

**LCM 3.22, 3.60, 3.62 & 3.64 OPERATION MANUAL
(WITH CONVERTOR PCB)
(LCM: LOOM CONTROLLER-MONITOR FOR CIRCULAR LOOM)
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Due to continuous development, specifications are subject to change without notice.

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1) About LCM Loom Controller:

A) General Description:

The loom controller is integrated unit for controlling various functions of Circular Woven Sack Loom. It has a powerful 32 Microprocessor, which is used for Haul-off speed control, Basic loom operation and stores the various Loom data for future analysis.

Two proximity switches mounted on Main motor shaft and Haul motor shaft measure the speed, and on basis of main motor speed, the haul off speed is controlled to get the desired Weft Density of fabric. The 32-bit microprocessor also takes care of loom inertia with PID loop, so that during Start, Stop and inch period, Weft density is maintained.

B) The (LCM) loom controller combined following three distinct functions:

1) Interlocking & Fault Monitoring: PLC functions:

- * INCH, START, STOP Operations event
- * Weft Break, Weft End and Warp Break monitoring.
- * Motor fault monitoring: Main motor, Haul motor, Winder motor.
- * Diagnostic LEDs for Inputs & Output for easy fault finding.
- * 'Ready for operation' Status Indication.
- * Fault and event Display on Graphic LCD Screen
- * Provision for Star-Delta and AC Drive for main motor.
- * Provision for Main motor Speed setting through additional Analog output.
 - a) 'Max Loom RPM' can set normal running speed of loom from 20 % to 100%.
 - b) 'Inch Speed' can set loom speed during Inching from 5 % to 50%.

2) Electronic Gearing: Mesh control functions:

- * Fabric Producing: Mesh control as per required Weft Density.
- * PID operator for mesh control in Start, Stop & Inch conditions.
- * Weft Break compensation.
- * Special Facilities: Periodic cramming of fabric facility (if required).
- * 'Test Menu' for easy setting & running condition parameter checking.
- * 'Manual Haul-off' facilities for pulling fabric when loom is stopped.
- * Easiest setting 'Weft Density required time to time.
- * Weft Break compensation: Clutch function not required in electronic loom when Weft Break occur.

3) Loom Data: Recording & monitoring functions:

- * Event count for Weft Break, Weft End & Warp Breaks.
- * Delay count for events: Weft Break, Weft End & Warp Breaks.
- * Efficiency calculation (Time efficiency) of loom working.
- * Real time Clock.
- * Shift setting and Shift wise (2 or 3 shifts per day): Current shift & last 2 / 3 shift reports can be seen.
- * Current Day report.
- * Grand total report.
- * 'Cut to Roll Length' facility: Take rolls of required length and balance roll length can be checked any time.
- * 'Order facility': Order length to be produced on the individual looms can be managed.

2) List of Technical Document for Reference:

Along with Manual, following Technical Documents are provided for easy and complete understanding of

a) Various Interlocking, b) Electrical connections, c) Fault finding etc.

As and when required, kindly refer to the document.

- * Interlocking (Fault logic) chart for PLC functions
- * Input description chart
- * Output description chart
- * 'Menu list' for main menu, sub menu levels.
- * Suggested loom panel wiring scheme (3 pages)

3) Construction:

The Loom Controller consists of high contrast Graphical LCD screen (Blue & White), 8 Tact keys for setting and reading of various parameters. The extra contrast makes the display readable in all light conditions. The Graphical display also uses higher font size for display of loom parameters when loom is running. In addition to Graphic display, LED indications are provided for 8 digital inputs 2 Pulse Inputs, running shift indication and 6 Relay outputs and 'status' on the front side of loom controller with green, red & white LEDs, so that fault finding becomes much easier & faster due to this LEDs. A high bright white LED indicates the Readiness of loom and it is visible from considerable distance. In general the design of Loom Controller has been made with Operator Convenience and easy maintenance in mind.

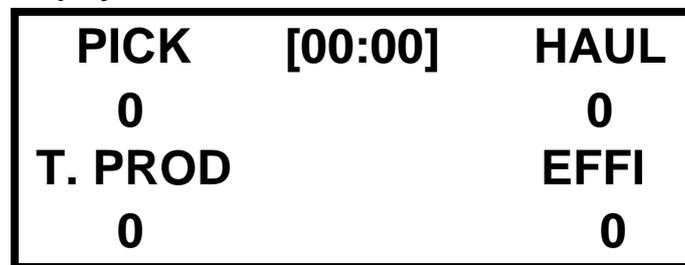
On the backside, all the connections are terminated on polarized plug type so that, in case loom controller needs to be replaced, no unscrewing of wires is required. This reduces the down time of Loom.

