

Instruction Manual

Automatic Concrete Compression Testing Machines

Models: 2412031/2412032 (1200Kn)

Model: 2415031/2415032 (1500Kn)

Models : 2420031/2420032 (2000kN)

Models : 24300311/2430031 (3000kN)



Please read this instruction before moving and installing this machine and attempting to run it.

Remember this machine is extremely heavy and may be unstable before installation completed. Therefore, without using proper equipment may result in severe injuries. Appropriate lifting or hoisting equipment of sufficient capacity must be used to be safe and secured. For better repositioning, use the hook installed on the upper plate of machine.

- Due to oil leaking from oil tank, do not decline the machine more than 30 degrees while moving or installing.
- Check out any accessories you have received with your packing list.
- The machine should be located in an area of laboratory without dust, moisture or contaminating fumes, which could possibly affect and accelerate corrosion to machine surface or electrical contacts.
- For service work and calibration on the machine, it should be left sufficient space at the rear and sides of machine (minimum space: 80 cm).
- The machine should be **levelled**(aligned) any time and in other replacement location.
- The power should be connected to earth wire for electrical shock proofing.
- The machine is stood on a heavy duty steel table for appropriate height of putting concrete specimens into machine.

Table of Contents

Contents

| | |
|--|-----------|
| 1. Introduction | 4 |
| 2. Specification and Accessories of Hardware | 4 |
| 3. Software Specification | 5 |
| 3.1 Accuracy of the Digital Indicator | 5 |
| 4. How to Use and Work Digital Indicator? | 5 |
| 4.1 The Buttons and Their Functions | 6 |
| 4.2 Choosing a Language | 8 |
| 4.3 Pace Rate Loading Pre- Setting (force/time)..... | 8 |
| 4.4 What is Loading Pace Rate (LPR) and how does it Work? | 8 |
| 4.5 What is -%Fmax (-%Sample Break Point) and how does it Work?..... | 9 |
| 4.6 Testing History Data and How to Print?..... | 9 |
| 4.7 History Data Page..... | 10 |
| 4.8 Force-Time (Kn/sec) graph | 11 |
| 4.9 Date and time setting..... | 11 |
| 5. Troubleshooting | 12 |
| 6. Wiring Diagram | 12 |
| 7. Maintenance and periodically Inspection | 13 |
| 8. Calibration Method Procedure | 14 |
| 9. Computer Software Report | 17 |
| 10. Hydraulic Schematic..... | 20 |
| 11. Schematic Drawing | 21 |

1. Introduction

As we have mentioned, this machine is made based on ASTM C39. It consists of steel frame meets the ACI standard, hydraulic system and digital indicator. They can be separated from each other easily for better service work, repair and when they need to be replaced by new substitutional one.

2. Specifications and Accessories of Hardware

- Expect the main steel frame, hydraulic system and digital indicator, it should be included 2 pcs of steel spacers, heavy duty steel stand and safety aluminum frame doors, wire diagram and operational manual.
- Digital Touch Screen 7" LCD surface is sensitive and should not be scratched or teared and should not be exposed by sunlight.
- Capacity of machines are 1200Kn, 1500Kn, 2000Kn or 3000Kn depend on model of machine. These have been operationally tested and calibrated at the *Control* factory.
- Heavy duty dual stage piston pump, 600bar (8,700psi) capacity. The piston and plunger elements are made of Bosch Company.
- Capability of connect to PC by RS232.
- 600bar (8,700psi) stainless steel Pressure Transmitter, WIKA Germany brand Company.
- Equipped with Limit Switch to prevent extra stroke of loading Piston more than 50mm.
- The best and high quality PTFE-BRONZE Seal and Guides for long service time and operation.
- 55 HRC hardened and grinded Loading Plates.
- Strong Powdered Painted for steel frame and other steel parts.
- 15Litres (4gal.) steel tank with oil level indicator.
- Heavy duty and safe Anodize Aluminum Frame Doors for front and rear of machine, with 8 mm thickness transparent Plexiglas windows.
- Front door equipped with electric micro-switch for shooting down the machine operation when it was opened.
- 0.75KW (1Hp), 110/220V, 60 /50Hz, 1ph, 1750/1450 rpm, aluminum body motor.
- Dimension for 2000Kn, L*W*H: 770*410*1250mm (30"×16"×49"inch), and Weight: 490kg.
- Dimension for 3000Kn, L*W*H: 850*560*1380mm (32"×18.5"×53"inch), and Weight: 850kg.

