



# EIE INSTRUMENTS PVT. LTD.

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Organization's ISO 9001:2015 Certificate



## Forward

Dear valued customer,

We just want to take a moment out to thank you for your keen interest in our company products. We greatly appreciate your business and the opportunity you provided us to assist you. You have joined a selected group of customers who have switched to the technologically superior and quality enhanced laboratory testing product.

Time has changed, so do the technology. Your purchase lists you on the cutting edge of 21st century technology. The attached test report is an excellent way of expressing and maintaining your trust in EIE's - superior quality testing products. Our continued efforts and commitment is to provide you efficient sales after services, prompt attention and highest level of customer satisfaction. If for any reasons, you have questions or comments, we are delighted to hear from you. Call us on **0091-79-660406013** or send us email at **info@eieinstruments.com/kunal@eieinstruments.com**. You can expect us to respond to your email within 24-48 working hours.

Once again, thank you for your trust and kind patronage. We look forward to serve you better in future.

Yours sincerely,

EIE Instruments

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## 1 Introduction to Compression Testing Machine

When a specimen of material is loaded in such a way that it extends, it is said to be in *tension*. On the other hand, if the material compresses and shortens it is said to be in *compression*. Compressive strength is one of the most important engineering properties of concrete. It is a standard industrial practice that the concrete is classified based on grades. This grade is nothing but the Compressive Strength of the concrete cube or cylinder.

To ensure precise compression strength **EIE offers** an instrument i.e. **Compression testing Machine (Combined Digital & Analog)** which have been meeting the application requirements as per **IS Standard**

## 2 Definition

**Compressive strength** or **compression** is the capacity of a material or structure to withstand loads tending to reduce size, as opposed to tensile strength, which withstands loads tending to elongate. In other words, compressive strength resists compression (being pushed together), whereas tensile strength resists tension.

## 3 Necessity & Scope

Cube or Cylinder samples are usually tested under a compression testing machine (CTM) to obtain the compressive strength of concrete.

## 4 Principle

CTM is based on following principle,

Strain in a solid is proportional to the applied stress within the elastic limit of that solid.

## 5 Packing slip

- 1) Loading frame
- 2) Pumping unit
- 3) Manual
- 4) Calibration report
- 5) Hydraulic pipe

## 6 Application

- Aerospace and Automotive Industry
- Construction Industry
- Electrical and Electronic Industry
- Medical Device Industry
- Packaging Industry
- Paper and Board Industry
- Plastics, Rubber and Elastomers Industry and many more.

