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SPADE STANDARD EIFFEL DISPLAY UNIT

Applicable Firmware Versions: **V4.00**, **V4.10**

USAGE NOTICE

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1. INTRODUCTION

The **EIFFEL Standard Display Unit** is designed with a **Tri-Color Bar Graph Display** combined with a **6-digit 7-segment numerical display**, offering a perfect balance of precision and ease of use. This intelligent visual interface helps operators monitor measurement results instantly.

In **comparative measurement mode**, the bar graph automatically transitions between **ACCEPT**, **REJECT**, and **REWORK** providing an immediate visual indication of component status. The **tolerance limits** are clearly superimposed on the display, allowing operators to identify deviations at a glance and take corrective actions quickly.

Built around an **advanced microcontroller-based hardware platform**, the Standard Eiffel Display Unit ensures **high-speed data processing**, **stable performance**, and **exceptional measurement accuracy**. Its **intuitive and user-friendly options system** enables quick setup and configuration, making it suitable for operators at all skill levels.

With exceptional **flexibility in settings**, the unit proves to be a **versatile solution** for **in-process quality inspection** and **mass production environments**. It is widely used for **dimensional and geometric measurement** of **cylindrical workpieces** such as **bores and shafts**, ensuring precise control over part quality and process consistency.

2. FEATURES OF STANDARD EIFFEL

Feature	Standard Eiffel
Display Type	Red 0.36” LED digits ensure clear visibility for precise readings.
Tri-Color Bar Graph (ACCEPT / REWORK / REJECT)	✔
Store up to 10,500 records internally	✔
Measurement Units Supported (Metric/Inch)	✔
Measurement Modes (Static / Dynamic)	✔
Manually Selectable Programs	Up to 32 programs
Least Count Options	0.1µm, 0.2µm, 0.5µm, 1µm, 2µm, 5µm, 10µm
Measurement Mode (Absolute / Relative)	✔
Bar Graph Ranges (10, 25, 100, 250, 500)	✔
RS232 Computer Connectivity	✔

Auto Save & Auto Sense Facility	✔
Built-in Real Time Clock & Low Battery Warning	✔
Auto Correction Command (via RS232 / Ethernet)	✔
Optional Features (Available on request; additional cost applicable)	
Time-Based Air Cut-Off	✔
Low Air Pressure Alert	✔
Ethernet, USB Port for Seamless Computer Connectivity	✔
Store up to 5 lakh records.	✔

Note-PrimeLogger software-only offering is available on demand.

3. SPECIFICATION

3.1 FUNCTIONAL SPECIFICATIONS

- **Communication Settings:** RS232 serial interface (No parity, 8 data bits, 1 stop bit), Ethernet and USB Port.
- **Baud Rate:** Selectable: 4800, 9600, 19200, 38400, 57600 bps *(*Factory default: 19200).
- **Probe Resolution Options:** 0.01 µm, 0.1 µm, 0.5 µm, 1 µm.
- **Probe Measurement Range:** ±1 mm, ±1.5 mm, ±2 mm, ±2.5 mm, ±3 mm.

3.2 ELECTRICAL SPECIFICATIONS

- **Power supply**: 100VAC to 265VAC, 50/60Hz.Fused with 1A slow blow glass fuse. A stable earth (ground) connection is required for proper operation of the device.
- **Probe excitation:** 2.5Vpp sine wave. 10 KHz for full bridge LVDT and 13 KHz for half bridge Tesa compatible probes. (Other factory options available on request).
- **Output:** 3 relay outputs.

3.3 PERFORMANCE SPECIFICATIONS

Following performance specifications have been identified at test lab when all the power supply specifications and operating conditions are at nominal values. These values may vary depending upon the field conditions. Proper care must be taken when high precision gauging is required.

- **Accuracy**
  ±0.1% within linear operation of inductive probe (1micron over the range of 1mm).
- **Drift**
  0.3micron over a period of 1hour.
- **Repeatability**
  After power cycle: 0.2micron
  After mechanical movement: 0.2micron.
- **Stability**
  ±0.15micron of nominal measured value at fixed position.
- **Maximum sampling time**
  For inductive probe: 1mSec (1000samples per second).
- **Warm-up time**
  The device must be allowed to stabilize for at least 60seconds before actually using the measurement reading from the connected probes. Although instrument requires much less time to stabilize, it is good practice to allow some spare time after power on. The

warm-up delay may not be required when instrument is powered off and then on within short time.

3.4 MECHANICAL SPECIFICATION

- 180mm (L) X 60mm (W) X 530mm (H).

4. KEYPAD FUNCTIONS

There are six keys on keypad

4.1 UP (^) Arrow Navigation Key

This key is used for scrolling options when entering system settings mode. This key is also useful when entering digit values into the program setting mode.

4.2 Right (→) Arrow/NEXT Navigation Key

To move to the next system setting option without saving the changes made while in the system settings mode, use this key. This key is also useful when you are in the program setting mode. When entering values for different parameters such as LSL, USL, nominal value, higher master, lower master, etc. While entering digit values, use this key to move from the left decimal place to the right decimal place.

4.3 SET key

This key is used to enter into the system setting mode. For entering into the system setting mode first turn off the device press and hold “SET” key then turn on device and hold the set key until you see on screen message “SETT”.

