

# T06200

Industrial Low Temperature Test system

Version 1.6



## Product Description

All 5G bearer network optical transceiver modules should work at temperature range -40°C ~ 90°C. New industrial low temperature -40°C testing requirements are proposed for TO-CAN devices used in these modules. With the large-scale expansion of 5G bearer network, this new testing demand is increasing. The traditional TO-CAN device testing system only supports room temperature and high temperature. To solve this problem, Semight Instruments introduced the TO6200 industrial low temperature TO-CAN test system satisfying this new demand and supporting 320 pcs TO-CAN batch test. Equipped with the precision source meter of Semight Instruments, TO6200 has high test repeatability, which is the best choice for industrial TO-CAN device testing.

## Key Features

**The testing equipment support the LIV and spectrum test of TO products. The detailed functions include:**

- Support the calculation of LIV scanning related parameters and algorithm selection of TO
- Support center wavelength and SMSR test, and judge the wavelength skip failure (multiple current point spectrum test method)
- Support LIV and spectrum parallel testing
- Ith repeatability: <2% at high temperature, <3% at normal temperature, <5% at low temperature
- Support the test temperature range of - 40 to 90°C
- Support dual temperature stage
- Support automatic judgment of test results
- Support the binding relationship between TO and fixture seat
- Switching of software compatible with different pin definitions
- It is needed to replace different fixture for different TO pin dimension, and each fixture has

160pcs TO seat

- Customizable specified TO fixture (it is necessary for fixture to have heat sink to ensure good heat transfer between heat sink and TO)
- Nitrogen access to defrosting is required
- Test capacity is 6,000-7,000pcs per day (single temperature test)
- It meets EOS and ESD protection and EHS requirements;

## Applications

Meet the test requirements of industrial grade lasers

Bin the products from -40 °C to 90 °C

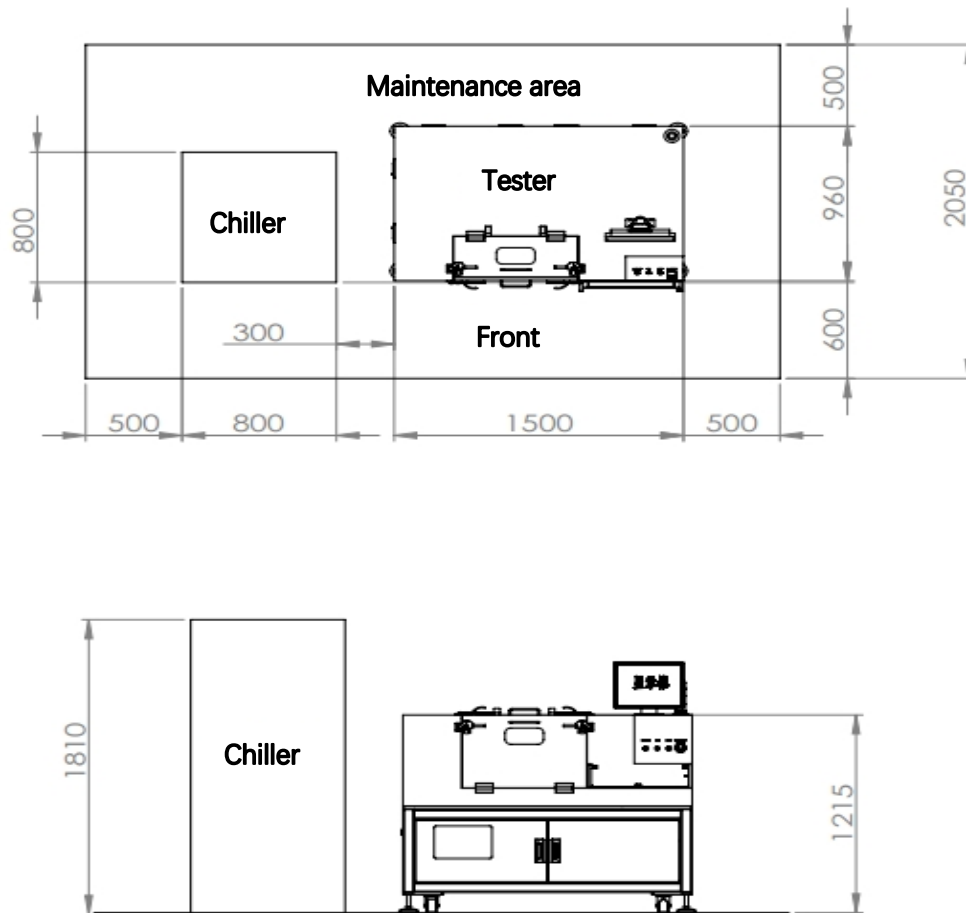
Spectral test on the different temperature

