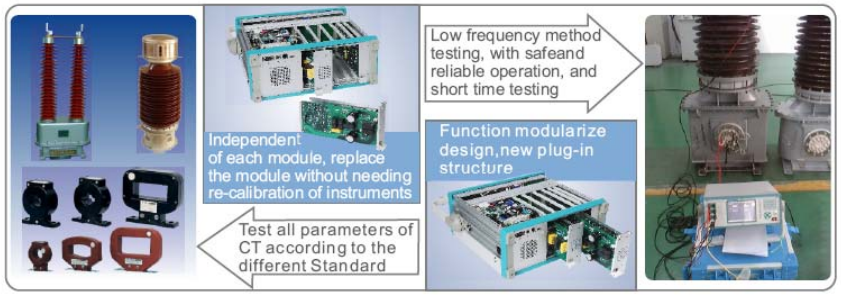


KINGSINE ELECTRIC AUTOMATION CO.,LTD.

Unique solution plan

KT200 Current Transducer Analyzer is designed to test and calibrate the low-magnetic-leakage current transducer (without air gap iron core), both available for in-house and on-site use. It is a professional test instrument for current transducer in electric industry.

Design Purpose

KT200 is used to test follows:

- Burden measurement
- CT secondary winding resistance measurement
- CT excitation characteristic test
- CT ratio measurement
- Phase and polarity measurement
- CT transient behavior measurement and analysis
- Automatic identification for brand of CT
- Inflection point voltage/current, 10% error curve, accuracy limit factor, apparatus safety factor, secondary time constan,t, residual magnetism factor, accuracy class, saturation and unsaturation, and inductance.
- KT200 CT/PT Analyzer used for PT test PT;PT Excitation test ,PT polarity ,variable ratio test.

Main Technical Features

1、Function modularize design, new plug-in structure， each module have self-calibration feature, simply replace the module, which can guarantee the precision of instrument, it is very user-friendly for on-site maintenance.

2、Using low frequency conversion principle ,the maximum output voltage is only 120V and the peak current is 15A, which can test the CT with max. 30KV at inflexion point, with high security.

3、Test the CT according to different standard GB1208-2006(IEC60044-1) and GB16847-1997 (IEC60044-6).

4、Complete testing functions, can test the Secondary load, the secondary coil resistance, excitation characteristics, transient characteristics, ratio difference, angle difference and other stable or transient characteristic of types of CT , and also accuracy limit factor (ALF), apparatus safety factor (FS), secondary time constant (Ts), residual magnetism factor (Kr), Transient area factor(Ktd), inflexion point voltage/current, current, degree, saturation and unsaturation inductance, 5%or 10% error curve, Hysteresis loop ,and it can evaluate the testing results according to fixed standard.

5、It have the function of calculating brand of CT ,and can search and test the Parameters of CT automatically. As for general CT, user can test the unknown CT only need little training.

6、High accuracy, resistance accuracy of 0.1% +1 mΩ, the phase accuracy of ± 3 points, the transformation ratio accuracy of ± 0.1% (1-5000), variable ratio accuracy of ± 0.2% (5000 -10,000).

7、Wide range of AC and DC power input, to meet the needs of various domestic and international power supply specifications.

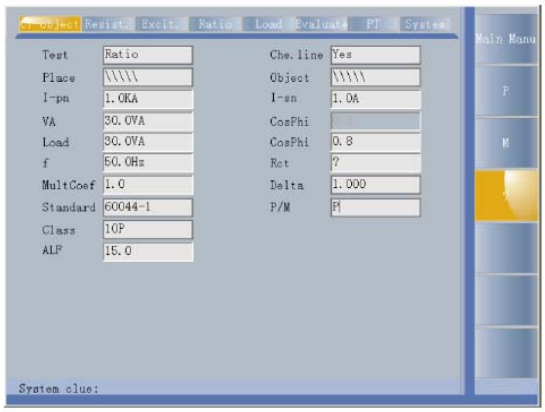
8、Simple, quick measurement, in addition to the load impedance measurement, the other tests are based on the same connection mode automatically.

9、With true color LCD screen, very aesthetic industrial software interface design, user operate it more fluidly.

10、Portable design, light weight, the machine is only 10kg, is ideal for field testing of power system, current transformer manufacturer or laboratory use.

Function Introduce

CT- Parameter Setting of Data Card



The menu of KT200 is showed in the picture , and the menu contains all kinds of necessary parameter and setting.