4) Main Display, Key Handling and Menu Selection:

Main Display:

Graphical Display – The display shows the current status of the loom in bold letters so that it can be viewed from distance. Following parameters are displayed in main display:

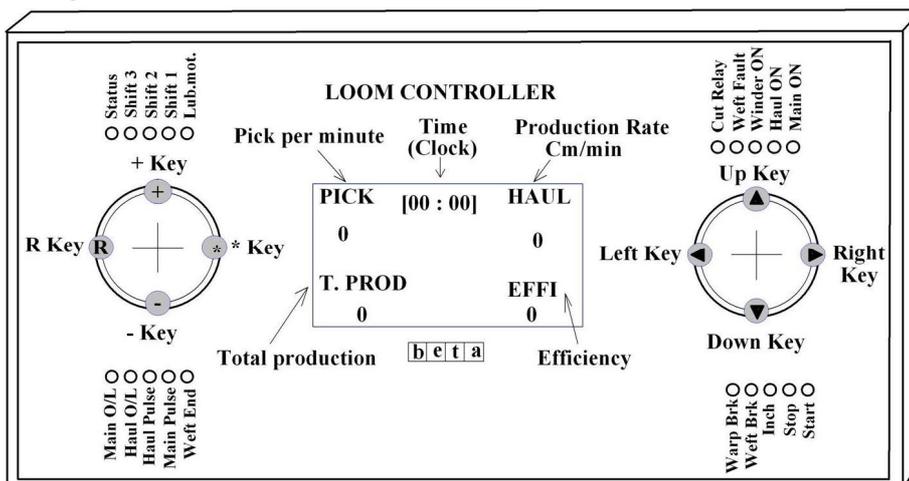
Main Screen or Main Display:



- 1) **T. PROD.** : “Total production” (Grand Total) :- On left bottom of LCD display total fabric produced in meters is displayed.
- 2) **PICK.** : Pick per minute : - On left top of LCD display “Pick” i.e. number of weft (horizontal) tapes inserted in fabric in one minute is displayed. This is instantaneous value. This value will be displayed only when loom is running.
- 3) **HAUL.** : On right top of LCD display this parameters indicates instantaneous value of production Rate in centimeter/minute.
- 4) **EFFIC.** : “Efficiency” : - On right bottom of LCD display this parameter shows the percentage of Time duration the loom is running in current shift till the given moment. Thus if 4 hour have been passed in current shift and loom was running i.e. on for 2 hours, then Efficiency will be 50% up to that moment in current shift.
- 5) **00: 00.** : Current time is displayed at the center top of LCD Display. If current time is not correct, please set the “Actual time”. If you face any problem with real time, please inform us.

(The Green and Red LEDs on the four corners of the front sticker show the Input and Output conditions. This is very much helpful for fault diagnosis.)

Key Handling and Menu selection:



- The user menu can be activated by pressing the 'UP' arrow key when in main screen.
- The controller will remain in menu mode until you come out of menu by pressing ← left arrow key OR it will come automatically out of the Menu after some time if any key is not pressed. If you are in sub-sub menu, then you have to press the ← left key two times.
- You can use Up / Down key to scroll through menu, and Right / Left key to enter / exit respectively from sub menu. The Plus (+) / Minus (-) key will change the parameter value.

5) Key lock and Password Policy:

To change any parameter value, key lock should be in 'unlock' position. In 'lock' position parameters cannot be changed. Now insert the Key & rotate the Key clockwise by 90°. This position is Unlock position. Now you can change the parameters. Key cannot be removed in the unlocked position. After parameter change is done, rotate the Key anticlockwise and then remove the Key. Now parameter cannot be changed (Lock condition).

PASSWORD:

PASSWORD MENU	
ENTER PIN 1	→
ENTER PIN 2	→
Change PIN 1	→
Change PIN 2	→

For setting the parameters in operator menu, password is not required, only key lock should be unlocked. There are two types of passwords. PIN 2 for fixed machine parameters in Factory Menu and PIN 1 for all other parameters.

Password entry is required for any parameter value change except operator Menu. Key lock must be Unlocked.

Password automatically gets deactivated after one minute when any key is not pressed OR if we come out of main menu i.e. in graphic display. When correct password is entered (unlocked), then you can change the parameter values. When password gets disable it keep showing 100 (locked).

PIN 1: Password PIN1 (123) for a) Shift menu b) System menu c) Cram menu d) Time menu e) PID Menu. Password menu → PIN-1 → enter the correct password and then go to any of the above menu to change parameter value in these menu.

PIN 2: Password PIN2 (124) is used only for "factory menu" parameters. (Pulses/Shuttle, Pulses/mm, Total Shuttles).

Password Menu → PIN-2 →, enter the correct password and then go to Factory Menu to change the values. The parameters in the factory menu is the fixed for particular machine. Changing this parameter will disturb the machine setting. Hence do not change these parameters unless it is required

How to Change Password: -

For password changing PIN 1 and PIN 2 go to password menu. Enter PIN1 then change Pin 1 (required value) after changing the pin value Switch Power OFF / ON the power supply and your Password will be changed. Same procedure can be done for changing password PIN 2.

How to Reset Password: - Please carefully remember both the passwords PIN 1 & PIN 2. If you forget the passwords, you will have to reset the passwords by "Master reset" procedure. Please refer to "master reset" facility mention in this manual. When you "Master reset" for password reset many other parameters will also reset. In this case, you will also have to set these parameters again in systematic and "step by step" procedure as mention in this manual. So do it in absolutely necessary condition only. So the best way is not to forget password.