4.4 ENT key

This key has dual functionality. When in setting mode, the 'ENT (enter)' key is used to enter the setting mode, save the selected values of the current option, and move to the next option. When in measurement mode, the 'ENT (enter)' key is used to transmit the current measurement data to the PC via serial communication.

4.5 M1 key

M1 key is used to enter mastering mode. Entering into mastering, press the M1 key first. The message shown on screen ‘PLACE PLUG IN HIGHER MASTER.' After placing the plug into the higher master, press the 'M1' key to save the M1 master value.

4.6 M2 key

The message shown on screen ‘PLACE PLUG IN LOWER MASTER.' After placing the plug into the lower master, press the 'M2' key to save the M2 master value.

5. SYSTEM SETTINGS

This is options where you can configure your device. For entering into system settings mode, turn off the device and press and hold the "**SET**" key and turn on the device. Press the 'SET' key until it shows '**SET**', then press the '**ENT**' key after it shows '**UNIT**'.

5.1 MEASUREMENT UNIT

Display the UNIT screen, then press the **ENT** key to enter the measurement unit options. Use the **UP (↑)** key to scroll through the available options. These are the measurement unit selection options.

MM- (millimeter)-Select mm to display the final results in millimeters.

Inch-Select inch to display the final results in inch.

After selecting the desired measurement unit, press the **ENT** key to go to the next setting.

5.2 COMMUNICATION BAUD RATE

Using this option, select the baud rate for communication between the display device and the computer. Display the BAUD screen, then press the **ENT** key to enter the BAUD RATE options.

Use the **UP (↑)** key to scroll through the available baud rates: **4800, 9600, 19200, 38400**, and **57600.**

After selecting the baud rate, press the **ENT** key to go to the next setting.

5.3 BUZZER STATUS

This feature provides an audio indication on key press. Display the BUZZER screen, then press the **ENT** key to enter the BUZZER STATUS options. Scroll the **UP (↑)** key to display the following options.

ON

To turn the buzzer on, select the ON option from the options.

OFF

To turn the buzzer off, select the OFF option from the options.

After selecting the buzzer status, press the **ENT** key to go to the next setting.

5.4 AUTO SENSE

The auto-sense concept in multigauging refers to the ability of the gauge to automatically detect the dimensions of the part being measured. Display the AUTO SENSE screen, then press the **ENT** key to enter the AUTO SENSE options. Scroll the **UP (↑)** key to display the following options.

ON

If the auto sense is on, the sense delay and auto save screens will appear.

OFF

If the auto sense is off, the sense delay and auto save screens will not appear.

After selecting the auto sense, press the **ENT** key to go to the next setting.

5.5 SENSE DELAY

Display the SENSE DELAY screen, then press the **ENT** key to enter the SENSE DELAY options. Scroll the **UP (↑)** key to display the following options.

Sense delay can be set from **1 second to 10 seconds**. The part's dimension is measured automatically based on the set delay**.**

After selecting the sense delay, press the **ENT** key to go to the next setting.

5.6 AUTO-SAVE DELAY

Display the AUTO SAVE DELAY screen, then press the **ENT** key to enter the AUTO SAVE DELAY options. Scroll the **UP (↑)** key to display the following options.

Auto save delay can be set from **1 seconds to 10 seconds** or can be **off**. The part's dimensions are automatically saved according to the set delay.

After selecting the auto save delay, press the **ENT** key to go to the next setting.

5.7 DEVICE ID

This feature provides you to manage or identify your display device. You can give device identification number for you ease. This device id is recorded into each transmitted data frame, using this device id you can bifurcate particular device data from your database. Display the DEVICE ID screen, then press the **ENT** key to enter the DEVICE ID options. Scroll the **UP (↑)** key to display the following options. You can set minimum "01" and maximum device id is "25".

After selecting the device id, press the **ENT** key to go to the next setting.

5.8 DATA TRANSFER

This feature provides you facility to transmit stored measurement data to the PC via serial communication for analysis or report generation. The internal storage capacity has 10500 records, but if there are more, new records will override the older ones. Display the DATA TRANSFER screen, then press the **ENT** key to enter the DATA TRANSFER options. Scroll the **UP (↑)** key to display the following options.

YES

To send data, select 'YES' and wait.

After successfully transferring data, the screen displays 'transfer done'.

NO
If the data is not sent, select 'NO'.

After selecting the data transfer, press the **ENT** key to go to the next setting.

5.9 DATA CLEAR

This feature provides you to clear all you recorded measurement data permanently. Once you clear your all data there is no way to get it back. So be careful when you clear data. Display the DATA CLEAR screen, then press the **ENT** key to enter the DATA TRANSFER options. Scroll the **UP (↑)** key to display the following options.

YES
To clear data, select 'YES' and wait. Data will be successfully cleared.

NO
If the data is not clear, select 'NO'.

After selecting the data clear, press the **ENT** key to go to the next setting.

5.10 AIR TURN OFF DELAY

Air Turn-Off Delay allows the user to control how long the air supply remains ON after activation. Display the AIR TURN OFF DELAY screen, then press the **ENT** key to enter the AIR TURN OFF DELAY options. Scroll the **UP (↑)** key to display the following options.

