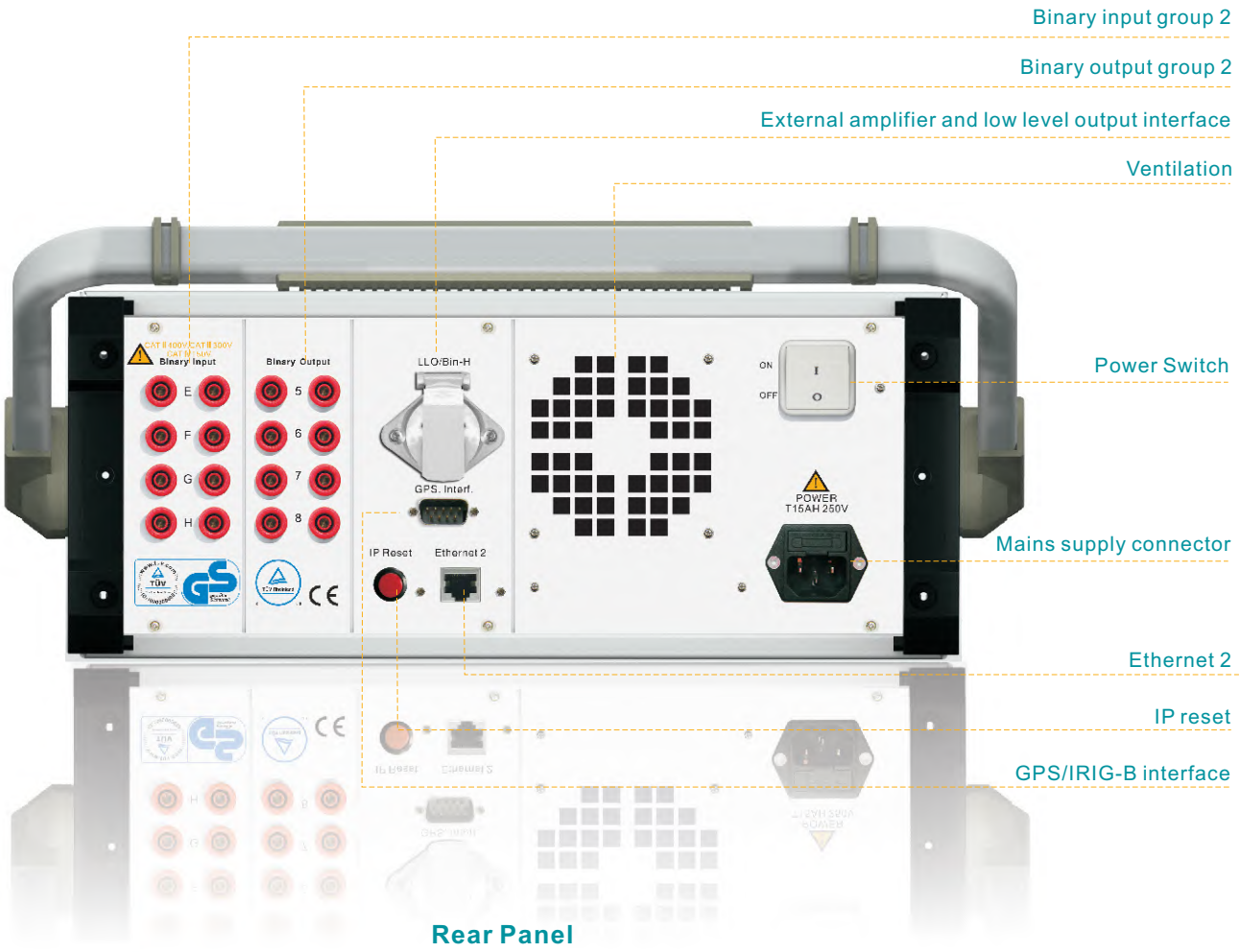
- In-built monitoring and recording
- Large output power
- High accuracy
- Support IEC61850 based test
- Current booster interface for testing high burden relay
- Support importing setting value of relays via XRIO/RIO/ PONOVO's Powertest default set files automatically

PW636i is designed with fuse on the mains supply and electronic protection for overload on the current (open circuit) or voltage outputs(short circuit), with immediate isolation of the output and alarm indication. Also diagnostic message for the setting of wrong data, mistakes on the input etc. There's also electronic protection in case of counter-feed of voltage output, if any incorrectness happen, the alarm light shall flash. And Overheat LED indicator shall flash for Protection against over-temperature, on all outputs.