6) Input and Output Indication on Front Panel:

There are 13 Digital input of 24VDC, (Electrically isolated) having green LED indication for input. (For 10 inputs, LED indication is provided. For 3 inputs, LED indications are not provided). There are 7 relay outputs. (For 6 relay outputs, LED indications are provided by red LEDs. For 1 Relay output (Star/Delta) LED indication is not provided). White bright LED indicates loom status .When loom is running, the white LED glow Continuously (ON). When loom stops due to any fault, the white status LED remains off. When the fault is cleared (Display doesn't any fault massage) and stilled loom is stopped, white Led will start flashing, indicating that Loom is now "Ready for Operation"

7) Parameter Settings:

Parameter Types:

1) Basic Machine setting Parameters:

a) Fixed parameters which are fixed by the design of the loom: These Parameters are in Factory Menu. These Parameters are set once only. (Total Shuttles in loom, Pulses / mm, Pulses / shuttle.)
Once set do not change the value.

b) Semi fixed Parameters are also the machine setting parameters to be set once only: These Parameters are in PID Menu. These parameters must be set in a very systematic "Step By Step" manner. (Haul Gain, P Gain, I Gain).

These parameters consider practical issues like Electronic Gearing Gain Setting, machine inertia and dynamic performance for uniform fabric: Haul gain, P gain, I gain. Please refer to "Step by step" mesh controller setting procedure, ensure that there is not pulse missing. This is very important.

2) Facility Parameters, Operation and Maintenance Parameters:

a) Some parameters which are related to operation and maintenance are included in System Menu.

Set the parameter values in this menu as per need of your loom system. These Parameters include: Lubrication facility, Auto Winder OFF / ON feature, Weft Break Compression, Star to Delta delay, etc.

b) Cram Menu Parameters include very special requirement of Regular Interval Cramming.

c) Timing Parameters are included in Time Menu. Here you can set the Shift timings as per your company's need. If clock and date is to be set, it can be set here. Normally clock and date is preset.

d) Operation parameters are the regularly used operational parameter and features: Weft Density of the fabric, Roll Length facility and the order length facility.

8) MENU DESCRIPTION (MAIN MENU)

GRAPHICAL DISPLAY  MAIN MENU  OPERATOR MENU

MAIN MENU	
OPERATOR MENU	→
SHIFT MENU	→
FACTORY MENU	→
SYSTEM MENU	→
CRAM MENU	→
TIME MENU	→
PID MENU	→
TEST MENU	→
PASSWORD	→

OPERATOR MENU	
Set Weft Density	→
Weft Density / inch	→
Cal Weft Density	→
Production Rate	→
Pick Per Minute	→
Roll Length	→
Balance Roll	→
Ready roll	→
Order Length	→
Balance Order	→
Ready order	→
Fabric Code	→
Operator Code	→

Operator Menu covers the parameters which are set by production department

- Activate the key lock to Unlock position.
- Password not required to changing the values.
- Go to Operator Menu by pressing [→] and set the weft density.
- Enter the desired value by means of the keys [+] & [-]
- The weft insertion depends on the machine and on the product to be produced

Setting Of the Weft Density:

Weft density represents the woven sack fabric weaving. Number of weft (horizontal) tapes required in 100mm length of fabric produced is termed as Weft Density. It can be represented in different units like number of weft tapes per inch or so. Setting the Weft Density is done in the "Operator menu"

Roll Length facility:-

The fabric produced is wound in roll form of desired length. Thus producing rolls of desired length is an important function. Roll length parameter is used for this function. The desired length is set in ROLL LENGTH parameter.

As loom produces fabric, the PRODUCTION parameter counts production in meter. The BAL. ROLL LENGTH parameter is a down counter to display the balance quantity in meter to be produced in the current roll. When the BAL. ROLL LENGTH parameter decrements to 0, the loom is stopped and display shows ROLL COMPLETE in fault screen. The CUT RELAY is activated till the fault is reset. The roll should be cut and new empty former is put in winder to wind the next new roll. The loom can be restarted by resetting the fault by pressing 'R' key on front panel of loom controller. As the new roll restarts from 0 length, the BAL. ROLL LENGTH will now show value same as ROLL LENGTH. Setting the Roll length is done in the "Operator menu"

Roll Length

In Roll Change Menu, go to Roll Length parameter to set or check the roll length & go to Balance roll parameter to read the balance fabric to be produced in current roll.

- Set the desired roll length with the keys [+] or [-] In case of an interruption of the roll length there exists the possibility to reset i.e. change the roll length Parameter value.
- Roll Complete: - When roll gets completed to set roll length then loom will 'Stop' indicating "Roll Complete" on display. The roll should be cut and new roll should be started. The loom can be reset by Pressing 'R' key on keypad ("Loom Ready" White LED will glow). Then the loom can be restarted by Pressing START push button. A CUT RELAY is provided to use it for any indication purpose. The master reset will also reset this parameter to factory setting i.e. "0"

When the ROLL LENGTH parameter value is set to '0' this feature is disabled.

So when you don't need Cut to length feature, please keep Roll length = 0. Otherwise it will keep stopping the Loom every time when non zero Roll length value completes.

