# aptos MAC DTU Data Transfer Unit User Manual

**Contents**

**Aptos MAC™ DTU Data Transfer Unit User Manual**

## Important Safety Information

### Read this First

This manual includes important instructions for installing and maintaining the Aptos Data Transfer Unit (MAC™ DTU).

### Safety Instructions

| Symbol | Usage |
|--------|-------|
| **DANGER** | Indicates a hazardous situation that can result in deadly electric shock hazards, other serious physical injuries, or fire hazards. |
| **WARNING** | Indicates directions that must be fully understood and followed entirely to avoid potential safety hazards including equipment damage or personal injury. |
| **CAUTION** | Indicates that the described operation must not be carried out. The reader should stop, use caution, and fully understand the operations explained before proceeding. |

- Note that only professionals can install or replace DTU.
- Do not try to repair DTU without approval from Aptos. If DTU is damaged, please return to your installer for repairing/replacing. Disassembling DTU without approval from Aptos will invalidate remaining of the warranty period.
- Please read all instructions, warnings, and technical specifications carefully.
- Do not use Aptos products in ways unspecified by manufacturer. Doing so may result death/injury to persons or damage to equipment.

**User**

This manual is only for professional installation and maintenance personnel to use.

**Support and Contact Information**

If you have technical queries concerning our products, please contact your installer or distributor. If further support is required, please contact Aptos' support at this link.

- **www.aptossolar.com**
- Aptos customer service center: **info@aptossolar.com**

**Other Information**

Product information is subject to change without notice. The user manual will be updated frequently; please refer to Aptos Solar Technology's official website at **www.aptossolar.com** for the latest version.

## Aptos Solar Technology Microinverter System

**Microinverter**

The Microinverter converts the DC output of PV modules into grid-compliant AC power. It sends the output information of PV modules and the operation data of the microinverters to the DTU, which is the hardware basis of the module-level monitoring. With conversion efficiency up to 96.7%and MPPT efficiency up to 99.9%, Aptos microinverters rank in the first class of the world's microinverter industry.

**DTU**

The DTU is the key component in Aptos microinverter system. It works as the communication gateway, which operates between the Aptos microinverters and the Aptos Monitoring Server. The DTU communicates with the microinverter wirelessly via 2.4GHz Proprietary RF (Nordic), collecting the operation data of the system. Meanwhile, the DTU connects to the Internet via router and communicates with Aptos Monitoring Server. The microinverter system operation data will be uploaded to Aptos Monitoring Server via DTU.
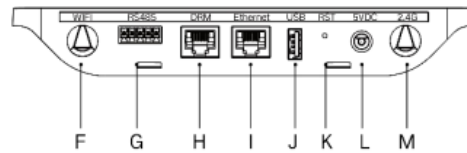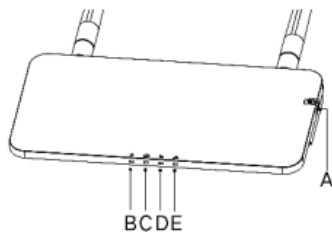
**Aptos Monitoring Server**