If you don't know the Parameter When setting it,you can choose "?" in options,the Parameter with mark "?"will be calculated in the test and filled in the Counterparts.

CT-data card is important part of user interface which contains all necessary test setting.

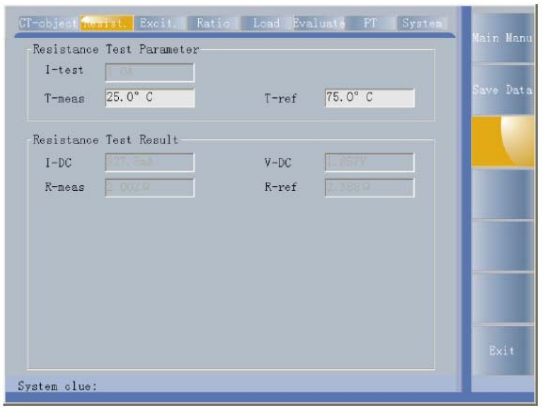
contains the following universal data unit :

Test Card	resistance, excitation, ratio, load
Place	test place
Object	serial number of CT
I-pn	Rated primary current Range: 0-99000A
I-sn	rated secondary current Range: 0.1-5A
VA	secondary circuit rated load, range: 0-300VA
Load	Secondary circuit real load, range: 0-300VA
CosΦ	Secondary circuit power factor, range:0-1
f	Rated working frequency(optional): 16.7Hz、50Hz、60Hz
Rct	loop resistance
Multiplication Factor	This factor is used to increase the level of change assessment ratio test, for example, 0.5 means double the level of acceptable error of the maximum allowable variation range than the standard half of tolerance.
Triangle Compensation	Measuring transformation ratio correction factor 1、1/3、2/3 optional

Resistance Test

Resistance Options is used for DC resistance test of CT secondary winding, which is fixed experiment project of "power equipment transfer and preventive testing procedures", and the purpose of the test is to comparing the real measured resistance unit of CT secondary winding resistance to the factory unit to see whether significant difference exist or not.

After DC current up to saturation, the resistance card will displays the test results as the interface picture shown:



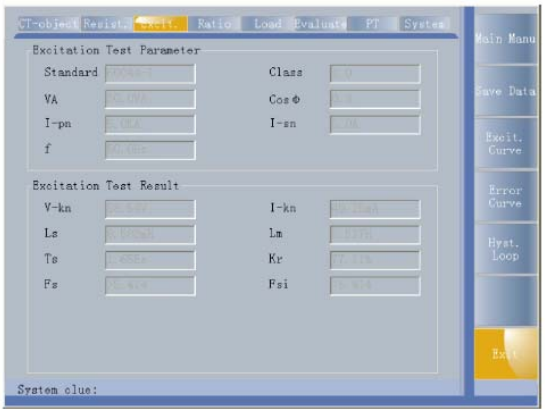
The following table describes the CT resistance test results:

I-DC	Actual test current
V-DC	Actual test voltage
R-meas	Currently temperature resistance
R-ref	Testing resistance converted to the value of the reference temperature

Test temperature & the reference temperature setting as follows:
1. Reference temperature is set to the requirements values of various CT standards, usually 75 ℃;
2. The test temperature and reference temperature is set to the same value if CT run out of power shortly,
3. The test temperature is set to ambient temperature if new CT or CT runs out of power 12h more.

According to various standard requirement of CT, the measured resistance must be converted to the reference temperature; thus the reference resistance here is converted according to the resistance temperature coefficient of test resistor, test temperature, reference temperature and copper materials, which is used for Excitation characteristics and the ratio testing. Therefore the reference temperature & test temperature must be correct setting; otherwise it will affect the accuracy of excitation characteristics and the transformation ratio testing.

Excitation Test



Exciting options is used for excitation test of CT secondary winding resistance.

CT sencondary winding excitation test is the fixed experiment project ofproject of "power transfer equipment and preventive testing procedures", its objectives are:

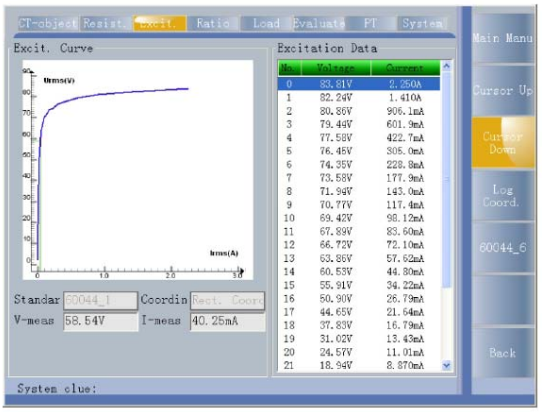
1. Comparison of the measured CT and the characteristic curves of similar transformers or manufacturer supplied to see whether significant difference exist or not;
2. According to Excitation curve, the 10% (or 5%) error curve can be calculated for the load comparison of protection Relays
3. Provide data for the CT parameters Calculation.

