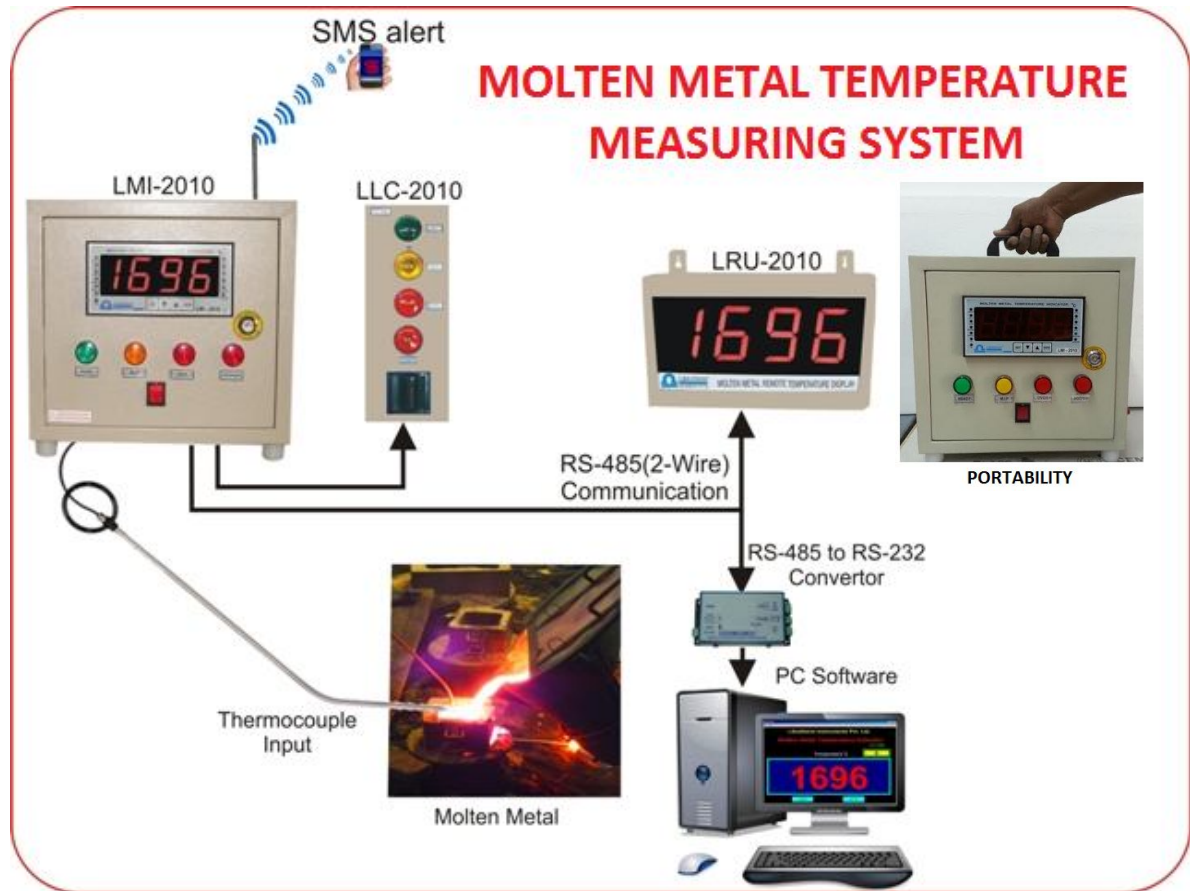


Molten Metal Temperature Indicator with Large Display and Computer Interface



System Description:

Molten metal Temperature Indicator (LMI-2010): Libratherm offers improved version of LMI-2010, where user has the choice of selecting two types of measurement from a single instrument.

