# LAKSHMI ENGINEERING WORKS

**Mfg & Supp of:** Soil, Cement and Concrete Testing Equipment, Survey, Drawing, Hydrological, Metrological, Geological, Scientific Instruments **(All type of Water Current Meters)**
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Dear Sir,

### Subject: PORTFOLIO OF M/s LAKSHMI ENGINEERING WORKS

We take pleasure to introduce ourselves as registered manufacturers & supplier of all kinds of Hydrological & Metrological Instruments as well as River Gauging Instruments.

We are supplying these items to all Government and Semi Government Departments with their entire satisfaction. We are also doing the repair works of these instruments at our workshop. Ourall instruments covered a guarantee for one year from the date of supply.

You are therefore requested kindly enlist our firm name on your mailing register & enquire us of our quality instruments, so that we may quote the most competitive prices.

Thanking You

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# Instruction Manual For
# Automatic Weather Station

Dear customer,

Thank you and congratulate you for purchase of 'LEW' Make Automatic Weather Station. You will undoubtedly find it to be the most advanced instruments of its kind available in the market.

**Introduction:**

This is a Micro controller based Automatic Weather Station reflect state of the art in micro controller based low cost instrumentation design.

All sensors can be attached with this data logger for the collection of real time data automatically. The micro controller converts the analog signals from these sensors to digital format. The micro controller has their individual operating software's programmed in their internal EEPROMS and the data acquired by them is stored in their internal data RAMS. This micro controller remains in the sleep mode and wake up only when either a signal from the sensors is available or when they receive control signals from the master controller for acquiring the stored data. The micro controller has its internal memory along with an additional 512K EEPROM, a real time clock with an LCD (16 X 2) to display the instrument status.

**Specification of Data Logger:**

Display: 16 Characters X 2 Lines LCD

Real Time Clock: Provided.

Data Storage: 128 K EEPROM.

Power Supply: 12V SMF

Clock accuracy: ±5 seconds per week

Battery Charging: Through Solar Panel.

Tripod Tower: Provided.

Radiation shield: Provided.

Sensor brackets: Provided.

Weatherproof enclosures: Provided.

Logging Interval: User Programmable from 1 minute to 24 Hour.

Operating Temperature: - 40 to 75 °C.

Operating Humidity: 0 to 95 % non-condensing.

Data retrieval: Through Data Shuttle / GPRS based Telemetry to Computer/Webserver.

**Following Sensors are available for Automatic Weather Station as per customer requirement at Extra Cost:**

| Sensor | Parameter | Description |
|---|---|---|
| Air Temperature | Sensor Type | Digital Sensor |
| | Range | - 40 to 123.8 ° C. |
| | Accuracy | ± 0.5 ° C @ 25° C |
| Relative Humidity | Sensor Type | Digital Sensor |
| | Range | 0 to 100% |
| | Accuracy | ± 2% @ 20 to 80 % |
| Wind Speed | Sensor Type | 3 Cup Anemometer |
| | Range | 0 - 250 K mph |
| | Accuracy | 0.5 m/s |
| Wind Direction | Sensor Type | Hall Effect |
| | Range | 0 to 359 ° |
| | Accuracy | ± 0.3 to 0.5% of signal range |
| Rainfall | Sensor Type | Tipping Bucket |
| | Range | 100mm / hour |
| | Accuracy | 5% @ 25mm/hr |
| Atmospheric Pressure | Sensor Type | Piezo-resistive |
| | Range | 150 mb to 1150 mBar |
| | Accuracy | ± 1% |
| Solar Radiation | Sensor Type | Silicon Diode |
| | Range | 0 – 2000 w/m2 |
| | Accuracy | ± 5 % |
| Leaf wetness | Sensor Type | electrical resistance |
| | Range | 0 to 100% |
| | Accuracy | ± 2% |
| | Cable length | 5 meter |
| Soil Moisture | Sensor Type | Granular Matrix |
| | Range | 0 to 200 Centibar |
| | Accuracy | ± 2% |
| | Cable length | 5 meter |
| Soil Temperature | Sensor Type | Digital |
| | Range | - 10 to 110 ° C |
| | Accuracy | ± 0.5 ° C |
| | Cable length | 5 meter |

| Models Available | | |
|---|---|---|
| *SN* | *MODEL* | *LOGGER, SENSOR & ACCESSORIES* |
| 1 | Basic AWS | Wireless GPRS Data Logger<br>Solar panel & Mounting accessories<br>Tripod & Data Shuttle & Software<br>Wind speed Sensor<br>Wind direction Sensor<br>Temperature & Humidity Sensor<br>Rain fall Sensor |
| 2 | Professional AWS | Wireless GPRS Data Logger<br>Solar panel & Mounting accessories<br>Tripod & Data Shuttle & Software<br>Wind speed Sensor<br>Wind direction Sensor<br>Temperature & Humidity Sensor<br>Rain fall Sensor<br>Barometric Pressure Sensor |
| 3 | Solar AWS | Wireless GPRS Data Logger<br>Solar panel & Mounting accessories<br>Tripod & Data Shuttle & Software<br>Wind speed Sensor<br>Wind direction Sensor<br>Temperature & Humidity Sensor<br>Rain fall Sensor<br>Barometric Pressure Sensor<br>Solar radiation Sensor |
| 4 | Agriculture AWS | Wireless GPRS Data Logger<br>Solar panel & Mounting accessories<br>Tripod & Data Shuttle & Software<br>Wind speed Sensor<br>Wind direction Sensor<br>Temperature & Humidity Sensor<br>Rain fall Sensor<br>Leaf wetness Sensor<br>Soil moisture Sensor<br>Soil Temperature Sensor |

**Lew ware Application Software:**

Lew ware is a user-friendly, Menu Driven, Windows based application software allows you to view & save collected data. Data file is saved in Microsoft's Excel format.