For more details and updating visit: www.control.ca

3. Software Specification

- Ability to inserting data like dimensions of specimen, selecting cubic or cylindrical concrete a specimen, loading pace rate,
- Choosing language (English, Spanish and Portuguese) and Engineering Unit (ISO, USA).
- Retrieving the data from History Bank.
- Setting of Date & Time.
- Printing the results of any test.
- 500 data storage of testing results.
- 10 selected (or user selection) point calibration method.
- Able to pre-set and accurate loading pace rate adjustment, this rate will be constant and any load and while applying force on specimens.
- Using USB for transferring data to PC.

3.1 Accuracy of the Digital Indicator

- Based on ASTM C39, if the testing machine load is indicated in digital form, the numerical increment must be equal to or less than 0.10 % of the full scale load of a given loading range.
- The *Control* digital compression machines accuracy for 2000Kn is 0.05 % (1Kn), twice accurate than ASTM standard. And for 3000Kn is 0.05% (1Kn), three times accurate than ASTM standard.

4. How to Use and Work Digital Indicator?

- Plug the indicator to nearest outlet. Be sure that the outlet support 110V, 60Hz. 15A or 220V,50Hz., 10A.
- Turn on the digital indicator by turning on **main switch** which is in front of consol.
- When testing, be sure the front door was closed.
- When the indicator turns on, this page will be shown.



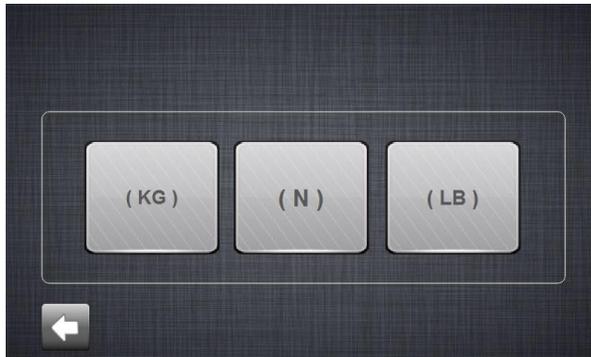
4.1 The Buttons and Their Functions

Click on the <start to test > button to follow the next Engineering Units.



- If the door was opened, the door status warning will be seen on screen, for deactivating this, click on “door status”. To do test when it was open, click on “locker sign” on the lower-right of page to make it green.

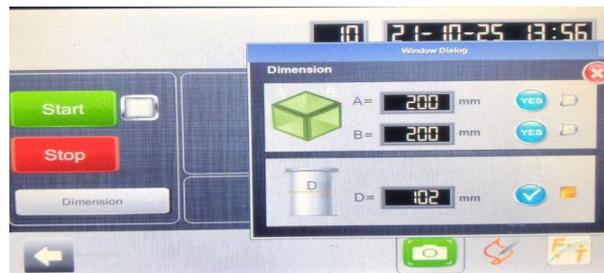




- Click on any engineering unit to be selected.
- Click on the <Arrow> key to go new or previous pages.

How to Use and Input Data into the Indicator?

- In this page user can select the pre-selected Area of specimens (cubic or cylindrical types) or inserting any new dimensions.



- Click on the right hand<Arrow> to go next stage.
- Click on the < start> key to start the test based on the inserted data. Click on the < stop>key to stop the test any time.

NOTICE: The loading/unloading valve lever should be at “loading” position while starting the test. And for lowering piston of hydraulic cylinder the machine should be off and the lever should be at “Unloading “position.

Screen of the indicator while testing specimens



- < F> key indicate the amount of PEAK FORCE in real time of testing.
- < T> key indicates the amount of PEAK STRESS in the same time of test.

4.2 Choosing a Language

Click on any key to select language.



4.3 Pace Rate Loading Pre-Setting

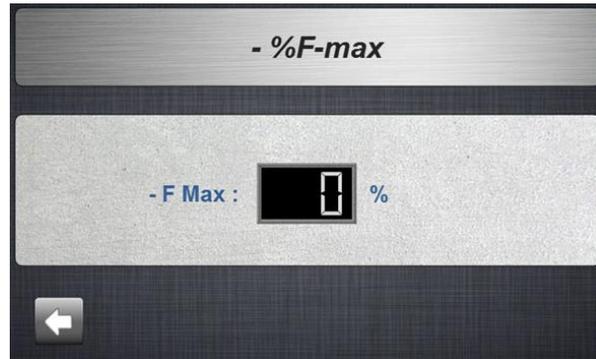
- The loading pace rate (LB/sec or N/sec) should be set before starting, the amount of rate based on ASTM C39 is 20-50 psi/sec (0.15 to 0.35 MPa/sec) and depend on the area of specimen, it can be calculated and inserted. For example, for a 6" dia. Concrete cylinder the loading should be 565-1413 LB/sec.
- Based on ASTM C39, during the application of the first half of the anticipated loading phase a higher rate of loading shall be allowed.