## System architecture

- Appearance: The appearance is shown in the figure below, with display and keyboard outside and painted in white; The appearance of the equipment can be customized if customers have special requirements. Equipment size (length, width and height) is about 1,500L\*900W\*1,400H



Figure 1: Equipment Appearance Rack



Recommended installation equipment layout with water cooler

- The upper part of the rack is sealed, filled with dry air or nitrogen, and the exhaust valve is used to ensure positive pressure inside.
- The spectrum analyzer, source meter, TEC controller and other related equipment are placed on the lower part of the rack.

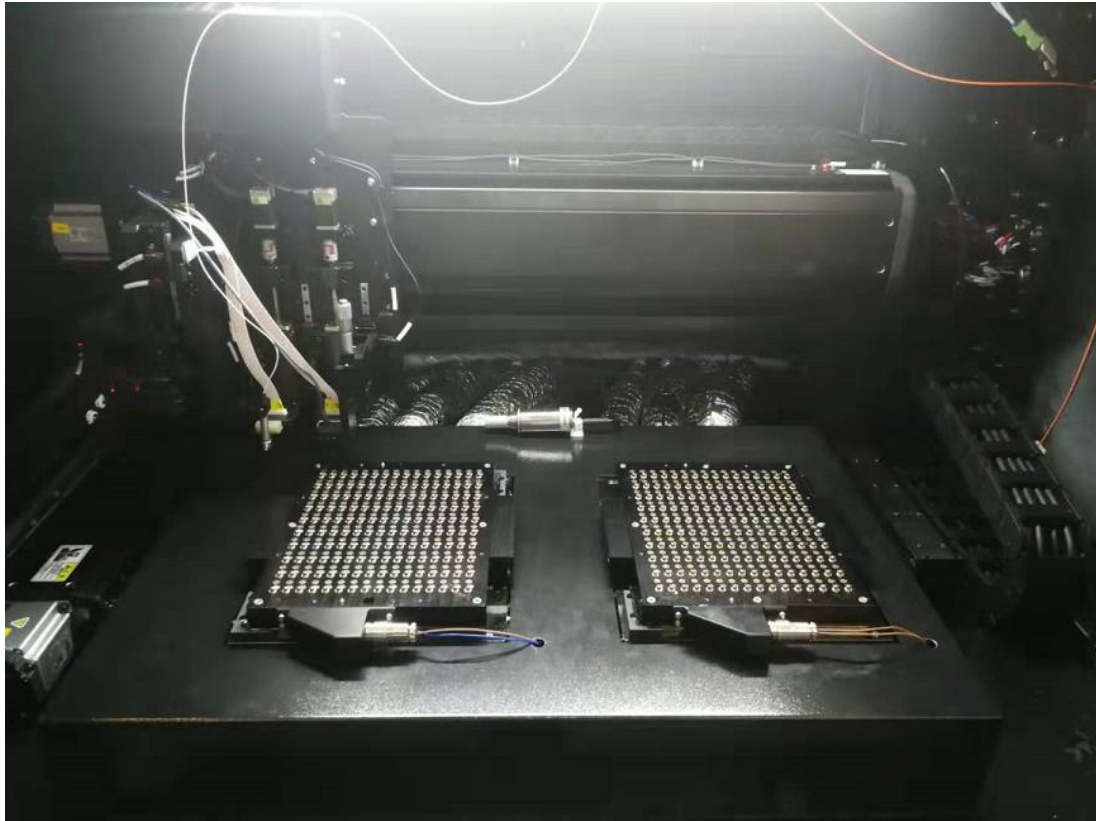


Figure 2 Internal Structure

- The inner part is divided into left and right fixture stage to control temperature separately.
- The test is a serial test for the left and right fixtures.
- There is a dew point detective inside to monitor the dew point.