**Specification of Data Shuttle (Hand Held Terminal):**

The data shuttle is a pocket-sized device that can be used to download & transport the data from weather station to a computer, allowing the instrument to stay in place for continuous monitoring/recording. The shuttle connects to a PC and is used with the "LEW ware" to download data.

**Specifications of Solar Panel:**

Output Voltage: 12 Volt DC, Wattage: 10 Watt

**Installation of Mounting Mast**

This is a medium mounting mast which is designed to allow installation in many types of geographicalarea with much stability & support.

This stand is made up stainless steel having a superiority grade of 304. It has folding structure can befolded.

**Parts of Stand**

Footrest

Level Slider

Trilinear Brackets

Legs

Center Pipe

**How to Install:**

**Installation of Mounting Stand**

Connect the center Pipe of tripod stand & setup as shown below

6

Now insert the Upper & Bottom Trilinear Brackets & attaché to the center pipe as shown below



Now attach the footrest to the leg & then attach to the upper Trilinear Bracket



7

Likewise attach all the three legs & Level Slider to the Top & Bottom Trilinear



## Solar Panel Setup

Take our solar panel & fix the solar panel clamp as shown below

**Setup of Enclosure**

Turn back the enclosure unscrew the screws used for fixing SS Strips to enclosure & toggle the position of SS-Strip & Cable gland Plate as shown below

**Fixing of Enclosure & Solar Panel to Tripod Stand**

Now fix the enclosure to tripod tower by inserting U-Clamp around the centre pipe of the Tripod stand as shown below

Tighten the nuts of the clamp using Keys keeping enclosure face towards North Direction. Now insert the solar panel in the same way & tighten the nuts of the clamp using Keys keeping solar panel face towards South Direction as shown below

Tighten the nuts using Keys keeping enclosure face towards North Direction & solar panel face towards South Direction as shown below
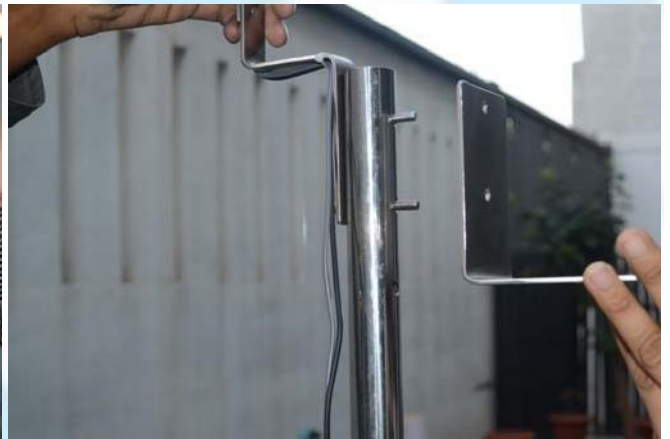
**Installation of Sensors (subjected to purchase of sensors):**

First fix Wind speed & Wind Direction sensor with Z-clamp provided as shown below:

Now Fix this Z-clamp with L-Clamp onto Tripod Stand as shown below:

Now Fix Temperature humidity Sensor below & Rainfall Sensor above L-clamp as shown below



Wind Direction Sensor ARM should be NORTH facing

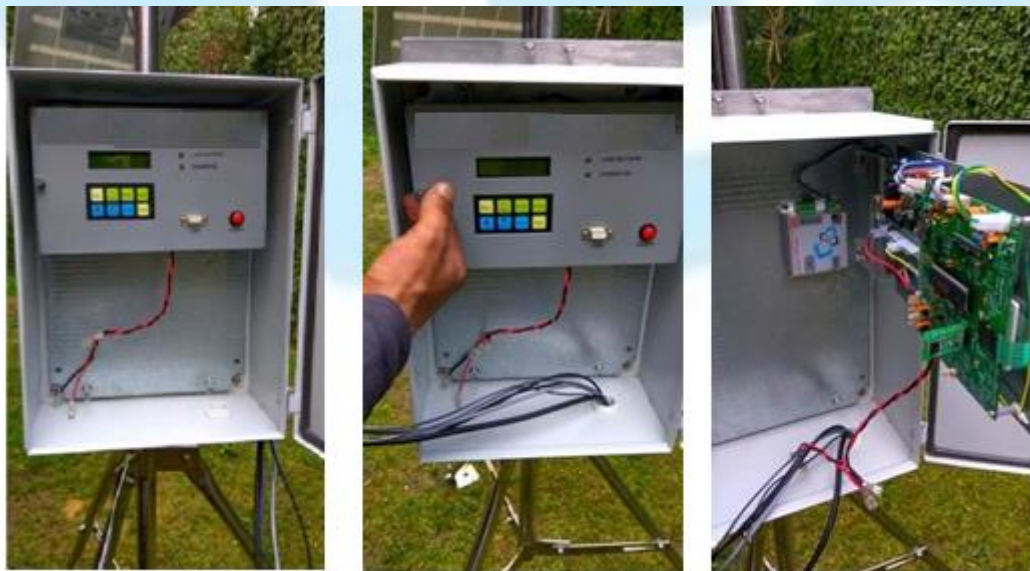Using cable ties clamp wires with stand as shown above