4.4 What is Loading Pace Rate and how does it Work?

- Based on ASTM C39, the pace rate (loading speed or force/time) is important and may increase or decrease the strength of specimens. Lower standard rate makes the strength lower and vice versa. With pre-setting the pace rate digitally, the machine will run the machine based on the per-set

rate till the breaking point. There is an option to deactivate the standard rate, so that, the technician can put his optional pace rate. The Control compression machine's pace rate varies from 1Kn/sec (225 LB/sec) to 20Kn/sec(4500LB/sec).

4.5 What is **-%F-max (Sample Break Point) (SBP)** and how does it Work?



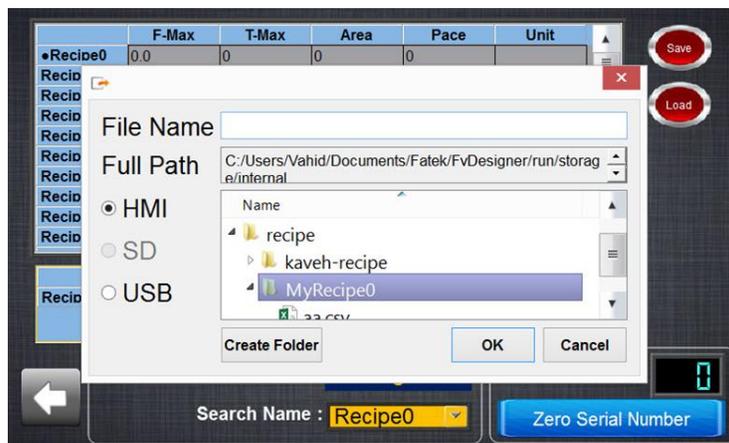
- **-%Fmax (SBP)** is defined as a percentage of sample yield strength and functions to define the end of test.it means when the SBP is set to 20%, and the max peak load applied to the test sample is 100,000LB (444.8KN) the indicator will terminate the test when the internal load value falls below 800,000LB (-20% of peak load).
- The amount of SBP is 10%- 80%.
- **Important Notice: The **-%FMax** parameter is not practical for force amount less than 50Kn, as the machine might not stop after breaking of the specimens. Please make sure the technician monitors the compression or flexural devices while working**

4.6 Data History of Testing and How to Print?

Click on the <  > key to open history data page



- If the Search No. was touched, the Row of the data will be highlighted to be seen better and if each test was touched in history chart, the search name can be revised easily.
- Insert USB device into the USB Port which is in front of digital indicator and wait until the contacting message was shown. click on the Save Icon, the browser will be opened. Select the USB option and continue the rule. Click on the < OK > key to end the saving process.



Press <  > key to take picture of the page

NOTICE: to take picture of any pages at any time, the UBS should be inserted to USB port.

4.7 History Data Page

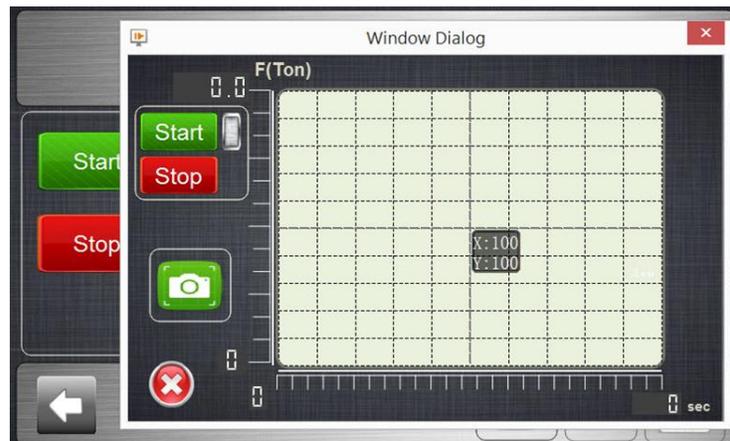
| | F-Max | T-Max | Area | Pace | Unit |
|----------|-------|-------|------|------|------|
| •Recipe0 | 0.0 | 0 | 0 | 0 | |
| Recipe1 | 0.0 | 0 | 0 | 0 | |
| Recipe2 | 0.0 | 0 | 0 | 0 | |
| Recipe3 | 0.0 | 0 | 0 | 0 | |
| Recipe4 | 0.0 | 0 | 0 | 0 | |
| Recipe5 | 0.0 | 0 | 0 | 0 | |
| Recipe6 | 0.0 | 0 | 0 | 0 | |
| Recipe7 | 0.0 | 0 | 0 | 0 | |
| Recipe8 | 0.0 | 0 | 0 | 0 | |
| Recipe9 | 0.0 | 0 | 0 | 0 | |

| Recipe0 | F-Max | T-Max | Area | Pace | Unit |
|---------|-------|-------|------|------|------|
| | 0.0 | 0 | 0 | 0 | |

Search No. : 0
Search Name : Recipe0
Zero Serial Number

In this page user can find the peak force, peak stress, area of specimen, loading pace rate, engineering unit, and code No. of specimens.