The Aptos Monitoring Server collects the operation data and status of the microinverters in the system and provides the module-level monitoring for the users and maintenance staff. The following diagram shows the Aptos Microinverter system:
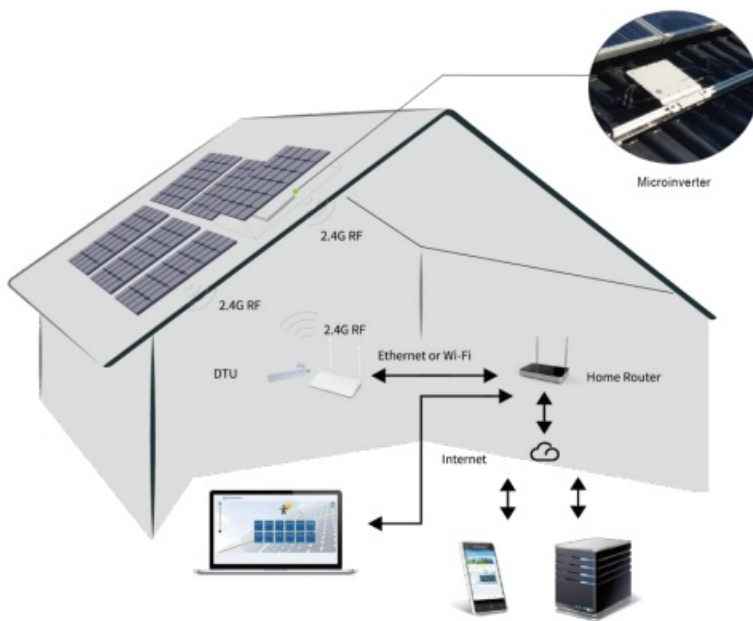


# Interface Layout

**Interface Layout**

| Item | Description |
|------|-------------|
| A | SD Card Slot |
| B | DTU Power Indicator |
| C | DTU Communication Indicator (With Server) |
| D | DTU Communication Indicator (With MI) |
| E | DTU Alarm Indicator |
| F | WiFi Antenna (2.4G) |
| G | RS485 |
| H | DRM Port (For Australia only) |
| I | Ethernet Port |
| J | USB Port |
| K | Reset Bottom |
| L | Power Port |
| M | 2.4G Antenna |

**Export Management Function (RS485 port)**

a. Device Required.

- Aptos Microinverter: 2-in-1 Unit and Single Unit
- DTU: MAC™ DTU:
- Meter: Chint Meter (DDSU666)/Chint Meter (DTSU666)/CCS WattNode Meter

b. Export Control Type

- Type 1: Zero Export: to limit the exporting power to zero so that it can prevent the generated power feed back to the grid.
- Type 2: Export Limit: to limit the exporting power within a certain value.
- Type 3: Production and Consumption Monitoring: enable to measure the PV generating under a high accuracy.

c. Installation Diagram.
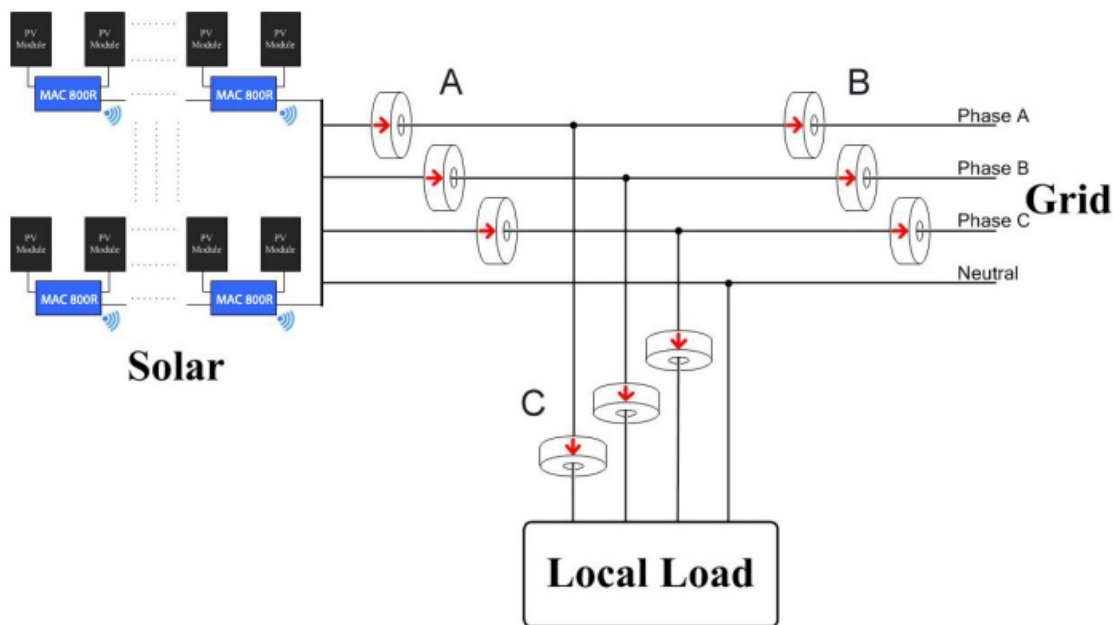
**Note:** Please refer to "Aptos Export Management Technical Note" for more details.