Now Take Solar Radiation Sensor & Install at the center pipe of Tripod Stand as shown below
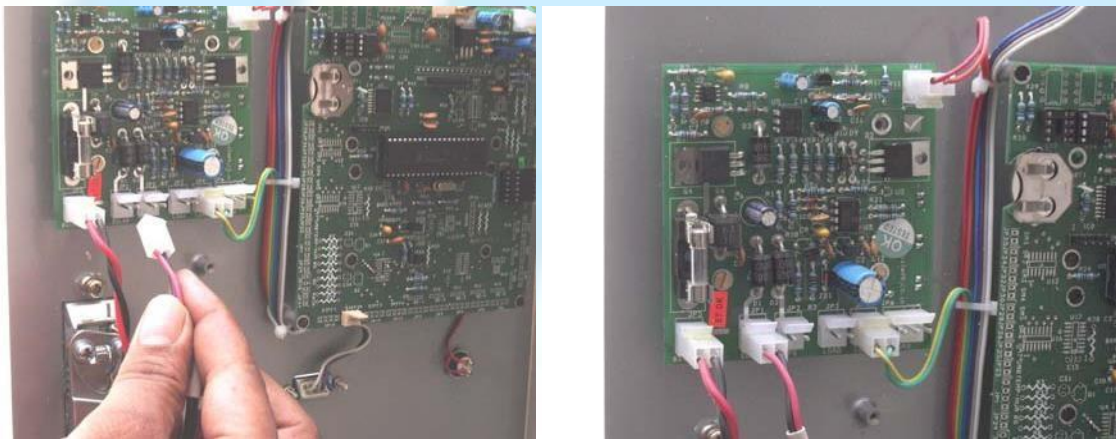
**Wiring Connections:**

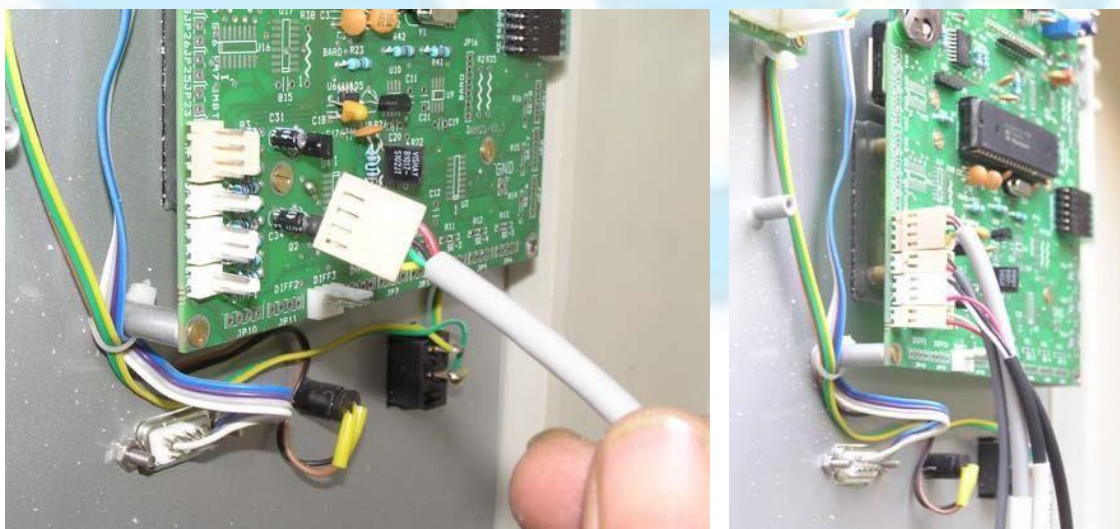Open the door of the logger by key provided & unscrew the panel as shown below

Insert the solar panel cable & Sensor Cables from the cable gland provided at the bottom of the enclosure as shown above



Connect the connector at the charging PCB (SOLAR is marked on PCB)

Now Connect the Sensor Cables at the connector provided on Mother –Board & screw back

**Wiring of Batteries**



Connect the red wire to Positive Terminal (Red) & black wire to Negative Terminal (black) of the battery & place them inside enclosure as shown below.