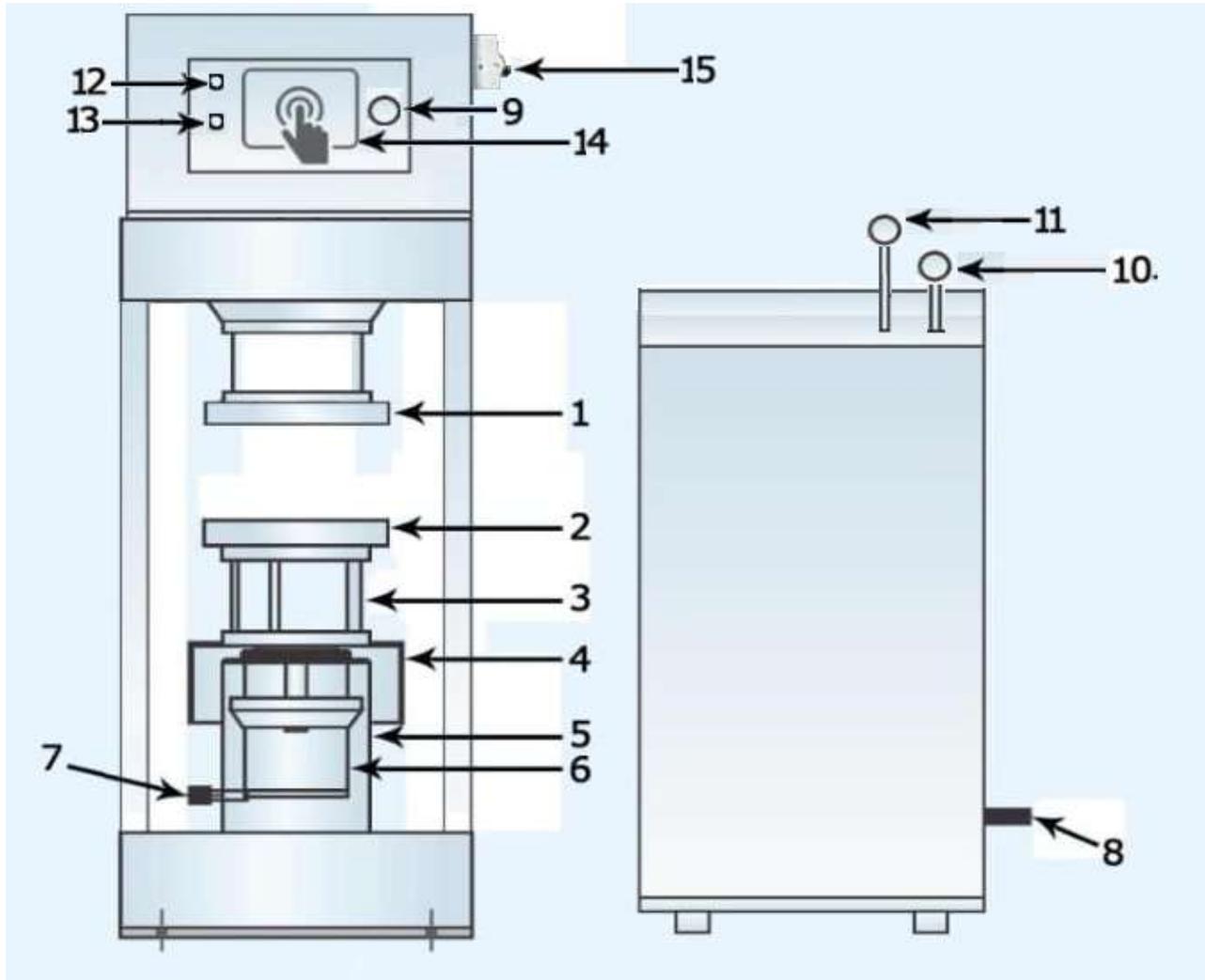
## 7 Technical specification

- Power Source : 230Volts, Single phase, A.C. supply
- Type : Digital
- Pressure unit : KN
- Capacity : 500/1000/2000/3000KN (As per order)
- Least count : 0.1 KN

### 7.1 Before operating Machine

- 1) Foundation must be established before installing the whole unit (as per foundation diagram).
- 2) Make proper foundation for the unit.
- 3) Check the level of foundation with the help of the spirit level and then install the machine.
- 4) Clamp the machine with perfect levelling.
- 5) Remove the air bubbles from established piping connection by applying pressure and allow some oil to flow out by losing hose pipe.
- 6) Now tighten the hose pipe in such a way that no leakage or flow remains in the pipeline.
- 7) The cable coming from panel should be given to main supply. (230 volts, single phase)
- 8) Neutral (black wire) is required in this machine.
- 9) Earthing cable is of green colour, do not power supply to earthing wire.

## 8 Component diagram of CTM



No.	Part name	No.	Part name	No.	Part name
1	Upper plate	6	Piston	11	Pace rate controller
2	Lower plate	7	Hose pipe (Input)	12	Mains indicator
3	Distance block	8	Hose pipe (output on the back side of the assembly)	13	Operation indicator
4	Jack cover	9	Emergency switch	14	Digital controller
5	Cylinder	10	Release valve	15	Mains switch (MCB)