1) Spot measurement (SM) - using disposable thermocouple tips, where the thermocouple tip is dipped into the molten metal for merely 3 to 5 seconds and then withdrawn. In this short measurement time, the operator is guided through the measurement cycle by audio/visual alarms for thermocouple continuity, measurement in progress and measurement over. Once the measurement is over the final reading is latched onto the display. Any error in measurement due to thermocouple open condition is immediately detected and informed by activating the audio/visual alarm. This is very common practice in the industry.

LMI-2010 is designed to measure and display the molten metal temperature in very short time interval. The indicator is rugged, reliable, field proven and very easy to operate. User can select the desired type of thermocouple and also set other parameters using front panel key board. During measurement, the indicator ignores the slag temperature and the Average or Plateau reading is determined using the advanced algorithm and the same is latched and displayed on the bright 7 segment 2" red Led display. The latched readings are transmitted on two wire RS485 bus for remote display and computer interface. The last 100 readings are stored in the built in memory and can be recalled as and when required.

2) Continuous measurement (CM) – using permanent installation of thermocouple inside the molten metal. The type of thermocouple and temperature measurement range entirely depends on the type of metal such as Brass, Copper, Aluminum, Iron etc... CM allows user to online monitor the temperature on local digital display and on large remote display. In this method No event indications are generated to guide the operator for CM.

SMS Alert: In today's era of mobile communication, user is interested in getting all the plant measurement data on his cell phone. Libratherm offers additional facility of generating SMS alert on every spot measurement. Whenever the SM is taken by the operator, the SMS alert can be sent to maximum 5 preselected mobile numbers. The SMS comprises the final temperature reading and the heat number or can be customized as per the user's requirement. For this facility user have to provide 1 no. of their SIM card subscribed for only SMS facility, from any of the available GSM service provider like Airtel, Idea, Vodafone, BSNL etc.... (or any other as available in that country).

Large or Remote Display (LRU-2010): Libratherm offers micro controller based remote display to be used in association with LMI-2010. The final reading available from LMI-2010 can be transmitted on RS485 2 wire bus to this large remote display model LRU-2010, which indicates the latched reading on either 4" or 8" height red 7 segment LED display. With single LMI-2010, maximum 4 nos. of LRU-2010 can be connected in serial multi-drop configuration. LRU-2010 works on 230VAC. LRU-2010 - 4" AND 8" are mainly used for distant viewing and for operator to know the final temperature measurement reading.

Lamp and Hooter Compartment (LLC-2010): For remote audio/visual indications – Libratherm offers this unit having 4 lamps and 1 hooter – which can be driven from the potential free contacts available from LMI-2010.

Technical Specifications (LMI - 2010):

Input	K, R, S and B type thermocouple (user selectable through front panel keyboard)
Range	Full positive range of the selected thermocouple K type : 0 to 1372°C , R and S type : 0 to 1768°C , B type : 0 to 1820°C or K type : 32 to 2500°F , R and S type : 32 to 3210°F , B type : 32 to 3300°F (Unit of measurement can be given as user selectable - OPTIONAL)
Accuracy	Within +/-0.1% of the range
Resolution	1°C / 1°F (factory set to °C)
Cold Junction Compensation	Automatic using built in sensor from 10°C to 60°C.
Display	4 digit – 2" red seven segment LED display
Measurement Time	2 to 9 seconds (user programmable)
Plateau Detection	1 to 99 °C (user programmable)
LED indication	13 front panel LEDs for various functions
Audio / Visual Alarm Indication	Provided for Thermocouple continuity, Measurement in progress and Measurement Over using the built in lamps and speaker.
Retransmission Current Output	4-20mA proportional to the measured temperature, RLmax = 400 ohms
Relay Output	Potential free relay changeover contacts for driving remote audio/visual indicator - LLC-2010. Relay contacts are rated for 5A @ 230VAC.
Data Storage	100 readings of measurement are stored in the memory, which can be recalled on demand.
GSM modem	Built in for SMS alert – Optional (at extra cost)

Serial Communication	RS485 – 2 wire for remote display (LRU-2010) and/or for computer interface or can be optionally provided for interface to GSM modem for SMS alert. (MODBUS RTU protocol)
Supply	230VAC +/-15%, 50/60 Hz (115VAC – Optional)
Enclosure	Dust free - Metallic powder coated.
Size	350 (w) x 320 (h) x 200 (d) mm.
Weight	4.5 Kg (approx.)
Mounting	Wall mounting key holes or Can be placed on a flat platform.