All the connections are done. Now press & hold the red ON/OFF button for 3Sec the to switch on the instrument. To switch OFF the instrument Press & Hold

Blinging of Power LED & display text will confirm that system has been installed successfully

**Key Board Details:**

The Keyboard comprises of a 4 X 2 key matrix. Details of the key designation are given below.

| Esc | D/L Data | Prog. | Func. |
|-----|----------|-------|-------|
| ▲ Up | ▼ Down | Next | Enter |

**Esc:** This key is used to exit from current operation.

**D/L Data:** This key is used to down load data on shuttle.

**Prog.:** This key is used to program the various parameters of the system.

**Func.:** This key is used to open function menu.

**Up:**    This key is used to increment settable numeric values

**Down:** This key is used to decrement settable numeric values

**Next:** This key is used to shift to the next menu and / or to any numeric value.

**Enter:**  This key is used to store the set numeric value and shift to next operation in pipeline.

**Program Menu Details**: This command button is used for programming of instrument.  Just press the program Command button and program the date numeric value with the help of Up button and Down button in the Date Menu. After selecting the numeric value please press next button.

```
ENTER DATE?. . . . .
11/10/2008
```

After the date programming, press next button for Time menu. Program the Time numeric value with the help of Up button and Down button in the Time Menu. After selecting the numeric value please press next button.

```
ENTER TIME?. . . . .
13:48 HRS
```

After the Time programming, press next button for Log menu. Program the required Recording interval (Log Rate) numeric value with the help of Up button and Down button in the Menu. After selecting the numeric value please press next button for exit from program menu.

```
ENTER LOG RATE?
00:01 HRS
```

After the Log rate programming, press next button for Log Start Time menu. Program the required Start time numeric value with the help of Up button and Down button in the Menu. After selecting the numeric value please press next button for exit from program menu.

```
LOG START TIME ?
11:15 HRS
```

**D/L Data Menu Details:** To download the data from logger connect the data shuttle as shown below, red led glow will confirm the connection & follow the instruction as described in download data menu.
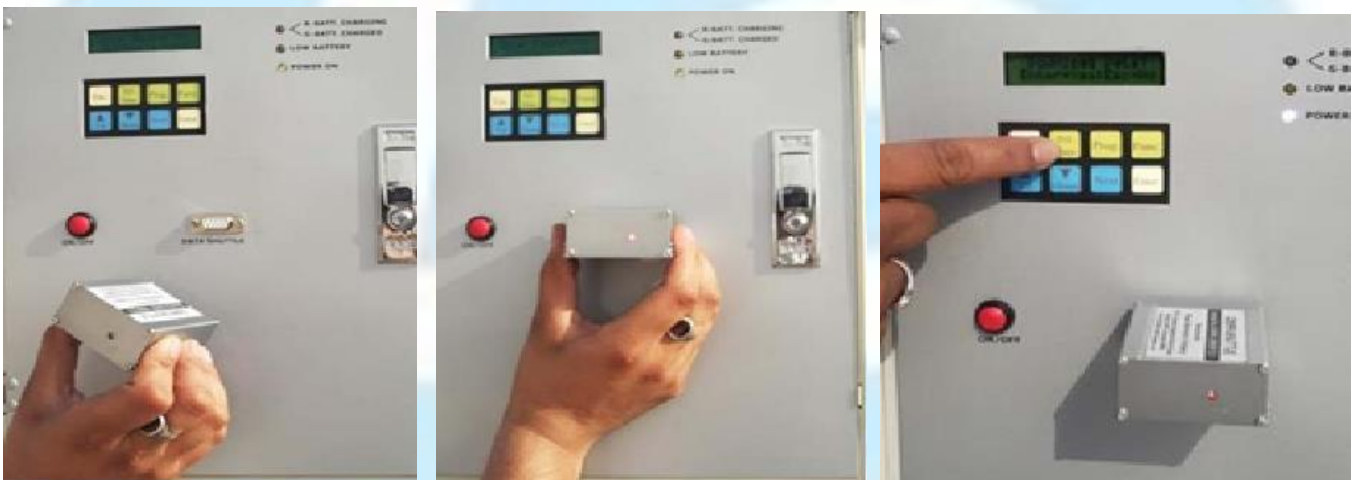


This command button is used for down load data from Data logger to Data Shuttle. Attach the Logger port and Data Shuttle port then press the D/L Data button on logger and press Enter button for retrieves data from logger to data shuttle.

```
Download Data?
Enter=Yes;Esc=No
```

**Function Menu Details:** This function menu has three-sub menus, Memory Test Menu, Memory clear menu and the Monitor Channel menu. Memory Test Menu is used to perform memory test function.

Just press the Func. Command button and Sys Memory Test? message will appear on the LCD screen. If you want to escape from this menu press Esc button and if you want to perform Memory test press Enter command button.

| SYS MEMORY TEST? |
| --- |

When you press the Enter command button following message will appear on the LCD screen

| TESTING MEMORY… |
| --- |

After the Memory test pass, following message will appear on the LCD screen

| **TESTING MEMORY<br>TEST PERIOD** |
| --- |

Now, press next button for next function menu, which is Clear Memory. The memory clear menu is used to perform erase data from data logger's internal memory. If you want to escape from this menu press Esc button and if you want to perform Memory test press Enter command button.

