

# MANUAL

## MS pH 211 T

### Online Field Mounted pH ORP INDICATING TRANSMITTER 2 Wire

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## 2. INTRODUCTION

### 2.1 Item Supplied :

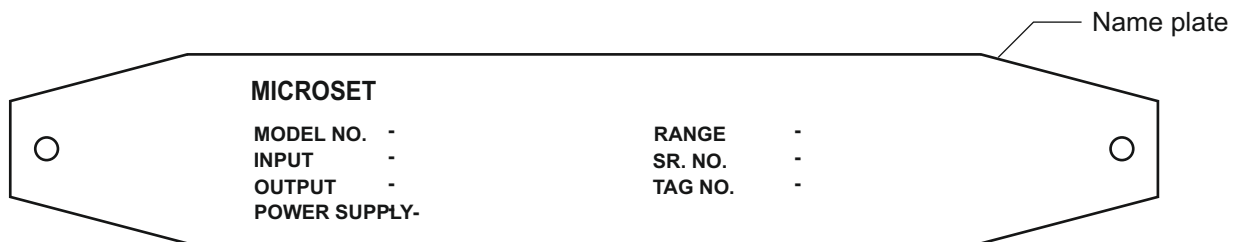
- MS pH 211T pH Transmitter
- User Manual
- Calibration Certificates

### Inspection :

- Check for mechanical damage due to possible improper handling during shipment. All claims for damage are to be made promptly to the shipper.
- Make sure the scope of delivery and the information on the name plate corresponds to the ordering information.

### 2.2 Device Identifications :

The Model no. and Specification are found on name plate, located on top of electronic housing. Check the Model no. & Specifications you have ordered.



### 2.3 Reading User Manual :

- This manual should be provided to the end user.
- Before use, read this manual carefully and compare the instrument specification.
- The contents of this manual may be changed without prior notice.

### 2.4 Warranty Terms :

- The terms of this instrument that are guaranteed are described in the quotation. We will make any repairs that may become necessary during the guaranteed term free of charge.
- Please contact our sales office if this instrument requires repair.
- If the instrument is faulty, contact us with concrete details about the problem and the length of time it has been faulty, and state the model and serial number. We would appreciate the inclusion of images or additional information.
- The results of our examination will determine whether the meter will be repaired free of charge or on an at-cost basis.

## **3. SAFETY INSTRUCTIONS**

### **3.1 General Instructions**

- This pH transmitter was carefully calibrated at the factory before shipment. When pH transmitter is delivered, visually check that no damage has occurred during transportation
- Read User manual carefully and understand instructions provided in this manual.
- In general, devices from the manufacturer may only be installed, commissioned, operated and maintained by properly trained and authorized personnel.
- Look at the ordering detail to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.
- Before powering up the instrument, consider the following:
  - Has the wiring been carried out correctly and have all safety procedures been adhered to.
  - Is the supply voltage correct.
  - Lethal power supply voltages may be present, do not apply power with the signal converter cover or terminal box cover removed.
- The following principles should be considered during installation:
  - If there is a noisy power supply voltage (especially peaks generated, usually by motors), use an external power supply filter between the flow meter and power supply.
  - Do not expose the pH transmitter to intense vibration.

### **3.2 Storage Precautions :**

- Store the device in a dry, dust-free location.
- Avoid continuous direct sunlight.
- Store the device in its original packing.
- Storage temperature: 0 to 55°C

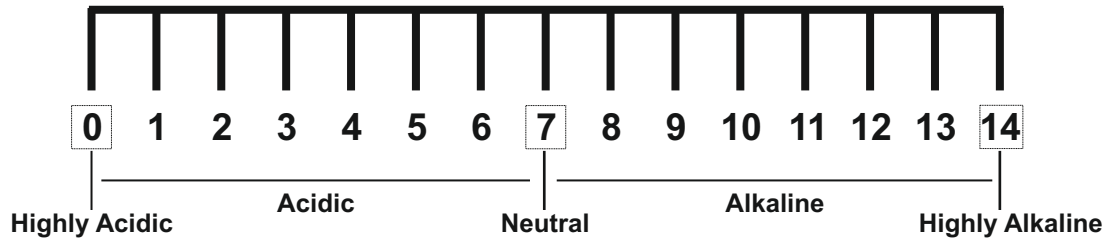
### **3.3 Installation Location Precautions :**

- Installation of the pH transmitter must be performed by expert engineer or skilled personnel. No operator shall be permitted to perform procedures relating to installation.

## 4. OPERATING PRINCIPLE

### 4.1 What is pH ? :

pH(Potential Hydrogen) is unit of measurement, used to determine the Acidity or Alkalinity of an aqueous solution. Practical pH scale for industrial instrumentation ranges from 0 to 14 pH. The acidic substances range from 0 to 6 and on the other end are the alkaline substances, which range from 8 to 14, with pH 7 being neutral, this is the pH of pure water which is neither very acidic nor very alkaline, is said to be neutral.



### 4.2 How pH is measured? :

Although everyone is familiar with Litmus paper, the only reliable way to measure pH is using potentiometric electrodes. These electrodes essentially develop a Mill volt Potential Directly Proportional to the Free Hydrogen Ion Concentration in an Aqueous Solution. These generated mill volts are converted to respective pH using pH/ORP meter.