4.8 Force-Time (N/sec) graph



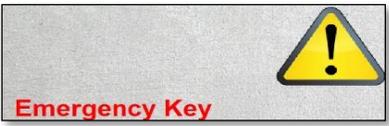
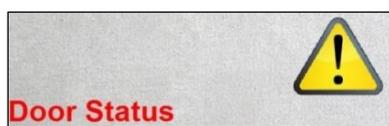
- Click on the < F/T > on above page to see the real time force/time graph, user can take a picture at any time (screen shot). Also user can stop the motor.
- If user click on the any point of this graph, he or she can see the amount of force related to similar time.

4.9 Date and time setting

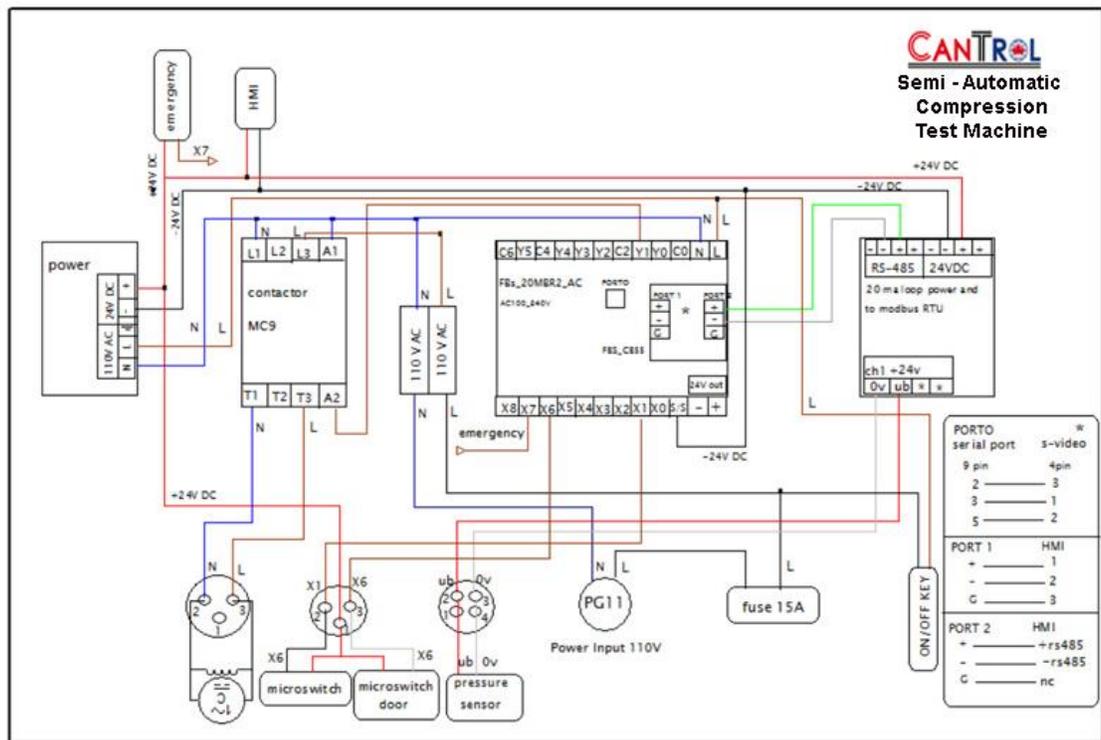


- Choose the “time and date” Icon to change or set the local day/time/year easily.