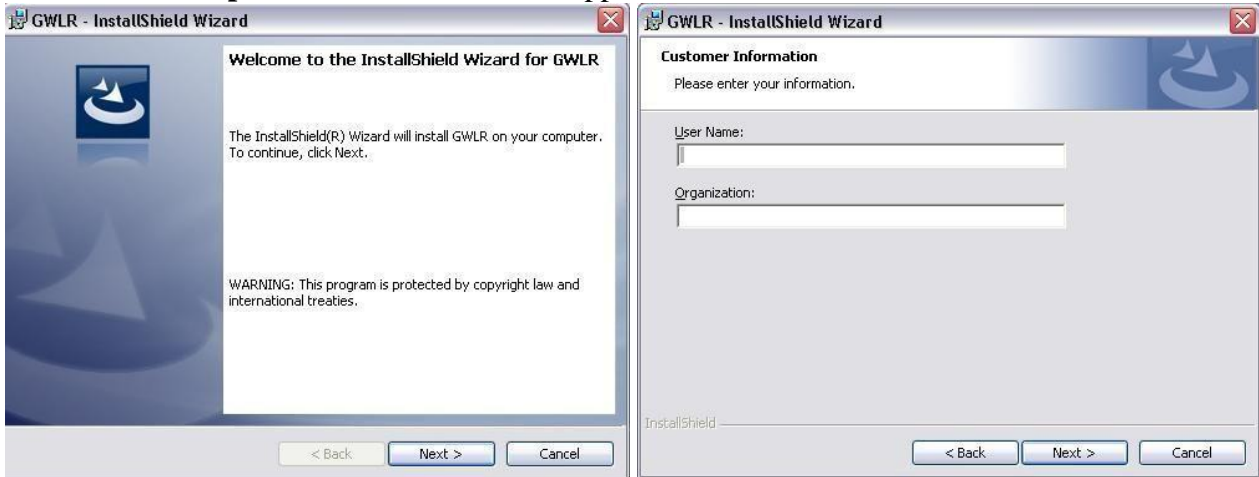| **CLEAR SYS<br>MEMORY?** |
| --- |

Following message will appear on the LCD screen after the Memory cleared. Press Esc command button for exit from this menu.

| **MEMORY<br>CLEARED PRESS** |
| --- |

Install LEW ware Application Software from CD:

Now run **Setup.exe** to install LEW ware application software.  Follow the instructions.



**GWLR - InstallShield Wizard**

Welcome to the InstallShield Wizard for GWLR

The InstallShield(R) Wizard will install GWLR on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

< Back | Next > | Cancel

**GWLR - InstallShield Wizard**

Customer Information

Please enter your information.

User Name:

Organization:

InstallShield

< Back | Next > | Cancel

**GWLR - InstallShield Wizard**

Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install GWLR to:
C:\Program Files\Virtual Electronics Co.\GWLR\

Change...

InstallShield

< Back | Next > | Cancel

**GWLR - InstallShield Wizard**

Setup Type

Choose the setup type that best suits your needs.

Please select a setup type.

◉ Complete
All program features will be installed. (Requires the most disk space.)

○ Custom
Choose which program features you want installed and where they will be installed. Recommended for advanced users.

InstallShield

< Back | Next > | Cancel

**GWLR - InstallShield Wizard**

Ready to Install the Program

The wizard is ready to begin installation.

Click Install to begin the installation.

If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

InstallShield

< Back | Install | Cancel

**GWLR - InstallShield Wizard**

Installing GWLR

The program features you selected are being installed.

Please wait while the InstallShield Wizard installs GWLR. This may take several minutes.

Status:

InstallShield

< Back | Next > | Cancel

**GWLR - InstallShield Wizard**

InstallShield Wizard Completed

The InstallShield Wizard has successfully installed GWLR. Click Finish to exit the wizard.

☐ Launch GWLR

< Back | Finish | Cancel

After installation of lew ware, click finish to complete the installation.

Now, connect data shuttle to your computers USB port, the computer will detect new hardware. Install the USB driver of Data shuttle from CD.

**Install USB Driver of Data shuttle from lew ware CD:**

Connect your Data Shuttle's USB Port to Computers USB port through USB cable as shown in



USB PORT

Image below.



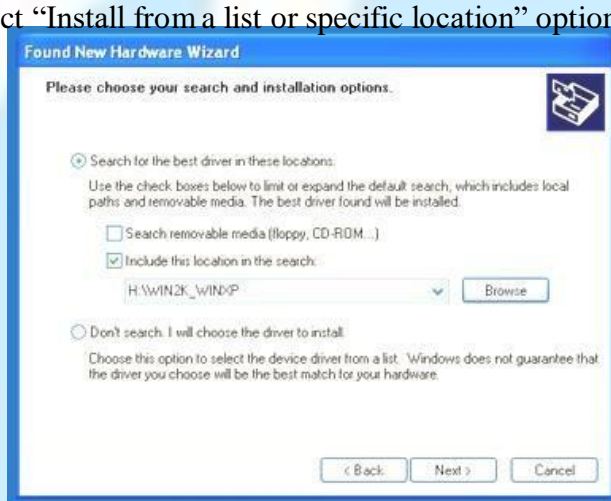Now connect another end of USB cable to Computers USB Port as shown in following Images.