If the Air Turn-Off Delay is set between **006 and 150** seconds, **disable**.

After selecting the Air Turn-Off Delay, press the **ENT** key to go to the next setting.
Note: the "air turn-off delay" parameter is not supported in **Eiffel Standard** probe units.

5.11 OPEN COUNT

To measure the open plug count, remove the plug in master then show the count and this count enter here. Display the OPEN PLUG COUNT screen, then press the **ENT** key to enter the OPEN PLUG COUNT options. Scroll the **UP (↑)** key to display the following options.

After selecting the open plug count, press the **ENT** key to go to the next setting.

5.12 DEVICE NAME

After selecting the device name, press the **ENT** key to complete the system settings.

6. PROGRAM SETTINGS

Whenever you turn on the device you will get only two options on screen, ADC count and Manual program select. You can switch between options by pressing "**NEXT→**" Key**.**

6.1 ADC COUNT

Shows the ADC count readings on the seven segment LED display.

6.2 MANUAL PROGRAM SELECT "01"

Using this option, you can load the parameters value for any program. For selecting program scroll up using **UP (↑)** arrow key.

After selecting the program, press the **ENT key** to go to the next setting.

6.3 RESULT DISPLAY LC

Display the LEAST COUNT screen, then press the **ENT** key to enter the least count options. Scroll the **UP (↑)** key to display the least count options.After selecting the required least count options press the **ENT** key.

If the **MM** option is selected, press the **UP (↑)** key to select the value.

'0.0001mm,0.0002mm.0.0005mm,0.001mm,0.002mm,0.005mm,0.010mm.

If the **INCH** option is selected, press the **UP (↑)** key to select the value. 0.00001",0.00002",0.00005",0.0001",0.0002",0.0005",0.001".

After selecting the least count options, press the **ENT key** to go to the next setting

6.4 SPECK VALUE

User need to enter speck value of the components to be used for measurement. Speck value is used for showing measurement result in absolute mode only. For relative display mode, speck value is not required. Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After entering the speck value, press the **ENT key** to move to the next setting

6.5 USL

This is upper specified limit of the dimensional measurement. When measurement value is above this limit, the component is for rework or reject depending upon direction. Display the USL screen, then press the **ENT** key to enter USL value. Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After entering the USL value, press the **ENT key** to move to the next setting.

6.6 LSL

This is lower specified limit of the dimensional measurement. When measurement value is below this limit, the component is for rework or reject depending upon direction. Display the LSL screen, then press the **ENT** key to enter LSL value. Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After entering the LSL value, press the **ENT key** to move to the next setting.

6.7 MASTERING TYEP

Mastering means the process of setting or calibrating the gauge using a reference master (known dimension part).It ensures that the gauge gives accurate measurement results during operation. Display the MASTER TYPE screen, then press the **ENT** key to enter the master type options. Scroll the **UP (↑)** key to display the mastering options.

DOUBLE

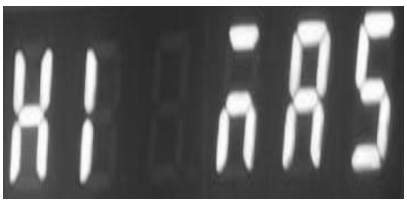
when two reference masters are available for measurement, choosing double mastering is required for calibration

SINGLE

When there is only one reference master available, choose single master mode. Single mastering will work only when double mastering is already done at least once for that program

After entering the mastering type, press the **ENT key** to move to the next setting.

6.8 HIGHER MASTER



Enter the actual value of the higher master that was mentioned on the higher master component. Display the **HIGHER MASTER** screen, then press the **ENT** key to enter the higher master value.

Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After entering the higher master value**,** press the **ENT key** to move to the next setting.

6.9 LOWER MASTER

Enter the actual value of the lower master that was mentioned on the lower master component. Display the LOWER MASTER screen, then press the **ENT** key to enter the lower master value. Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After entering the lower master value**,** press the **ENT key** to move to the next setting.

6.10 MEASURING DIRECTION

Final results are dependent on these selections.

ID (Internal Diameter)

For measuring Display the DIRECTION screen, then press the **ENT** key to enter the direction options. Scroll the **UP (↑)** key to display the direction options.

internal diameter of component chooses this option else results are different. If measurement direction is ID in that case readings goes above higher limit values result will be REJECT, and if readings go below lower limit values result will be REWORK.

EX-ID=15.20 mm

If ID is 15.25mm then Reject Condition

If ID is 15.15mm then Rework Condition

OD (Outer Diameter)

For measuring outer diameter of component choose this option else results are different. If measurement direction is OD in that case readings goes above higher limit values result will be REWORK and if readings go below lower limit values result will be REJECT.

EX-OD=20.20 mm

If OD is 20.30mm then Rework Condition

If OD is 20.10mm then Reject Condition

Range

If the user wants to check and accept components only within a certain range, and all components outside of that range are rejected, then select this option.