Front Panel

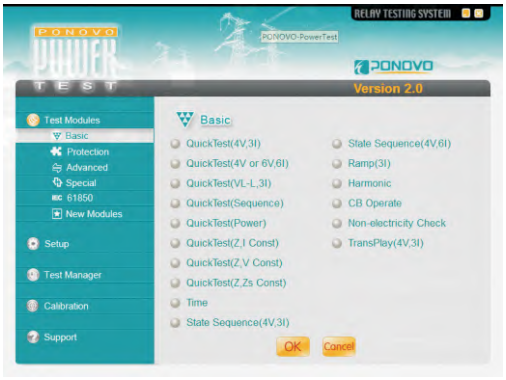
Do you want to know a new friend?
Here is PW636i, Your good assistant on relay testing.



Rear Panel

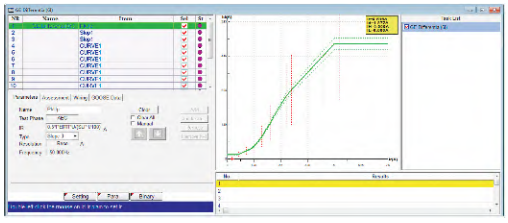
PowerTest Relay Test Software

Start Page



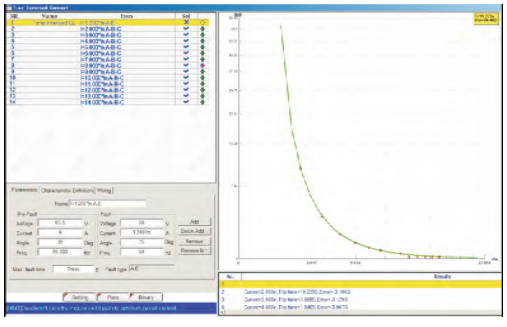
Differential

Differential module is suitable for use the 6 output current channels' relay tester, which is applied on transformer, generator and bus bar etc. differential protection equipment test. Because of adopting the 6 currents output, it realizes the two sides three phases test between relay tester and relay equipment.



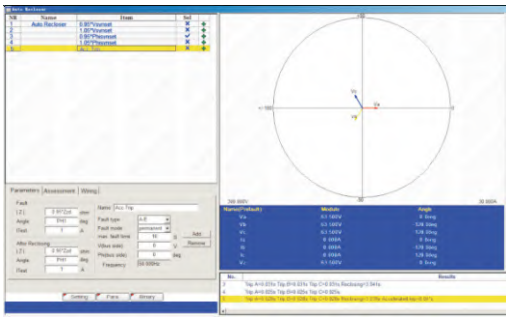
Inverse time overcurrent

This module realizes the directional over-current test and non-directional over-current test. This module also include: testing positive sequence, negative sequence and zero sequence instantaneous time over-current, over-heat protection inverse time over-current or the customized “Current/Time” operation characteristic.



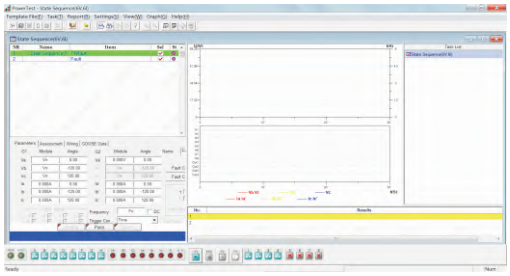
Auto-reclosing

Auto-reclosing module is the specific module which is applied to test the reclose function. This module can realize that relay automatic reclosing with checking the difference between system and unit, checking the synchronization setting, reclose set time checking and automatic evaluating of testing results.



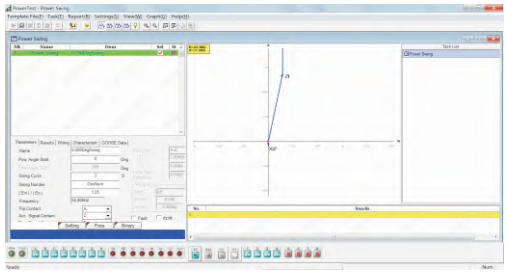
State Sequence

In the State-Sequence module, the relay tester can output multiple continuous state sequences. This module can help user to do customized test.