Order Length facility:

Indication of order change:

The loom controller can keep track of your order. It monitors the production and alerts when the order is complete. It also shows the balance quantity.

This feature is similar to roll length feature. The difference is that an order length is the total length of fabric to be produced on that loom for the current fabric. An order length will consist of multiple rolls.

All the description for roll length feature will similarly apply to this feature. The Parameters are now ORDER LENGTH and the BAL. ORDER.

When the ORDER LENGTH parameter value is set to '0' this feature is disabled.

MAIN MENU ⇨ SHIFT MENU ⇨ CURRENT SHIFT

SHIFT MENU	
Current shift	→
Shift 1	→
Shift 2	→
Shift 3	→
DAY Total	→
Grand Total	→

CURRENT SHIFT	
Fabric	0 mtr
Efficiency	0%
Main ON	00:00HM
Loom ON	00:00HM
Warp Break	0 No
Weft Break	0 No
Weft End	0 No

Description of Shift Menu parameters:

All production data is recorded & stored in shift menu.

Shift menu shows production data of "Current shift", "last 2 or 3 shifts", "Current Day Total", and the "Grand Total".

FABRIC: The value in this parameter indicates the production in meters.

EFFICIENCY: It is the percentage of time duration the loom is running. Thus if 4 hours have been passed in current shift and loom was running i.e. ON for 2 hours, then efficiency will be 50 %.

MAIN ON: This parameter measure the amount of time in hours the loom supply was on.

LOOM ON: This parameter measures the amount of time in hours the loom was actually running.

WARP BREAK: Hundreds of tapes coming from creel stand are woven by circular loom using weft tapes to produce woven sack fabric. These hundreds of tapes are popularly called WARP. The number of times the loom stops due to wart tape breakage is counted in this parameter. Warp zone wires are connected to fault PCB or any warp control system, which generates the warp break signal.

WEFT BREAK: The circular loom has 4 or 6 or 8 or so shuttles in loom. The tape coming out of shuttle Bobbin is popularly called as WEFT. The number of times this tape breaks while loom is running is counted in this parameter. A Weft Break sensor is used for the detection of the broken weft.

WEFT END: The near empty condition of shuttle bobbin is detected by another sensor installed on loom, call Bobbin Sensor or color sensor or weft end sensor. The operator need not keep watch on shuttle bobbin and frequently stop the loom to watch the status. The Weft end sensor (Bobbin Sensor) will automatically detect and stop the loom. These numbers of weft ends are counted in this parameter.

Reading of the shift data:

The shift data shows the running (Current) shift data. Every time the shift changeover occurs as per shift timings set in TIME MENU, the shift data is transferred to respective 1 or 2 or 3 shift data and the shift data parameters resets to 0 for counting again in current shift.

Press UP key to go to main Menu.

With the key [→] you will move to the [SHIFT MENU]

Reading of the shift data is provided in the SHIFT MENU.

By using DN [↓] & RT [→] key's you move to the all shifts and read the Parameter data as listed in above menu box.

When actuating the key [←] you move back to the [Shift Data] and again actuating key [←] you move back to the [MAIN Menu].

MAIN MENU ⇨ FACTORY MENU

FACTORY MENU	
Total shuttle	→
Pulses/mm	→
Pulses/shuttle	→
loom address	→
Loom serial no.	→
Loom mfg. year	→

Setting of Fixed parameters: pulses/shuttle and Pulses/mm

Factory Menu has three parameters which are the fixed parameters for the loom. These parameters will never change unless loom design changes. The two essential parameter settings required for mesh control (Weft Density control) are pulses/shuttle for main motor and pulses/mm for haul motor system.

Pulses/shuttle: It is the number of pulses received to loom controller per shuttle in one rotation of loom.

$$\text{Pulses/shuttle} = \frac{\text{Number of Main Pulses generated in one rotation of loom}}{\text{Number of shuttle on loom}}$$

For example, if 192 pulses are generated for one rotation of loom and no of shuttle in the loom are 6 then the value of pulses / shuttle will be $192 / 6 = 32.0$.

This parameter is also used in PPM calculation. (Pick / minute or Tape / minute)

Pulses / mm: It is the number of pulses received to loom controller for 1 mm of fabric produced.

$$\text{Pulses / mm} = \frac{\text{Circumference of the Haul-off roller}}{\text{(total Gear reduction from motor to Haul-off roller} \times \text{Number of Pulses received in one rotation of Haul-off motor)}}$$

For Example:

If Circumference of Haul-off (Take-up) Roller = 533mm,

Total Gear Reduction = Gear box reduction \times Chain coupling reduction = $90 \times 2.05 = 184.5$

Number of Haul pulses received in one rotation of Haul-off motor = 40

Then pulses / mm = $(184.5 \times 40) / (533)$

The Haul-off roller circumference must be very accurately measured, as it is also used of measuring the production. Measure the total Reduction: Gear Reduction and Chain coupling reduction.

Once set do not change the value.