Figure 1 Component Diagram of CTM

## 9 Foundation diagram for CTM

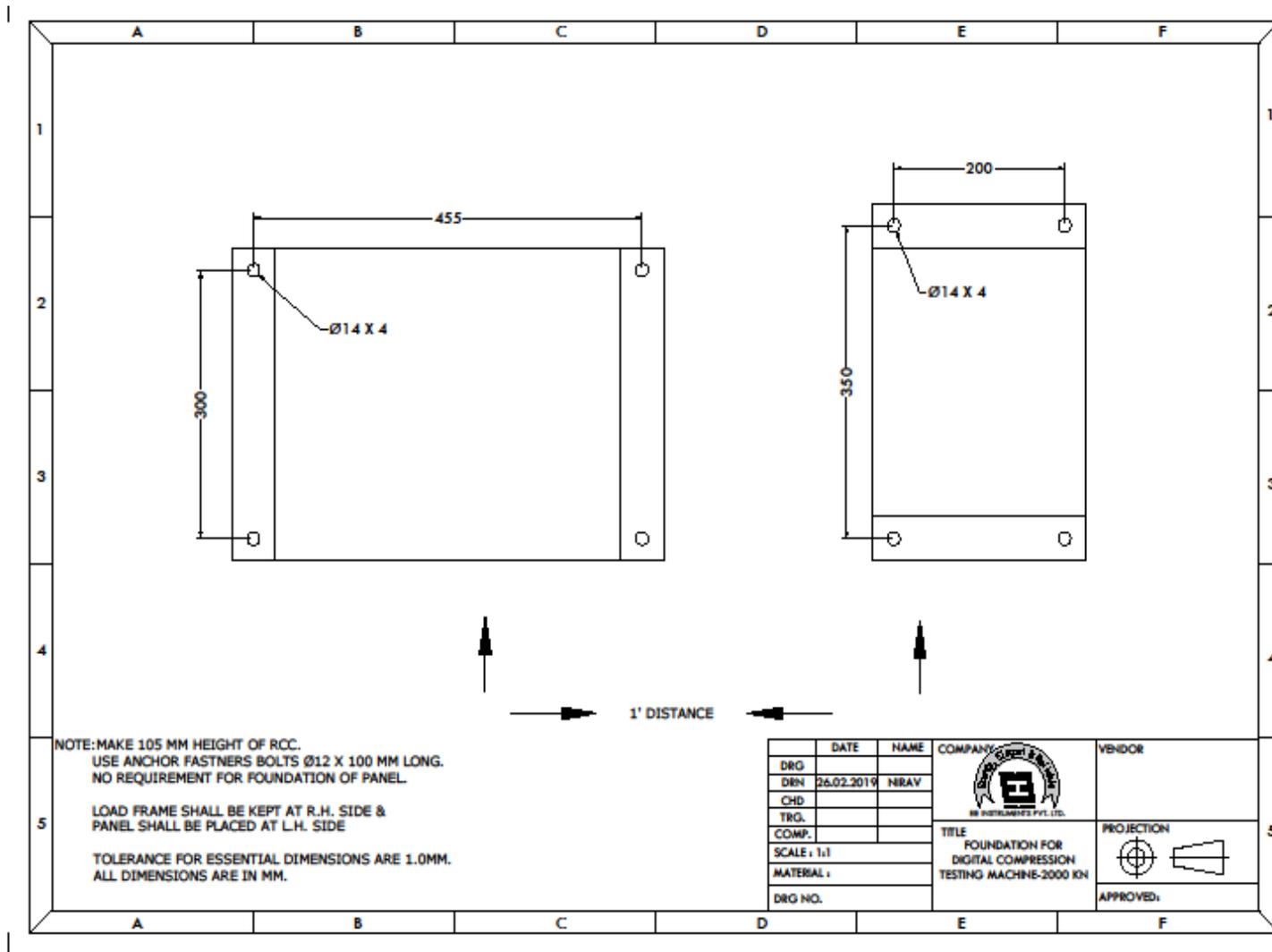


Figure 2 Foundation diagram for CTM

## 10 Electric wiring diagram of CTM

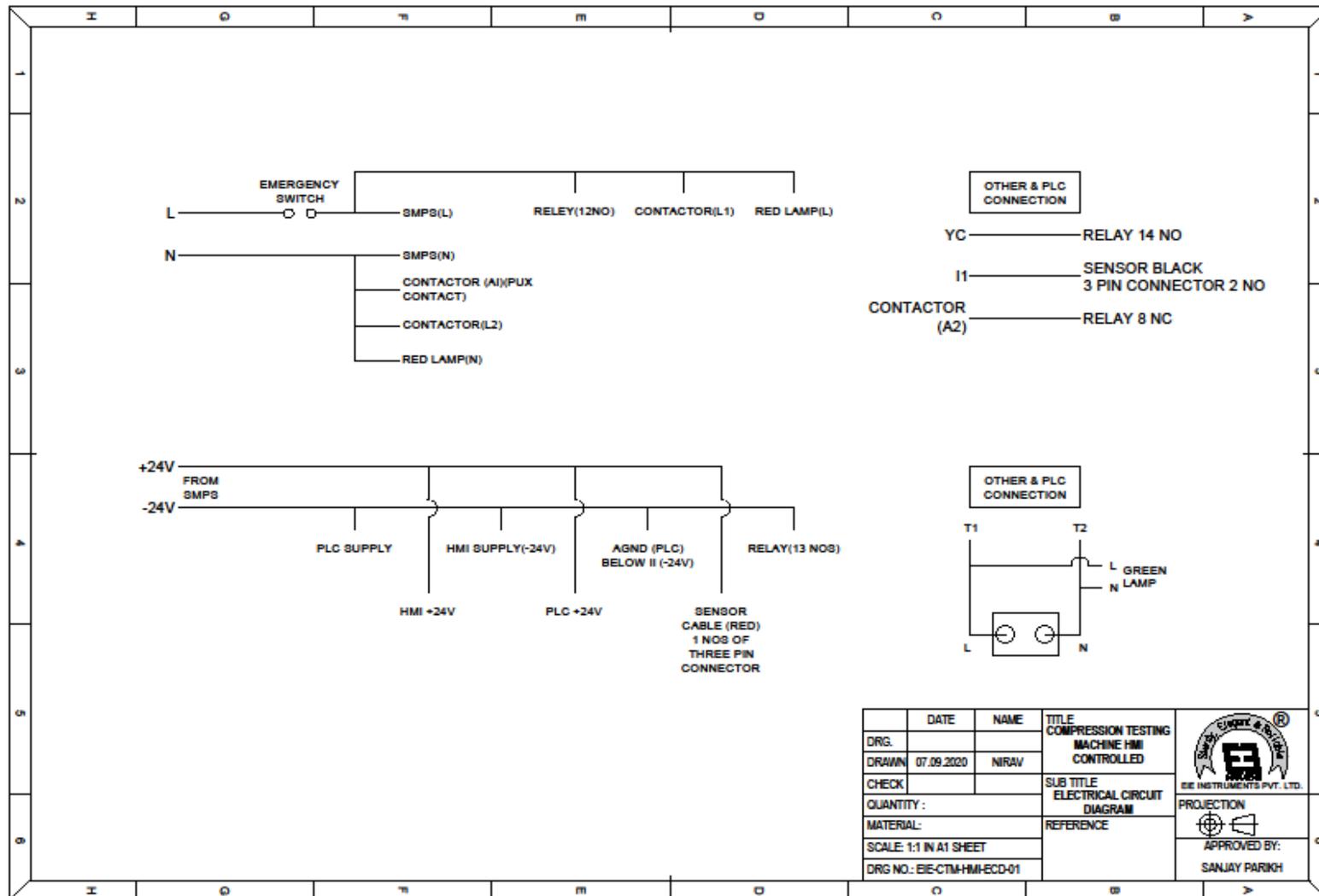


Figure 3 Electric wiring diagram of CTM

## 11 Operating parts for Manual Pace rate controller

### Release valve:

For generating and releasing pressure, for functioning of the test process. Close this valve before starting new test, and release after each test.

### Regulating Valve:

This is for controlling rate of loading. By applying in clockwise direction pressure will be applied faster and in anti – clockwise direction pressure will apply slowly. You can apply rapid pressure by operating pressure control valve in forward direction.

### 11.1 Standard Operating Procedure

- 1) Place the sample on the center of the bottom plate.
- 2) Apply the distance piece to reduce the distance between upper & lower plate.
- 3) Gently tighten the release valve for applying the load.
- 4) Turn ON the MCB mains switch to start the apparatus, after that press “F1” (start button) to apply the load.
- 5) You can apply rapid pressure by operating pressure control valve in forward direction.
- 6) As soon as the pressure is developed the jack piston will be raised and the sample concrete cube will be compressed between upper and lower plate.
- 7) The pressure at which the sample fails is called “Peak load valve”.
- 8) Release the pressure before starting a new test.

## 12 Standard formula

1 KN = 101.97 kg

Actually 1 kg = 9.81 Newton

$$\text{Compressive strength} = \frac{\text{Applied Load (N)}}{\text{Cross Section Area (mm}^2\text{)}}$$

### 13 Operation instruction for Digital Controller

- Connect the mains chord to your local properly grounded outlet.
- Place the specimens between the two plates and fix it properly.
- Then turn ON the mains switch (MCB), after that following display will appear in the controller display as shown in below figure.