5. Troubleshooting

| Alarms | Trouble | How to fix? |
|---|---|--|
|  | The Emergency button is shutdown. All the performance of the machine is stop. | Turn the button to right. |
|  | The force is reached to the Max..Force (Overload). | Place the loading lever in the unloading position. |
|  | The piston of cylinder is in the upper position so that, limit switch is activated. | Place the loading lever in the unloading position. |
|  | Machin cannot be started. | Door is opened. You must close the door. |

6. Wiring Diagram



7. Maintenance and periodically Inspection

- Clean up loading bearing platens and around the stroke limit switch from crushed concrete pieces.
- Check the oil level regularly when the lower bearing platen is in the lowest position. If needed, add Dextron 3 Automatic Transmission Fluid (or any AW32 or AW46) till to oil level indicator.
- Check the oil leakage from cylinder or hose connections regularly. Never attempt to grasp a leaking hose under pressure with your hands, because the force of escaping fluid could damage and cause serious injury.
- Inspect the hose for wear, if the weariness is major, call Control with your machine model no. for replacing.
- Check if the bearing platens` roughness are out of ASTM standard regulations. Call Control for platens replacement.
- Be careful of extra (abnormal) noise of machine while working, contact Control for some advices.
- The air into hyd. System cause the performance and read out results of machine and may cause abnormal noise. For Dearing the hyd. System, run the piston to its full stroke and then retract it to initial position, do it two or three times to ensure the air is gone.

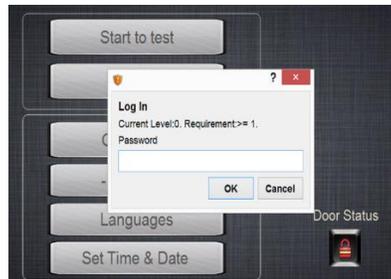
8. Calibration Process:

Compression machines have been operationally tested and calibrated at CANTROL factory. in order to fully comply with ASTM C39 and ASTM E4, these machines must be calibrated in new location again. For any assistant contact info@cantrol.ca

- For calibration of compression machine click the <Calibration> button.



- By clicking on <Calibration> the following page will be opened. Insert the password at the space and then click on the <Ok>. (the **Password** will be given to the customer since the purchasing have completed.)



- Enter the password, then click on the <ENT> key to appear the calibration page. This page has three parts:
 - Force Calibration
 - Overload Setting
 - Set Parameters: Specifying of Display Limitations and machine Calculations.



Click on the <overload> to insert the overload amount.

- Click on the <ENT> to confirm the overload amount.
- click on the < ← to return to main calibration page.

Note: according to the last step of the calibration should be equal to the maximum power of the machine (for example, 2000Kn), before calibration, set the overload number to $(2000\text{Kn} + 5\% = 2100\text{Kn})$ so that, the machine does not reach the maximum point during calibration. It causes the loading process to do not stop the machine while calibration. Then after the calibration was done, insert the overload number at 1950Kn.



- Click on the <Set Parameters > to enter the zero point starting determination of force display. And starting point of determination maximum force.

In the unloaded state of the device, when the alternate numbers appear in the "Cal Pressure" box, enter the Maximum number appearing in <Cal Pressure> +1 into the <No Real Force>.

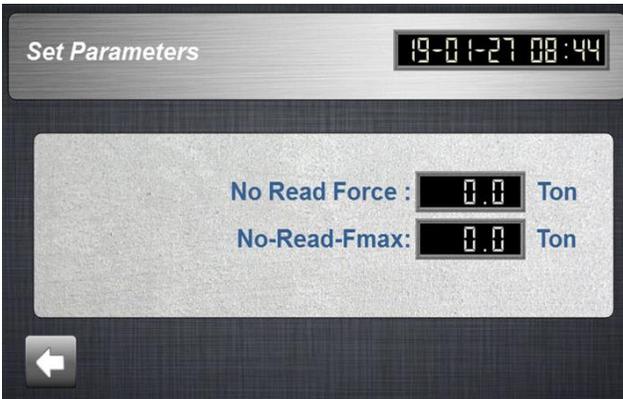
As the same way, enter the number equal to <No Real Force> +1 into the <No Real Fmax> box.

(For example:

If Cal Pressure max= 1.0,

“No Real Force “=1.0+1.0=2.0 Ton;

“No Real Fmax”= 2.0+1.0=3.0)



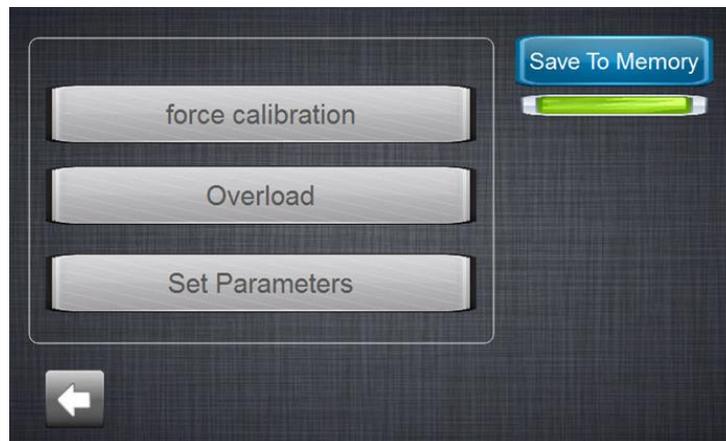
- At main calibration page, click on the <Force calibration> to reach the calibration chart page.
- This page has eight steps.
 1. Deleting the previous information.
 2. Inserting the selected Forces(Kn) based on **ten set points**.
 3. <Checking> button to fix each step.
 4. The force amount of machine corresponding to each point before calibration process
 5. <Start>button to start machine.
 6. <Stop> button to stop machine.
 7. “Real Data”, the Force amount of machine corresponding to related amount are
 8. Force after calibration process