### 4.3 Why temperature compensation is required for pH? :

The value of pH changes with change in temperature. As temperature of aqueous solution rises, its pH value decreases. Temperature changes in the measured liquid affect both the response of the measurement electrode to a given pH level (ideally at 59 mV per pH unit), and the actual pH of the liquid. Temperature measurement devices can be inserted into the liquid, and the signals from those devices used to compensate for the effect of temperature on pH measurement, but this will only compensate for the measurement electrode's mV/pH response, not the actual pH change of the process liquid. This is why a pH meter always has a temperature compensation probe.

### 4.4 Principal Of Operation :

The MS pH 211T is a two wire transmitter with nominal working voltage of 24VDC. In two wire configuration the transmitter draws power from the loop itself. The transmitter draws current of 4-20 mA from supply. This current is proportional to the measured variable. The mV signal from the pH electrode is given to input terminal. A special A/D Converter digitizes the analog voltage, suppresses the noise on the signal and gives accurate pH/ORP and temperature inputs to micro controller. The micro controller further processes the data, displays the results on LCD display and generates retransmission current output. The micro controller accepts the inputs from keyboard during programming and calibration. The application specific parameters such as temperature compensation are user programmable through keyboard.

## 5. TECHNICAL SPECIFICATIONS

Instrument Name	: PH Indicating Transmitter
Model No. Serial	: MS pH 211 T
Type of Inputs	: 1) pH electrode 2) From Pt-100 /Pt-1000 Sensor
Display	: COG Graphics LCD
Output	: 4 - 20 mA DC
Power Supply	: 24V DC External
Calibration Range	: 0 to 14 pH (pH Input)
Temperature Compensation	: Auto / Manual through RTD, Pt 100 /1000 sensor for 0-150°C
Accuracy	: +/- 0.01pH
Isolation	: 1.4 KV between Input & Output
Electrical Connection	: Through Terminals
Repeatability	: +/-0.25% of F. S., at 25°C
Sensitivity	: +/-0.02pH
Response Time	: < 1500 mSec
Temperature Coefficient	: +/- 0.05% per °C
Temperature Drift	: +/- 0.02% of span per °C (zero & span) at 25 °C
Dimensions	: 150 (H) x 98 (W) x 130 (D) in mm approx.
Cable Entry	: M20 X 1.5 (F)
Mounting	: 2" Pipe Mounting
Operating Conditions	: Temperature -20 to 75°C / Humidity 5 to 95% non condensing

## 6. ASSEMBLY OVERVIEW

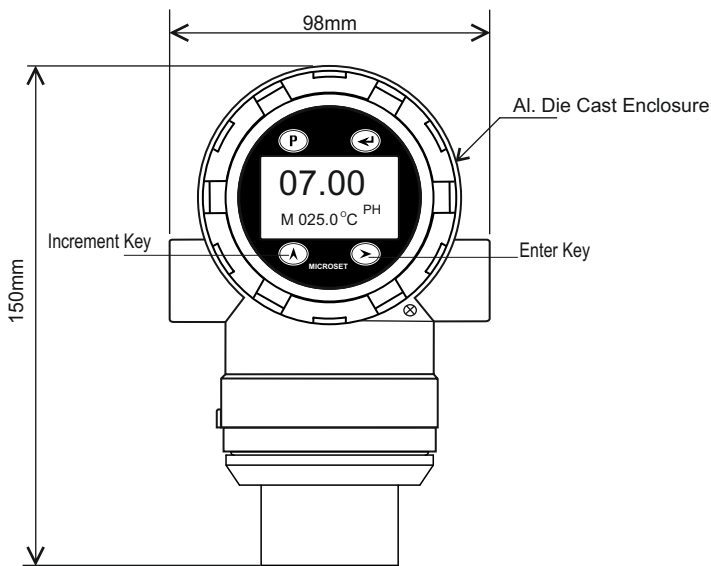


Fig.1 Front View

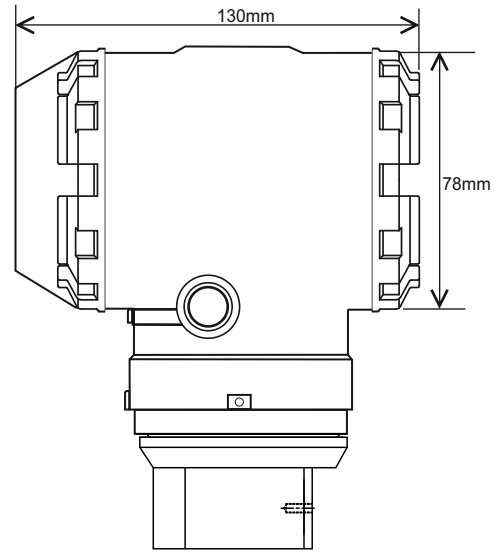






Fig.2 Side View

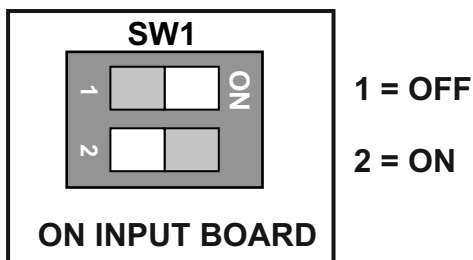
**NOTE: All Dimension in 'mm'  
Tolerance : +/-3mm**