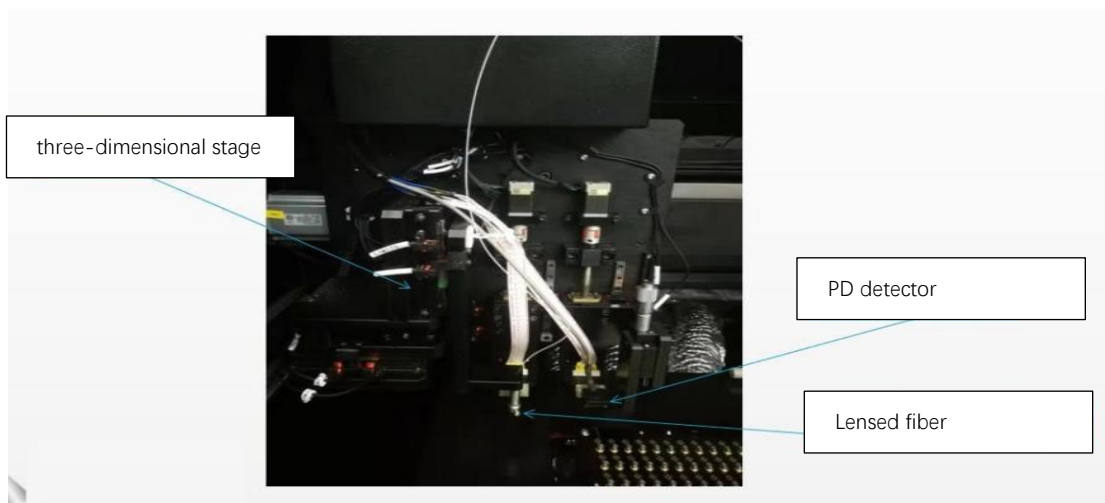


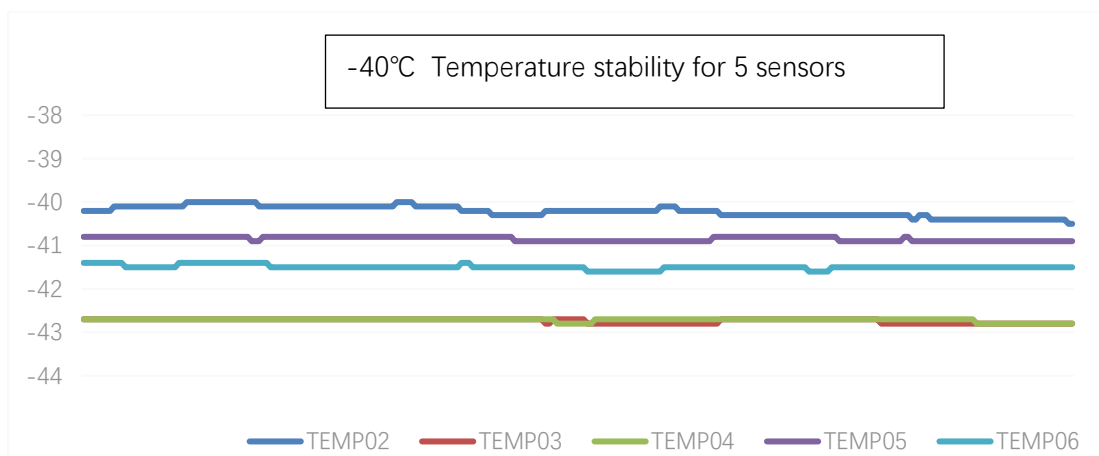
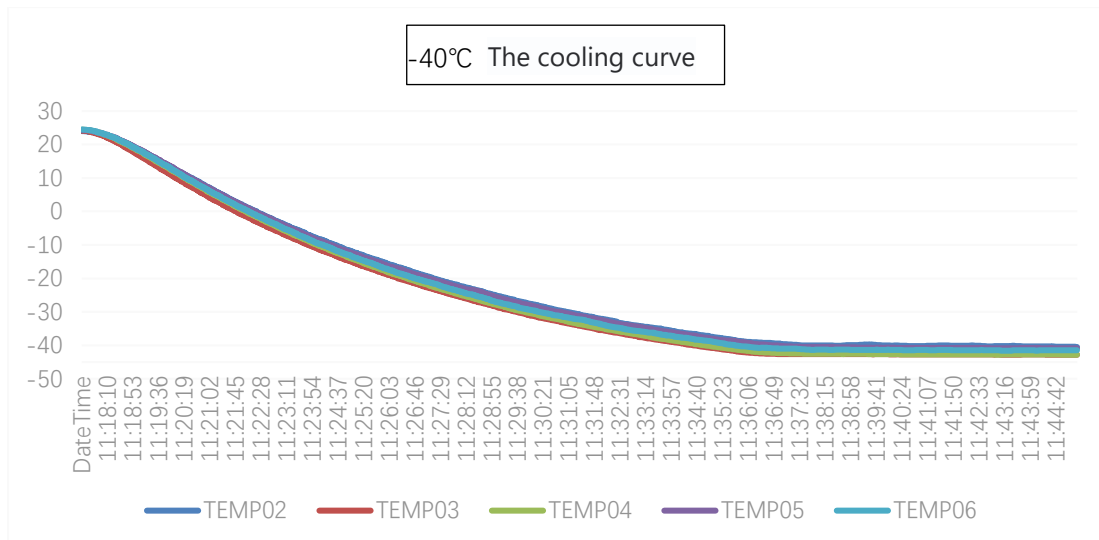
Figure 3 Test probe structure

- Put the PD detector and coupling optical fiber on the same X-dimensional stage, and the coupling optical fiber has independent three dimensional for control.
- LIV and spectrum can be test at one time for time saving.



Figure 4 Physical Drawing of Fixture

- Fixture size 180mm \* 320mm
- The fixture can load 160 pcs (16 \* 10) TO totally
- The fixture is fully enclosed structure, and the base plate is of copper, with good temperature uniformity, stability and fast response speed. The uniformity is  $\pm 2^{\circ}\text{C}$ , and the stability is  $\pm 0.2^{\circ}\text{C}$  after 5 minutes of temperature stability (four test points are taken around the surface of the fixture, and one test point is taken in the center)



- TO base is connected to fixture surface and the pin connect to probe pad with internal wiring
- Select different sockets according to different TO pin size and quantity. The socket can withstand - 50°C to +110°C and has a plugging life of >20K times
- Fix the probe copper cylinder with ESD protective material to eliminate the ESD issue
- The probe copper cylinder is used to conduct the TO pin. It is a material with high hardness and zero resistance value
- Support multiple pin definition switching
- The fixture supports the automatic plugging function