**Remote Active Power Control (RS485 port)**

Some countries require generating plants to be equipped with a logic interface (input port) in order to cease output active power or limit active power to a regulating level. This logic input can be RS485 port, Ethernet port, etc. MACTM DTU provide RTU Modbus protocol over RS485 port for this remote active power control. For more information, please refer to "Modbus implementation Technical Note".

**DRM Port**

DRM port is provided to support several demand response modes as below by connecting external control device with a standard RJ-45 connector. For MACTM DTU, it can support DRM0/5/6/7/8 if used with Aptos microinverters.

| Mode | Requirement |
|------|-------------|
| DRM0 | Operate the disconnection device |
| DRM1 | Do not consume power |
| DRM2 | Do not consume at more than 50% of rated power |
| DRM3 | Do not consume at more than 75% of rated power AND Source reactive power if capable |
| DRM4 | Increase power consumption (subject to constraints from other active DRMs) |
| DRM5 | Do not generate power |
| DRM6 | Do not generate at more than 50% of rated power |
| DRM7 | Do not generate at more than 75% of rated power AND Sink reactive power if capable |
| DRM8 | Increase power generation (subject to constraints from other active DRMs) |

**Local Install Assistant**

Local Install Assistant is a new function integrated with MACTM™ DTU. Please download the Installer App (for installer/distributor use only) first.

MAC™ DTU has improved from the previous generation of DTU products. New functions allow installer to:

a. One step to complete the WiFi configuration;

b. Station overall Inverters status indication allows the installer to see how many MI underthis DTU is working properly (and the details for each MI) and how many is abnormal (and the details for each MI) with one glance of eyes;

c. Add the Connection status, which will display the signal strength between each MI with connected DTU, so that installer can adjust the DTU installation location accordingly. This function will simplify the DTU installation, and avoid a second visit by the installler due to a poor connection between DTU and certain MI.

**Note:** Please refer to "Aptos Local Install Assistant Technical Note" for more details.

## DTU Installation

### System Capacity

The MAC™ DTU is capable of monitoring up to 99 panels. If the communication between the DTU and microinverter caused by the installation conditions, the number of PV modules that the DTU can monitor may be reduced.

**Note:** Max. monitoring quantity is for open space, installation condition meets the requirement from both DTU and Microinverter manual, and the distance between Microinverter and DTU needs to be within the required range.

### Basic Conditions Required

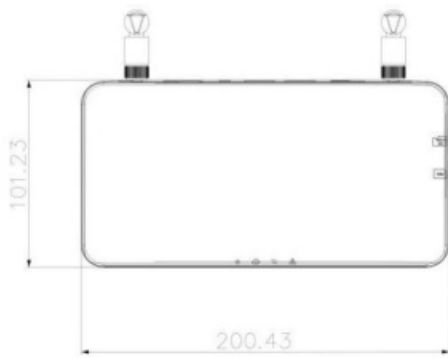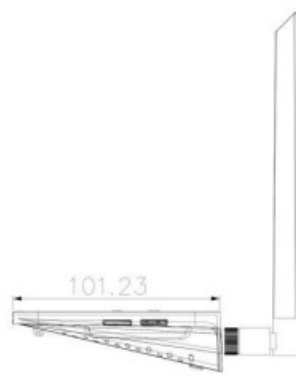Before installing the DTU, ensure that the site meets the following requirements:

- Standard 220 VAC power outlet.
- Stable broadband internet connection.
- Router with Ethernet port.