MAIN MENU ⇨ **SYSTEM MENU**

LCM 3.22

SYSTEM MENU	
Lub. Off Time	→
Lub. On Time	→
Width fault	→
Winder off del	→
Winder speed	→
Max. Loom RPM	→
Inch speed	→
Weft break comp.	→
Winder off set	→
Max. haul off	→
Star/delta	→

LCM 3.60 / 3.64

SYSTEM MENU	
Lub. Off Time	→
Lub. On Time	→
Width fault	→
Winder off del	→
Winder speed	→
Winder on del	→
Winder off set	→
Max. Loom RPM	→
Max. Inch RPM	→
Inch low RPM	→
Weft break comp.	→
Max. haul off	→
Star/delta timer	→
Not used	→

System Menu covers some useful parameters which are set by maintenance department in consultation with production department.

Lubrication system: Relay output is provided with variable Off Time & On Time. If you need this system, you can use it by setting the “Lub. Off Time” & “Lub On Time” of the Relay. If you do not want this periodic lubrication, please keep “Lub On Time” value to ‘0’.

NOTE (for LCM 3.64) : The Periodic Lubrication will be active only when loom is running. When loom is stopped, the lubrication will remain Off.

Width fault: Width fault sensor output may be connected to width fault input. If this signal comes, Loom will be stopped and width fault will be indicated on display. There is no delay provided for this input for stopping the Loom. The action is immediate

Winder Stop (Winder off delay): - Winder auto off feature

A facility is available in loom controller to stop winder motor and save power while loom is not running. This feature is used for switching off winder motor automatically after set time in seconds, while loom is stopped for any reason. If set to "0" this feature is disabled and the winder motor will be usually ON. To restart the winder any time the STOP push button should be pressed and released. The loom will go to ready condition if no fault. This feature is modified in 3.60 to restart winder any time by pressing ‘inch’ or ‘start’ or ‘stop’ push button

This delay timer is settable in system menu →

“Winder off delay” if set to ‘0’ this feature is disable and the winder motor will be always on

Winder on Delay: This parameter is used only when ‘auto winder off’ feature is enabled. In some looms, torque drive is used for fabric winder and in that case, this parameter is set to ‘0’ second. In other cases where fabric winder is magnetic coupled type, after auto off to restart loom, this delay is used after which loom will inch / Start. In this case, to start loom after winder auto off, Inch or Run must be pressed till delay is over. Just to reset the loom after auto winder off, stop or inch or start can be pressed. Loom can be started only after the delay is over.

(OPTIONAL FEATURES : Additional two Analog Outputs: Main V-out and Winder V-out (0-10V DC)

Optional 3rd analog output: “Winder V-out” is provided which may be used for torque controlled fabric winder or even warp control.

Winder off set: This 3rd analog output is proportional to haul output with multiplying factor in % and then this off set parameter is the off set voltage added to this multiplied proportional voltage output.

Optional 2nd analog output: Main V-out

Max. Loom RPM: Optional 2nd Analog output “Main V-out” is provided for setting loom speed through Loom Controller. For this, ‘Main V out’ Analog output can be connected to Main motor AC Drive.

Max. Inch RPM: (For two speed Operation) this parameter is provided for rotating loom at slower RPM during Inching. To use this facility, optional 2nd Analog output for main motor AC Drive should be connected.

Inch Low RPM (For LCM 3.60) : This parameter is provided for rotating loom at required lower speed in ‘RUN’. This can be done by pressing INCH first and keeping it pressed, also then presses RUN.)

Setting of the weft break Compression

When a tape coming out of any shuttle breaks, gap in fabric is observed, resulting in damaged fabric. To avoid this fault in fabric, WEFT COMP. Parameter is used to correct the weft fault In case of a broken weft tape the cloth is crammed in order to avoid any visible weft fault. The value of Compression depends on number of shuttles. For example if one weft is missing in 4 shuttles loom the Compression should be 33% (1/3). You can set the value by trial and error for the specific loom once.

NOTE (for LCM 3.64) : If you do not use this feature, do it disable (Weft compression % 0)

Max. Haul off: The manual Haul off facility is provided. This facility is used only when Loom is stopped and you want to pull the fabric for some reason. The manual Haul off speed **is set** in this parameter. Use * key to pull the fabric manually when loom is stopped. Key locked not required.

Star / Delta Changeover time: If it is set to ‘0’ in **LCM 3.22**, Main and Star Relays remain ON, for both Inch and Run. If it is set to ‘0’ in **LCM 3.60**, only Main Relay remain ON for both Run and Inch.

The Star to Delta Changeover time in seconds is set in this parameter.

MAIN MENU ⇨ CRAM MENU

CRAM MENU	
Bag length	0cm
Cram length	0mm
Cram density	100%

Setting of the CRAM MENU for special requirement of periodical weft cramming:

Cram menu is the special facility which is use by production department. Normally this facility is not used. When this facility is not used, keep “Bag length = 0” and “Cram length = 0”

The parameters used for this feature are BAG LENGTH, CRAM LENGTH and CRAM DENSITY in Periodic cramming. The Controller provides periodical cramming of fabric for stitching. This crams the fabric at set bag Length and the width of cramming can also be set.