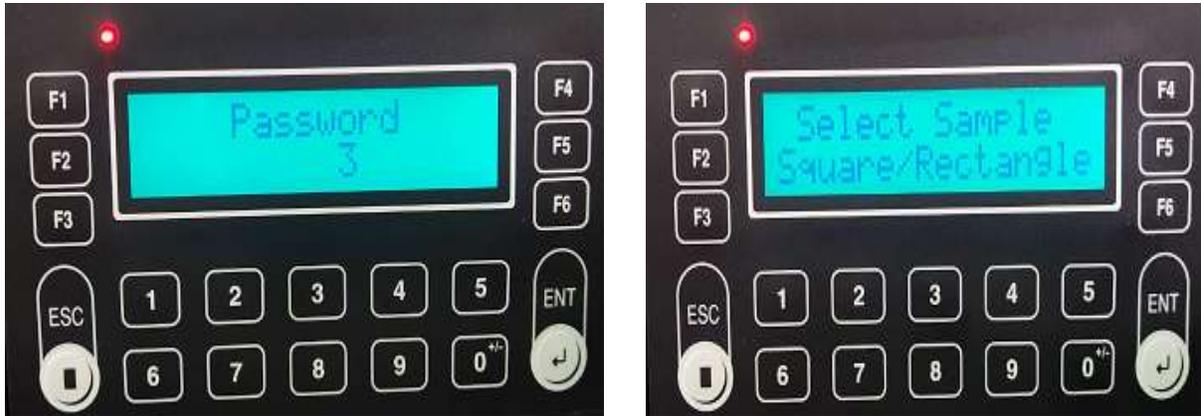


Figure 4 Home screen

- F1** : To start Test process (Motor starts for compression tests).
  - F2** : To stop the Test process.
  - F3** : Tare key (To nullify the load value, if any value is being displayed in the controller before starting of test.)
  - F4** : To go to password screen.
  - F5** : To refer previous performed test results. (Controller save previous 10 results).
- Before starting test process, user have to set different parameters as per selected specimen description.

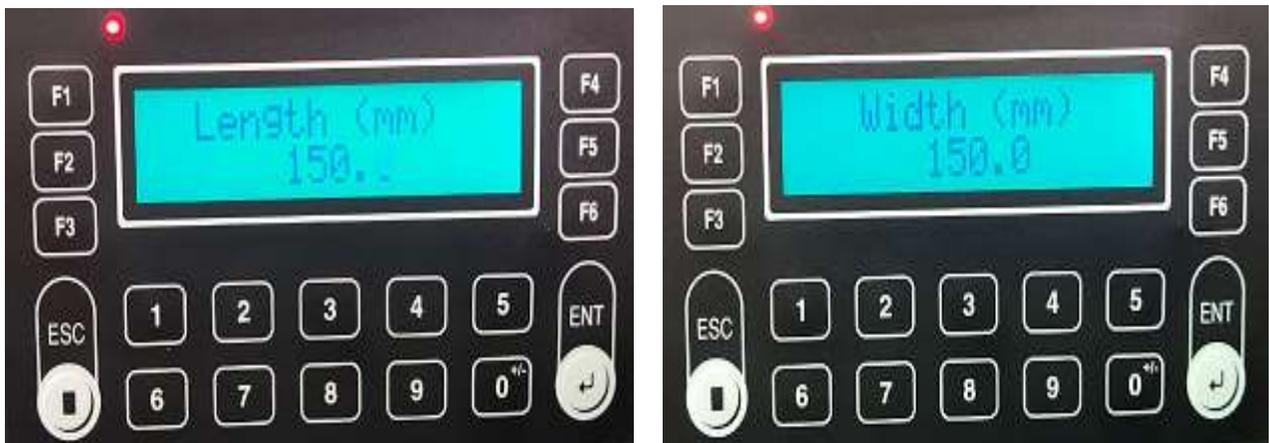
### 13.1 Sample selection

- Press “F4” for password window, enter password “3” for sample selection.