How to start calibration process?

1. First, click on <Zero> button, before starting the machine.
2. Insert the desired 10 set points based on Kn into right columns.
3. Put the appropriate calibration device on the center of lower bearing plate of machine.
4. When the machine was started, the pace rate (piston speed) was in lowest rate. For increasing or decreasing of rate click or push on the left or right **blue arrows** .while calibration process.
5. Click on **check** button just after starting machine (zero force step 1).

6. When the amount of second step of force (Kn) is being seen on calibration device, **click on the Check** button(step2) which is the correspondence amount of force (Kn),
7. Continue each step until all the steps till to step 9, for step 10, just put the loading & unloading lever at unload position (discharging oil and letting piston to come down to initial position) after the force exceed than last step, in this case the step 9 is 1900Kn. In this time, the machine will stop automatically.
8. click on <  > button to return to main calibration page.
9. To save the calibration data into memory, click on the <save to memory> , then the green light will be on and it will be off after a few second.
10. When the green light was off, the calibration process would be finished completely.



9. Computer Software Report

- Form data entry software for testing Data Entry Software

CANTROL

Compressive Strength **CANTROL**
www.cantrol.ca

START TEST

D (cm): Sample Name:

B (cm): Client:

H (cm): Supervision:

Sampling rate: (per/s) Contractor:

Weight (gr): Project:

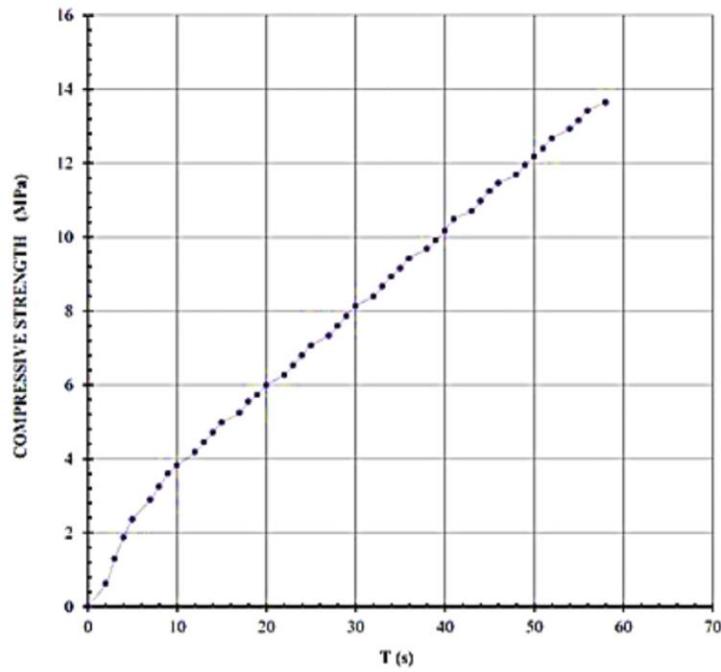
Sample Shape Square Circle

Insert Data **Start Test**

10.Report test

| | | | |
|--------------|------------|-----------------|--------------|
| Client: | Mr.Edvard | Sample No/Name: | T-3122 |
| Supervision: | ----- | Project: | Street No.31 |
| Contractor: | ----- | Loading Type: | Compressive |
| Date: | 10/21/2018 | Sampling rate: | 672 Kg/cm^2 |

| Date of Test | Slump No. | Sample Shape | | | Area (cm ²) | Vol. (cm ³) | Weight (gr) | Density (gr/ cm ³) | Max. Load (KN) | Compressive Strength (MPa) |
|--------------|-----------|--------------|--------|--------|-------------------------|-------------------------|-------------|--------------------------------|----------------|----------------------------|
| | | A (cm) | b (cm) | H (cm) | | | | | | |
| 10/21/2018 | T-3122 | 15.0 | 15.0 | 15.0 | 225.0 | 3375.0 | 8500 | 2.52 | 0.00 | 13.64 |