- When you are in the [Main Menu] you move with the key [↓] to [Periodic Cramming] Main Menu-> Periodic Cramming After having operating the key [↓] you move in the menu [Periodic Cramming] to [Bag length] Sub sequent to [Cram length] and [Weft density] The Bag length has always to exceed the cramming length by at least 1cm. Activate the key lock to unlock position,
- And set the desire values (Bag length, Cram length, & Cram density in % of the nominal weft insertion) by the keys [+] or [-].

NOTE: - 100% Cram density means no cramming

MAIN MENU ⇨ TIME MENU

TIME MENU	
Set Time	0m
Not used	0h
Set Date	0d
Set month	0m
Set year	0y
Shift 1 Start	06:00h
Shift 2 Start	14:00h
Shift 3 Start	22:00h

Setting of RTC (Real Time Clock)

Time menu is used by production department by setting the shift start timings & setting of 2 shift or 3 shift, if timing is not correct or timing is reset to 00 by master reset, then time & date has to be set through this menu.

For the 3 shift per day enter the shift 1, shift 2, shift 3.

For the 2 shift per day set shift timing for shift1 and 2 and then set the shift 3time as 24.00.

The Loom controller has a Real Time Clock built in. This clock will keep track of time even when Loom controller is OFF. The clock is provided with Battery backup. You can set the current time of the clock in this menu and also set the shift start timings.

Set Shift timings

The Loom Controller will change the shifts automatically based on shift start time setting and Current time from real time clock. You will have to enter the shift start time of each shift. You can have unequal shift also. Maximum three shifts are supported. However you can have two shifts also, by setting third shift start time as 24.00.

Set the A SHIFT i.e. 1st shift start timing. For Example set to 6:00 if 'A' shift starts at 6 'O' clock in the morning Go to SHIFT parameter in SET SHIFT MENU and press right arrow key.

Set the B SHIFT i.e. 2nd shift start timing. For Example set to 14:00 if 'B' shift starts at 2 'O' clock in the afternoon.

Go to C SHIFT parameter in TIME MENU and press right arrow key.

Set the C SHIFT i.e. 3rd shift start timing. For Example set to 22:00 if 'C' shift starts at 10 'O' clock in the night.

Activate the key lock to ON position, and set the value by means of the key [+] or [-].

NOTE: - For 2 shift selection, Shift 3 Start = 24:00

MAIN MENU \rightleftarrows **PID MENU**

PID MENU	
Loop Time	→
Set weft density	→
Cal. weft density	→
Haul gain	→
set P Gain	→
Actual P error	→
set I gain	→
Actual I error	→
Set D gain	→
Actual D error	→
haul off set	→
ramp up time	→
ramp down time	→

Setting the PID Controller Values: - Basic Mesh setting and fine tune

P I D controller is an important form of control for Haul motor. These values in Haul Controller menu need to set once only. First correctly set all other parameters. Set required Weft Density, set pulses/shuttle and pulses/mm. ensure that these three parameters values are accurately calculated and correctly measured. Following PID parameters need to be set for correct operation of mesh control (Weft Density Control) function.

Refer to PID Menu:

HAUL GAIN: This is overall gain of Haul-off system (This is basically Electronic Gearing factor)

P Gain (PROPORTIONAL): This is multiplying factor is for proportional error which is the difference between calculated and actual haul pulses received.

I Gain (INTEGRAL): This multiplying factor is for accumulated error for number haul pulses that must be received in reference to Main Pulses received.

D Gain (DIFF). This is multiplying factor for the differential error. This parameter is not used

“Step by Step” Setting Procedure for Mesh control function: Brief procedure is mentioned below.

For detail procedure please refer to our “Step by Step” guide provided along with this manual.

- 1) Set Weft density, pulses/shuttle for one rotation of loom and the pulses/mm of production accurately.
- 2) Connect 0-10V DC Analog output to Haul-off AC Drive and configure it correctly. Haul off AC Drive acceleration and deceleration must be set to 0 or minimum.
- 3) Initially Set P Gain Value to 0, I Gain value to 0 and D Gain Value to 0.
- 4) Now by running the loom, set the HAUL Gain parameter value by + / - key (password required) such that Haul Pulse actual becomes equal to Haul Pulse Calculated when loom is running. You will have to repeat this procedure to accurately set the HAUL GAIN.
- 5) Once Haul Gain is correctly set, then you can enter the following values:-

P GAIN = 10
 I GAIN = 20
 D GAIN = 0

Now observe the fabric quality while the start and stop of loom. If gap while start is observed then decrease HAUL INTEGRAL parameter value and if the cramming is observed while start and stop then increase the Run the loom to full speed and actual Weft density and Set weft density should match.

MAIN MENU → TEST MENU

TEST MENU	
Main Pulse Freq	→
Haul Pulse Freq	→
Haul Pulse Cal.	→
Actual P Error	→
Actual I Error	→
Actual D Error	→
Haul DAC Volt	→
Main DAC Volt	→
Winder DAC Volt	→
Weft Density Cal.	→
Production in mm.	→
Loom Off for	→
T. Haul pulses	→
Test Voltage	→
Test Voltage	→
Test Voltage	→

Test menu is very important facility provided to see the various important test parameter values when Loom is running. This is very useful diagnostic tool to verify the performance and know important test value. Production in mm is used for production calibration (Production verification).