Power swing

Power swing module is applied to simulate the power system swing and test the generator losing synchronization and normal network splitting equipment.



Test funcionts according to IEEE relay code

IEEE. NO.	DEVICE	PW636i
2	Time Delay Starting or Closing Relay	√
21	Distance Relay	√
24	Volts per Hertz Relay	√
25	Synchronizing or Synchronism-CheckDevice	√
27/27N	Undervoltage Relay	√
30	Annunciator Relay	√
32	Directional Power Relay	√
36	Polarity or Polarizing Voltage Devices	√
37	Undercurrent or Underpower Relay	√
40	Field (over/under excitation) Relay	√
46	Reverse phase or Phase-Balance Current Relay	√
47	Phase-sequence or phase-balance voltage relay	√
50/50N	Instantaneous Overcurrent	√
51/51N	AC Time Overcurrent Relay	√
52	AC Circuit Breaker	√
53	Field Excitation Relay	√
55	Power Factor Relay	√
56	Field Application Relay	√
58	Rectification failure relay	√
59/59N	Overvoltage Relay	√
60	Voltage or Current Balance Relay	√
61	Density switch or sensor	√
62	Time-Delay Stopping or Opening Relay	√
64	Ground Detector Relay	√
67/67N	AC Directional Overcurrent Relay	√
68	Blocking or "out of step" Relay	√
74	Alarm Relay	√
76	DC Overcurrent Relay	√
78	Phase-Angle Measuring Relay	√
79	AC-Reclosing Relay	√
81/81U	Under Frequency Relay	√
81/81O	Over Frequency Relay	√
81/81R	Rate of change of frequency	√
82	Dc load-measuring reclosing relay	√
85	Carrier or pilot-receiver relay	√
86	Lock-out relay	√
87/87B	Busbar Differential Protective Relay	√
87/87T	Transformer Differential Protective Relay	√
87/87L	Line Differential Protective Relay	√
91	Voltage Directional Relay	√
92	Voltage and Power Directional Relay	√
94	Trip Relay	√
Other Fuctions (Optional)	IEC61850	√
	High burden relay	√
	Lower Level outputs	√
	Transducer	√
	Energy meter	√

PONOVO Template Service

PONOVO provides relay test templates based on relay model from different relay manufactures. With the use of template the relay test work can be simplified greatly. Each relay test template is one independent file which support automatically import setting value of relays and includes characteristics and testing functions of the relays and can be opened in PowerTest relay test software. Registered users can download relay templates from PONOVO website. The following are some part of typical relay templates for some popular relays from relay manufactures. More templates could be downloaded from www.relaytest.com.

ABB

LZ96
REG100
REL511
REL531
MSOC
RAZFE
REB670
REC670
REF542
REG216
REL300
REL316
REL350
REL352
REL356
REL511
REL512
REL521
REL531
REL561
REL650
REL670
RET521
RET670
REZ1
SPAC150C
SPAC310C
TPU2000R

AREVA

CAG17
CAG37
CDD
CDG 11
CTIG
CTIGM
CTMFM
CTMM
CTNM
CTT
CTTM
CTU
DIFB
EAP3100-350
Generic Mho
KBCH
KCEU 141 241
KVFG
LFZP
LFZR
LGPG
MBCH
MCGG
MFVUM
Micromho
MVAPM
MWTU
Optimho
P111
P115
P120
P121
P122
P123
P124
P125
P126
P127
P141
P142
P143
P144
P145
P241
P242
P243
P342
P343
P344
P345
P430
P437
P433
P435
P436
P438
P441
P442
P443
P444
P445
P521
P543
P544
P545
P546
P547
P631
P632
P633
P634
P642
P643
P645
P921
P922
P923
P940
P941
P942
P943
PPX
PVMM
Quadromho
SKE
SKD
VAGM22
VAPM