After this your Computer will display a message "New Hardware Found"

Select "No, Not this time" option and press next

Select "Install from a list or specific location" option and press next





Select "Search for the best driver in these locations" option and press Browse
Select the path of USB driver Folder from LEW ware CD and press OK
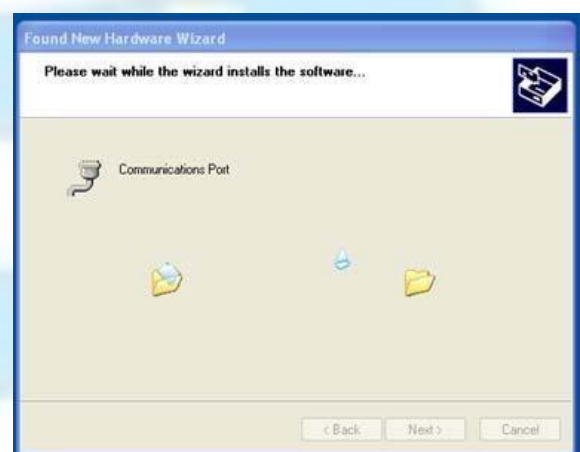




Now press Next Button

Above screen will display

Following warning will display in-between, Press "Continue Anyway" button & Screen will display

after completion, Press "Finish" button

Your computer will show following message



## Using lew ware-Automatic Weather Station Software:

Before running lew ware Automatic Weather Station Software follow the following steps for COM Port Selection.

### COM Port Selection Procedure

After installation of data Shuttle USB driver (per steps given in the instruction manual) remove the Data shuttle from the computer & right click on the My Computer Icon on Desktop.



Click on the properties & Click Hardware TAB, Now Click on Device Manager Button Following Screen will appear.
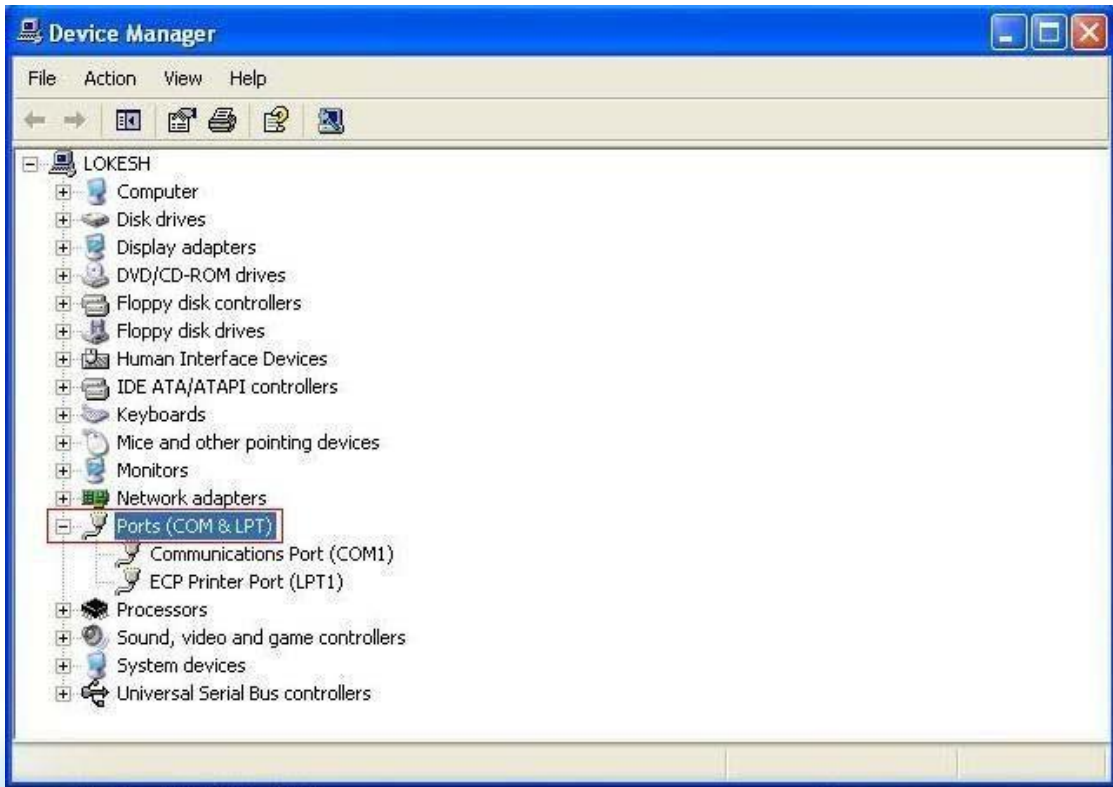
Now click on Ports (COM & LPT), it will expand like above image.

