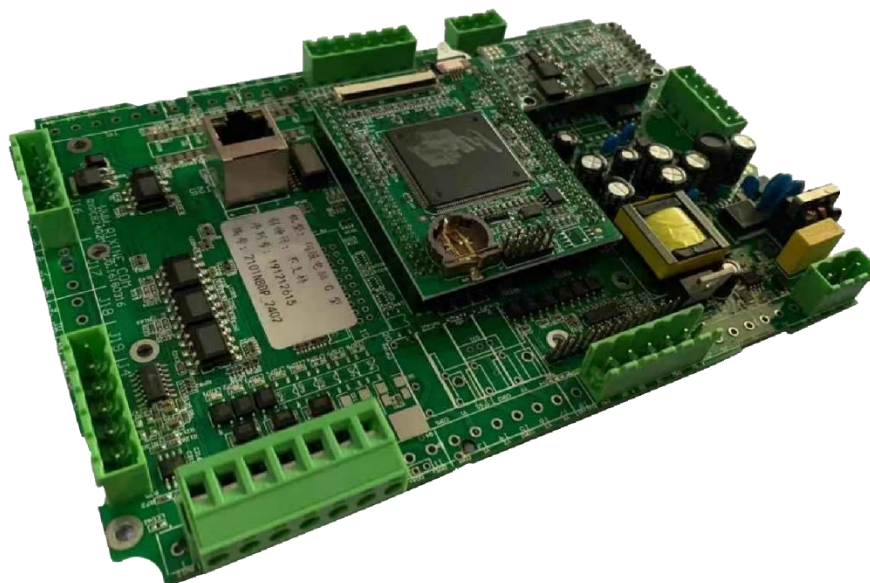


1 Introduction of TM2101 measurement and control system

The TM2101 measurement and control system is designed purposely for microcomputer controlled electronic universal testing machine, microcomputer controlled universal hydraulic testing machine and microcomputer controlled compress testing machine, used for the test of tension, compress, bend, shear, tearing and peel. With the personal computer and interface plate, it could collect, save, process and print test result. Further it can calculate multiple parameters, i.e. maximum force, yield strength, average peel force, maximum deformation, yielding point and elastic modulus; this system is featured in curve process, multi-sensor support, image interface, flexible data process and powerful system function.



1.1 Main function

1. Hardware

With a 32 bits ARM as the MCU, the test system has better overall performance、faster computational speed and higher control accuracy than the traditional test system with 8 bits MCU.

The core device of acquisition system is ultra-high-precision 24 bits AD (analog-to-digital converter) IC with data rate up to 2000 times per second, so it can capture the transient process of the force, and the resolution can up to 500000 indexing. The system with 6 points calibration has high accuracy which is far exceed the requirement of national standard.

The displacement encoder with 4 frequency doubling technology can increase by 4 times the resolution of displacement, up to 0.0005mm.

2 output control method: pulse and voltage, can control any Servo motor、inverter motor or DC motor with pulse or voltage interface, achieve smooth stepless. In addition, with switch signal (such as up、down or stop) to drive the external relay or solenoid valve, in order to control DC and pneumatic、hydraulic pressure equipment.

Advanced loosed-loop technology for velocity、displacement and force can achieve precise control of arbitrary waveform.

Multiple serial interfaces: Up to 4 channels 24 Bits analog input, 3 channels 16 bits analog input, 3 channels pulse input, 3 channels AB phase optical encoder input, 9 channels switching value input, 8 channels switching value output, 1 USB, 1 RS232, 1 485, 4 types of LCD interface, 1 parallel port micro print interface, 1 serial port micro print interface, 1 8X4 matrix keyboard interface.

All input and output interface use high-speed photoelectric isolation technology, which makes the system to have strong anti-interference capability.



2. Software

It is the most easy to use software in the test machine industry with windows standard style、structured mode of operation and detailed help documentation and tips, so that you can significantly improve the efficiency of debug and software training.

Use Multi-threaded parallel processing make the software can display “Force-Displacement”、 “Force-Time” 、 “Displacement-Time” and “Stress-Strain” curves simultaneously, so you can switch to any graph which you want to see and check the user settings.

Standard test process control and report output temperate, can define any number of testing standards (including GB、ASTM、DIN、JIS、BS、 etc.) for user to call. Flexible and strong customize testing method, with multi-control mode (Constant Speed、 Constant Displacement、 Constant Force、 Constant Force and Velocity、 Constant Stress、 Constant Stress and Velocity、 Constant Strain、 Constant Strain and Velocity、 etc.). Realize complex multi-step nested-loop control. Setting automatic return、 automatically determine the fracture and automatic zero.

Strong ancillary tools with capability of data analysis, statistics and graphical analysis of curves, which have zoom、 pan、 cross cursor、 check points and other functions. Can transfer historical data to graph many times, and can display to compare at the same time. Up to 7 interval setting、 30 manual sampling points and 60 automatic sampling points. Multiple statistical functions including maximum、 minimum、 average、 average after remove the maximum and minimum、 median、 standard deviation and overall standard deviation.

Opening testing results edit method make user get any wanted test data. Up to 400 (such as maximum force、 fracture force、 peel strength、 tensile strength、 shear strength、 tear strength、 maximum deformation、 yield strength、 elongation、 elastic modulus、 ring stiffness、 non-proportional elongation minimum force range、 average force range and elongation under constant force) can be called by user.

Microsoft Word report format for easily use.

Permission management can help you lock any function mode of the software, separate the software into multiple permission levels, make the operation of software more secure.

Digital calibration system make the calibration process easily and efficient, double protection on calibration data.