### 6.1 Key Details :-

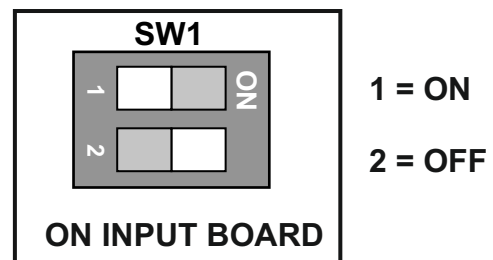
-  **PROGRAM KEY:** - This key is used to toggle between Run mode and Program mode.
-  **INCREMENT KEY:** - This key is used to 1) Increment the numerical value of any digit, from 0 to 9, by one at each time.  
2) Go to the next parameter in Program mode.
-  **SHIFT KEY:** - This key is used to shift the cursor to the next digit.
-  **ENTER KEY:** - This key is used to validate the function or value of parameter.

### 6.1.1 RTD Pt-100 & Pt-1000 Switch Selection:

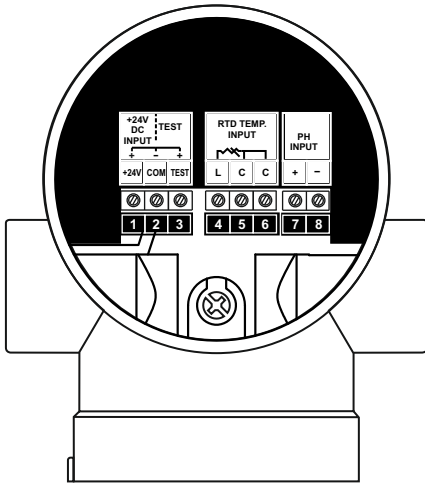
#### 1) RTD Pt-100 :



#### 2) RTD Pt-1000 :



## 6.2 Termination Details :-

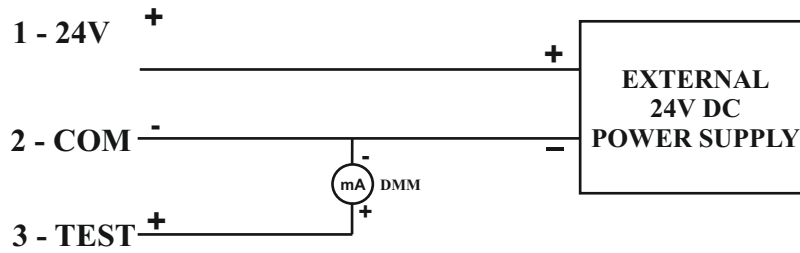


Terminal No.	Terminal Details	Description
1	+24V	Input Supply 24V DC
2	COM	
3	TEST	Test
4	L	Pt-100 RTD INPUT
5	C	
6	C	
7	+	PH INPUT
8	-	