On every power ON “Production in mm” reset to 0.

9) MASTER RESET:-

There are three types of ‘Master Resets’. ‘Master Reset’ procedure is also mentioned below:

Key lock must be in Unlock position.

Master Reset Type	Effect	Further Action
With ‘R’ & ‘ * ’ key	All set parameters reset to Default values, and all production parameters reset to 0. Both passwords reset to default values. Except : Clock & Grand total	Set parameters very carefully. Note: Passwords are changed to default values.
With ‘R’ & ‘ + ’ key	Only Clock reset to 00:00. Date & Time	Set Clock (Time) Set Date
With ‘R’ & ‘ - ’ key	Only Grand total parameters reset to 0. Grand total parameter will start counting from 0 again.	

Master Reset procedure:-

First unlock the key and then Switch OFF the 24V DC power supply. Now referring to the above chart, pressed the required keys and keeping the keys pressed, switch ON the power supply. Wait for the reset message on the display and then release the keys. These “Master Reset” will change the parameter as per above chart. For respective default values please refer to the Menu list.

Note – “Master Reset” resets the “set points” to the “default values” and resets ‘production data’ parameter values to 00. Hence use master reset in absolute necessity. Key lock must be Unlocked.

The loom controller has many parameters to be set and many ‘production data’ parameters values are updated depending upon various inputs and the events. To reset the set parameters to some default values and to reset the ‘production data’ parameter values, the Master Reset function is provided.

Please refer to the “Menu List” chart. It shows the “default values” of all the parameters after doing master reset. The clock should be set to current time immediately after the master reset.

Perform the master reset only when necessary because it will change the settings required for your particular loom. Then carefully set all the required parameters to their correct values. For Mesh controller function setting, strictly follow the “step by step procedure” in mentioned sequence only.

After Master reset, parameter values reset to default value (factory reset values). For these default values please refer to the Menu list.

- 1) Real time clock is reset to 00:00. Please set it to current time (R and + keys)
- 2) Roll Length is set to 0. 0 values disable the Roll Length feature. If required then set the Parameter.
- 3) Order Length is set to 0. 0 values disable the Roll Length feature. If required then set the Parameter.
- 4) A Shift time will be set to 6:00. Change if different A shift starts timing.
- 5) B Shift time will be set to 14:00. Change if different B shift start timing.
- 6) C Shift time will be set to 22:00. Change if different C shift start timing.
- 7) Main Pulse/Shuttle Value will be set to 32. Change it if different as per loom design.
- 8) Haul Pulse/mm value will be 17.7 pulses per mm of fabric produced. Change if different for your Loom.
- 9) Winder Stop (winder off delay) value is set to 0. 0 values disable the winder stop function. This is power saving function when loom is stopped. Change the value if required.
- 10) In Shift Menu all parameter values are reset to 0.
- 11) In PID parameters are set to their default values. These parameters should be set as per their required values.

Note: (LCM 3.60) Loom Power ON Safety feature: When loom supply is Powered ON, you have to press and release ‘Stop’ push button only and then Inch / Run can be done. This feature is providing to avoid loom starting automatically on ‘Power ON’ if Inch or Run push button get shorted.

10) LCM 3.22, 3.60 & 3.64 MENU LIST

MENU LIST LEVEL 1	MENU LIST LEVEL 2 (Sub Menu)	MENU LIST LEVE 3 (Sub-Sub Menu)	DEFAULT VALUE AFTER MASTER RESET	MINIMUM VALUE	MAXIMUM VALUE	UNIT	REMARK
OPERATOR MENU	Set Weft Density		40	10	100	NO	
	Weft Density / inch		10			NO	
	Cal Weft Density		40			NO	
	Production Rate		00			Cm	
	Pick Per Minute		00			NO	
	Roll Length		00	0	10000	MTR	
	Balance Roll		00			MTR	
	Ready roll		00			MTR	
	Order Length		00	0	65000	MTR	
	Balance Order		00			MTR	
	Ready order		00			MTR	
	Fabric Code		100	01	5000	NO	Can be used
	Operator Code		01	01	100	NO	Can be used
	SHIFT MENU	Current Shift	Fabric	00			MTR
Efficiency			00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data
		Shift 1	Fabric	00			MTR
		Efficiency	00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data