Excitation test results are different according to different standards and CT types.

Standard	Type	Class	Parameters
GB1208-2006 (IEC60044-1)	P	5P/10P/PR	V-kn: Knee voltage I-kn: Knee current Ls: Saturated inductance Lm: Unsaturated inductance Ts: 2nd time constant Kr: Remanence factor ALF: Instrument security factor (direct method) ALFi: Instrument security factor (indirect method)
		PX	V-kn: Knee voltage I-kn: Knee current Ls: Saturated inductance Lm: Unsaturated inductance Ts: 2nd time constant Kr: Remanence factor Kx: Specific area factor Ek: Specific accuracy-Limit voltage Ie: Specific accuracy-Limit current E1: User-defined e.m.f. for examination current check Ie1: Max. Allowed excitation current under above E1 condition
	M	0.1/0.2s/0.2/0.5s 0.5/1.0/3.0/5.0	V-kn: Knee voltage I-kn: Knee current Ls: Saturated inductance Lm: Unsaturated inductance Ts: 2nd time constant Kr: Remanence factor Fs: Instrument security factor (direct method) Fsi: Instrument security factor (indirect method)

Standard	Type	Class	Parameters
GB16847-1997 (IEC60044-6)	P	TPX	Kssc: Rated current coefficient of symmetrical short circuit Tp: 1st time constant Ktd: Transient area factor Cycle: Duty cycle t1: Defined duration time t-all: Defined precision-limit time ε ^: Peak instantaneous error Emax: Max. e.m.f. voltage contained of transient component
		TPY	Kssc: Rated current coefficient of symmetrical short circuit Tp: 1st time constant Ktd: Transient area factor Ts: 2nd time constant Cycle: Duty cycle t1: Defined duration time t-all: Defined precision-limit time ε ^: Peak instantaneous error Emax: Max. e.m.f. voltage contained of transient component
		TPS	Kssc: Rated current coefficient of symmetrical short circuit Tp: 1st time constant K: Set area index V-al: Set accuracy-limit voltage I-al: Set accuracy-limit current E1: User-defined e.m.f. for examination current check Ie1: Max. Allowed excitation current under above E1 condition
		TPZ	Kssc: Rated current coefficient of symmetrical short circuit Tp: 1st time constant Ktd: Transient area factor Ts: 2nd time constant

Excitation curve



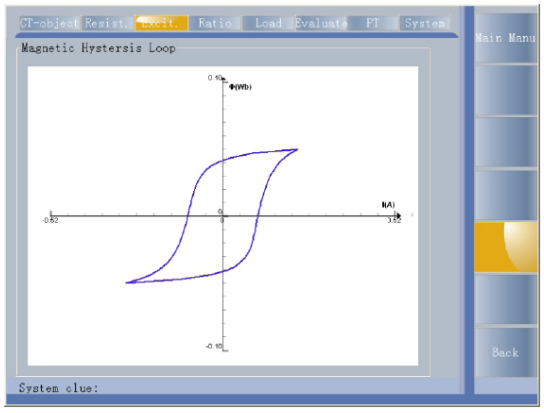
Using direction key or mouse to select the excitation curve which was shown in Figure, the interface give theused standard, coordinate types, inflection point voltage and inflection point current, then get the measured data. The values are observed by direction key or mouse, also can use keyboard to input a specific voltage or current value to observe the corresponding current or voltage value.

In addition, the cursor up or down will make the cursor of Excitation curves up or down to observe the data;

Clicking Logarithmic coordinates or Cartesian coordinates can be interchangeable

Clicking IEC60044-6 or IEC60044-1 standard also can be interchangeable.