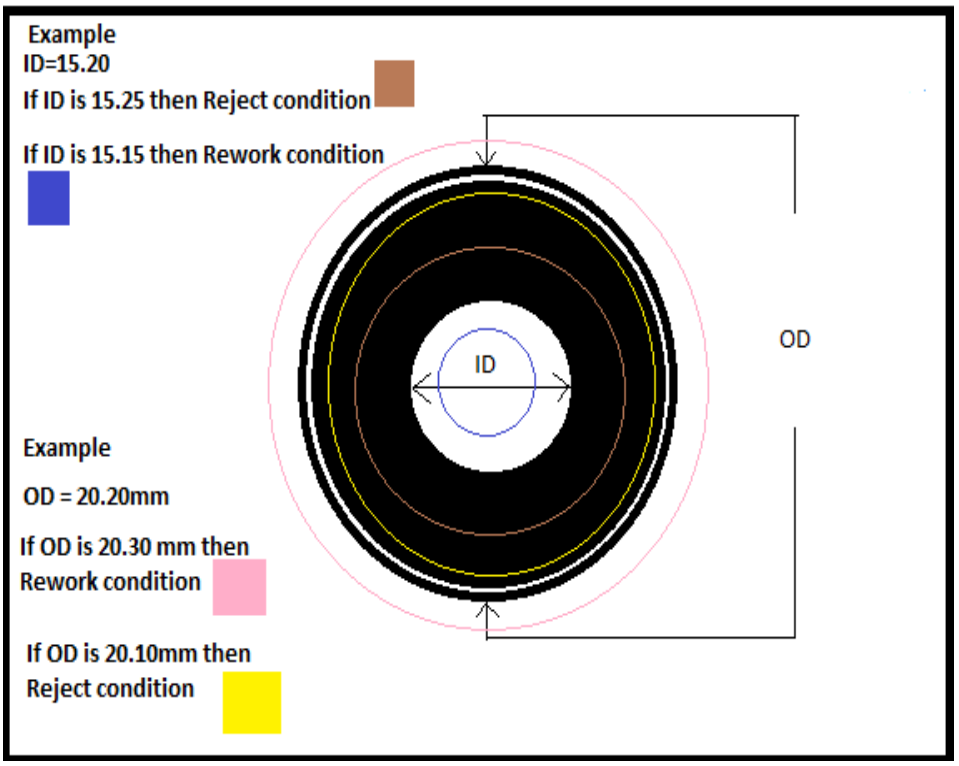


Figure 1

After entering the measuring direction, press the **ENT key** to move to the next setting.

6.11 MEASUREMENT MODE

Scroll the **UP (↑)** key to display the measurement mode options.

Current

In Current mode actual current moments readings are shown as result.

Max

In Max mode highest reading of measurement cycle is captured and displayed as result.

Min

In Min mode lowest reading of measurement cycle is captured and displayed as result.

Average

In Average mode average of all readings are shown as result.

TIR

In TIR mode total traverse of readings during measurement cycle are shown as result.

MEAN

In Mean mode mean of all readings are shown as result.

After entering the measurement mode**,** press the **ENT key** to move to the next setting.

6.12 RESULT DISPLAY MODE

Scroll the **UP (↑)** key to display there relative display mode options.

RELATIVE

In this mode nominal value will not be considered for final result display. Direct measurement value is shown on display as final result

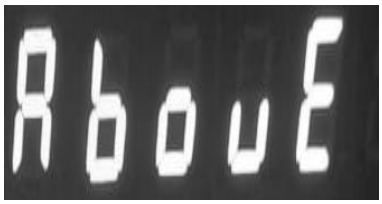
ABSOLUTE

In this mode nominal value will be added to the obtained measurement value and then final result will be displayed.

After entering the result display mode**,** press the **ENT key** to move to the next setting.

6.13 SENSE DIRECTION

Display the SENSE DIRECTION screen, then press the **ENT** key to enter the sense direction options. Scroll the **UP (↑)** key to display the sense direction options.



ABOVE

Select the sense direction Above or Below. If the cycle start trigger is expected when the value goes above idle value, select Above. Otherwise select Below.

BELOW

Select the sense direction Above or Below. If the cycle start trigger is expected when the value goes below idle value, select below. Otherwise select Above.

After entering the sense direction**,** press the **ENT key** to move to the next setting.

6.14 SENSE VALUE

When a sense value limit is entered, the cycle will start automatically after the limit is reached. Display the SENSE VALUE screen, then press the **ENT** key to enter the sense value. Use the **UP (↑)** key to scroll the digits. To move to the next digit, press the **NEXT** key.

After selecting the sense value, press the **ENT** key to complete the program settings.

7. MASTERING

7.1 HOW TO DO MASTERING

7.1.1 DOUBLE MASTERING

- If Double Mastering is chosen under the Mastering Type option, the device will enter the Double Mastering procedure.
- Press the M1 key; the screen will display the message 'HIGHER MASTER (HI MAS)'.
- Place the plug on the Higher Master and press the M1 key.
- The screen will then display the message 'LOWER MASTER (LO MAS)'.
- Place the plug on the Lower Master and press the M2 key.
- The message 'SAVE' will be displayed.

7.1.2 SINGLE MASTERING

Note: When there is only one reference master available, choose single master mode. Single mastering will work only when double mastering is already done at least once for that program.

