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ITM-S SERIES  
Semi-Automatic Impact  
Testing Machine  
instruction manual

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## I. Products

This product is a metal material in the dynamic load under the impact performance testing instrument, can do a large number of continuous metal impact test, using full automation control, control system using imported programmable controller (PLC), through the microcomputer software program control to take the pendulum, the whole process of impact test. Display impact absorption work, impact toughness, the rotation angle of the pendulum and print test reports. Easy to operate, safe and reliable, high efficiency. The machine is equipped with a fully enclosed aluminum alloy protective net cover, which provides a strong guarantee for the user's safe operation.

## II. Technical parameters

Semi-Automatic Impact Tester		ITM-S300J	
Equipment model		ITM-S300J	
Impact energy		300J	150J
Dial scale range and indexing values	Range of competence	0-300J	0-150J
	Graduated value per cell	2J	1J
Pendulum torque		M=160.7695N.m	M=80.3848N.m
Pendulum prehension angle		150°	
Distance from the center of rotation of the pendulum axis to the impact point (sample center)		750mm	
Impact velocity		5.2m/s	
Specimen support span		40mm	
Specimen support end arc radius		R (1.0~1.5)mm (1mm Size is a special order.)	
Impact knife radius		R (2.0~2.5)mm (8mm Size is a special order.)	
Specimen support surface inclination		11°	
Impact blade angle		30°	
Impact blade thickness		16mm	
Minimum angular resolution		0.1°	
Specimen specification (LxWxT)		55x10x10mm (Thickness can be special order)	
Weight of the mainframe		420kg	
Dimensions of the mainframe		2050x690x2015mm	
External dimensions of the base		500x800mm	
Power supply		three-phase four-wire system 380V 50Hz 1.5kW	

## III. Environment of use

1. Room temperature in the range of 10 to 35°C;
2. Relative humidity not greater than 85%;
3. In an environment free of corrosive media;
4. Installation on concrete foundations with a thickness of not less than 150 mm or fixed to a foundation of more than 1400 kg;
5. Adjust the level of the mounting reference plane on the machine base to within 0.2/1000mm.

## IV. Description of main functions

The equipment is mainly composed of main frame, pendulum, hanging pendulum device, transmission system, energy display device, safety protection device, electrical control system and other parts, each part has the following advantages:

1, the main frame: the main frame and base integrated design casting processing, high stability, good rigidity, no assembly error. The column is symmetrical in front and back, and the pendulum axis is supported by simply supported beam, which has simple and reliable structure, high processing precision, small energy loss, and no trembling when the pendulum is swinging, which is more suitable for high-energy impact.

2, Pendulum: square pendulum body design, wind resistance is minimized. Impact knife using screw fastening wedge block compression mounting, easy and simple to replace. Plug and pendulum high rigidity, to prevent the pendulum in the axial and radial jitter after the impact specimen.

3, hanging pendulum device: hanging pendulum device adopts buffer design, avoiding the impact of hanging pendulum and the damage it may cause, effectively reducing the noise of hanging pendulum, prolonging the service life of the equipment and improve the safety, and the pendulum pre-lift angle is constant.

4, transmission system: the use of standard two-stage reducer to replace the old pendulum complex transmission system, simple structure, easy assembly and maintenance, long service life, low failure rate, maintenance-free. Solve the main failure points of the old pendulum.

5, energy display device: there are two types of energy display, namely, dial display, computer display.

6, safety protection devices: the entire testing machine is equipped with a fully enclosed protective net, which can effectively prevent the fracture specimen splash, but also prevent the test personnel from entering the interior of the testing machine during the test. The protective net is equipped with a door limit switch, in the case of opening the protective door, the tester will self-lock and the main operation will be invalid, thus preventing misoperation and ensuring the safety of test personnel.

7, electrical control system: the equipment adopts Japan Panasonic PLC to design and control the use of high-precision rotary encoder to obtain the real-time position of the pendulum. Due to the strong anti-interference ability of PLC, the system is reliable, stable and accurate. The control system integrates machine, electricity and automatic control technology, realizing the fully automated process of taking the pendulum, withdrawing the pin, impacting and releasing the pendulum.

The fully automated process greatly reduces the labor intensity of the operator and improves the working efficiency and operation safety.

## V. Electrical control principle

### 1. Take the pendulum:

Press the "Power" and "Run" buttons on the main machine, press the "Pendulum" button on the operation panel, and then the PLC controls the action of the relay and contactor to turn on the electromagnetic clutch and the high-torque gear motor, and the pendulum is lifted to the highest position. After the pendulum is lifted to the highest position, it contacts the travel switch and the motor stops.

After the pendulum is lifted to the highest position, it contacts the travel switch, the motor stops rotating, and the other electrical circuits are reset.