Now again connect Data Shuttle to the computer it will show to which COM Port Data Shuttle got Connected as below image shows Data Shuttle Connected on COM 4
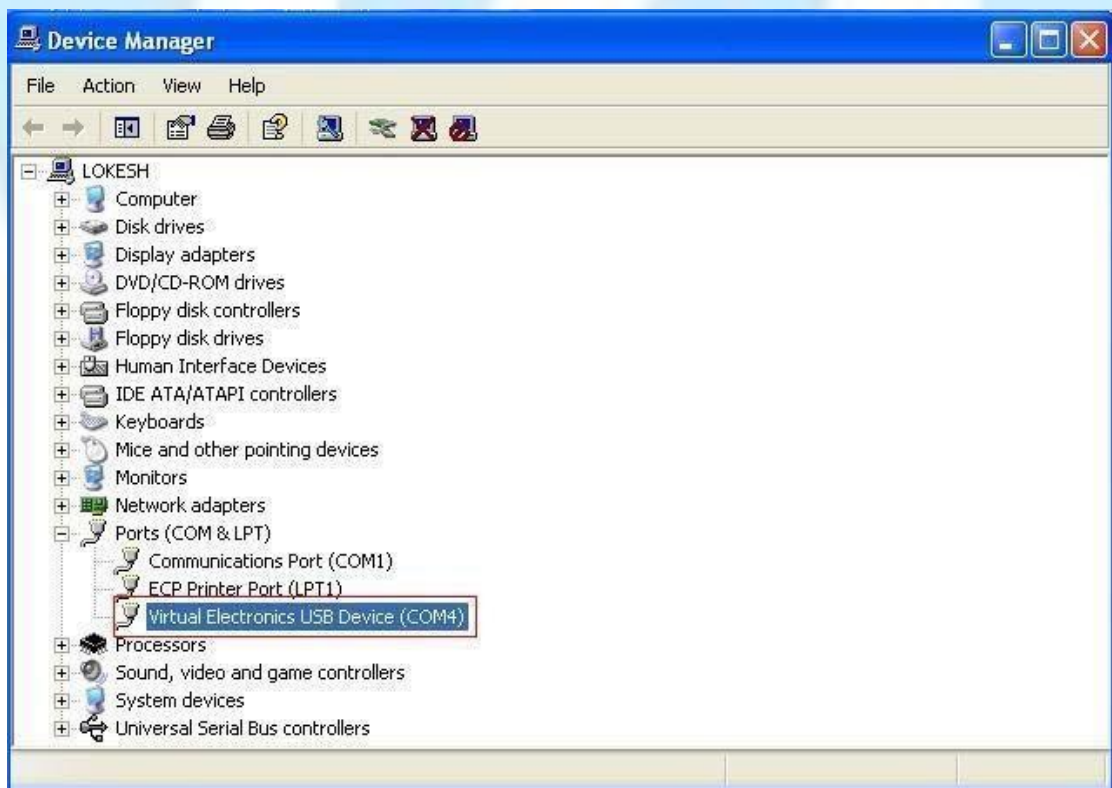


Now Run lew ware Automatic Weather Station Software as per steps given in the instruction manual below & in COM Port Selection menu select this COM Number (it can vary from 1 to 16,

depends on which com-port it got connected if assigned COM-Port above 16 then follow the below steps to change the COM Port No.)

**Changing COM port assigned number**

Systems automatically assigns a COM port number when you plug-in device. In case you wish to change the assigned number, you can follow below steps.
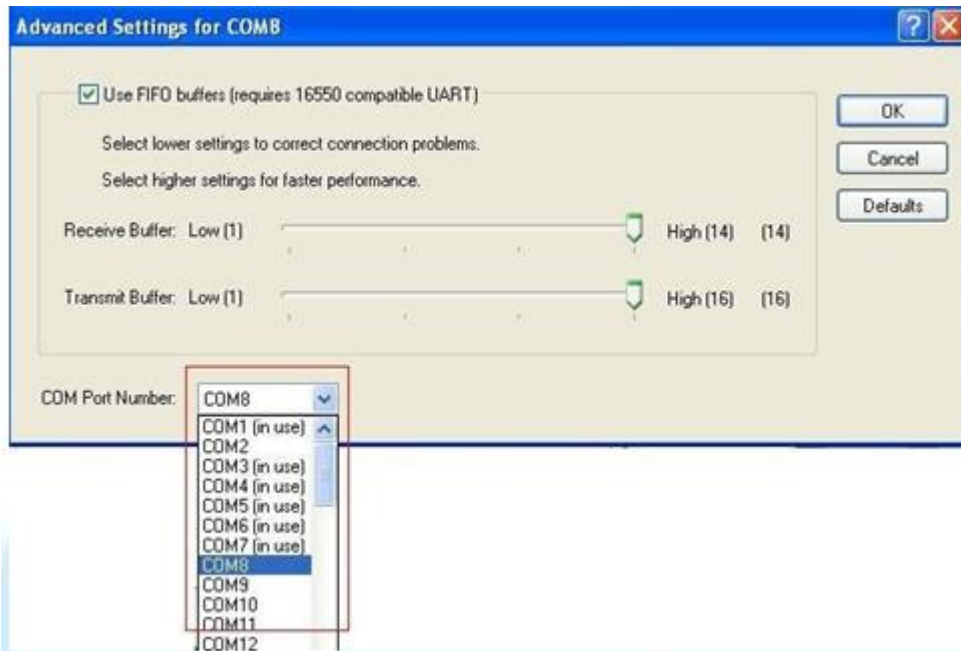
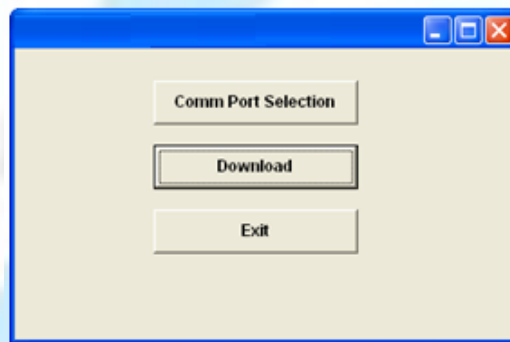1. Right click on installed port and click properties
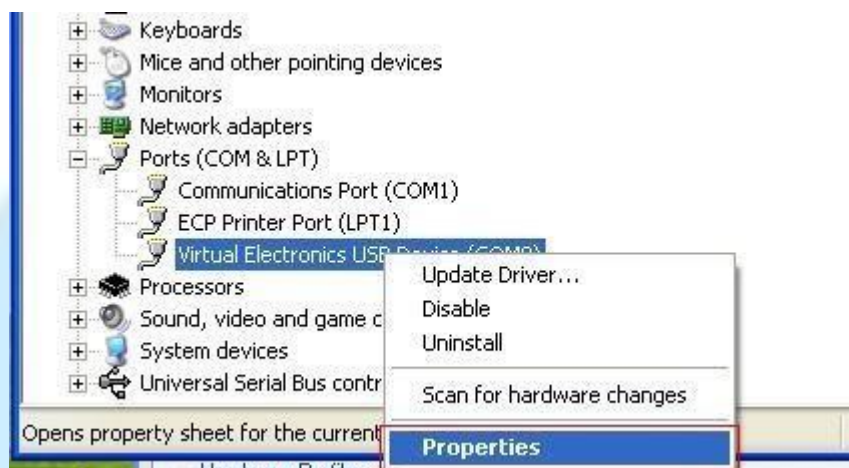


