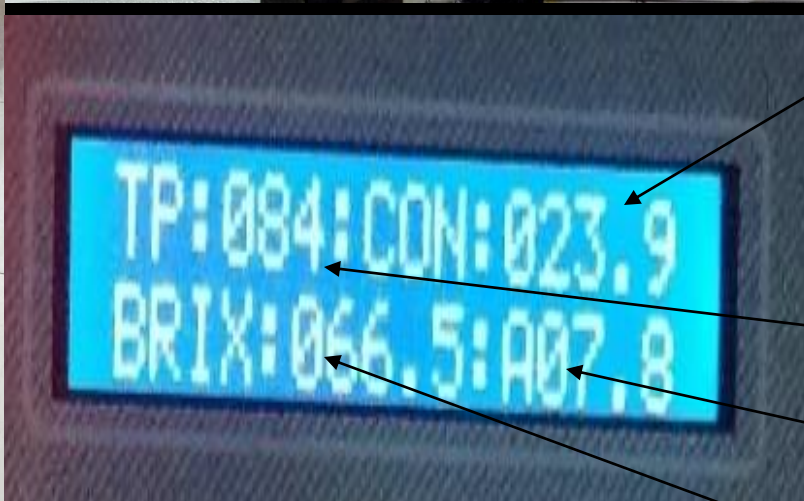# Operating User Manual of Transmitter-NCBTM-59TX

CONDUCTIVITY

TEMPRATURE

OUTPUT: 4-20mA

BRIX

Introduction:

This is Microprocessor Based Online Conductivity Transmitter for Brix Reference Measurement System. The Instrument Measure Conductivity of Brix in Batch/Continuous Vacuum Pans etc., our transmitter has an efficient working in B batch pan B continuous pan

and C batch pan and C continuous pan and <u>A Batch pan</u> etc. It Have Two Relay control o/p for electrode Auto Cleaning. In the parameter of auto cleaning user can be set time for auto cleaning interval (As time In minutes, Like 30/60 etc.). During The auto cleaning instrument hold last o/p value up to cleaning process complete. Its fundamental principle is conductivity. It is used to measure messecute's conductivity. *Conductivity* is inversely proportional to *brix* (if conductivity increases then brix decreases and vice – versa). Here the constant is K its value is dependent upon two factor i.e. temperature and Conductivity.

BRIX = K *1 /CONDUCTIVITY

The Instrument is Field Programmable and user friendly. The Instrument Have One computer communication Port (Rs485). Along with one Analogue Isolated of 4-20mA.

How To Use ?

Step1: Switch the power ON

Step2: set the value of **Select Application** parameter As 1/2/3/4 value. (2= B/C pan,3= A pan/liquid sugar etc.)

Application: 4= use to measure 0-30 Brix from Liquid/syrup etc.

Application: 1= use for measure Brix From melter etc.

Step3: Now select the output parameter, Here The user can decide whether they want output (4-20mA) in Brix or Conductivity. It can be done in the Following Way:

* ∗. **0 value for conductivity (0-100%)**
* ∗. **1 Value for Brix (0-100%)**

Step4: Auto Cleaning Mode can be used in two following ways

- During This Mode if we measure the liquid Sugar Then Hot Water connection should be disconnected.

- Or If we measure Of Brix in Pan there is a need of hot water Connection for Sensor.

- Set the value (minutes) in the parameter of Auto Cleaning time so that after the given time it will auto clean.

Step5: Communication Parameter Can selected from any of the One from Following.

- Value 0 for Disable Communication (optional).
- Value 1 for Modbus Communication (RS485), If this value is set Then we have to set Slave ID Parameter value from 1-255.

Configuration: Press PRG key for 5Seconds Display Parameter Select Application Parameter. Now user can select Parameter that they want to modify by use Of Up/Dn key , Then press Enter Key after That use Up/Dn key to modify further And then Press Enter Key to Store. Now Select Next parameter and apply same.

Calibration ☹ (AUTO TUNE CALIBERATION)

Press up key &Hold after 1second Press PRG key and hold up to 5seconds or As we reach in calibration mode.

1st step - there should be 15-20 as count value on the display but if it shows 0 as count value this means the calibration process is not working so power off and restart after 20 seconds and again go to calibration mode and check step 1 for 15-20 count value. If 15 -20 count value appears so, it will automatically reach to step 2 .In step 2 - the count value will be 1109 -250, if it shows 0 as count value then power off and restart after 30 seconds .Same will be for step 3 .When the calibration will be completed it will appear "CALIBERATION COMPLETED" on display and system itself will go in run mode now.

Calibration ☹ (Manual CALIBERATION)

Note : When Auto calibration Has been failed then use manual calibration.