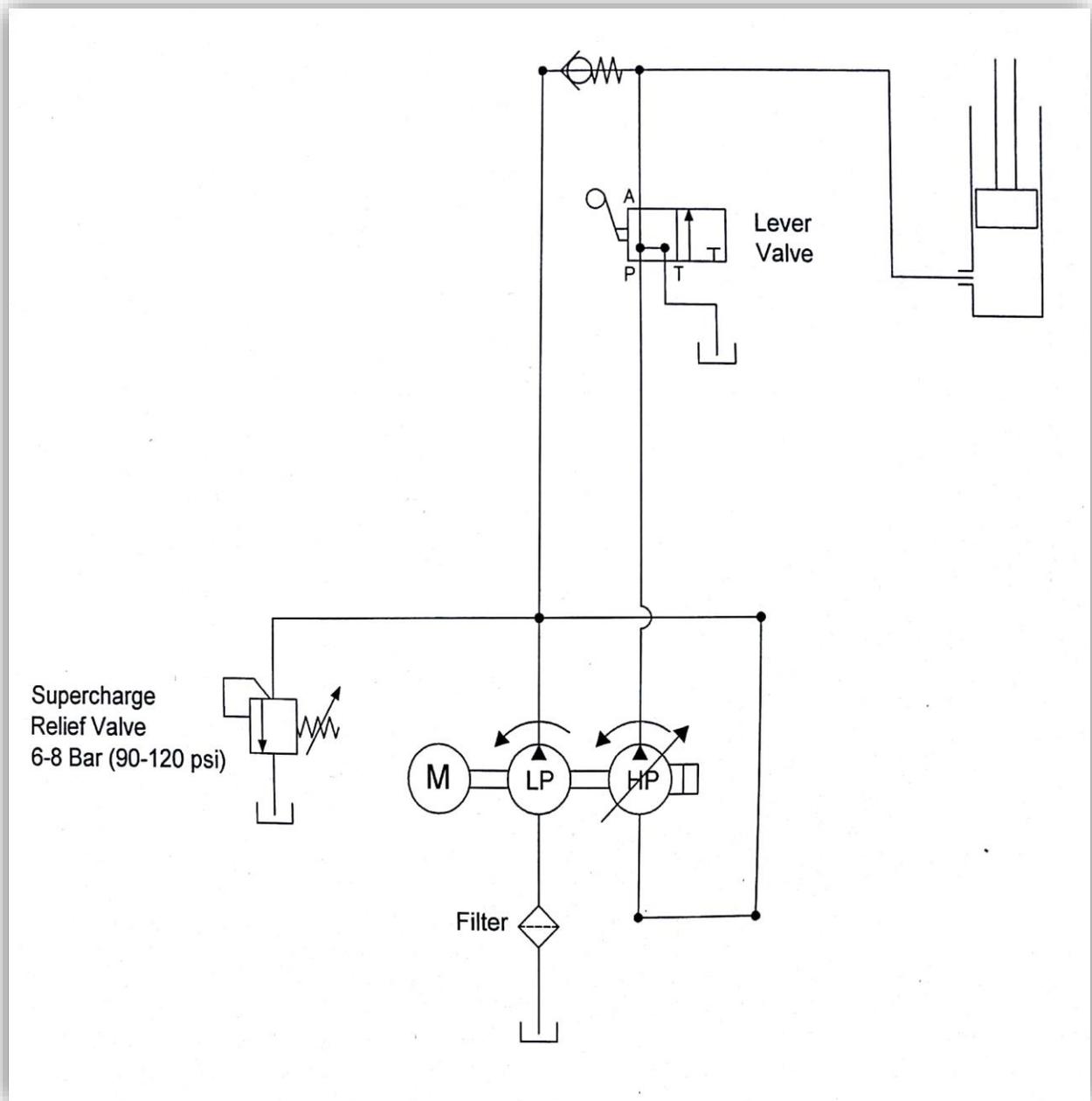


Confirmed by :

Supervised by :

