Wide angle marine instrument (pull spring structure)









1.Application

96x96,72x72 wide angle square type and 110x110,80x80 wide angle meter,according to the actual use environment of ship and requirements,developed the design of structure, material,seals. This product has the reasonable structure,high quality,light weight, and also can anti Mechanical force and adapt the different weather. And it has convenient install,and extended specification.

2.Main technical parameter

1.meter rotation part adopts the Magnetic tension wire support, without friction,can operate reliably.
2.high mechanical shock resistance,vibration under 0.7g acceleration is acceptable.
3.high accuracy: frequency meter is 0.5 level,power factor meter si 3.0 level, other is 1.5 level.
4.pointer spread angle is 240°.
5.temperature: Min -25°C, Max +55°C
6.shell protect conforms to standard of IP22.
7.voltage withstand: AC2000V one minute between circuit and shell

3.RM96,RM72 series wide angle meter(96x96),(72x72)

No.	Name	Model No.	Measure range	Wire method	Note
1	DC ammeter	RM96・RM72-ZC-A RM96・RM72-DC-A	0.5mA-1A-7.5kA	direct connect,above 10A with external divider	extended to other non electrical indicating instrument like rotate speed,temperature, pressure,etc.
2	AC voltmeter	RM96・RM72-ZC-V RM96・RM72-DC-V	100mV-600V-3kV	direct connect,above 750V with external resistor	
3	AC ammeter	RM96・RM72-RZC-A RM96・RM72-AC-A	1-10A-10kV	direct connect,above 10A needs to through CT	secondary current 5A overload is 2,3,6 times
4	AC voltmeter	RM96・RM72-RZC-V RM96・RM72-AC-V	50-450V-42kV	direct connect,above 450V through PT	secondary voltage 100V
5	Frequency meter	RM96・RM72-HZC-Hz RM96・RM72-Hz	45-55-65Hz 350-480Hz	100V 200V through PT380/100V	Header converter integration
6	3-phase wattmeter	RM96・RM72-WTCZA-W RM96・RM72-W	3kW-6MW	through PT/100V,CT/5A	Header integration Negative power calibration in accordance with 10-20
7	reactive wattmeter	RM96・RM72-YTCZA-Var RM96・RM72Var	2.5Kvar-5Mvar	through PT/100V,CT/5A	Header converter integration
8	power-factor meter	RM96・RM72-FTZ-COSφ RM96・RM72-COSV6φ	Capacitive0.5-1-0.5inductive	through PT380V/100V,CT/5A	Header converter integration
9	High resistance meter	RM96・RM72-ZMΩ(INZ)-MΩ RM96・RM72MΩ	0-5MΩ	127,220V,1mA, through PT380/100V	Header converter integration JDB,ZCB has Insulation monitor
10	three-phase synchronous meter	RM96・RM72-ZS(STZ) RM96・RM72-S	Synchronization point	100V,220V, through PT380/100V	Electric pointer Electronic luminous 360℃
11	AC power grid insulation resistance monitor	RM96・RM72-BMΩ RM96ΩRM72-BMΩ	0-5MΩ	AC220V	integration,with alarm, details see instruction

Wide angle marine instrument (pull spring structure)

4. 45 type wide angle series meter(110x110)

No.	Name	Model No.	Measure range	Wire method	Note
1	DC ammeter	45C$^{8}_{9}$ • 2101-A	0.5mA-1A-7.5kA	direct connect,above 10A with external divider	extended to other non electrical indicating instrument like rotate speed,temperature, pressure,etc.
2	DC voltmeter	45C$^{8}_{9}$ • 2101-V	100mV-500V-3kV	direct connect,above 750V with external resistor	
3	AC ammeter	45L$^{8}_{9}$ • 2102-A	1-10A-10kV	direct connect,above 10A through CT	secondary current 5A overload is 2,3,6 times
4	AC voltmeter	45L$^{8}_{9}$ • 2102-V	50-450V-42kV	direct connect,above 450V through PT	secondary voltage 100V
5	High resistance meter	45L$^{8}_{9}$ • 2103-MΩ	0-5MΩ	127V 200V through PT380/100V	Header converter integration JDB,ZCB has Insulation monitor
6	3-phase wattmeter	45L$^{8}_{9}$ • 2105-W	3kW-6MW	through PT/100V,CT/5A	Header integration Negative power calibration in accordance with 10-20
7	reactive wattmeter	45L$^{8}_{9}$ • 2106-Var	2.5Kvar-5Mvar	through PT/100V,CT/5A	Header converter integration
8	power-factor meter	45L$^{8}_{9}$ • 2107-COSΦ	Capacitive 0.5-1-0.5 inductive	through PT380V/100V, CT/5A	Header converter integration
9	Frequency meter	45L$^{8}_{9}$ • 2108-Hz	45-55-65Hz 350-480Hz	100V,220V, through PT380/100V	Header converter integration
10	Three-phase synchronous meter	45T$^{8}_{9}$ • 2109-S	Synchronization point	100V,220V, through PT380/100V	Electric pointer Electronic luminous 360℃