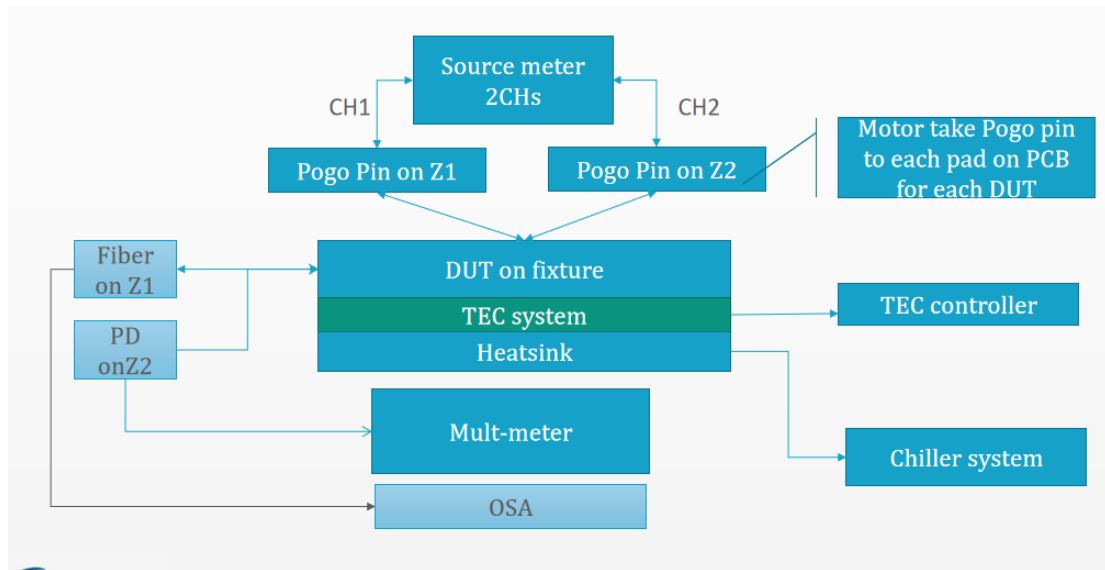


Figure 5 System Architecture Diagram

## Software function

Semight TO6200 test software platform is a configurable, including the following functions:

- The test plan can be added, edited and deleted for each fixture ID. The test plan includes test conditions, test sequences, test algorithms and pass/fail judgment.
- Support Semight test source meter and commercial source meter specified by customer, Yokogawa AQ series and Anritsu MS series spectrum analyzer.
- Automatic binding of fixture information and SN information of each TO, and automatic selection of test plan for testing.
- Support user permission control, including engineer, technician and operator, the three permission levels



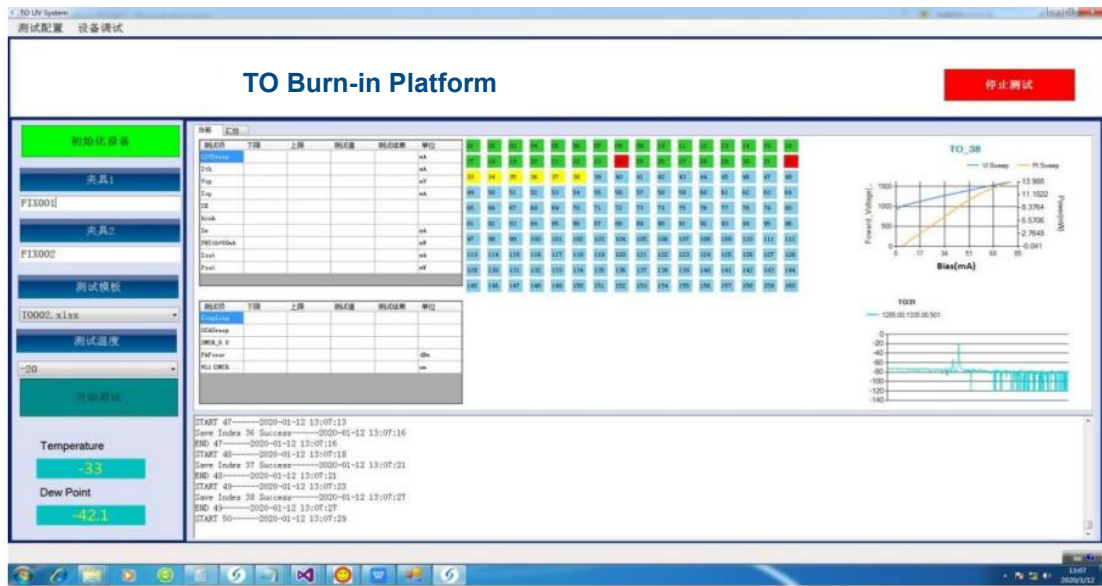


Figure 6 Software interface: Including information input area, test information display area, chart display area, LOG area