Hysteresis loop



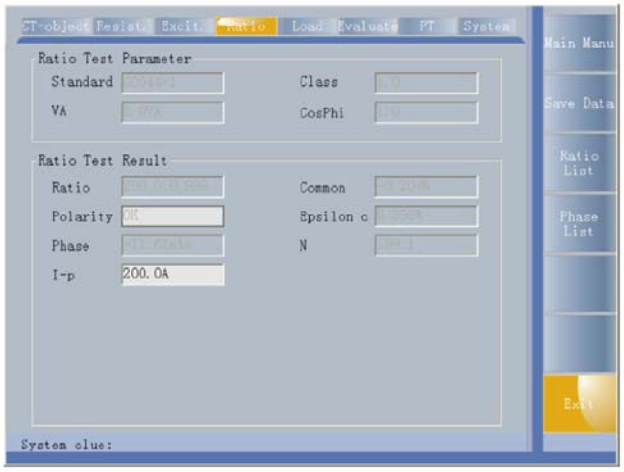
Using direction key or mouse to select the hysteresis loop, then show the hysteresis loop interface,

Figure:

Variable ratio test

Variable ratio test is used for calculation of variable ratio, polarity test and ratio error, phase error. Ct ratio and polarity test is the "transfer of power equipment and preventive testing procedures" set forth in the pilot project, the test objectives are:
(1) to compare the actual measured CT ratio, polarity and the nameplate logo to confirm whether they are matched;

(2) to compare the ratio difference value and the phase difference value of the measured CT and the experimental value of the manufacturer to see whether there is an significant change or not and whether matched the level of provisions or not.



Variable Ratio Test interface,refer to the figure

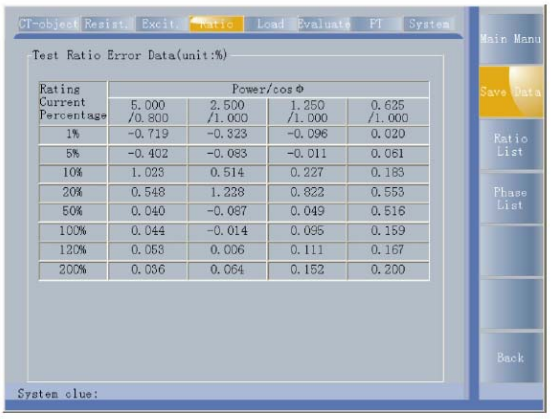
1. save the data: save the test data;
2. ratio difference list: display the ratio difference;
3. angle difference list: display angle difference;

Test Result

Based on the variable ratio measurements and the excitation characteristics, KT200 is able to calculate the ratio and phase difference according to working load or rated load, and the results will be written to test report. CT ratio test result is as follows:

Ratio	actual transformation ratio
io difference	Current ratio difference
Polarity	Positive or negative polarity
ε c	Composite error
phase difference	Primary current and secondary current phase
N	actual turns ratio
I-p	Primary current value

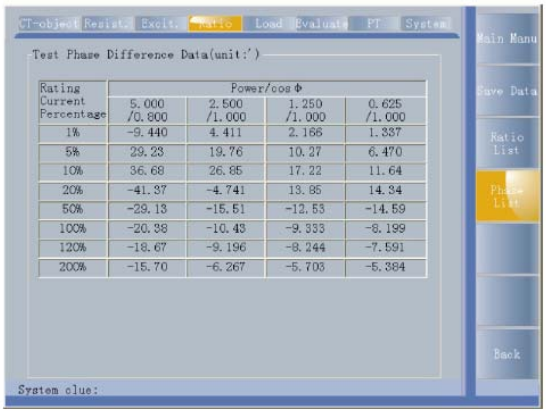
ratio difference list



Use key or mouse to select the ratio difference list, which will significantly show the percentage of the different rated current and current ratio difference list of tested CT under different load condition.

Figure:

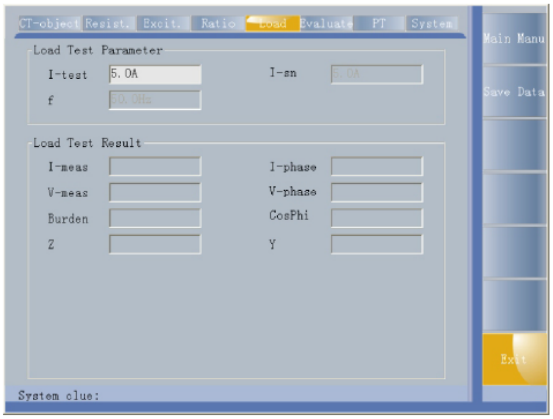
Angle difference list



Use key or mouse to select the phase difference list, which will significantly show the percentage of the different rated current and phase ratio difference list of tested CT under different load condition.