MENU LIST LEVEL 1	MENU LIST LEVEL 2 (Sub Menu)	MENU LIST LEVE 3 (Sub-Sub Menu)	DEFAULT VALUE AFTER MASTER RESET	MINIMUM VALUE	MAXIMUM VALUE	UNIT	REMARK
	Shift 2	Fabric	00			MTR	Production Data
		Efficiency	00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data
	Shift 3	Fabric	00			MTR	Production Data
		Efficiency	00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data
	Day Total	Fabric	00			MTR	Production Data
		Efficiency	00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data
	Grand Total	Fabric	00			MTR	Production Data
		Efficiency	00			%	Production Data
		Main on	00:00			HM	Production Data
		Loom on	00:00			HM	Production Data
		Warp break	00			NO	Production Data
		Weft break	00			NO	Production Data
		Weft end	00			NO	Production Data
FACTORY MENU	Total shuttles		06	04	16	NO	By manufacturer
	Pulses / mm		17.7	01	100	NO	
	Pulses / shuttle		32	01	100	NO	
	Loom address		100			NO	Not used
	Loom serial No.		01	01	50000	NO	Can be used
	Loom mfg. year		00	01	250	NO	Not used
SYSTEM MENU	Lub. Off Time		00	00	240	Min	
(For LCM 3.22)	Lub. On Time		00	00	20	Min	
	Width Fault		00	00	20	Mtr	
	Winder Off Delay		00	00	1000	Sec	
	Winder speed		50	01	120	%	Not used
	Max. Loom RPM		100	20	100	%	Can be used
	Inch Speed		10	05	50	%	Can be used
	Weft Break Comp.		33	10	100	%	
	Winder Off set		00	00	250	mV	Not used
	Max. haul off		100	100	500	mV	Manual Haul off
	Star/Delta		02	00	15	Sec	Changeover time
SYSTEM MENU	Lub. Off Time		00	00	240	Mn	Cyclic off time
(For LCM 3.64)	Lub. Off Time		00	00	900	Mn	Cyclic off time
(For LCM 3.60)	Lub. On Time		00	00	20	Mn	Cyclic on time

MENU LIST LEVEL 1	MENU LIST LEVEL 2 (Sub Menu)	MENU LIST LEVEL 3 (Sub-Sub Menu)	DEFAULT VALUE AFTER MASTER RESET	MINIMUM VALUE	MAXIMUM VALUE	UNIT	REMARK
(For LCM 3.64)	Lub. On Time		00	00	300	Sec	Cyclic on time
	Width Fault		00	00	20	Mt	Instant ON/ OFF
	Winder Off del		00	00	600	Sec	Auto off feature
	Winder speed		50	01	120	%	Not used
	Winder on Del		00	00	10	Sec	Operation Delay
	Winder off-set		00	00	500	mV	Add on to Vout
	Max. Loom RPM		100	20	100	%	Can be used
	Max. Inch RPM		10	05	50	%	Can be used
	Inch low RPM		00	00	50	%	
(For LCM 3.60)	Weft Break Comp.		33	10	100	%	
(For LCM 3.64)	Weft Break Comp.		33	00	100	%	
	Max. haul off		100	100	500	mV	Manual Haul off
	Star/Delta timer		00	00	15	Sec	
	Not used		00			%	
	Not used		00			pp	
	Not used		00			%	
	Not used		01				
CRAM MENU	Bag Length		00	00	250	Cm	
	Cram Length		00	00	100	Mm	
	Cram Density		100	10	100	%	
TIME MENU	Set Time		00	00	23:59	HM	
	Not used		00	00	23	HR	Not used
	Set Date		00	00	31	DD	
	Set Month		00	00	12	MM	
	Set Year		00	2000	3000	YY	
	Shift 1 Start		06:00	00	23:59	HM	
	Shift 2 Start		14:00	00	23:59	HM	
	Shift 3 Start		22:00	00	24:00	HM	
PID MENU	Loop Time		100	50	300	MS	Not used
	Set Weft Density		40			NO	Test Parameter
	Cal. Weft Density		00			NO	Test Parameter
	Haul Gain		350	50	2000	NO	
	Set P Gain		00	00	100	%	Proportional Gain
	Actual P error		00			NO	Test Parameter
	Set I Gain		00	00	100	%	Integral Gain
	Actual I Error		00			NO	Test parameter
	Set D Gain		00	00	100	%	Not used
	Actual D Error		00			NO	Not used
	Haul Off Set		00	0	250	MV	Not used
	Ramp Up Time		00	0	20	SEC	Not used
	Ramp Down Time		00	0	20	SEC	Not used
TEST MENU	Main Pulse Freq.		0			Hz	X 2.5 Hz
	Haul Pulse Freq.		0			Hz	X 2.5 Hz
	Haul Pulse cal.		0			Hz	X 2.5 Hz
	Actual P Error		0			NO	Test parameter
	Actual I Error		0			NO	Test parameter
	Actual D Error		0			NO	Test parameter

MENU LIST LEVEL 1	MENU LIST LEVEL 2 (Sub Menu)	MENU LIST LEVE 3 (Sub-Sub Menu)	DEFAULT VALUE AFTER MASTER RESET	MINIMUM VALUE	MAXIMUM VALUE	UNIT	REMARK
	Haul DAC Volt		0			MV	Haul V-out
	Main DAC Volt		0			MV	Not used
	Winder DAC Volt		0			MV	Not used
	Weft Density Cal.		0			NO	Test parameter
	Production in mm		0			mm	For Calibration
	Loom Off For		0			mn	Not used
	T. Haul pulses		0			NO	Pulse counter
	Test Voltage		0			VO	Not used
	Test Voltage		0			VO	Not used
	Test Voltage		0			VO	Not used
PASSWORD	Enter pin 1		100	101	1999	NO	
	Enter pin 2		100	101	1999	NO	
	Change pin 1		-	101	1999	NO	
	Change pin 2		-	101	1999	NO	

11) Physical Dimension (LCM 3.22, 3.60 & 3.64 Box dimensions):