### 2. Impact:

After placing the specimen manually, press the "Impact" button to connect the valve solenoid to realize the impact of falling pendulum, and make all the electric lines reset. All electric lines are reset. The meter automatically displays the impact work.

### 3. Automatic lifting and swinging:

PLC control drag motor rotation for automatic lifting swing. At this time, the feeding transfer motor works to send out the punched specimen.

### 4. Press "Release Pendulum":

the pendulum will rotate in clockwise direction and stop automatically when it turns to the vertical position.

## VI. Installation and testing

1. After the folding box is cleaned, move the testing machine to the pre-made foundation, adjust the level of the machine base to 0.2/100mm with a level meter, and fasten the ground screws.

2. Check whether the parts are complete and undamaged, and the rotating parts should be flexible.

3. Connected to the three-phase four-wire system 50Hz, 380V power supply.

4. Connect the wires and connect the power supply.

5. Press the "power" switch, the indicator light should be on.

6. Press the "take pendulum" button, the main motor should rotate, the pendulum by its own weight hanging in the hanging off the pendulum mechanism. When you need to impact, when you press the "impact" button, the valve electromagnet will be energized, and the top will move the hanging pendulum mechanism to take off the pendulum, and the pendulum will fall down to impact→automatic lifting of the pendulum→hanging of the pendulum, and the pendulum will fall down to impact. When you need to put the pendulum, press the "put pendulum", the pendulum is clockwise direction of rotation, when turned to the vertical position, automatically stop the pendulum.

7, support span and its relative position with the knife edge adjustment, according to the span adjustment chart operation.

8, microcomputer software operation (see microcomputer control automatic impact testing machine software instruction manual)

Note: Do the test when the actual size of the pendulum must be used and the software selected the size of the pendulum energy consistent.

## VII. Use and maintenance

1. start to use by idle running, in order to check whether the machine is normal.

2. according to the energy requirements to choose the appropriate pendulum, change the pendulum in the lead hammer position, unscrew the upper end of the pendulum on the connector fastening screws, from the equipment to remove the original set of pendulum, replaced with the required pendulum, and lock the fastening screws.

3. the pendulum hook and the pendulum mechanism contact length of 3 ~ 4mm or so appropriate (factory has been adjusted, the user does not have to make adjustments). If you need to adjust, you need to move the position of the hook.

4. when the equipment is energized, please close the fully enclosed protective net first, and then carry out the equipment operation, when the operation is carried out, the staff shall not move or work within the swinging range of the pendulum, in order to avoid danger.

5. The bearings at both ends of the pendulum shaft have been refueled at the factory, the use of units do not have to refuel. After repair and cleaning can be added 1 to 2 drops of sewing machine oil or clock oil. The rest of the power bearings plus Ventolin or grease.

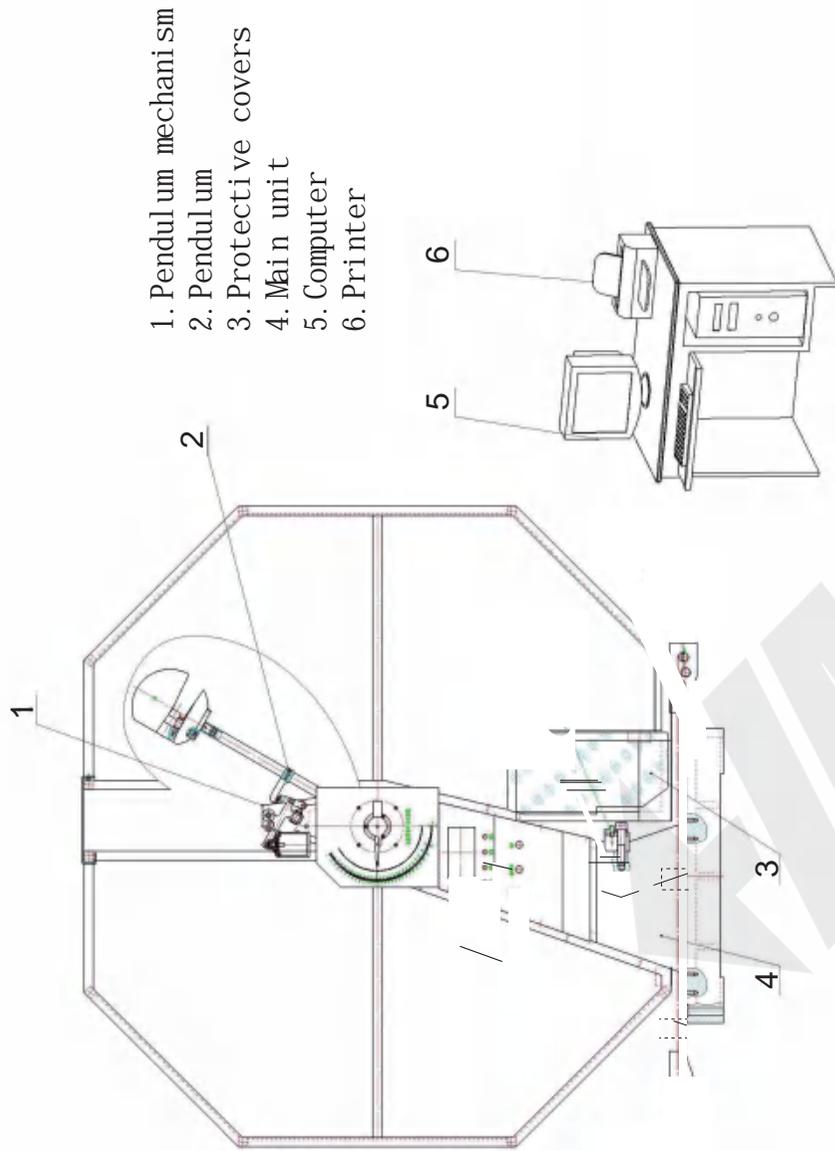
6. The distance between the armature and the yoke of the electromagnetic clutch is 2~3mm. It has been adjusted at the factory, and the user does not need to adjust it again.