Press Dn key &Hold after 1second Press PRG key and hold up to 50 seconds or As we reach in manual calibration mode. Now connect resistance 3.3k 5w with the Terminal S1 & S2, 1st show value 007- 030 on LCD Display Now Press Dn key & hold after 1 second Press E key Now 1st step has been completed ,And Display Step2 ,In this step connect resistance 200E/220E 5W with the Terminal S1&S2 now 2nd step value show 130-280 on Lcd display now press upkey & hold after 1 second press E key Now 2nd step Has been

completed , And Display Step3, In this step connect resistance 40/50E 5W with Terminal S1 and S2 now 3rd step value show 400-680 on LCD display now press upkey & hold after 1 second press E key now Calibration has been completed.

How can Calibrate Conductivity to Brix:

First of all, note down the conductivity running on the Brix Transmitter and after getting it sampled in the Lab, it will find out what Brix is coming on that conductivity. After this we have to calibrate what will be the Brix at current conductivity according to the sample taken.

Press prg key for 5 seconds Now it will display "APPLICATION PARAMETER" now use E key (Press and release) up to display parameter "PV. Brix " , Now adjust pv brix at current conductivity by using up/dn key after the calibration of brix at current conductivity now the user should store it by pressing & hold prgkey after 1 second press E key now release both key. If the user does not want to store it or by pass this parameter then press E key only.

> PV.BRIX. :000.0
> BRIX CALB:000.0

This is the value of Brix at Current Conductivity. It can be adjusted by use Up/Dn key use

Applications:

• Batch Pan Automation.

• Continuous Pan Automation

• Molasses Conditioner Automation

∗ Melter Automation.

*Spent wash Brix Measurement.

 * Liquid Sugar syrup Brix measurement etc.

Parameters & Descriptions:

Select Application : 1,2 = 'B'/'C' pan, value 3= 'A' Pan etc, **4=** use to measure 0-30 Brix from Liquid/syrup etc.

- **Auto Cleaning Time :** For Electrode Auto Cleaning Time set (0- 60000 Minutes)

- **Nos. Of In/Out CyL :** In this parameter User can be set value of Pneumatic cylinder In/Out Numbers (During Auto Cleaning).

- **Output:** Here The user can decide whether they want output in Brix Or Conductivity.(1/0)
- **Modbus Comm. Id.:** set Slave ID Parameter value from 1-255.
- **PV.Brix:000.0 Parameter(** BRIX CALIBERATION FACTOR PARAMETER)

   At bottom of display it is mention value of factor, here we have to set the Brix (0-100%) by using up and down Keys required for the given conductivity. To apply this you have to press and hold PRG key after 1 sec press ENTER key Now Brix calibration factor is completed, exit the program mode.

- **DEAD BEND:** In This Parameter user can adjust fluctuation of value (0.0-20.0). When the value set in this parameter exceed value or low that value only when the action will take place, otherwise will remain in the dead bend.

- **Scale:** In this parameter user can adjust division factor value for conductivity. (0.000 to 9.999).

   Example: If Display Conductivity 80.0% but you need to display 67.0% then scale factor = 80.0/67.0 Now scale = 1.194

   Note: If not required scale factor then set 0.000 values in this parameter.

   * **Damping sample: In this parameter user can be adjust the variation in the conductivity (0-100%) is very high, the variation can be reduced by increasing or decreasing the dumping time value.**

   **

   Note: During Auto Cleaning hot water not apply when you are using sensor in syrup Brix sensing.

SPESCIFICATION OF TRANSMITTER M59TX

Power supply   : 220ACV,@50HZ
Display   : Blue LCD/ Backlit LED
Enclosure   : ABS Plastic
Panel cut out : 185x92mm (WxH)
Output   : 4-20mA isolated (Conductivity/Brix)
Accuracy   : 97%
Input   : SS Conductivity Electrode Probe