Technical Specifications (LRU – 2010 – 4” and LRU-2010-8”)

Signal Input	2 wire RS485 serial output from LMI-2010 in MODBUS RTU protocol
Display	4 digit – 4” or 8” red seven segment LED display
LED indication	2 front panel LEDs for RXD and TXD
Supply	110 or 230VAC +/-15%, 50/60 Hz
Enclosure	Dust free – Metallic powder coated
Size	500(w) x 250(h) x 150(d)mm. (4”) / 760(w) x 350(h) x 160(d)mm.(8”)
Weight	6.0 to 8.0 Kg (approx.)
Mounting	Wall mounting key holes or can be placed on a flat platform.

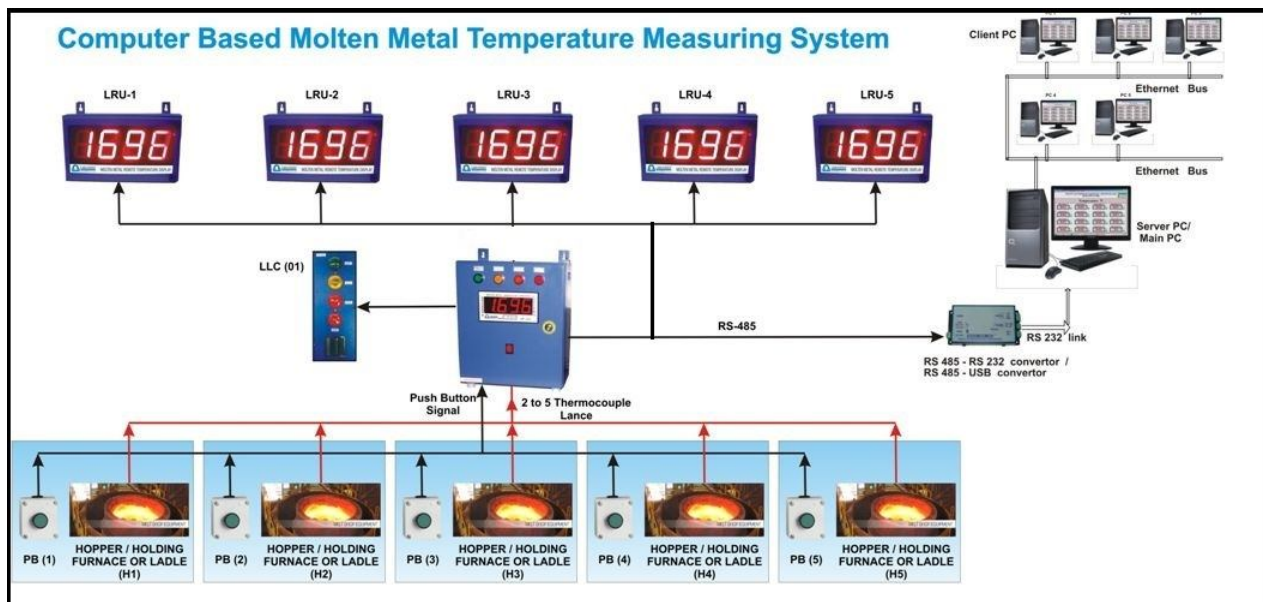
Note: Due to continuous improvement – the specifications are subject to change without notice.