Figure:

Overload test



CT secondly overload test interface ,refer to the figure

Overload option is used for CT secondly overload test, CT secondly overload impedance is displayed overload impedance of current transformer secondly terminal, it contains relay impedance, connection lead-wire impedance. During relay protection, when CT flow by the max. short circuit current, the allowable max. overload current, the allowable max. overload larger than practical secondly overload. Thus, the test purpose of CT secondly overload test is to provide practical test secondly overload value for relay protection calculation, which used for overload comparation.

If set test current, please doing the overload test according to the set current.

If did not set test current, please doing the overload test according to rated secondly current.

If did not set test current, please doing the overload test according to rated secondly current.

All current frequencies are rated frequency.

Test Result

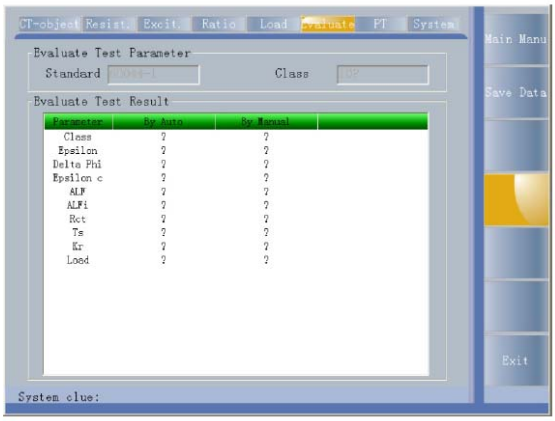
CT overload test result:

I-meas	Use for CT overload test current, range:0.1-5A, default: 1.0A
I-phase	Current phase
V-meas	Voltage virtual value
V-phase	Voltage phase
Burden	Overload
CosΦ	Power factor
Z	Impedance
Y	Admittance

Evaluation

Evaluation use for CT comparing of setting and testing Parameters

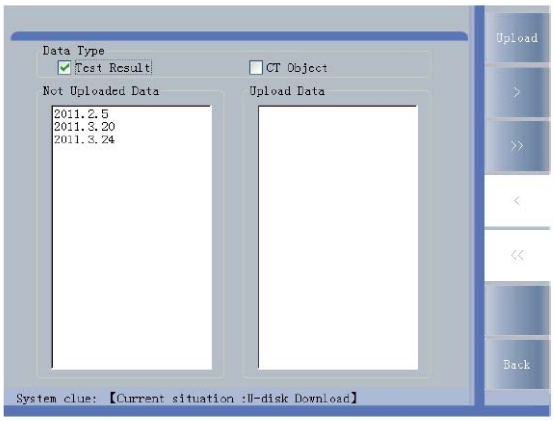
Evaluation test interface:

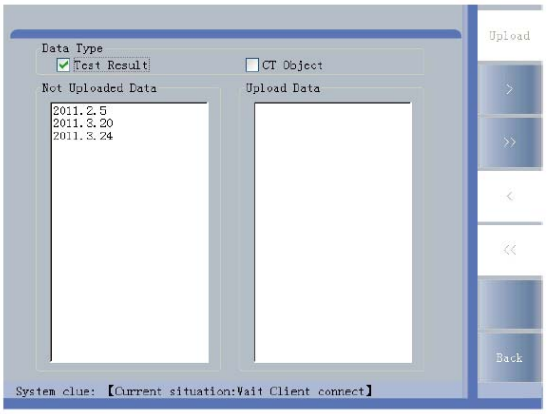


test report

There are options of USB download and PC upload in data processing interface

USB download interface

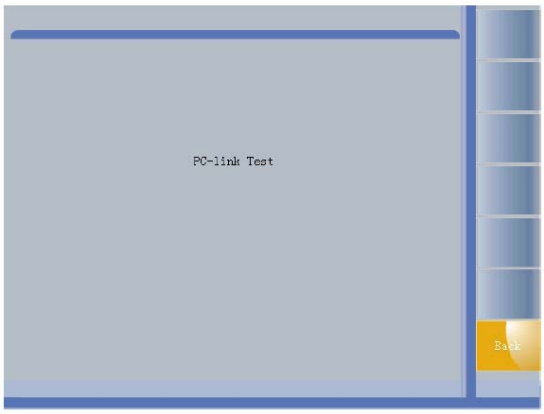




You can upload the test results by use >, >>, <, << keys to select the desired report; after Report selected and then click upload, there are two options for USB and PC uploading; If you insert a U-disk, click USB to download, the report will be automatically downloaded to the U-disk; If the instrument has been PC-link, click PC upload, the report will be automatically uploaded to the PC.