Schneider Electric

SEPAM 10
SEPAM 80
SEPAM 2000
SEPAM S42
T20

GE

Sr489
SR745
F650
SR750
GT60
D60
DLPD
G30
L90
Ge345

SEL

SEL300
SEL351
SEL587
SEL311B
SEL487B
SEL487E
SEL167
SEL411
SEL311C
SEL311L
SEL321
SEL421
SEL501
SEL587
SEL701
SEL751
SEL751A
SEL787

SIEMENS

7RW600
7SA6XX
7SA511
7SA513
7SA518
7SA519
7SA522
7SD5
7SD52
7SD63
7SJ61
7SJ63
7SJ80
7SJ600
7SL24
7SS52
7ST6
7UM61
7UM62
7UM512
7UM515
7UM516
7UT6xx
7UT51
7UT512
7UT6127VE61
7VE61
7VE63
ARGUS 1
DCD121A
DCD125A

VAMP

VAMP 255
VAMP 265

TOSHIBA

GRB100
GRD110
GRD140
GRD150
GRF100
GRL100
GRL150
GRT100
GRZ100

NR

PCS-902
RCS-915
RCS-931
RCS-993
RCS-902
PCS-9611
PCS-902H
PCS-931D
PCS-9611C

WOODWARD

MRA4
MRDT4
MRI4
MRM
MRN

SIFANG

326GD

ERL PHASE

F_PRO
L_PRO
T_PRO

www.adv-cs.com

PCT210

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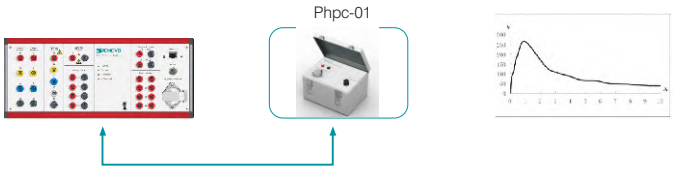
More Templates can be download from our website www.relaytest.com

Optional Accessories

- Current Booster (**Phpc01**)

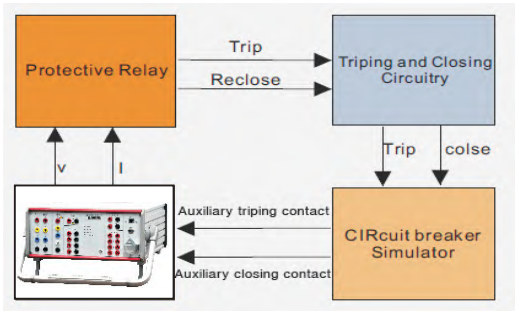


Phpc01 current booster is designed to supply high compliance voltage even at small current range, suitable for testing high burden electromagnetic current relays.

- GPS synchronization (**PGPS02**)

It provides GPS synchronization signal in PPS (pulse per second) or PPM (pulse per minute) for synchronized test. Trigger time can be set for end-to-end test application.

- Circuit breaker simulator(**PSS01**)



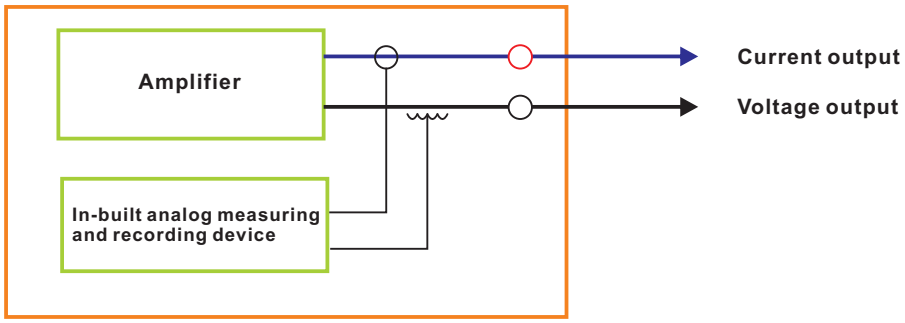
Working together with PONOVO relay testing device, PSS01 is to be used to simulate the circuit breaker operation for checking the relay scheme performance. Complicated software settings can be avoided by using this simple accessory.

- Scanning Head (**PACB108**)

The passive optical scanning head PACB108 detects the status of an LED, that is either an optical pulse output from an energy meter or the binary status of a protective relay or other similar optical source.