5. 63 type wide angle series meter(80x80)

No.	Name	Model No.	Measure range	Wire method	Note
1	DC ammeter	63C$^{18}_{19}$ • 2181-A	0.5mA-1A-7.5kA	direct connect,above 10A with external divider	extended to other non electrical indicating instrument like rotate speed,temperature, pressure,etc.
2	DC voltmeter	63C$^{18}_{19}$ • 2181-V	100mV-500V-3kV	direct connect,above 500V with external resistor	
3	AC ammeter	63L$^{18}_{19}$ • 2182-A	1-10A-10kA	direct connect,above 10A through CT	secondary current 5A overload is 2,3,6 times
4	AC voltmeter	63L$^{18}_{19}$ • 2182-V	50-450V-42kV	direct connect,above 450V through PT	secondary voltage 100V
5	3-phase wattmeter	63L$^{18}_{19}$ • 2185-W	3kW-6MW	through PT/100V,CT/5A	Header integration Negative power calibration in accordance with 10-20
6	reactive wattmeter	63L$^{18}_{19}$ • 2186-Var	2.5Kvar-5Mvar	through PT/100V,CT/5A	Header converter external
7	power-factor meter	63L$^{18}_{19}$ • 2187-COSΦ	Capacitive 0.5-1-0.5 inductive	through PT380/100V,CT/5A	Header converter integration
8	Frequency meter	63L$^{18}_{19}$ • 2188-Hz	45-55-65Hz	220V,380V through PT380/100V	Header converter integration

9	DC ammeter	63C1 $^{18}_{19}$ • 63C2-A	0.5mA-10A-750A	direct connect, with external divider	
10	DC voltmeter	63C1 • 63C2-V	2-750V	direct connect	
11	AC ammeter	63L1 • 63L2-A	1-20A.10A-7.5kA	direct connect, with voltage transformer	CT connect is /5A
12	AC voltmeter	63L1 • 63L2-V	50V-450V-7.2kV	direct connect, with current transformer	secondary voltage is /100V

6. 63 type wide angle, square type meter(without backlight)

No.	Name	Model No.	Measure range	Wire method	Note
1	AC ammeter	63L7-A	0-10A-750A	direct connect,through CT	secondary current 5A
2	AC voltmeter	63L7-V	0-450V	direct connect	380V connect
3	Frequency meter	63L7-Hz	45-55-65Hz	direct connect, through divider	220V,380V
4	DC ammeter	63C7-A	0.5-mA-10A-750A±750A	direct connect	750mV divider external
5	DC voltmeter	63C7-V	0-750V±750V	direct connect	
6	DC ammeter	62C12-A	0.5mA-10A-750A	direct connect, through divider	
7	DC voltmeter	62C12-V	2-750V±750V	direct connect	

7. Synchronization indicator and Synchronous pulse transmitter

◆ Electronic luminous synchronization meter

1. No.3,5 terminal is meter operate power-supply input port,shall connect to normal generator network. No.1,8 connect with backup Generator network and shall has the same phase as normal generator network
2. when two generators operates to rated speed, it connects to meter.
3. meter has 36 read indicator with same Equal Distance. each one has Interval 10 electric angle.
4. middle green indicator operate within 0-±10.
5. when the difference of normal generator network frequency and backup generator network frequency is less than 0.4Hz. And difference of phase is between 350 to 10, the upper green indicator lighten, and then the backup generators can start connecting and operating.

◆ Pointer type synchronous meter

A,B line connects to normal generator,A,B,C line connect to backup generator. When backup generator operates to rated speed of normal generator,and frequency, phase difference is closed, the Generator merging.

Wide angle marine instrument (pull spring structure)







◆ Synchronous pulse transmitter parallel operation instruction integrated synchronous meter

This device is matching use with Electronic luminous synchronization meter,and integrated with S meter.

And before phase difference is 0, and the moment voltage and frequency difference is less than one setting value,it allows the close indicator light,and give the main switch close command,to realize the synchronization of parallel generator and system.