2. Click on advanced in Port Setting tab
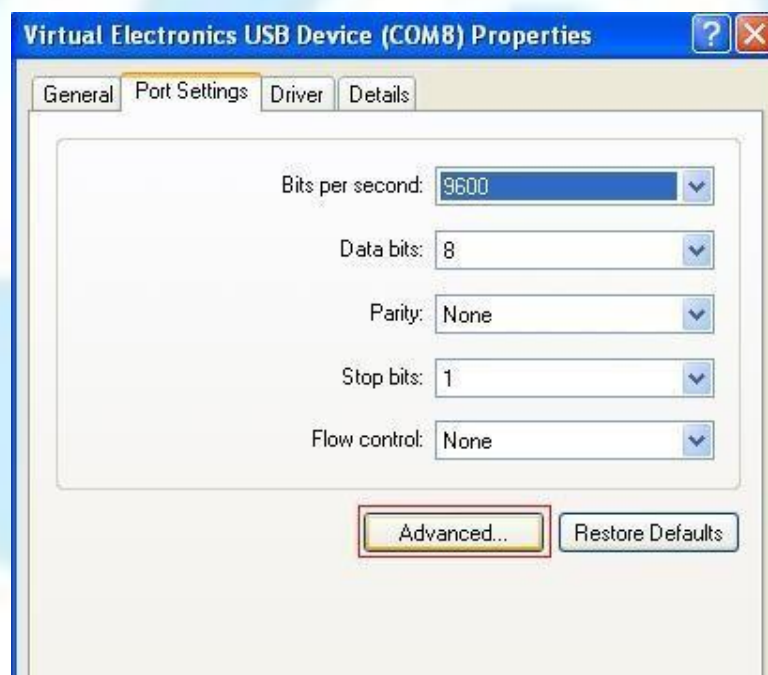


3. Select a new / unused (generally between 10 to 16) COM port and click OK

Run lew ware-Automatic Weather Station icon from desktop.

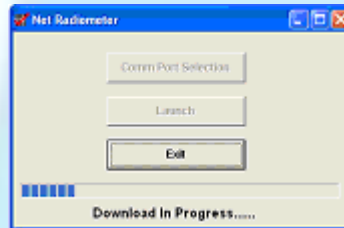Following screen will appear.



Now press Comm Port Selection button. Following screen will appear.



Now select your active COM Port and press OK button. Now Press Download Button, Following screen will appear.

Now select your desired location and file name and press open button. Following screen will appear.



Now data is downloading from data shuttle to computer. After completion of download. Following screen will appear.
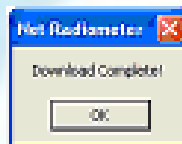


Now press OK & then Exit button to exit from lew ware

**Maintenance:**

☐ Inspect and clean the Sensor at regular intervals, e.g. every month. Cleans any accumulated dust, etc using soft cloth dampened with water.

☐ Replace the batteries after 1.5 years

**Precautions:**

☐ Ensure that all transducer cables are securely laid out and the cables are not hanging between supports.

☐ It is also important to check the data returned from the sensor, as it will show the first indication of a fault.

☐ Prevent data logger from direct sunlight.

☐ Do not Transport logger with Batteries.

☐ Allow about 10-15 seconds time between a switch OFF / ON sequence to allow the internal power supplies to stabilize.

**Factory Warrantee:**

- This instrument has been extensively tested before dispatch. The instrument is factory warranted for a period of one year from the date of dispatch against component replacement services. No responsibility is however accepted for any consequential damage. The warranty will however be null and void if the instrument is tampered with and effort is made to tamper with the circuits inside.

- **Within one year of the date of purchase**, i) any replacements for components will be chargeable with the prices at the time of replacement. ii) Factory services, related to replacement executed free of charge by Company.

- This warranty does not cover any form of damage resulting from natural calamites, weathering, accident, misuse, application of incorrect voltage or any use contrary to the operation instruction supplied with the equipment.

- Company will not accept any responsibility for damage arising out of unauthorized modifications of alterations of any nature made to the equipment.

- The company will not accept any responsibility for damage or loss incurred during transit of the equipment.

- This warranty does not cover the cost of transportation of the equipment from the place of installation to the Company.