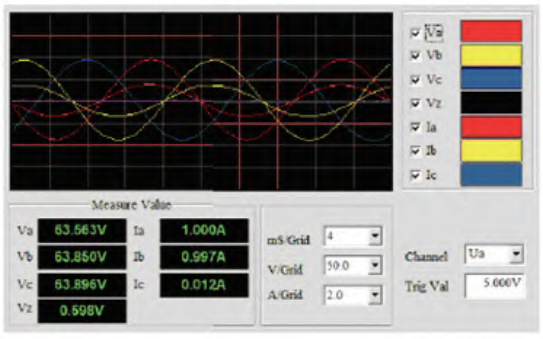
In-built analog monitoring & recording unit

This in-built analog monitoring and recording unit samples the actual current/voltage outputs and real-time output waveform can be displayed in the software. This makes it easy to check the correctness of wiring before the test and observe the output during the test process



Principle

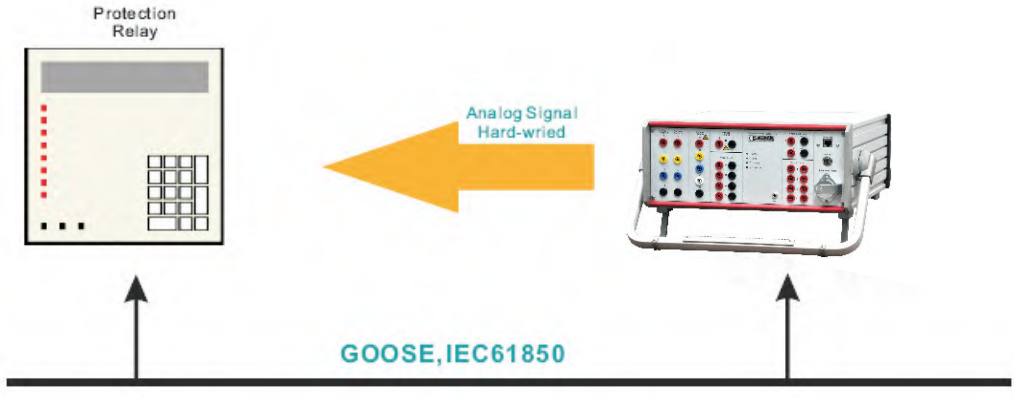
Real-time output waveform display helps the fast trouble shooting of wiring and test circuitry before test is actually started. User can also use this provision to analyze the external signals, such as phase angle, power, harmonic, etc.



Real-time outputs display

IEC 61850 Function

PW636i provides analog voltage/current signal to relay and the GOOSE message from relay is received and interpreted by relay test equipment.



PONOVO

PW636i
Universal Test System

Specifications

Voltage generators

Setting range	
4-phase ac(L-N)	4×0~300Vrms
1-phase ac(L-L)	1×0~600Vrms
dc (L-N)	4×0~300V

Power	
4-phase ac (L-N)	4×75VA at 300V
3-phase ac (L-N)	3×150VA at 300V
1-phase ac (L-L)	1×200VA at 600V
dc (L-N)	3×150 W at 300 V
Accuracy(AC)	error < 0.08% rd.+0.02 %rg guar., at 0 ~300 V
	error < 0.03% rd.+0.01 %rg. typ., at 0~300 V
Accuracy(DC)	0.1% range typ. 0.2% range guar.
Ranges(Aux ac)	300Vrms,max.150VA
Resolution(AC/DC)	0.001/10mV for 300Vac
Distortion	< 0.02 % typ., (< 0.05% guar.)

Current generators

Setting range	
6-phase AC (L-N)	6×0~32Arms
3-phase AC (2L-N)	3×0~64Arms
1-phase AC (6L-N)	1×0~180Arms
dc (6L-N)	1×0~180A

Power	
6-phase AC (L-N)	6×400VA at 32A
3-phase AC (2L-N)	3×700VA at 64A
1-phase AC (6L-N)	1×1000VA at180A
DC (3-phase and 1-phase)	3×400W at 64A
	1×1000W at 180A
Max compliance	
Voltage (L-N) (L-L)	21Vpk/42Vpk
Accuracy (AC/DC)	error < 0.15 % rd.+0.05 % rg . guar., at 0~ 32A
	error < 0.0 5% rd.+0.02 % rg . typ., at 0~ 32A
Ranges	32 A
Resolution	1mA
Distortion	< 0.05 % typ. (< 0.1 % guar.)