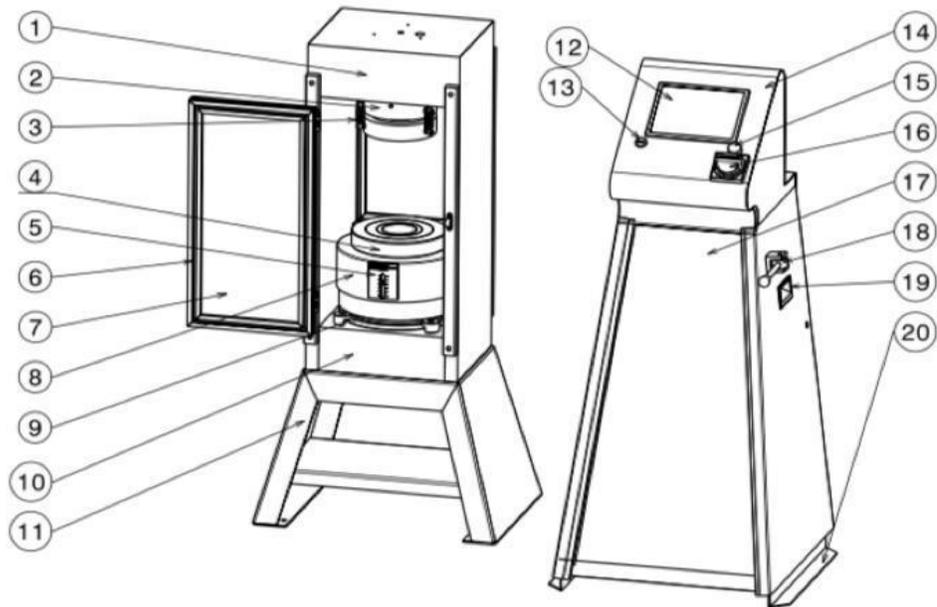
Performed by :

Hydraulic Schematic



11.Schematic Drawing

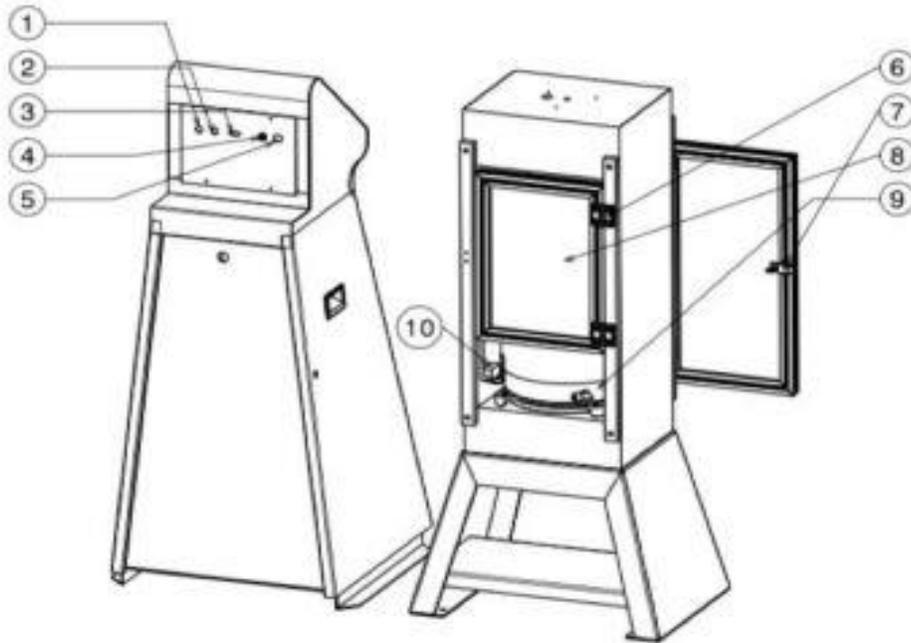
FRONT



| # | Part Name |
|----|---|
| 1 | Upper plate of main body |
| 2 | Upper disk of ball joint |
| 3 | Lower bearing plate (6.5Inch) |
| 4 | Lower bearing plate(8.5Inch) |
| 5 | Stroke limitatiaon sign of piston(50mm) |
| 6 | Front door |
| 7 | plaxi glass(8mmthickness)Protection |
| 8 | Cover of piston |
| 9 | Cylinder clamps(4 pcs) |
| 10 | Lower plate of main body |

| # | Part Name |
|----|-----------------------------|
| 11 | Heavy duty steel stand |
| 12 | 7" TFT,touch screen display |
| 13 | USB port |
| 14 | Console |
| 15 | Signal light |
| 16 | Main power switch |
| 17 | Front door of Console |
| 18 | Loading&unloading lever |
| 19 | Lifting handles(2pcs) |
| 20 | Console footage |

REAR



| # | Part Name |
|---|---------------------------|
| 1 | Door & micro-switch port |
| 2 | Pressure transmitter port |
| 3 | Rs232 Port |
| 4 | Fuse |
| 5 | Main Power cord Connector |

| # | Part Name |
|----|----------------------------------|
| 6 | Door Hings |
| 7 | Front Door locker |
| 8 | Rear Door Plexi glass protection |
| 9 | Pressure Transmitter |
| 10 | Micro limit switch |