- If Single Mastering is chosen under the Mastering Type option, the device will enter the Single Mastering procedure.
- Press the M1 key; the screen will display the message 'MASTER'.
- Place the plug on the Master and press the M1 key.
- The message 'SAVE' will displayed.

7.2 MASTERING FLOW CHART

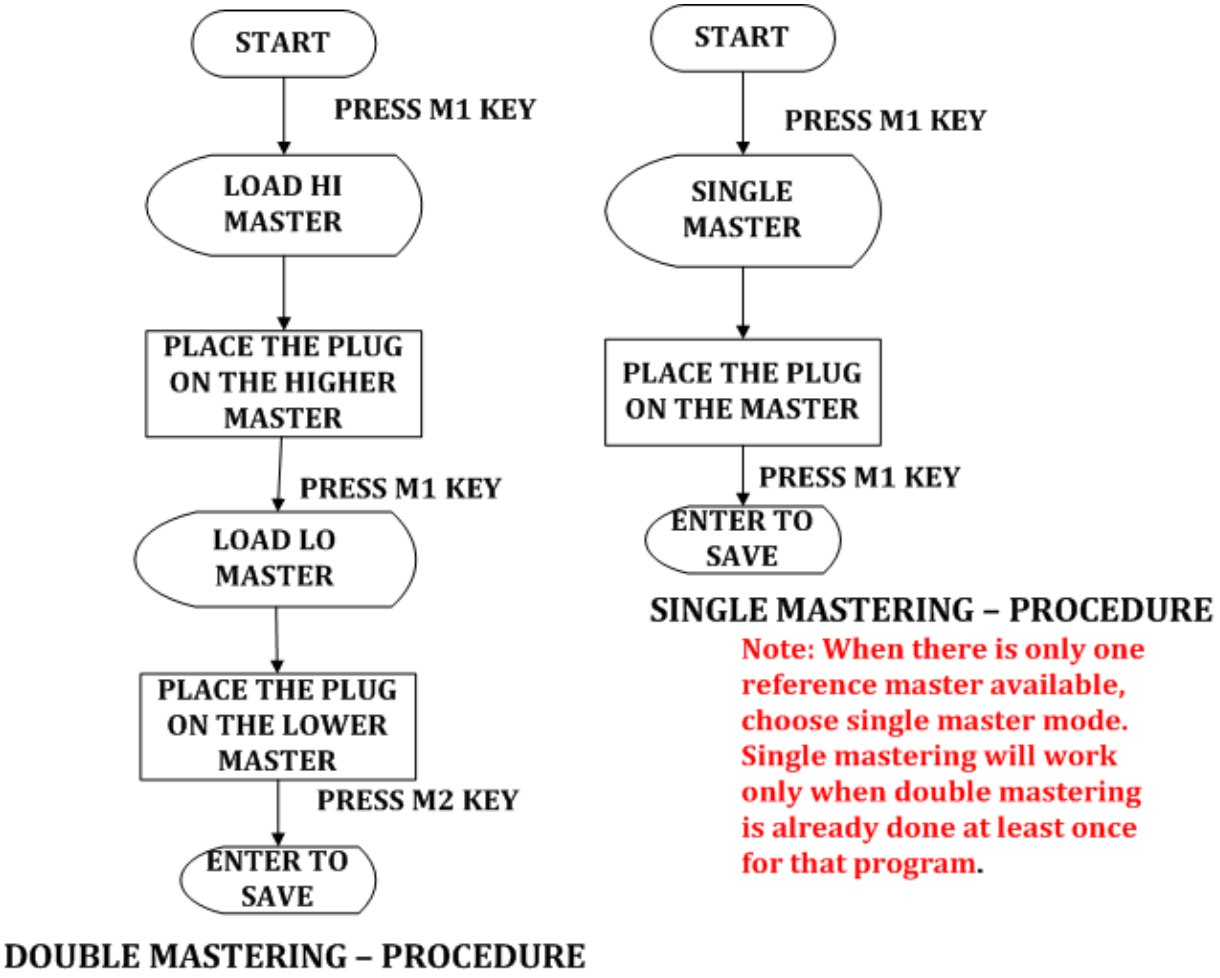


Figure 2

8. STANDARD EIFFEL DATA TRANSFER OPTIONS: RS-232, ETHERNET, AND USB