8. AC Power grid insulation resistance detecting instrument(integrated)

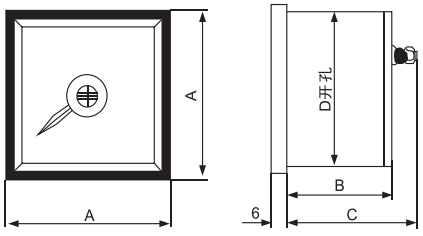
1. Applied to continuous monitoring insulated resistance between boat and electric circuit in the below 500V Non-ground AC distribute system, and give out the Sound and light alarm when the error happening in the power grid that the insulated resistance is lower than instrument setting value.
2. The valued measure range is 0.005~ 0.2~ 0.5MΩ,alarm setting value is 10KΩ,30kΩ,60kΩ,100kΩ.
3. Output alarm signal output terminal capacity is DC240V,3A ,or AC220V(max) 1A. No.4,5 is NO terminal,No.5,56 is NC terminal.
4. After correct wiring, connect to power, Work indicator light , the instrument is under monitoring state,pointer is for power-grid insulated resistance.
5. According to needs to setting alarm value, and adjust setting pointer to the related level. when the resistance is lower than setting,instrument will output alarm signal, and red alarm lightening. when resistance recovery, alarm state will cancel automatically.
6. In the same network,please using two monitors at same time or other instruments measure the insulated resistance of same network at same time.
7. If need to identify instruments operate normally, it can be inspected. After self-inspect, it must return the instrument back to normal operate state.

Note: This meter measure 0~5MΩ,rated operate voltage AC100V,110V,220V,380V.

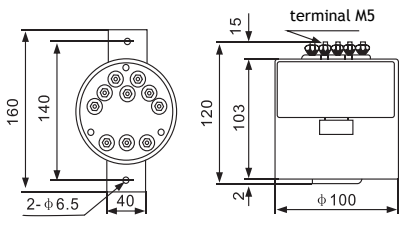
9. RM96,RM72,45 type,63 type shape and install dimension(mm)

Model No.	A	B	C	D open hole	install
RM96	96	95	108	92×92	use 2 or 4 Diagonal support to fix
RM72	72	95	108	68×68	

Model No.	A	B	C	D open hole	E	F
45 type	110	80	90	101	95	M5 hole Φ6
63 type	80	90	105	71	64	M4 hole Φ6



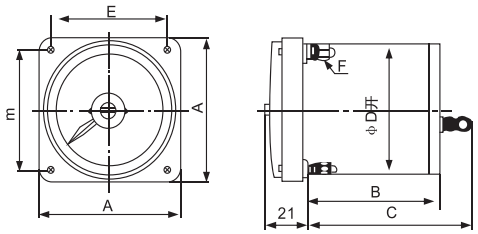
QF96, QF72 shape install dimension



external converter shape

Wide angle marine instrument (pull spring structure)





45 type,63 type shape and install dimension

10. AC power-grid insulation monitoring alarm instrument

JDB type instrument, is applied to continuously monitoring the boat or land AC power-grid 3-phase non-grounding system power,and if the grid insulation error happening in the Electric heating or lighting network, resistance is lower than setting alarm value, It will give out the sound and light alarm signal.

Instrument is equipped with specified boat electrical measure meter,has clear read, electronic circuit adopts the large-scale integrated circuit,alarm setting level is indicated with cursor,and has button operate and setting memory function after AC power loss.

JDB-II type can monitor two network insulation level at the same time, through LW95 converter to switch, then have two resistance of two network.

Alarm level can setting at the range of 0.01-1.0MΩ, is applied to monitor low resistance alarm under normal situation and high resistance zone(like boat,bell,mine,medical.). It has small volume, light weight, beautiful outfit, convenient operate,clear read.



11. JDG4-0.5TH type voltage transformer

◆Application

JDG4-0.5 TH type boat voltage transformer,is applied to AC circuit of frequency 50-60 Hz, voltage below 500V,as voltage and power measurement, relay protection.

◆structure

The iron core is made of C shape with cold rolled silicon steel sheet, fixed the install base and terminal frame with Tin plated steel strip,and welding the tin to prevent loosening,primary and secondary coil is sheathed on the middle column of the two C shaped iron core.