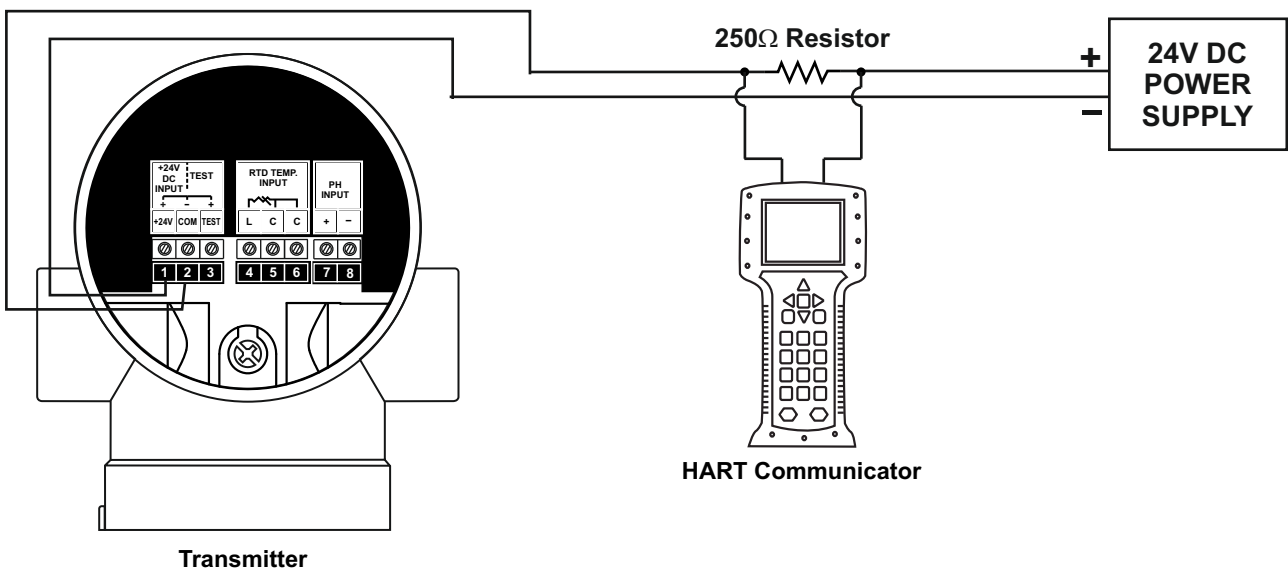
Fig.4 Rear View

## 6.3 Loop Diagram :-

### 6.3.1 Loop Diagram with 24V DC Power Supply :-



### 6.3.2 Loop Diagram with HART Communicator :-





## 7. INSTALLATION DETAILS