Auto Cleaning Timer : 0-60000 Minutes.
2Nos Relay   : Both Relay Use for Auto Cleaning
Relay RL1   : For water on Solenoid valve
Relay RL2   : For cylinder In/Out Solenoid valve
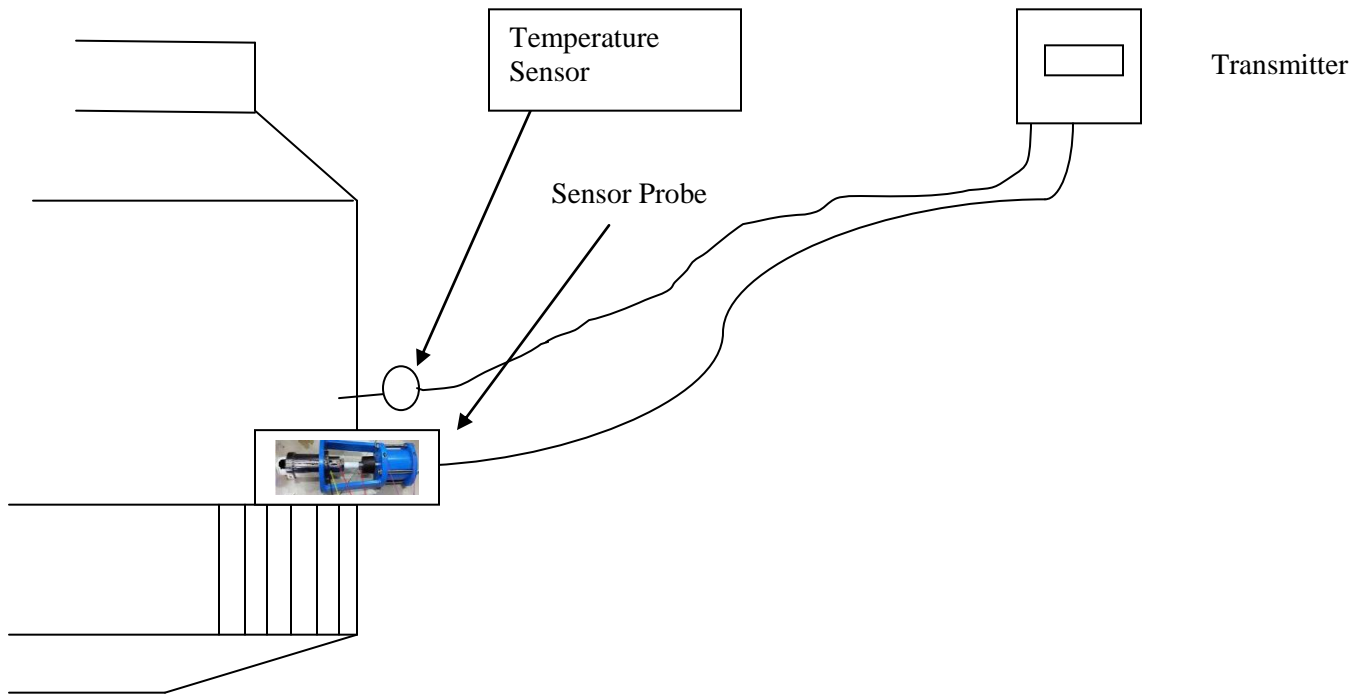
Terminal Details of Transmitter M59TX:

1. **L   : Line 220v AC, 50Hz**
2. **N   : Neutral**
3. **E   : Earth**
5. **NO: For Hot Water on Solenoid valve**
6. **C1   : Common Line (Phase)**
7. **NO: In/Out solenoid valve**
10. **T1: Temperature (RTD)**
11. **T2: Temperature (RTD)**
14. **mA+: o/p 4-20mA**
15. **mA- : o/p 4-20mA**

SPECIFICATION OF GLASS DOOR PANEL BOX

Size: 330x350x300mm (WxHxD)

Terminal Details of Panel Box

L N E		
1	Dual Pole MCB	
2		
3		
4	HOT WATER(Phase)	
	NEUTRAL-to solenoid	
6	Cleaning(Phase)	
7	Neutral- to solenoid	
8	RTD-1	
9	RTD-2	
10	Brix-Sensor-1(S1)	
11	Brix-Sensor-2(S2)	
12	O/P +mA	
13	O/P - mA	