The environmental requirements for DTU installation:

- Away from dust, liquid, acidic, or corrosive gas.
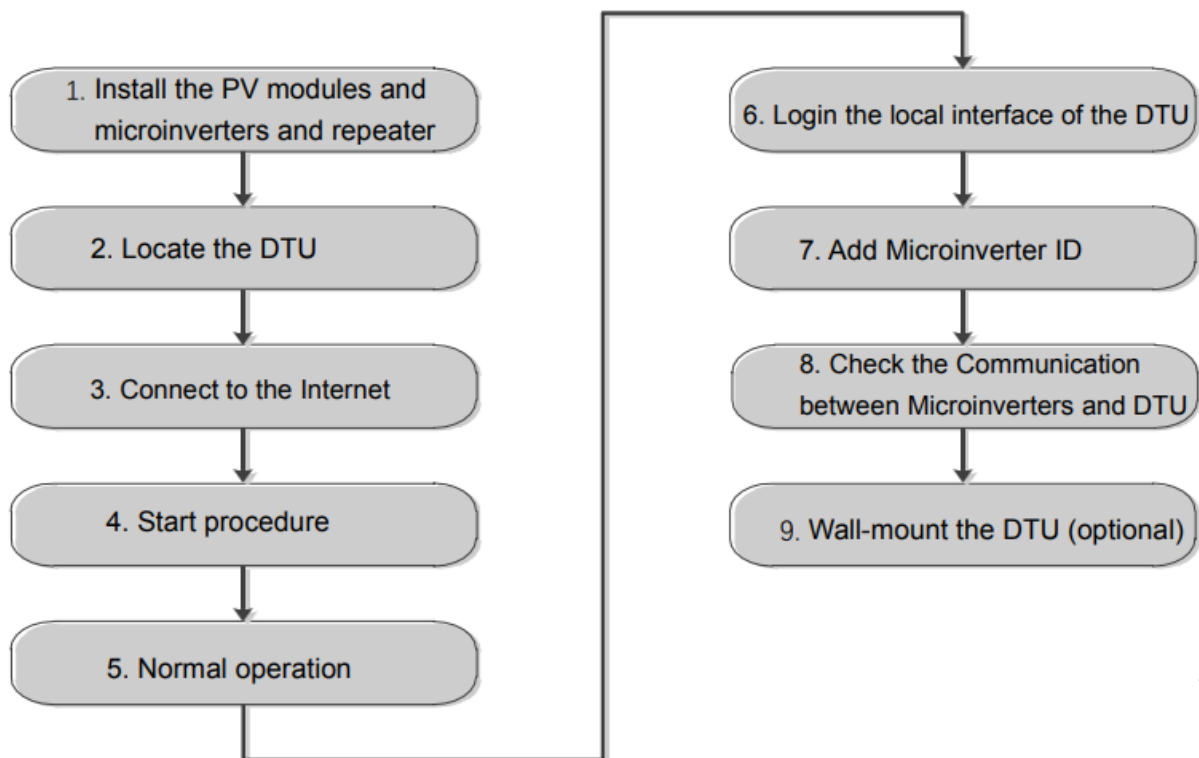- The temperature should be between -20ºC and 55ºC.

If you plan to install the DTU on the wall, please prepared two #8 (4.166mm diameter) screws and a screwdriver in advance.