8.1 RS-232 /USB COMMUNICATION

Figure 3

8.2 ETHERNET COMMUNICATION

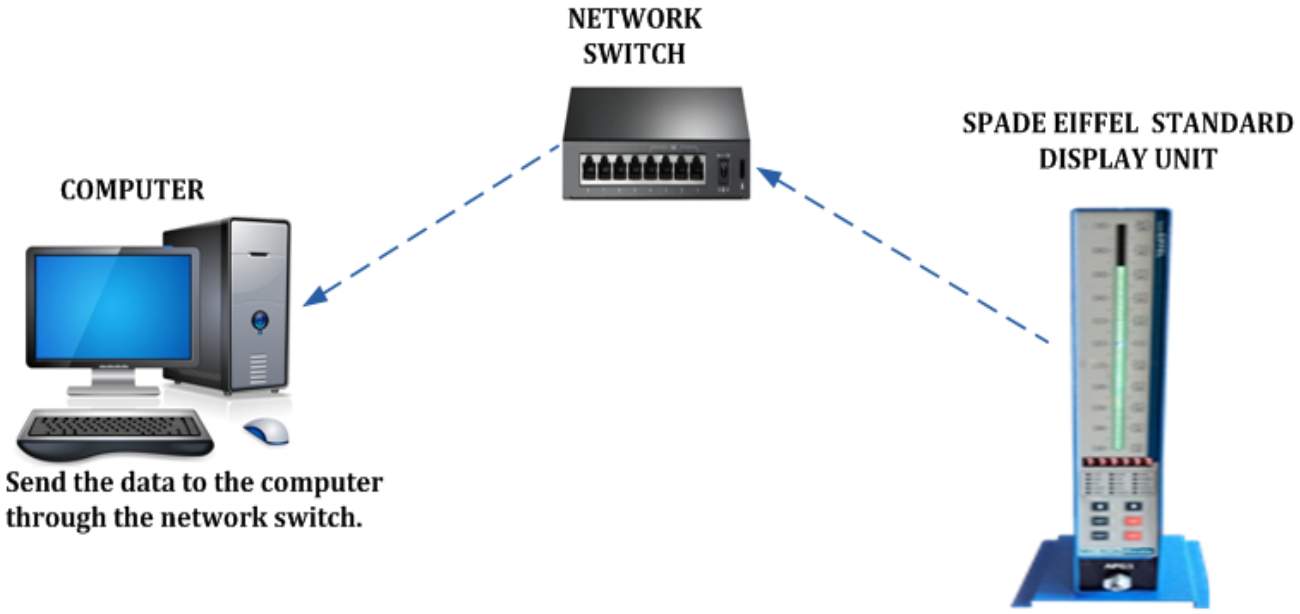


Figure 4

9. CONNECTION DETAIL

9.1 BACK PANEL PLATE CONNECTIONS

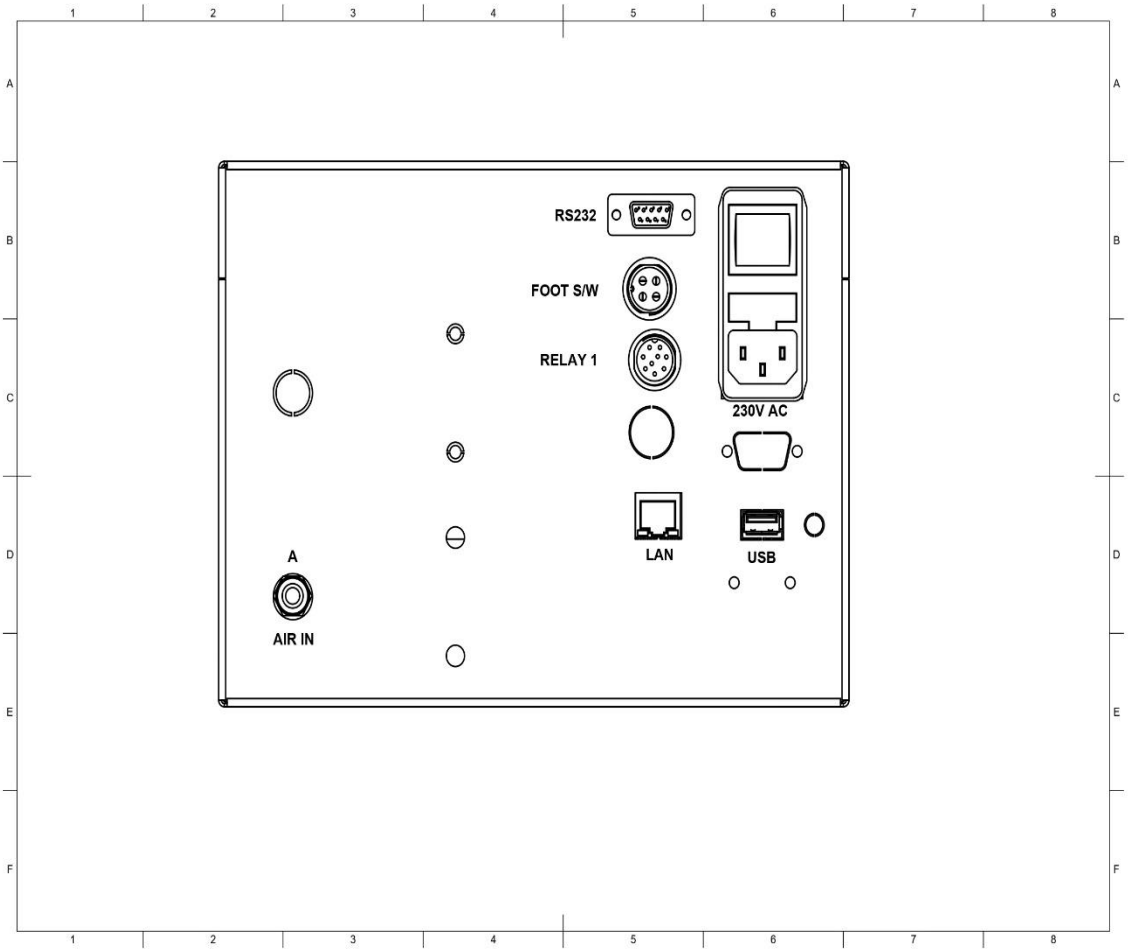


Figure 5

9.2 RESULT STATUS RELAY CONNECTION

9 Pin round Connector	Relay Connection	Relay
1	NC	ACCEPT Relay
2	CMN	
3	NO	
4	NC	REJECT Relay
5	CMN	
6	NO	
7	NC	REWORK Relay
8	CMN	
9	NO	