7. After the test is completed, press the "release pendulum" button, the pendulum automatically fall to the plumb position, cut off the power supply.

## VIII. Common faults and troubleshooting methods

NO.	Troubleshooting and remedy	Cause analysis	exclusion method
1	The pendulum does not move by pressing the "take pendulum" button.	1. Power supply failure 2. microswitch failure	1.Check fuses 2.Replace microswitch
2	When the pendulum is swinging back to the left of the plumb position, the electromagnetic clutch comes together and makes a loud banging sound.	1.Poor contact between clutch and carbon brushes 2.oil on clutch and brush surface	1.Wipe the parts clean with acetone solution. 2.The end notch of the carbon brush should not be on the contact surface of the clutch.
3	Do not stop when placed in a vertical position	PLC controller failure	Contact the manufacturer

Figure 1



- 1. Pendulum mechanism
- 2. Pendulum
- 3. Protective covers
- 4. Main unit
- 5. Computer
- 6. Printer

Figure 2: Installation Diagram

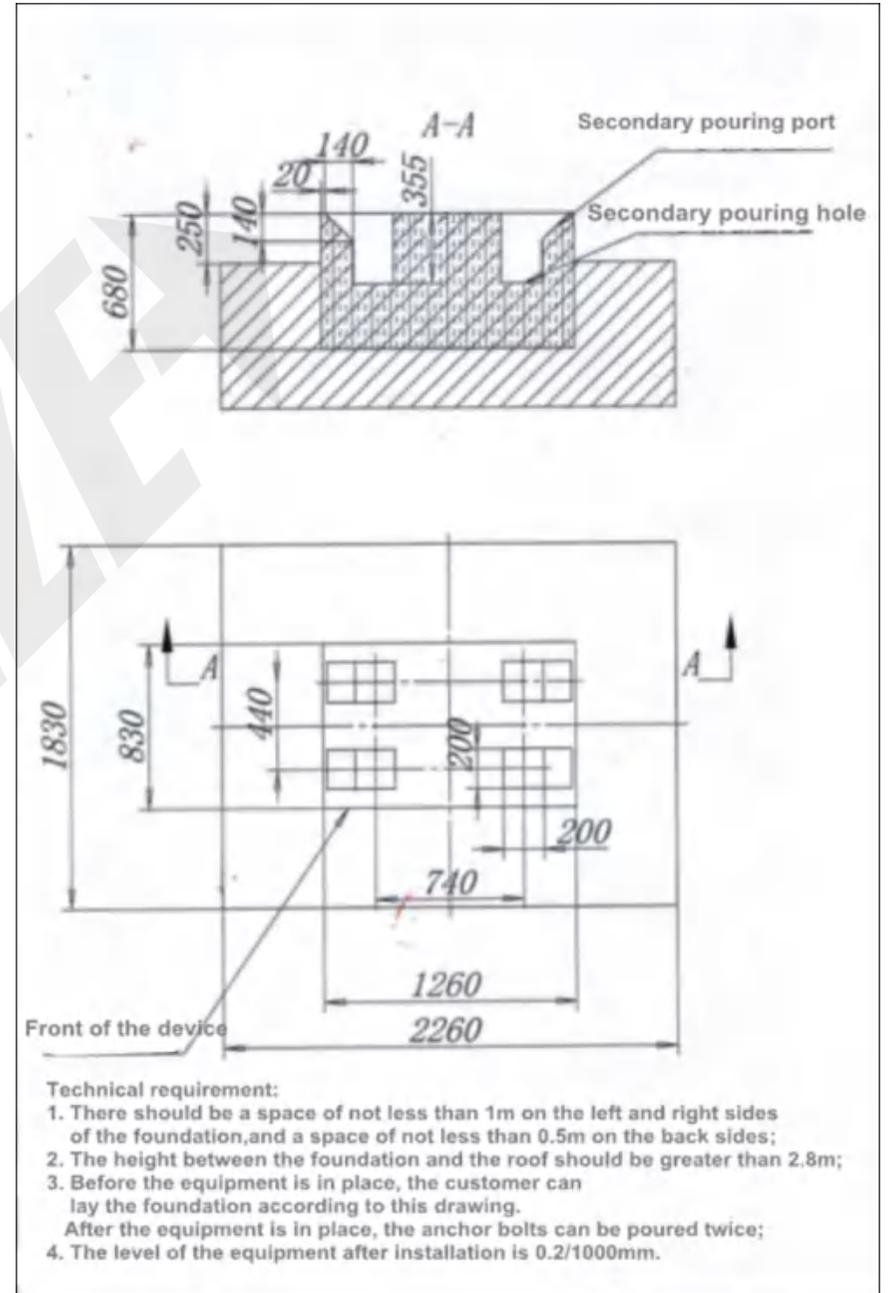


Figure 3: Impact Specimen Dimensions

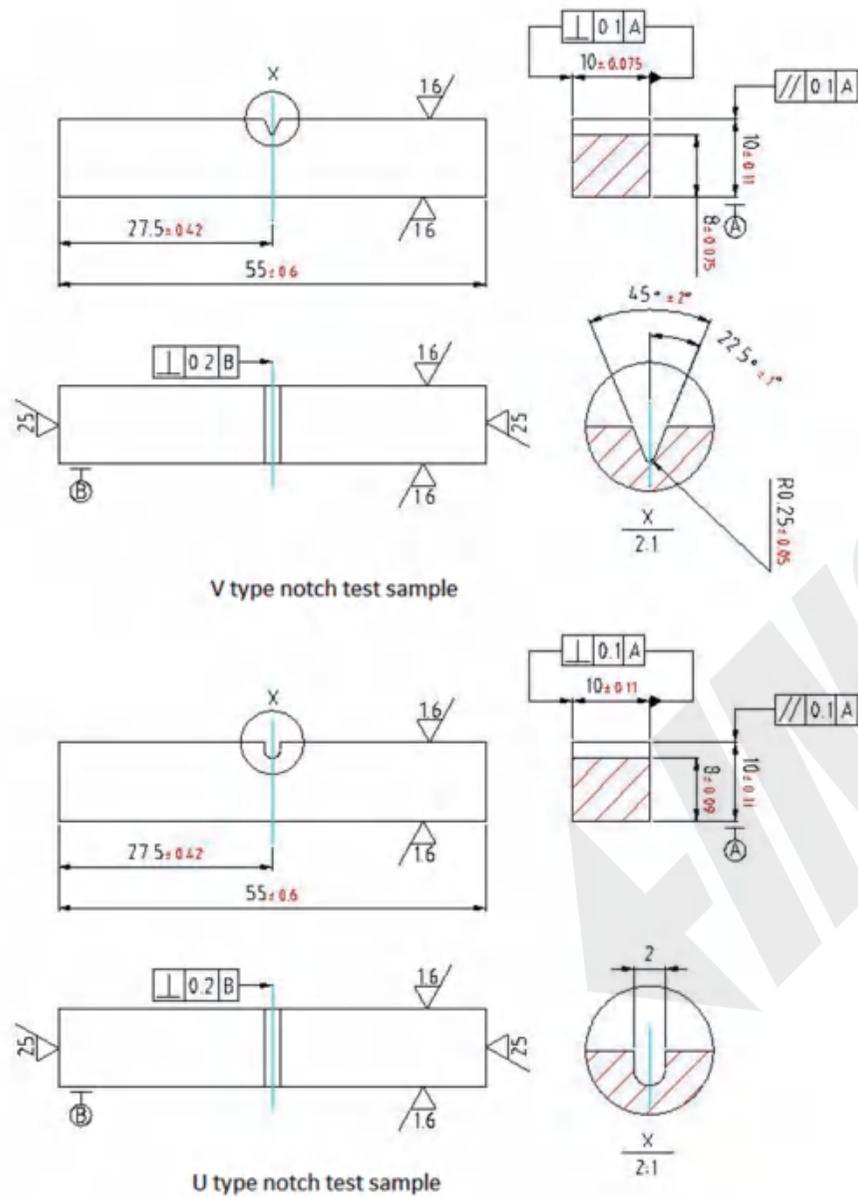


Figure 4: Electrical schematic