### Dimensions

(Unit: mm)

**System Installation Sequence**



1. Install the PV modules and microinverters and repeater

2. Locate the DTU

3. Connect to the Internet

4. Start procedure

5. Normal operation

6. Login the local interface of the DTU

7. Add Microinverter ID

8. Check the Communication between Microinverters and DTU

9. Wall-mount the DTU (optional)

**Preparation**

A. Download the **Aptos** mobile App

B. Check the box for following items:

- Aptos MAC™ DTU
- Two Antennas
- Adapter
- Bracket
- 5-Pin Plug

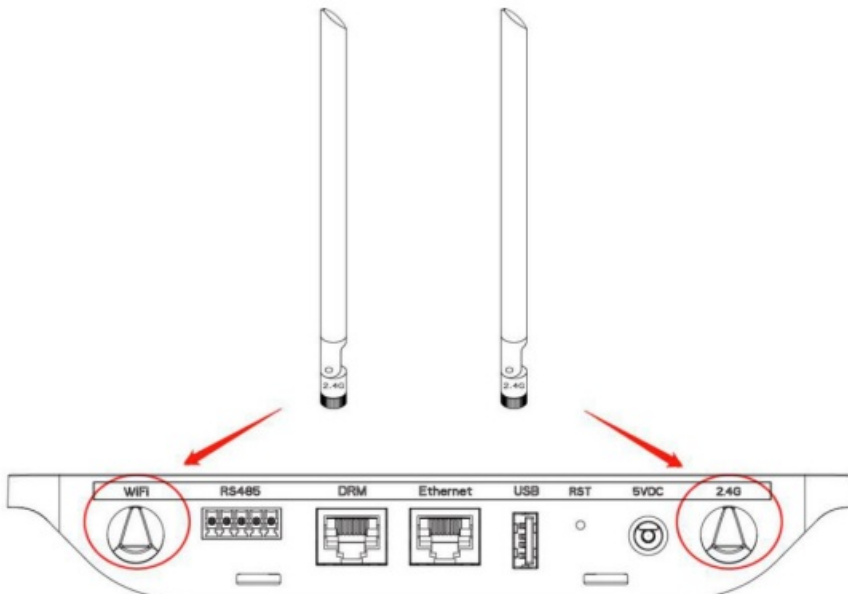C. Choose the way MACTM DTU connects to the Internet:
Use WiFi or Ethernet. Please prepare for the following items, if needed:

- Ethernet Cable (for Ethernet option).
- Aptos Installer App.

**Install the DTU**

**Step 1:** Install the antennas
Take two 2.4G antennas out from the box. Screw the antenna into the WiFi port and 2.4G port.



**Note:** If the DTU installation location is inside the metal box or under the metal / concrete roof, extended 2.4G cable or 2.4G sucker antenna will be suggested, which can be purchased from Aptos or local electrical store (Please contact Aptos Tech. support team for the detail type of the cable or antenna at **info@aptossolar.com** ).

**Step 2:** Choose an Installation Location

- Installed on the top floor to increase the signal strength.
- Installed near the center of the PV array.
- Installed at least 0.5m above the ground and more than 0.8m away from the corner.

**Note:** To prevent signal dilution, do not install the DTU directly above metal or concrete.

**Step 3:** Choose the Installation Method

**Option 1:** Mount the DTU on the wall.

- Screw the bracket on the wall. Choose at least two screw holes (one from each side) to affix the bracket (the M4 screws need to prepare by installer);
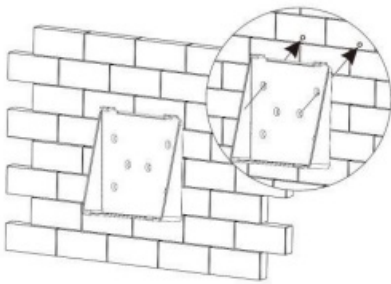


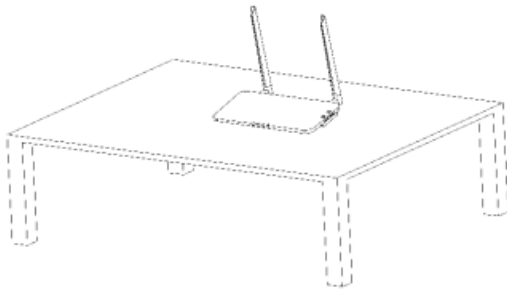- Match the brackets upper buckle with MAC™ DTU;