### 7.1 Pipe Mounting:

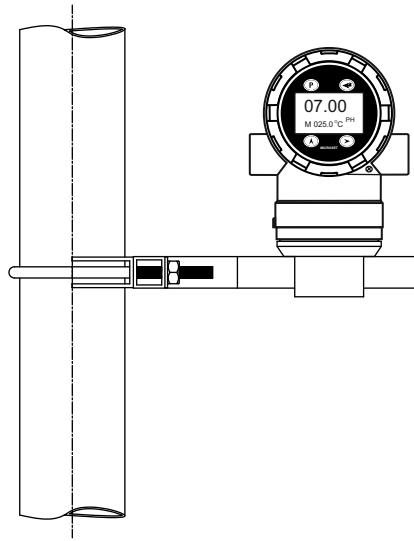


Fig.5 2" Pipe Mounting Front View

### 7.2 Panel Mounting:

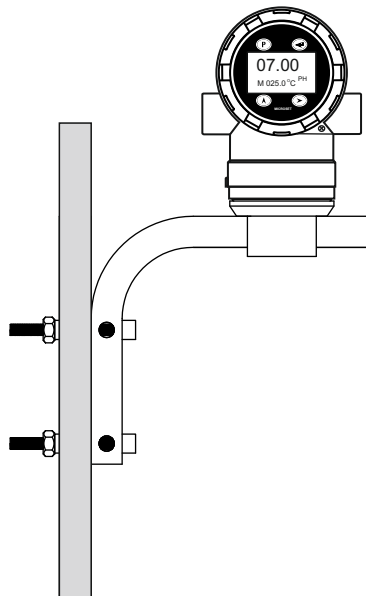
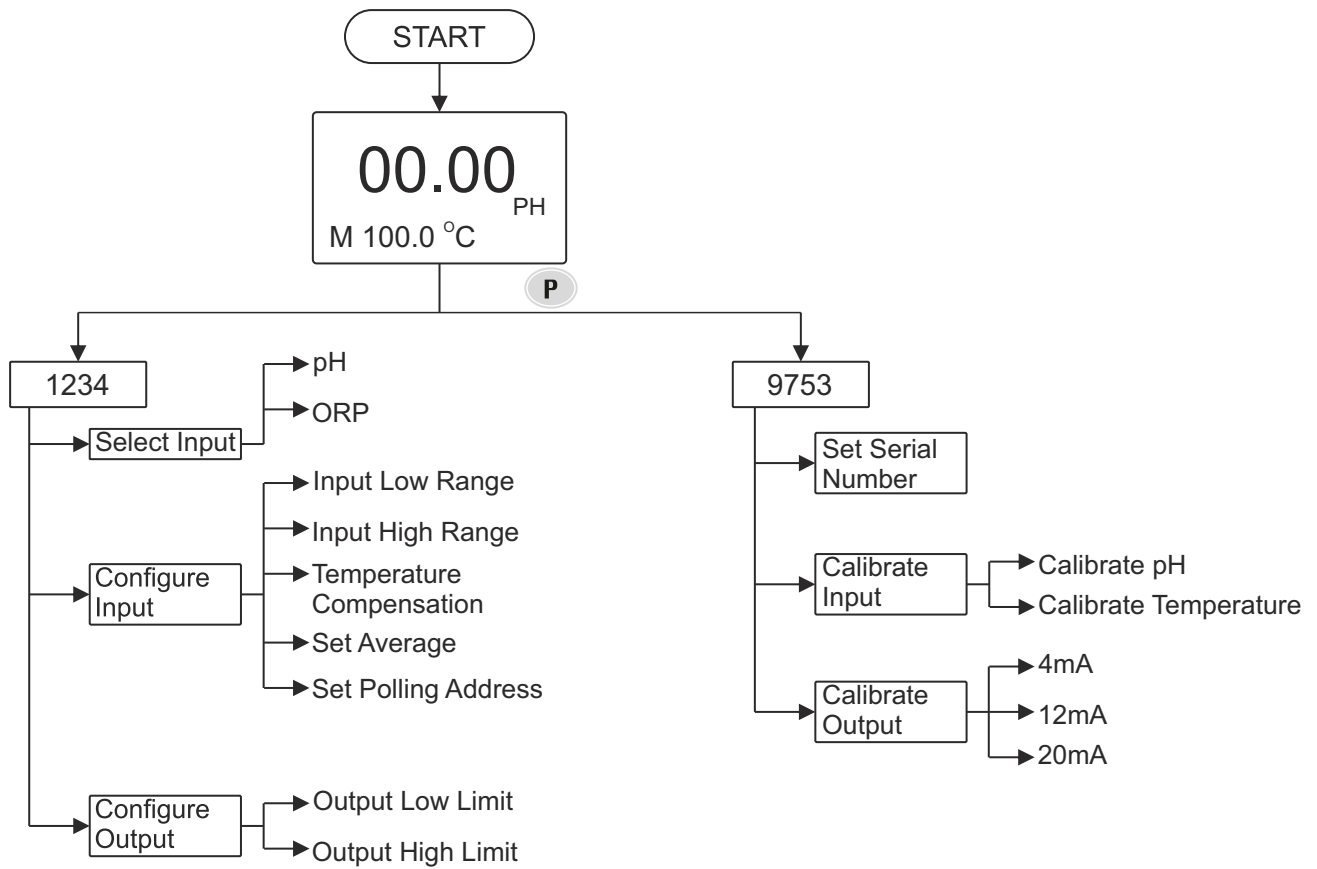