Table 1

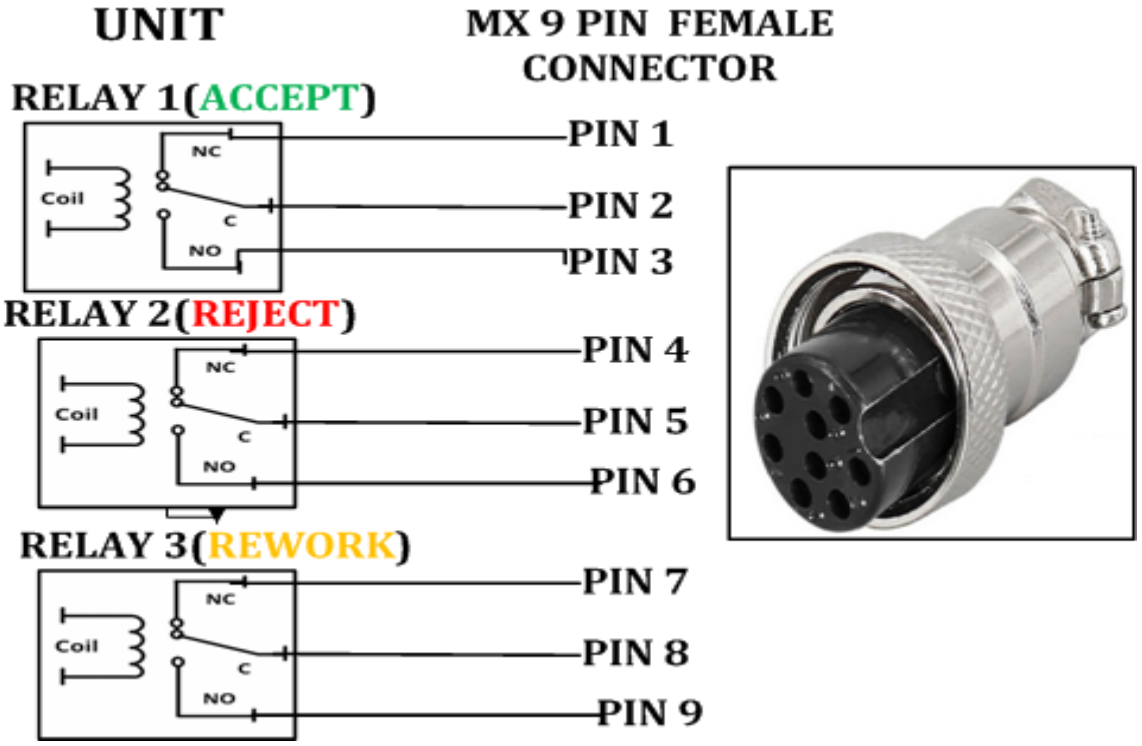


Figure 6

9.3 FOOT-SWITCH CONNECTION

4 Pin round connector	Connection
1	Common
2	Footswitch-1
3	Footswitch-2
4	NC

Table 2

- To operate Foot-switch-1 connect one terminal of switch to common (pin1 of 4pin connector) and another terminal to Foot-switch-1 (pin2 of 4pin mx male connector).
- To operate Foot-switch-2 connect one terminal of switch to common (pin1 of 4pin

mx male connector) and another terminal to Foot-switch-2(pin3 of 4pin mx male connector).

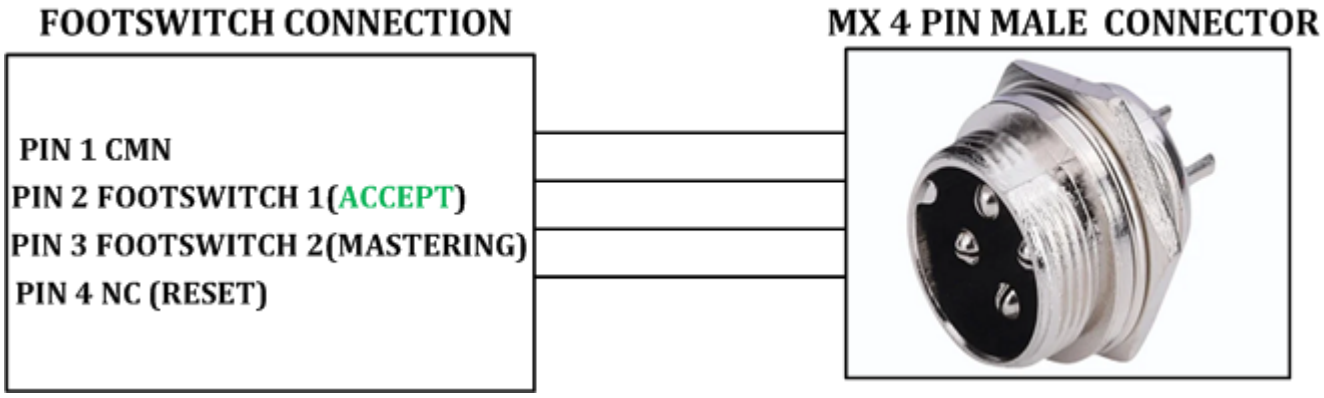


Figure 7

9.4 SERIAL COMMUNICATION PORT

Display unit has D sub miniature 9pin female connector for serial interface. Below are pin details for this connector. If the is being connected to computer's serial port, one to one straight three core cable is required.