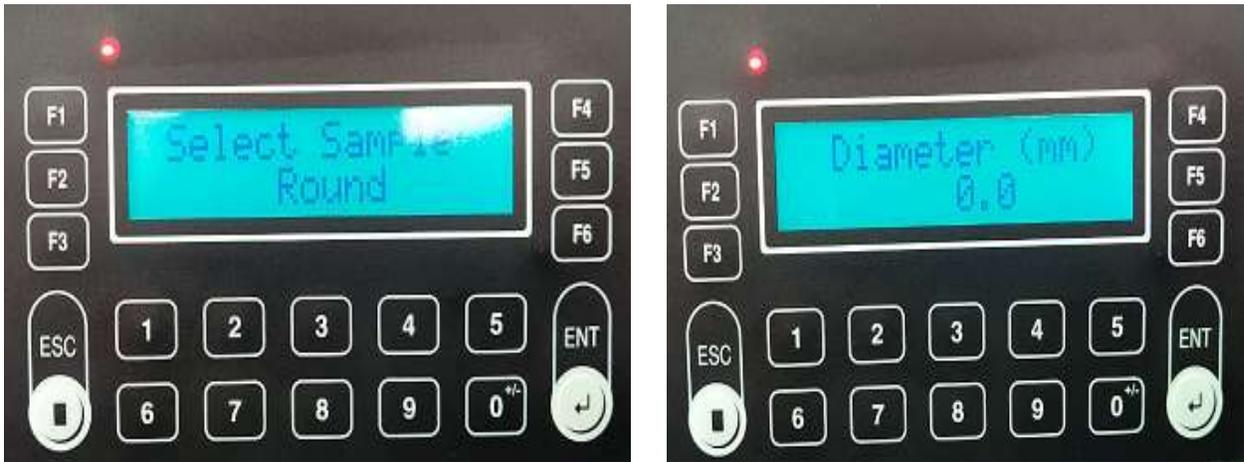
*Figure 5 Password & Sample selecting screen*

- Press “F5” button to select shape of specimen such as “SQUARE / RECTANGLE” accordingly, again press “F4” button to the enter its dimensions (for square enter its side length and for rectangular shape enter its Length and width dimension respectively), using numeric keys provided. Press numeric keys digit will start blinking, now set the desired value and then press “ENTER” button then digits will stop blinking which indicates that value is saved. After that press “F4” button to return back in home screen.



*Figure 6 Parameters screen for Square/ Rectangle*

- If sample is Round in shape, again press “F5” button, select “Round” and after that enters its diameter in diameter column. After that press “ENTER” key to save the entered data.



*Figure 7 Screens for Round sample selection*

- To return back in “Sample Selection” page, press “F6” button.

**Note: If irregular shape specimen is used, user have to enter its area.**



*Figure 8 Screen for irregular Sample write its area*

### 13.2 How to set Pace Rate?

- Press “F4” to enter in password window, for setting of pace rate enter “Password: 4”.
- Immediately following window will appear as shown in figure: 4



Figure 9 Set pace rate value screen

- Set pace rate “5.25” and press “ENT” button to save. Now press “F4” button return back on the main screen of the machine.
- Now start the machine, pace rate which is set will come on the 2<sup>nd</sup> line of the controller.
- Now, if the pace rate is less than set pace rate the bar graph will move towards left side and if the pace rate is more than the set Pace rate the bar graph will move towards right side.



Figure 10 Pace rate bar graph display

- User can control the pace rate with the flow control valve, provided on the panel (Bigger one) as indicated in figure.



### 13.3 How to set Maximum Trip Value?

Maximum trip value depends on capacity of apparatus. It is for safety purpose, as while operating process maximum load will cross the maximum trip value, apparatus will automatically stop.

For example, apparatus capacity is 2000 KN, then its Maximum trip value is “1950 KN”.

- To set maximum trip value, open password window using “F4” button and enter “password: 5”.
- Now, using numeric buttons enter “1950” then press “ENTER” button to save.



Figure 11 Maximum trip value screen

### 13.4 How to set Auto trip Value?

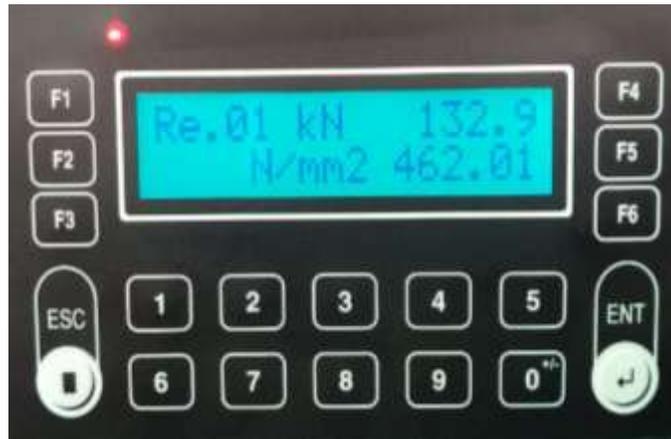
Auto trip value is the value of minimum deviation between maximum load value and current load value, which is detected by the controller and stops the functioning of motor.