Technical Specifications (LLC – 2010):

Contact Inputs	4 nos. of C-NO potential free contacts from LMI-2010
Audio/Visual Indication.	4 nos. of 100Watt lamps (Red, Amber and Green colour) for visual indication of Measurement in Progress, Measurement Over, Thermocouple Continuity and a Hooter at the END of Measurement.
Supply	110 or 230VAC +/-15%, 50/60 Hz
Enclosure	Dust free – Metallic powder coated
Size	185(w) x 500(h) x 125(d)mm.
Weight	5.0 Kg (approx)
Mounting	Wall mounting key.

Salient Features of standard PC software (ELMI2010): (Optional – at extra cost)

- 1) The PC software version ELMI-2010 is available on single CD. This software is to be loaded on to the computer hard disk, and it allows interfacing of LMI-2010 to the computer.
- 2) The interfacing with computer is made either on serial com port or on USB port with recommended convertor.
- 3) The front panel screen GUI (Graphical User Interface), in general, allows user to configure a) the COM port settings b) setting of security passwords c) viewing of current data and historical data in the tabular and graphical format.
- 4) The data of all online measurement are displayed in large size on the computer screen and also stored in the hard-disk, by date and time wise as long as PC is connected to LMI-2010 and software is active.
- 5) Print out of the report and graph can be taken for the selected heat number, with real time and date.
- 6) The x and y co-ordinate of the graph is automatically adjusted based on the process value, so that the pattern is visible on the center of the screen. This is auto scaling feature.
- 7) User has option to enter Heat number and Furnace number to record keeping and retrieval of the stored records by using these parameters as search field.
- 8) User can review the number of measurements carried out on daily basis.
- 9) Any other software facility can be customized as per the requirement.
- 10) Software versions are available for connecting max. 5 nos. of LMI-2010



Partners In Measurement And Control (doc:160414)

401-403, Diamond Industrial Estate, K.P. Road, Dahisar east, Mumbai 400068, Maharashtra, India.
Tel/Fax: 91-22-42555353,42555339. Email: libratherm@libratherm.com sales@libratherm.com

Ordering Information for Model LMI-2010, LRU-2010 AND LLC-2010:

The LMI-2010 can be ordered with or without LRU-2010 and LLC-2010 GSM modem with single LMI-2010 maximum 5 LRU-2010 and one LLC-2010 can be connected. User will have to specify the models and quantity of LRU, LLC and requirement of standard PC software and supply voltage.

Basic Model	Measurement Method - A	B- No. of LRU-2010	C- No. of LLC-2010	D- PC software required	E-GSM modem for SMS alert required	F- Supply Voltage
LMI-2010	A1 - SM – Spot Measurement	B1- (One) B2- (Two) B3- (Three) B4- (Four)	C1- (One) C2 - (Two) 00 - (None)	D1- (Yes) 00- (None)	E1- (Yes) 00-(None)	F1- (230VAC) F2-(115VAC)
	A2 - CM – Continuous Measurement	00- (None)				
	A3 – SM + CM both					

Example:

Basic Model	Measurement Method - A	B- No. of LRU-2010	C- No. of LLC-2010	D- PC software required	E-GSM modem for SMS alert required	F- Supply Voltage
LMI-2010	A1	B1	C1	D1	E1	F1
LMI-2010	A2	00	00	00	00	F2
LMI-2010	A3	B2	C2	00	00	F1

Example	Ordering Code	Description
1	LMI-2010-A1-B1-C1-D1-E1-F1	Model LMI-2010 with spot measurement along with 1 no. of LRU-2010, 1 no. of LLC-2010 with PC software and SMS alter facility and operating on 230VAC supply.
2	LMI-2010-A2-00-00-00-00-F2	Model LMI-2010 with continuous measurement and operating on 115VAC
3	LMI-2010-A3-B2-C2-00-00-F1	Model LMI-2010 with spot and continuous measurement with 2 nos. of LRU-2010, 2 no. LLC-2010 and all operating on 230VAC supply.

For any further information, please write to us on sales@libratherm.com ; marketing@libratherm.com