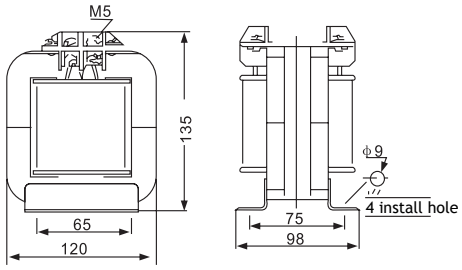
◆technical parameter

Transformer can longtime operate under 110°C and rated voltage. when secondary load is max capacity,its coil temperature raise shall be no more than 60°C ,and transformer shall withstand the insulation voltage-withstand test: primary coil to secondary coil is 3kV, secondary coil to ground is 2kV, last time is 1 min without breakdown and arc-over.

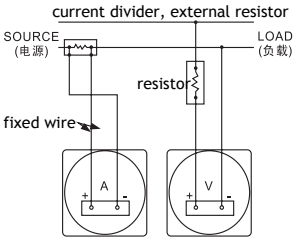
Wide angle marine instrument (pull spring structure)

rated voltage (V)		rated capacity(VA)			max capacity(VA)
primary coil	secondary coil	0.5 level	1 level	3 level	
220 380 500	100	15	25	50	100

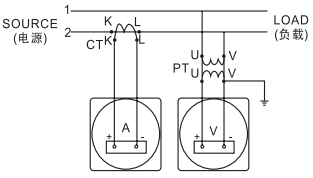
◆ shape dimension



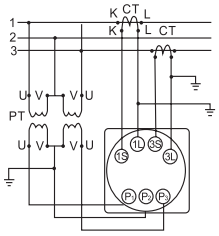
12. Wiring diagram



DC current-voltage meter



AC current-voltage meter

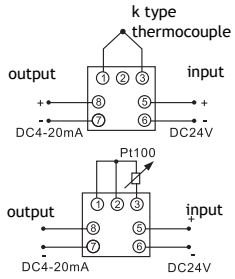


3-phase wattmeter(W)

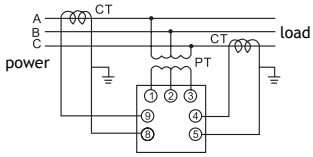
Wide angle marine instrument (pull spring structure)

◆RM96-TC6(K型)

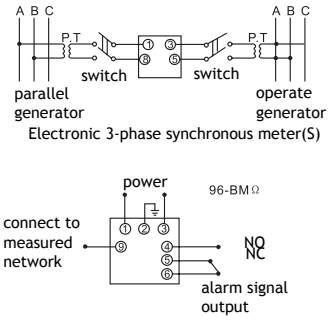
◆RM96-DCTB



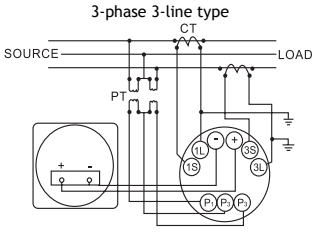
RM96-TC6(PT100型)RM96-DCT



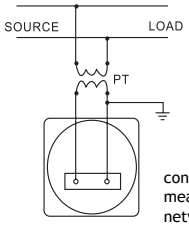
96 type 3-phase wattmeter



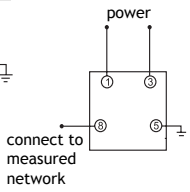
AC power-grid insulate resistance monitoring instrument



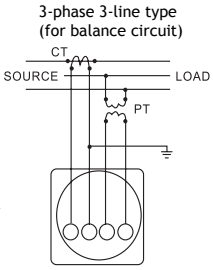
external power converter



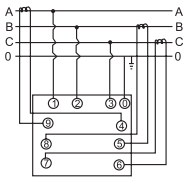
frequency(Hz)



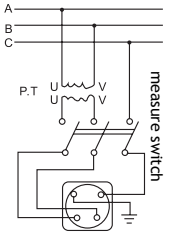
Meg-ohmmeter



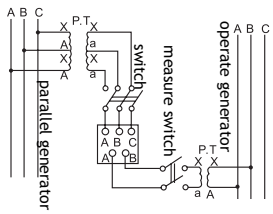
3-phase power factor meter(CosΦ)



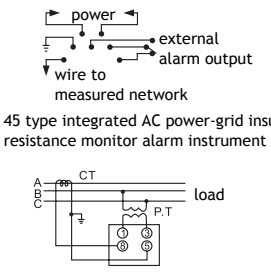
96 type 3-phase 4-line power meter(kW)



96 type resistance meter(MΩ)



pointer type 3-phase synchronous meter(S)



45 type integrated AC power-grid insulation resistance monitor alarm instrument

96 type 3-phase power factor meter(CosΦ)