Temperature Sensor

Transmitter

Sensor Probe

Brix Sensor Probe installed at Vacuum Pan

S2

S1

AIR LINE FROM SOLONIED VALVE
AUTO CLEANING

HOT WATER CONNECTION AS FROM VALVE
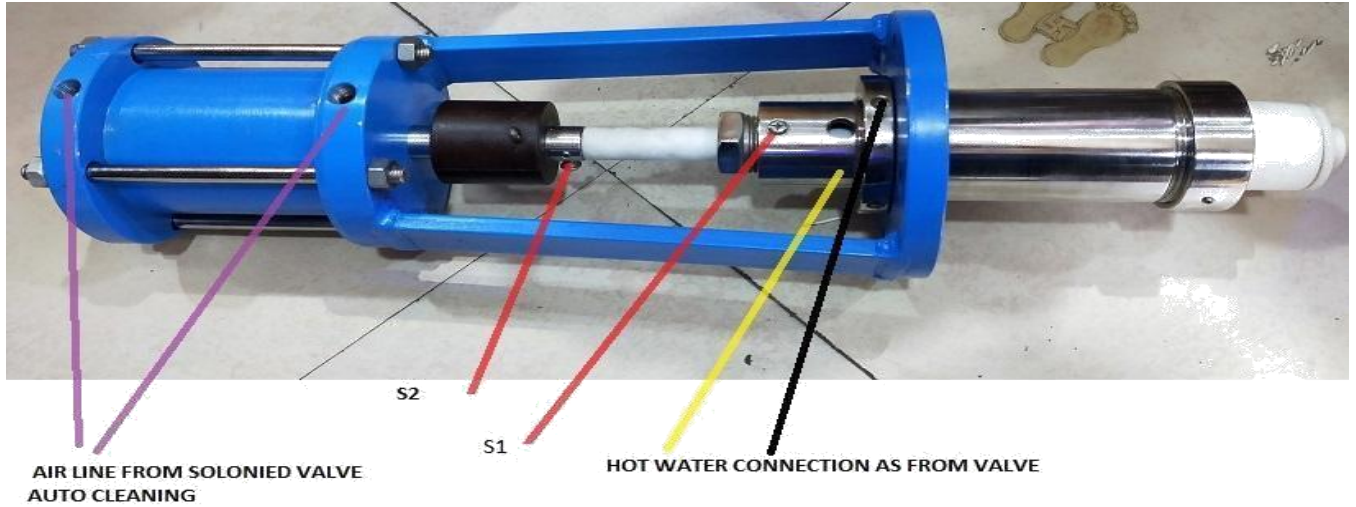
Temperature sensor

In

out
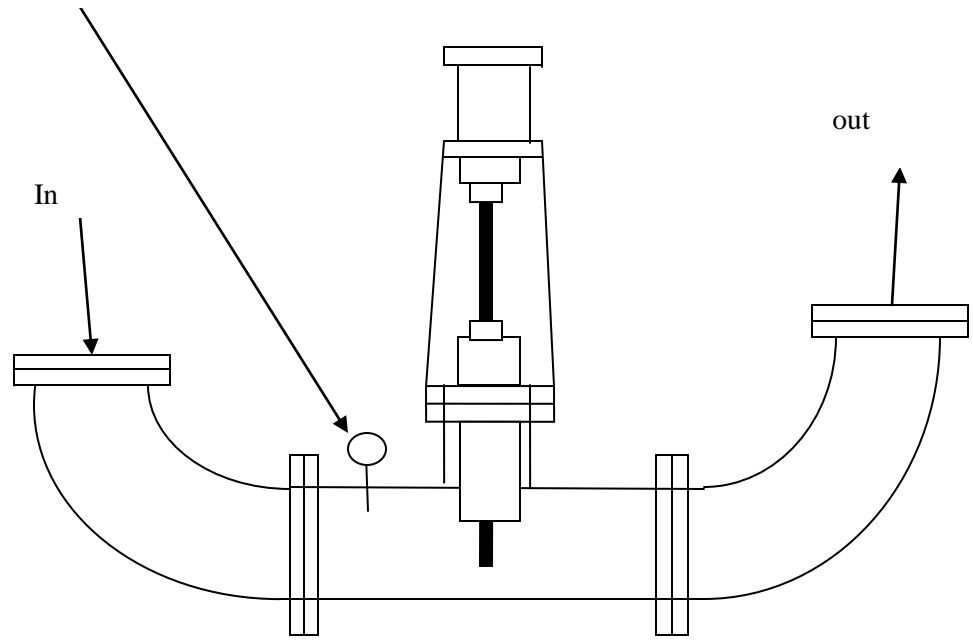
If The Brix Sensor Probe is to be installed in a pipeline, it is
shown in the picture above and you must ensure that both
the sensing rods of the sensor are always completely
Immersed in the liquid otherwise the sensor will not sense
properly will do.

CONDUCTIVITY BASED
BRIX MESURMENT TRANSMITTER

Internal Panel Connection Diagram

L	1	
N	2	**Line**
E	3	Neutral
HOT WATER	4	
NEUTRAL-to	5	
Cleaning	6	
Neutral solenoid	7	
RTD-1	8	
RTD-2	9	
Brix-Sensor-1(S1)	10	
Brix-Sensor-2(S1)	11	
O/P + mA	12	
O/P - mA	13	

BRIX TX
MODEL No.M59TX

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Faults & Errors

1. **Sensor Fail:**
   This error could be due to the wire being disconnected or the sensor not fully submerged in liquid, or the calibration is erased from the memory of the transmitter. In this condition, recalibrate the transmitter and check the sensor cable properly.

2. **OVER RANGE:**
   This error can be caused by selecting the wrong application value. In this condition, go to Application Parameters and change the Application Value.