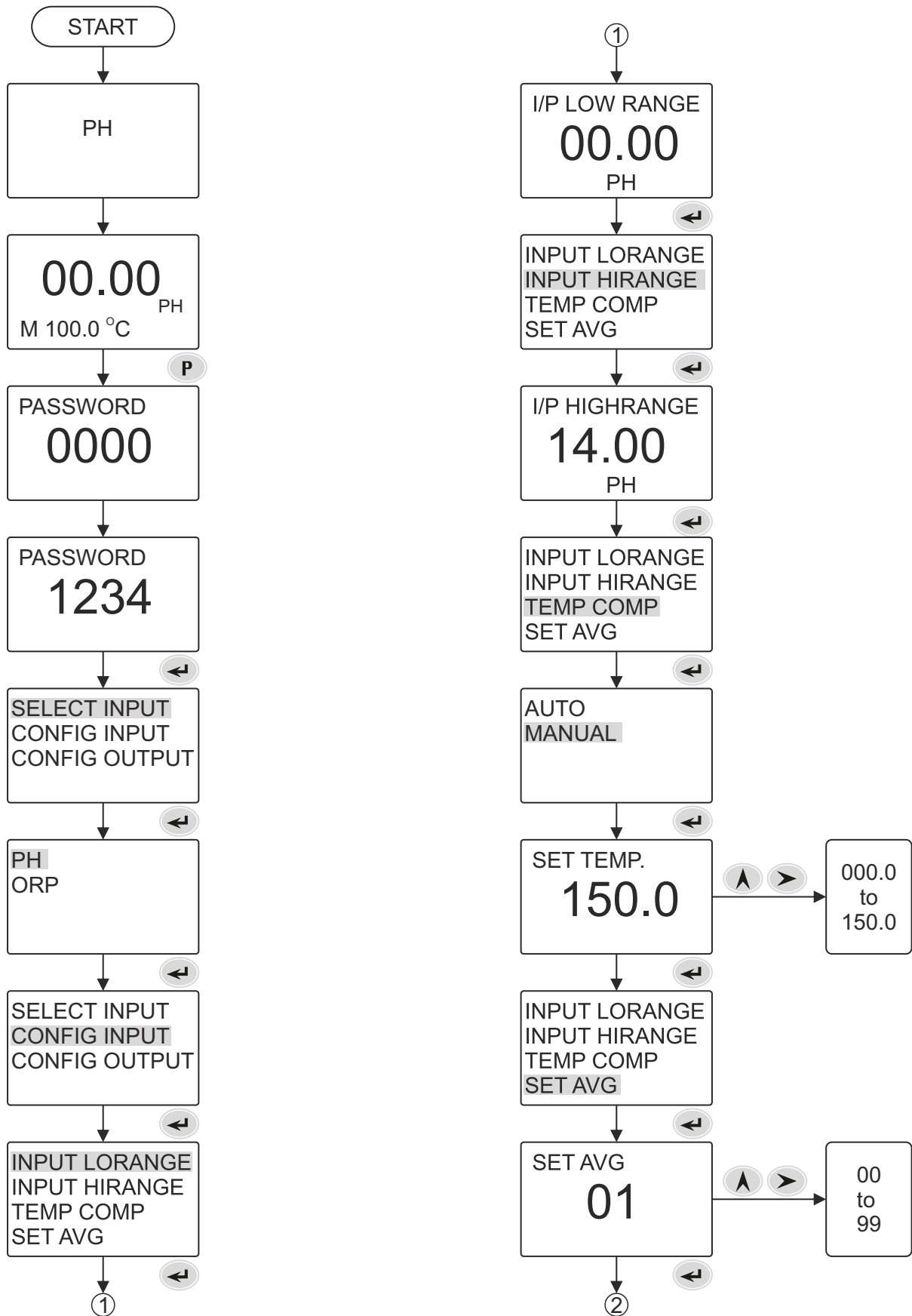
Fig.6 Panel Mounting Front View

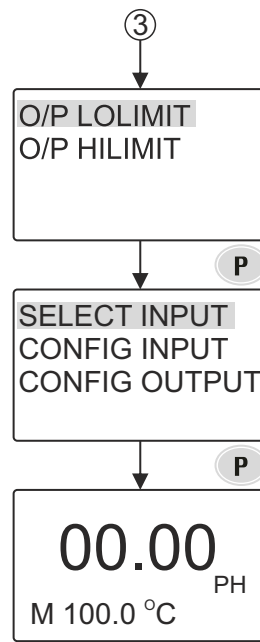
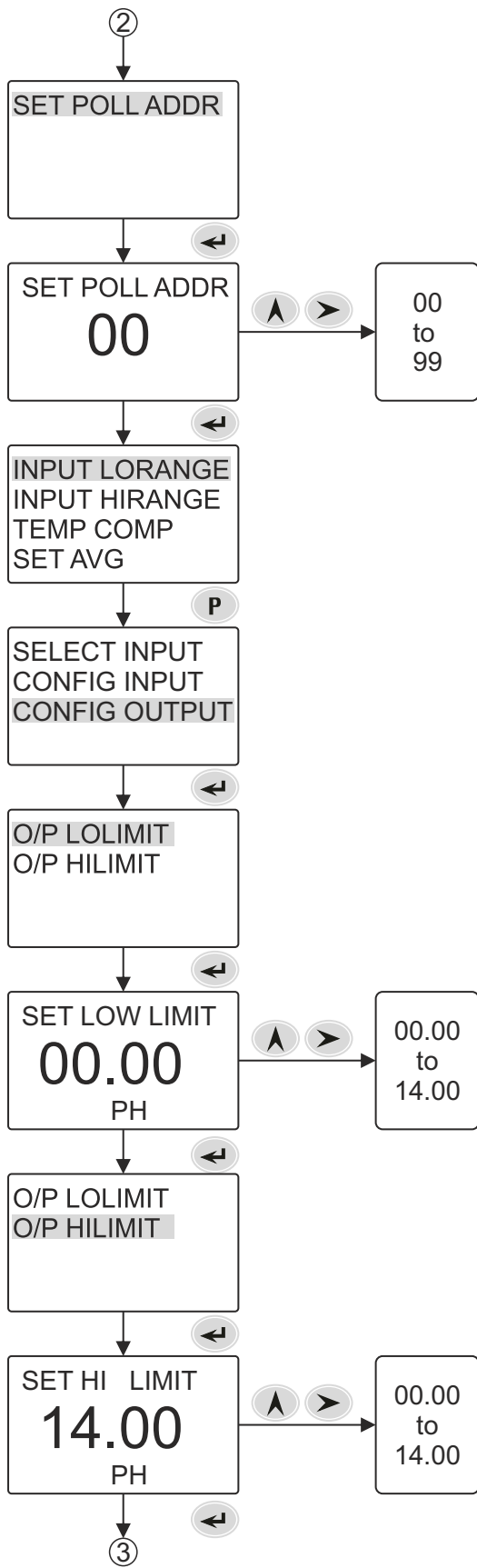
## 8. OPERATING FLOW CHART