Wide angle marine instrument (pull spring structure)

13. 3-power wattmeter specification and measurement range

series connect / direct connect	rated current (A)	range	rated voltage V										
			direct connect	through voltage transformer connect(secondary voltage is 100V)									
			100	200	380	3K	6K	10K	15K	35K	110K	220K	380K
rated current (through secondary current is 5A current transformer connect)A	5	kW	0.8	2	3	25	50	80	80	120	1	2	3
	7.5		1.2	3	5	40	80	120	120	200	1.5	3	5
	10		1.5	4	6	50	100	150	150	250	2	4	6
	15		2.5	6	10	80	150	250	250	400	3	6	10
	20		3	8	12	100	200	300	300	500	4	8	12
	30		5	12	20	150	300	500	500	800	6	12	20
	40		6	15	25	200	400	600	600	1	8	15	25
	50		8	20	30	250	500	800	800	1.2	10	20	30
	75		12	30	50	400	800	1.2	1.2	2	15	30	50
	100		15	40	60	500	1	1.5	1.5	2.5	20	40	60
	150		25	60	100	800	1.5	2.5	2.5	4	30	60	100
	200		30	80	120	1	2	3	3	5	40	80	120
	300		50	120	200	1.5	3	5	5	8	60	120	200
	400		60	150	250	2	4	6	6	10	80	150	250
	600		100	250	400	3	6	10	10	5	120	250	400
	750		120	300	500	4	8	12	12	20	150	300	500
	800		120	300	500	4	8	12	12	20	150	300	500
	1K		150	400	600	5	10	15	15	25	200	400	600
	1.5K		250	600	1	8	15	25	25	40	300	600	1000
	2K		300	800	1.2	10	20	30	30	50	400	800	1200
	3K		500	1.2	2	15	30	50	50	80	600	1200	2000
	4K		600	1.5	2.5	20	40	60	60	100	800	1500	2500
	5K		800	2	3	25	50	80	80	120	1000	2000	3000
	6K	MW	1	2.5	4	30	60	100	100	150	1200	2500	4000
	7.5K		1.2	3	5	40	80	120	120	200	1500	3000	5000
	10K		1.5	4	6	50	100	150	150	250	2000	3500	6000

Wide angle marine instrument (pull spring structure)

14. 3-phase wattmeter measure range and specification

series connect	rated current (A)	range	rated voltage V										
			direct connect	through voltage transformer connect(secondary voltage is 100V)									
direct connect			100	200	380	3K	6K	10K	15K	35K	110K	220K	380K
rated current (through secondary current is 5A current transformer connect)A	5	Kvar	0.6	1.5	2. 5	20	40	60	100	250	800	1.5	2.5
	7.5		1	2.5	4	30	60	100	150	400	1.2	2.5	4
	10		1.2	3	5	40	80	120	200	500	1.5	3	5
	15		2	5	8	60	120	200	300	800	2.5	5	8
	20		2.5	6	10	80	150	250	400	1	3	6	10
	30		4	10	15	120	250	400	600	1.5	5	10	15
	40		5	12	20	150	300	500	800	2	6	12	20
	50		6	15	25	200	400	600	1	2.5	8	15	25
	75		10	25	40	300	600	1	1.5	4	12	25	40
	100		12	30	50	400	800	1.2	2	5	15	30	50
	150		20	50	80	600	1. 2	2	3	8	25	50	80
	200		25	60	100	800	1. 5	2.5	4	10	30	60	100
	300		40	100	150	1. 2	2. 5	4	6	15	50	100	150
	400		50	120	200	1. 5	3	5	8	20	60	120	200
	600		80	200	300	2. 5	5	8	12	30	100	200	300
	750		100	250	400	3	6	10	15	40	120	250	400
	800		100	250	400	3	6	10	15	40	120	250	400
	1K		120	300	500	4	8	12	20	50	150	300	500
	1.5K		200	500	800	6	12	20	30	80	250	500	800
	2K		250	600	1	8	15	25	40	100	300	600	1000
	3K		400	1	1. 5	12	25	40	60	150	500	1000	1500
	4K		500	1. 2	2	15	30	50	80	200	600	1200	2000
	5K		600	1. 5	2. 5	20	40	60	100	250	800	1500	2500
	6K		800	2	3	25	50	80	120	300	1000	2000	3000
	7.5K	Mvar	1	2. 5	4	30	60	100	150	400	1200	2500	4000
	10K		1.2	3	5	40	80	120	200	500	1500	3000	5000