- To set maximum trip value, open password window using “F4” button and enter “password: 6”.
- Enter “50 KN” in auto trip value using numeric button on controller, then press “ENTER” button to save the data.



Figure 12 Auto trip value screen

- Press F5 button to refer pre tested results at home screen window, press “F5” to scroll 10 consecutive test results.



**Figure 13 Result screen**

**Note:** User can set pace rate in pace rate column in range (1 to 9 KN/sec), but it does not show any effect on operation pace rate it just display on graph.

Hence, user have to control Pace rate using the handle provided in hydraulic panel, by pushing forward to increase the pace rate and pulling backward direction will decrease the pace rate.

**NOTE:** Never try to change the factory set data otherwise inaccuracy may occur.

#### **Important Notes**

- Check oil every 30 days in the oil tank, please use 68 number hydraulic oil only.
- Please check the power stability of the premises.
- If the power is fluctuating or you are using your machine on power generator, we recommended to use stabilizer. (we recommended to use servo stabilizer only).

## 14 Troubleshooting

Problem	Causes	Solution
<b>Piston goes down slowly</b>	There is a chance that air may have come in the system, which cause system slow.	Lose the hose pipe of the machine and allow some oil to come out. This will remove the air from the machine, but make sure that oil level should not decrease. If oil level decreases fill it with fresh 68 number oil in the instrument to its required level.
<b>Pressure is not developing</b>	<ul style="list-style-type: none"> <li>a) Oil level may be not sufficient as per required</li> <li>b) There may be leakage in hose pipe</li> <li>c) Or oil leakage is from piston – cylinder.</li> </ul>	<ul style="list-style-type: none"> <li>a) Fill the unit with fresh 68 no. oil to its required level</li> <li>b) Check and tightly fit the hose pipe</li> <li>c) Replace the oil seal, it may be outdated or broken.</li> </ul>
<b>Uneven reading</b>	Calibration of the machine may be disturbed.	You have to recalibrate the CTM machine.
<b>Cube breaking from single side</b>	May be cubes are not casted evenly.	Use properly casted cubes only and always remove unnecessary concrete after casting.

## 15 Precautions to be followed

- 1) While cleaning take care that the small/ sensitive parts which do not get damaged.
- 2) Keep the instrument tidy, clean and dry with mint cream. Before initiating the fresh day, use preferably clean soft cloth. Brush up the unit body as to maintain its finishing.
- 3) Do not remove cover from piston cylinder, as it protects piston cylinder from dust.
- 4) Place in plane and even surface only otherwise inaccuracy may occur.
- 5) Keep checking the oil level in the tank before performing the test.
- 6) Please take a note that piston must not lift more than 2 inches. This happens when the machine is turned ON and the sample is not placed between the plates of loading frame, so do not operate the machine without placing the sample.
- 7) Always release the valve after every test.
- 8) After completion of test disconnect all the connections carefully.
- 9) Disassembly of this equipment is strictly limited to the qualified persons and licensed engineers only.
- 10) In case of any difficulty, please do not try to repair without consulting us, especially when the instrument is under warranty period.

### Warranty certificate

Your EIE product is guaranteed to be free from defects in materials and workmanship for one (1) year under normal use from the date of purchase. This WARRANTY does not apply to any product damaged by accident, misuse, mishandling, abuse, negligence, transit, improper line voltage, drop, fire, flood or if the products were altered or repaired by anyone other than the qualified service personnel. The liability of EIE Instruments is limited to repair or replacement and under no circumstances shall EIE be liable for any collateral consequential damages or loss. This guarantee specifically excludes the expendables and consumables.

All warranty claims must be directed to your corresponding purchase organization that is responsible for the sale of this equipment. The users are responsible for shipping expense. The warranty cards which are not signed and stamped by the actual user will be treated as void. The warranty card should accompany the defective products sent for repair, without which no claims would be entertained. Please detach the below warranty card from following cut-line.

.....

Name of the company:

Address:

Telephone no:

Mobile no:

Email address:

Date of purchase:

Product model:

Serial no:

Bill or cash memo no:

This card should be detached, filled in properly and posted within 15 days from the date of purchase otherwise the warranty becomes invalid.



--- End of Document ---

**Any Note or Queries**

**Please write us  
Thank you**

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