Powerful unit system, adapt to all unit system over through the world, for example, there are more ten types of force unit, such as gf、 kgf、 N、 kN、 tf、 lbf、 ozf、 tf (SI)、 tf (long)、 tf (short) .

Multiple protection mechanism: Over range protection of force、 route and displacement, hardware setting protection for up and down limit switch.

Intuitive and efficient test data management system: Single test data can be stored in Windows standard format with free storage path and file name, so the data store has no limits.

All operations can instead of by shortcuts, can connect with the external manual control box, can connect all the commonly used buttons such as Fast Up、 Fast Down、 Middle Speed UP、 Middle Speed Down、 Slow Up、 Slow Down、 Zero、 Clear、 Return、 Pause and Stop.

The language version can be easily switched: Chinese Simple、 Chinese Traditional、 English and the advanced version have up to ten types of language: Japan、 Korean、 Russia、 German、 French、 Spanish、 Portugal.

Green software, need not to install, can copy to computer directly (need install serial port driver first), very easy to maintenance and upgrade.



1.2 Technical specifications:

Force:		
	Resolution	1/250000
	Precision	0.1%
	Range	Free option from 1 N to 20000 kN
	Transducer sensitivity	1--40mV/V
	Excitation voltage	9VDC

Small Extension (strain gauge)		
	Resolution	1/100000
	Precision	0.1%
	Range	Free option from 1mm to 2000mm
	Transducer sensitivity	1--40mV/V
	Excitation voltage	9VDC

Large range Extension(photoelectric encoder):		
	Resolution	Yielding to the mechanical system and photoelectric encoder; normal requirement: 1um
	Precision	Zero error of the instrument system
	Range	Free option from 0mm to 20000mm
	Transducer type	photoelectric encoder

Position(a photoelectric encoder):		
	Resolution	Yielding to the mechanical system and photoelectric encoder; normal requirement: 1um
	Precision	Zero error of the instrument system
	Range	Free option from 0 to 20000mm
	Transducer type	AB-phase quadruple output photoelectric encoder
	Sampling rate:	50000 times/s

Speed control: (for an electronic universal testing machine):		
	Control mode	Pulse
	Frequency coverage	0.072 Hz-- 50 kHz
	Precision	0.05% (standard test point)

Speed control: (for an electronic universal testing machine):		
	Control mode	Voltage
	Output range	0~5V
	Precision	0.05% (standard test point)

Suitable for a servo controller with pulse input or a stepper motor controller with pulse input; and used for AC frequency variable controller.



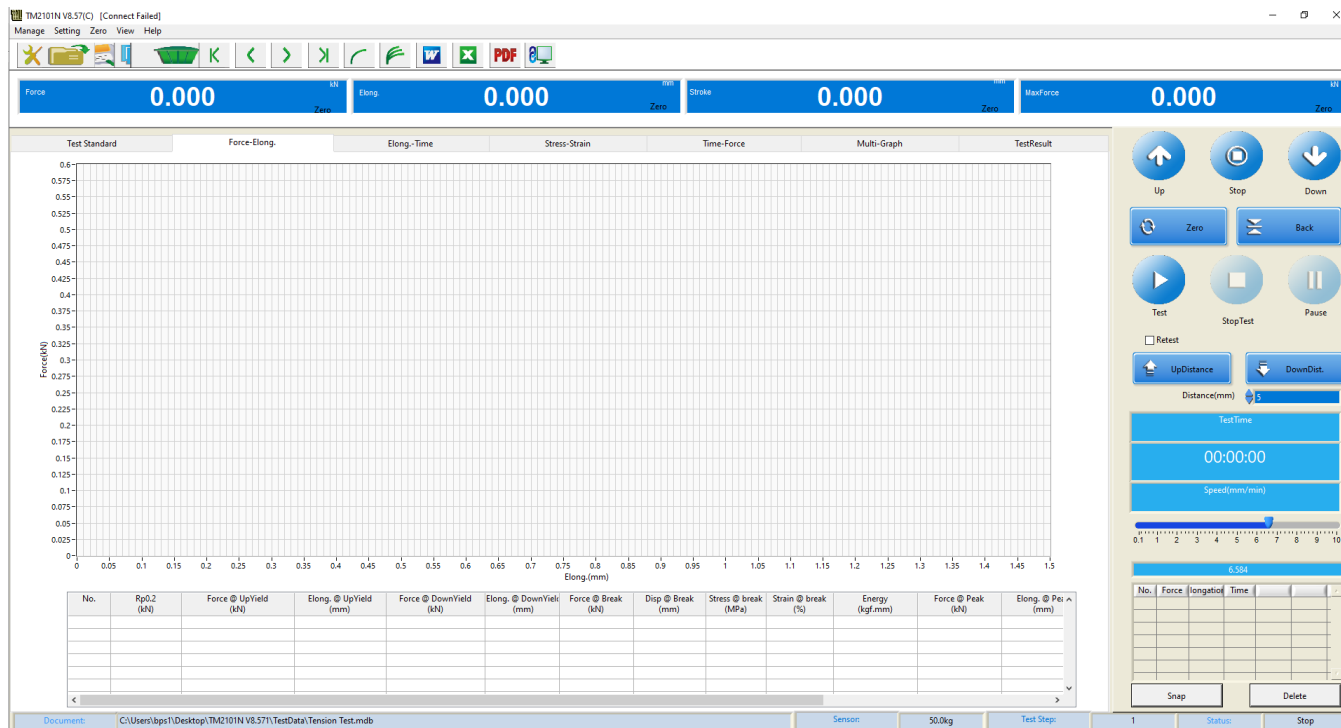
1.3 Working conditions

Temperature: 0~55°C;

Humidity: Relative humidity <85%;

Power: 220±10%VAC, 50Hz;

Away from strong electromagnetic interference.



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