On-line upload interface:

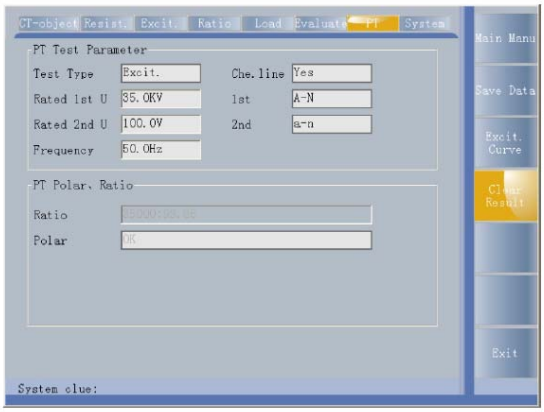
Online Testing



Using PC with KT200 Current Transducer Analyzer,to do online test, Operating the testing software in PC and controlling the tester .

Online Testing is using PC to operate and test when it is online.

PT Test

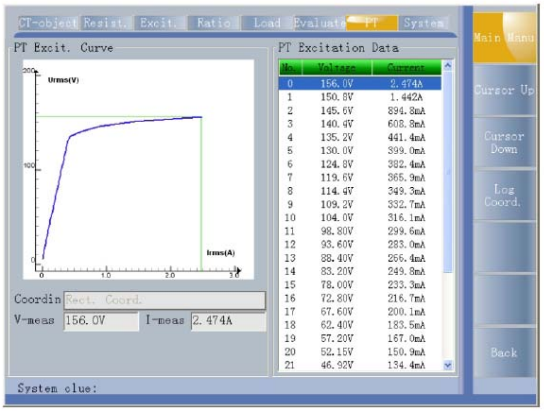


KT200 CT/PT Analyzer can do variable ratio, polarity and secondary winding excitation test of inductive PT.

Attention:The Connection Way of PT Excitation Test is different from PT variable ratio and polarity test.

the connection way of primary side andsecondary side must be right, otherwise, may brings about tens of thousands of volts voltage.

test report



PT variable ratio and polarity test result is displayed in PT test interface.

PT Excitation Test is the test for PT secondary winding, as the connection way is correct, after the PT excitation test, the test results can be seen in the interface of "excitation curve"

Technical Parameters

Measurement input

Voltage Measurement(SEC)	Measurement Range：0-300V Accuracy：±0.1%
Voltage Measurement(PRIM)	Measurement Range：0-30V Accuracy：±0.1%
RatioMeasurement	Range:1-5000 Accuracy:±0.1% Range:5000-10000 Accuracy:±0.2%
Phase Measurement	Resolution：0.01min Accuracy：±3min
Secondary winding Resistance Measurement	Measurement Range：0.1-100Ω Resolution：1mΩ Accuracy：0.1%+1mΩ
Load Measurement	Measurement Range：0-300VA Resolution：0.01VA

Power Supply Parameter

Input current	Permitted Range：85V-260VAC
	Frequency：47-63Hz
	Max. Current：10A
	Or Permitted Range：120-370VDC
	Max. Current：5A

Amplifer output

Output Voltage	OutputRange：0-120VAC
Output Current	OutputRange：0-5A(RMS) (Max.Pink15A)
Output power	OutputRange：0-450VA (Max.Pink1500VA)

Enviromental condition

Enviromental condition	Temperature：-10℃-55℃ Humidity：95% No condensation

Weight and size

Dimensions	360mm*140mm*325mm
Weight	Less than 10kg

Enviromental condition

Enviromental condition	Temperature：-10℃-55℃ Humidity：95% No condensation

Weight and size

Dimensions	360mm*140mm*325mm
Weight	Less than 10kg

KT200 CT Analyzer packing list

Name	Quantity
KT200 CT Analyzer	1set
Transport case	1pc
KT200 user Manual	2pc
Test report	1pc
Software CD	1pc
QC Passed Certificate	1pc
Cross Cable	1pc
Connect Cable	1pc
PS/2 switchover Cable	1pc
Power Line	1pc
Fuse	1pc
3m coaxial-cable	2pc
10m coaxial-cable	1pc
6mGrounding (PE)Cable	1pc
40mm Large open clamp	(Red:1pc;Black:2pcs)
20mm Small open clam	(Red:2pcs; Black:2pcs)
Pin Plug	(Red:3pcs; Black:3pcs)

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