DB9 Pin	Signal Name
1	NC
2	TXD RS232
3	RXD RS232
4	NC
5	GND
6	FOOT- SWITCH COMMON
7	FOOT- SWITCH-1
8	FOOT- SWITCH-2
9	P1.11

Table 3

- **Table Terminology**
  NC: Do not make any electrical connection to these pins. Some or all of these pins might be used for internal testing and factory settings.
  GND: Supply negative.
  Warning: Wrong connection or over voltage at any of the D type connector pin may permanently damage the device.

10. DATA TRANSMISSION FRAME FORMAT

A data frame is sent over RS232 port at predefined interval. All the data is in ASCII format and can be viewed on hyper terminal. Default interval setting is 50mSec and default baud rate is 19200. The data frame is always terminated by ASCII code of carriage return.

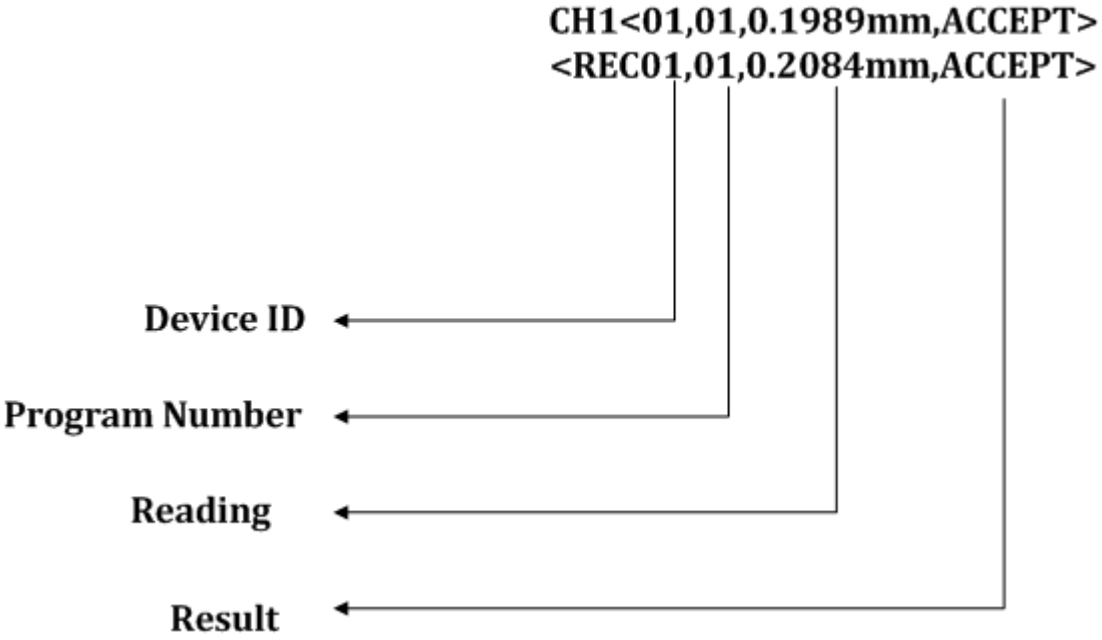


Figure 8

11. WARRANTY STATEMENT

All the products are covered under warranty for a period of 12 months against Manufacturing defects, workmanship and malfunction under normal operating conditions. The warranty is subject to the terms and conditions mentioned below.

1. The warranty commences from the date of sale for a period of 12 months irrespective of the actual installation date.
2. The warranty is against manufacturing defects and any subsequent malfunction of the instrument during the normal operation. The warranty shall not be applicable in case of accidental damage, damage due to wrong operation, connection or conditions that are out of normal operating specifications.
3. MICRONBEATS Metrology Solutions, at its discretion may repair or replace the product depending on the condition of instrument, availability of spare parts and type of failure.
4. In case of warranty claim, the warranty period will not be extended and remains same as stated earlier from the date of sale.
5. Maximum liability of MICRONBEATS Metrology Solutions remains up to repair or replacement of the product only. Any damages or losses raised out of use of the instrument are not covered by this warranty. In any case, cost of the product will not be refunded.
6. In case of warranty claim, the product should be sent over to MICRONBEATS Metrology Solutions immediately after noticing the defect or failure. A detailed note of operating conditions in which fault occurred will be helpful in rectifying the defect.
7. Do not try to open or repair the instrument on your own. Warranty will stand null and void in such case. Products with tampered warranty seal will not be considered for warranty claims and regular service charges will be applicable.
8. In all claims, the company's decision will be final and legally binding.
9. Any and all disputes are subject to pune jurisdiction only.

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