General

Frequency	
Sine signal	DC,0~1000Hz
Transient signal	dc~10.0 kHz
Accuracy	±0.3ppm
Resolution	<5μ Hz

Timer

Time range	infinite
Resolution	50/40μs
Time accuracy	≤0.001 % of the measure ± 0.05 ms

Phase

Angle range	-360º~+360º
Accuracy	<0.02ºtyp.,<0.1° guar.at 50/60Hz
Resolution	0.001°

Auxiliary dc supply

Voltage range	0~ 300V
Power	88W at 110V, 176W at 220V, 90W at 300V
Accuracy	error < 0.1 % rg. typ. (<0.5 % rg. guar.)

Power supply

Nominal input voltage	110~240Vac
Permissible tolerance	90~260Vac
Nominal frequency	50/60Hz
Permissible frequency	45~65Hz

Binary inputs Group1

Number	8
Input characteristics	0~400Vdc dry or wet contact
Sample rate	20kHz
Time resolution	50μs
Max. measuring time	infinite
Debounce/Deglitch time	0~25ms
Counting function	< 3kHz at pulse width>150μs
Galvanic isolation	8 galvanically isolated

Binary inputs Group2

Number	4
Input characteristics	0~5Vdc dry or wet contact
Sample rate	25kHz
Time resolution	40μs
Max. measuring time	infinite
Debounce/Deglitch time	0~25ms
Max. counting frequency	25kHz
Pulse width	> 3μs
Threshold voltage	2V
Voltage hysteresis	0.8V
Max. input voltage	+5V

Binary outputs, semiconductor

Number	4 (rear side)
Type	semiconductor
Break capacity dc	Vmax: 400Vdc /Imax: 0.5A /Pmax: 150W
Update rate	100μs
Imax	0.5A

Binary outputs, relay

Number	4 (front side)
Type	Potential free relay contacts,software controlled
Break capacity ac	Vmax: 400Vac /Imax: 8A /Pmax: 2000VA
Break capacity dc	Vmax: 400Vdc /Imax: 8A /Pmax: 150W

DC voltage measuring inputs

Measuring range			0~±10V
Accuracy	error <0.02% rg. typ.(<0.05% rg. guar.) /±0.001%rd+0.005%rg		
Distortion	0.0001	Input impedance	500KΩ

DC current measuring inputs

Measuring range			0~±20mA
Accuracy	error <0.02% rg. typ. (<0.05% rg. guar.) /±0.001%rd+0.005%rg		
Distortion	0.0001	Input impedance	50Ω

In-built monitoring and recording

Monitoring	currents and voltage outputs
Recording	analog outputs, binary inputs/outputs status
Mode	real time monitoring, no external wiring is required
Recording length	16s

Low level outputs

Setting range	12×0~10Vpk
Max. output current	1mA
Accuracy	error < 0.025 % typ. (< 0.07 % guar.)at 1~10Vpk
Resolution	250μV
Distortion(THD+N)	< 0.05 % typ. (< 0.1 % guar.)
Connection	19 pin combination socket (rear side)

IEC61850 Goose function(Optional)

Interpretation hardware is in-built. Please contact the supplier for options to activate the IEC61850 software support Goose function

Environmental conditions

Operation temperature	0~+50ºC
Storage temperature	-25~+70ºC
Relative humidity	5~95% non - condensing
EMC(E&I)	EN/IEC 61326-1 EN/IEC 61000-3-2/3 EN/IEC61000-4-2/3/4/5/6/8/11/18
Environment	EN/IEC 60068-2-1/2/3/6/27
Safty	EN/IEC 61010-1/1-12/2-030 EN/IEC 60255-25/27
	FCC Part 15:Sub B
Others	ECS-001:2006 LVD EU

Developed and manufacturedunder an ISO 9001: 2015 registered system

Others

PC connection	Ethernet, RJ45, 10M/100M ; USB optional
External amplifier interface	Circular connector
Current booster interface	Circular connector
GPS interface	RS232
Ground Socket (earth)	4 mm banana socket; front side
Weight	20kg
Dimensions (W x H x D)	360 mm× 157mm× 427 mm

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subject to modification

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