## Technical Specification

Parameter Type	Parameter	Parameter	Acceptance Method
System Functions	Fixture type	Semright 10 * 16=160pcs TO fixture	Verify the function through actual operation
	Test temperature range	-40°C ~ 90°C	Verify the function through actual operation
	SN batch input	The batch input of the product SN	Verify the function through actual operation
	LIV and spectrum test	LIV and spectrum test and automatic judgment	Verify the function based on actual test results
	Test parameters and log saving	Storage of test raw data, calculation results and detailed logs of system operation	Verify the function through actual operation
Electrical Parameters	Source meter type	Semright 4-quadrant standard high-precision source meter	Measure the range, accuracy and clamping function of all current
	I/V source resolution	500nA/100mV	
	I/V measurement	500nA/100mV	

	resolution		sources/ammeters/voltage sources/voltmeters by means of Keithley or Keysight commercial source meter
	Voltage source/ammeter range	10V	
	Voltage source/voltmeter accuracy	+/- (10V/60V), 0.02%+0.01% F.S	
	Current voltage clamping	Any clamping at current voltage point	
	Undershoot under normal operation	NO EOS	Check the current and voltage changes under all operating conditions by means of oscilloscope. See Section 7.5 for the list of operations to be checked
	Overshoot under normal operation	NO EOS	
	Undershoot under normal operation	NO EOS	
	Overshoot in case of abnormal operation	NO EOS	
Optical Parameters	Detector type	Ge	Verify the function through actual operation
	Optical power measurement wavelength range	1000-1650nm	Verify the function through actual operation
	Optical power measurement range	10uW-45mW	Verify the function through actual operation
	Optical power measurement accuracy	0.2dB	Verify the function through actual operation
	Optical spectrum measurement wavelength range	Spectrometer provided by the customer	
	Optical spectrum measurement accuracy	Spectrometer provided by the customer	
Temperature	Temperature control method	TEC water chiller	Verify the function through actual operation
	Temperature range	-40°C~90°C	Verify the function through actual operation

	Ramp up speed	25°C~85°C<12min	Verify the function through actual operation
	Ramp down speed	25°C ~ -40°C<30min	Verify the function through actual operation
	Temperature uniformity (5-point range of fixture)	High-temperature <± 3°C Low temperature <± 2°C	Take 5 temperature points on the surface of the fixture. The temperature fluctuation range is<± 0.2°C within 5 minutes of monitoring after the temperature stabilized
	Temperature accuracy (Comparison with standard thermometer )	<1°C	
	Temperature stability	<0.4°C	
System Indicators	Ith repeatability @high temperature	<2%	Verify repeatability through G R&R, and obtain test time data at the same time
	Ith repeatability @room temperature	<3%	
	Ith repeatability @ low temperature	<5%	
	SE repeatability	<2%	
	Power repeatability	±0.2mW	
	Wavelength repeatability	<+/-0.1nm	
	SMSR repeatability	<±3dB	
	Coupling power	>-25dBm (Ith+30)	
	Test efficiency:	Once LIV (501 step points) and once spectrum Average time <6S; -40°C single temperature 22-hours	

Institutions		6k-7k; 25°C/ -40°C/ 85°C three temperature cycle in 22 hours 3K+ (the above reference data will be affected by the customer's actual test conditions )	
	Probe movement range	Cover all test seats, Z- axis>5mm	
	Axis movement accuracy	X/Y axis <50um, Z axis <20um	

## Ordering Information

TO6200	Standard configuration
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\*This information is subject to change without notice.