### 8.1 General Overview of Operation:

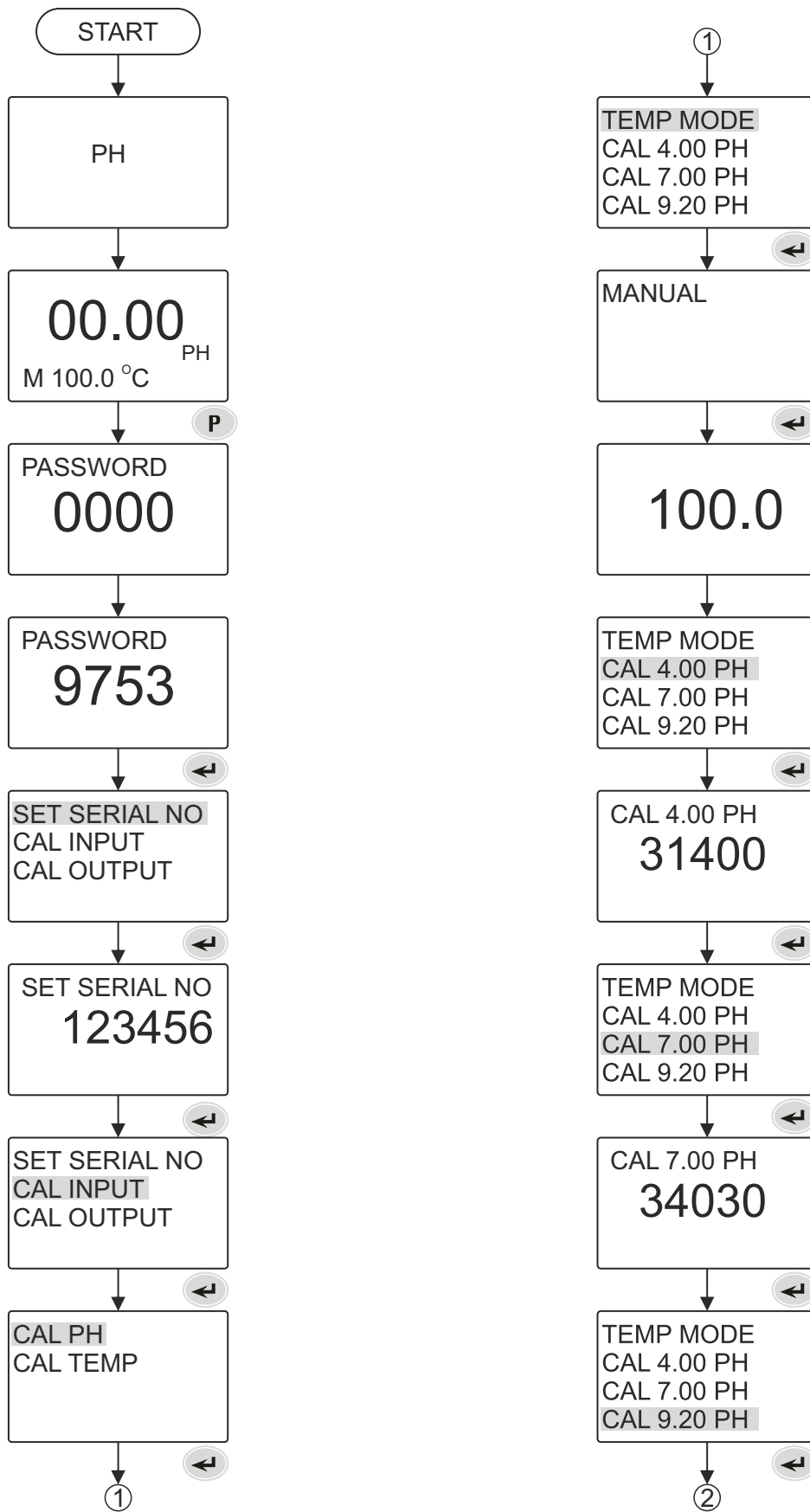


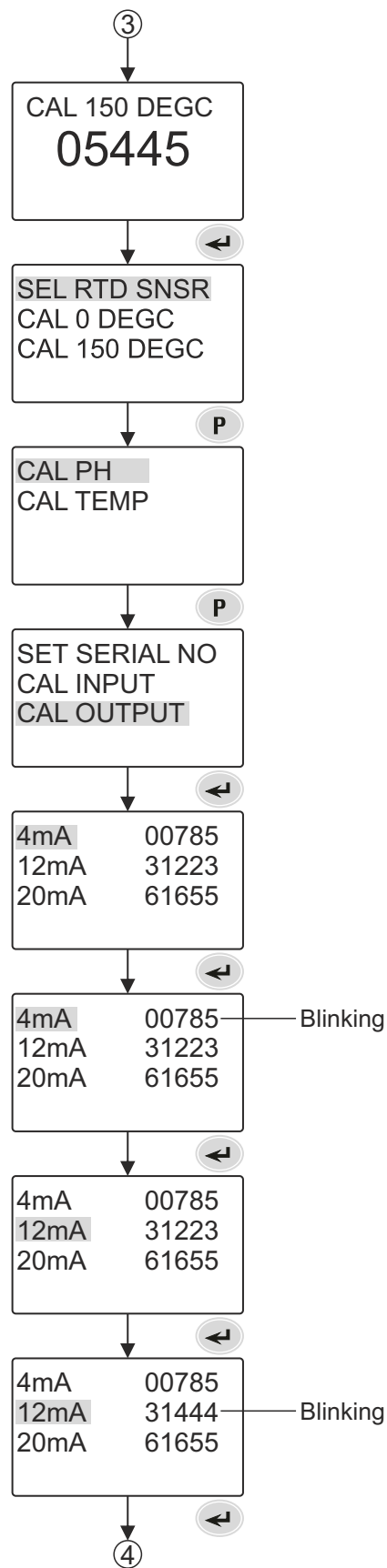
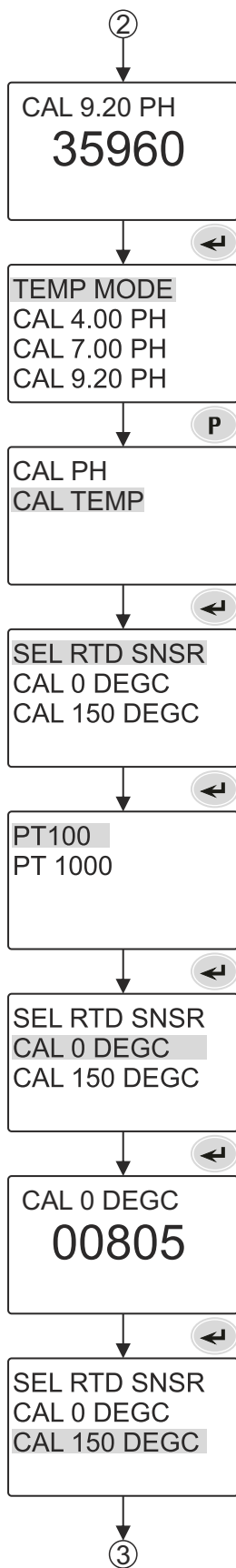
## 8.2 Parameter Mode:

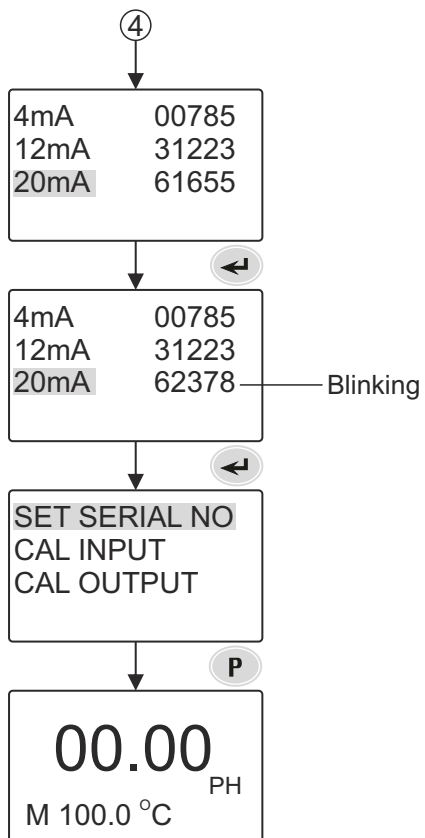




### 8.3 Calibration Mode :




















## 9. CALIBRATION PROCEDURE

### 9.1 pH input Calibration Procedure:











- 1) Do the connections as per termination details.
- 2) Power ON the instrument.
- 3) Prepare buffer solution for 4, 7, 9.20pH value.
- 4) Always clean the pH electrode by distilled water & properly dry it use in cotton & blotting paper before inserting the pH electrode.
- 5) Go to calibration mode by entering password 9753 & select **CAL INPUT**  
Press  key, display will Highlight **CAL PH**  
Press  key, display will Highlight **TEMP MODE**  
Press  key, display will Highlight **MANUAL** (Set 25°C in Parameter Mode)
- 6) Press  key, display will Highlight **CAL 4.00 PH** (Insert sensor in 4.00pH Buffer solution)  
Press  key, display will show **CAL 4.00 PH & 31400** (Approx. ADC counts)  
Press  key to save 4.00 PH ADC counts.
- 7) Press  key, display will Highlight **CAL 7.00 PH** (Insert sensor in 7.00pH Buffer solution)  
Press  key, display will show **CAL 7.00 PH & 34030** (Approx. ADC counts)  
Press  key to save 7.00 PH ADC counts.
- 8) Press  key, display will Highlight **CAL 9.20 PH** (Insert sensor in 9.20pH Buffer solution)  
Press  key, display will show **CAL 9.20 PH & 35960** (Approx. ADC counts)  
Press  key to save 9.20 PH ADC counts.
- 9) Press  key, to exit calibration mode.

### Buffer Solution Preparation:

Open a capsule of required buffer solution and by twisting and pulling apart. Mix this capsule content in 100 ml of DM (Demineralized) water, to make a buffer solution of corresponding pH value.



## 9.2 Temperature Calibration Procedure:

- 1) Do the connections as per termination details.
- 2) Power ON the instrument.
- 3) Go to calibration mode by entering password 9753 & select **CAL TEMP**  
Press  key, display will Highlight **SEL RTD SNSR**  
Press  key to select **PT100 / Pt1000**  
Press  key to save **SEL RTD SNSR**
- 4) Press  key, display will Highlight **CAL 0 DEGC**  
Press  key, display will show **CAL 0 DEGC** & 00805 (Approx. counts)  
Press  key to save CAL 0 DEGC counts.
- 5) Press  key, display will Highlight **CAL 150 DEGC**  
Press  key, display will show **CAL 150 DEGC** & 05445 (Approx. counts)  
Press  key, to save Cal 150 DEGC counts.
- 6) Press  key, to exit calibration mode.



## 9. SAFETY WARNING & GENERAL INSTRUCTIONS

1. Read User manual carefully and understand instructions & directions provided in this manual.
2. Installation, connections, commissioning and service shall carry out by only qualified and authorized person.
3. To protect instrument from any external hazards, customer should take necessary care while preparing site ready before installation.
4. Ensure proper supply voltage (24V DC) with proper polarity to the instrument, before Powering ON instrument.

## 10. TROUBLE SHOOTING PROCEDURE

SYMPTOMS	CAUSE OF FAILURE	ACTION TO BE TAKEN
No display indication	<ol style="list-style-type: none"><li>1. Absence of 24 V DC at terminal block.</li><li>2. Loose connection on termination</li></ol>	<ol style="list-style-type: none"><li>1. Check 24 V DC power supply &amp; rectify the fault.</li><li>2. Tight the terminal connections.</li></ol>
Incorrect current output	<ol style="list-style-type: none"><li>1. In correct setting of Lo &amp; Hi limit for output.</li><li>2. Incorrect calibration.</li></ol>	<ol style="list-style-type: none"><li>1. Do the correct setting for Lo &amp; Hi limit for output as per requirement.</li><li>2. Do proper calibration (Refer Calibration procedure).</li></ol>



## TEST / CALIBRATION CERTIFICATE

Calibration Date: \_\_\_ / \_\_\_ / 20\_\_

### ITEM DETAILS

Name : pH Indicating Transmitter

Make : MicroSet

Model : MS pH 211 T

Serial No : \_\_\_\_\_

Input :  pH Sensor Model : MS pH \_\_\_ SN : \_\_\_\_\_

pH Simulator

### READING

Standard Buffer Solution pH	Observed Reading Before Calibration pH	Observed Reading After Calibration pH	Observed Reading After Calibration mA
7.00			
4.00			
9.20			

Calibrated By,

*Sign*

*Seal*

*Initials*





## WARRANTY CERTIFICATE

MicroSet warrants each instrument to be free from defects in material & workmanship. This obligation to servicing or part returned to the company for that purpose & making good any parts thereof which shall be within warranty period, returned to the company under a written intimation & which to the company's satisfaction to be found defective. The company reserves the right to decide the workplace for the repair work. The freight for defective material will have to be borne by the buyer, & the transit risk for such material will rest with the buyer. The warranty is applicable only if the instrument is used within its specification.

**THIS WARRANTY IS VALID UP TO 12 months from date of Tax Invoice (Sensors Carry No Warranty since Consumables)**

### ITEM DETAILS

Name : pH Indicating Transmitter  
Make : MicroSet  
Model : MS pH 211 T  
Serial No : \_\_\_\_\_

*Seal*