- Match the brackets lower buckle by gently press the lower side of the MACTM DTU until you hear a click. Please make sure the antennas are vertical to the wall.
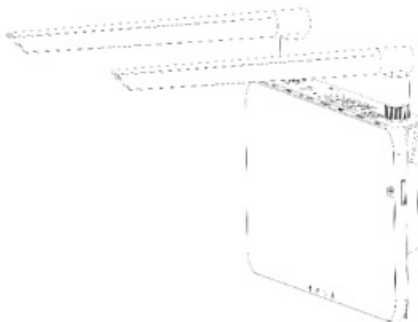


**Option 2:** Place the DTU on the table

- Place DTU on the table. Ensure the antennas are vertical to the table;



a. Plug in the power adapter to power the DTU;
b. Set up with Internet.


a. Use a smart phone or tablet to open the Installer App and log-in. Approach to "Me" on the bottom of the page and then "Network Configuration". Complete the WiFi configuration (for WiFi option);
b. Use the LAN cable. Connect one side with the house router and the other side with the DTU Ethernet port
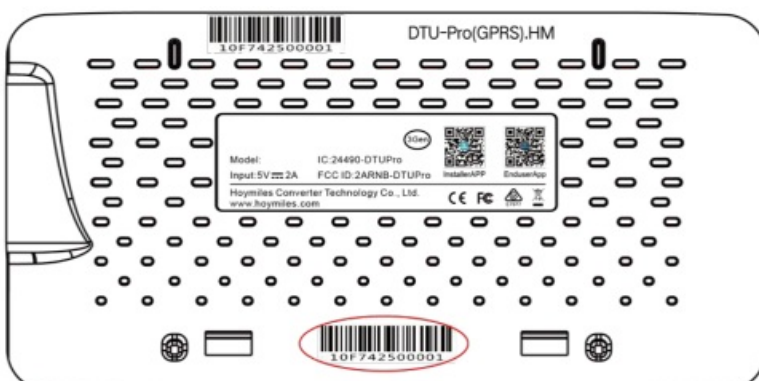

Use the smart phone/tablet to open the Installer App and login. Approach to "Me" on the bottom of the page and then "Network Configuration", select "Ethernet" (for Ethernet option).
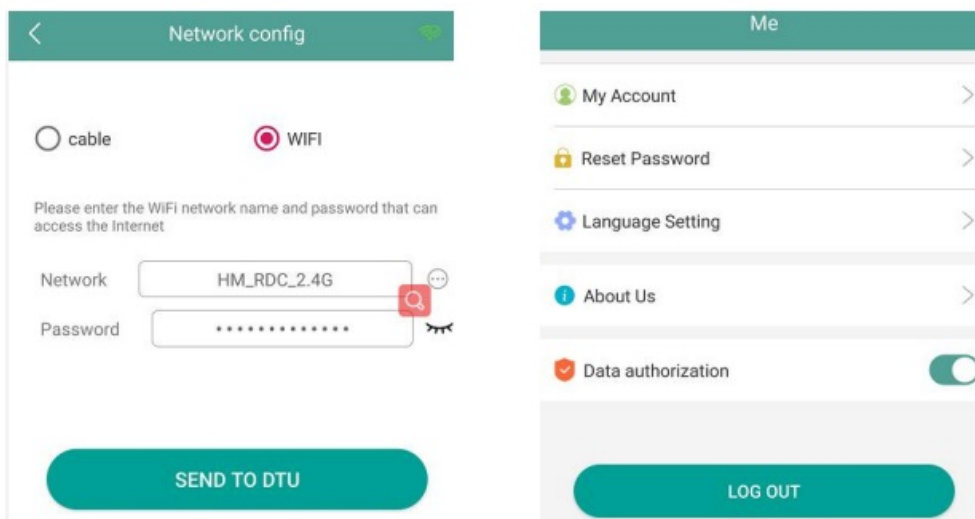


## Complete Installation Map


Please complete the installation map.


A) Peel the serial number label (as circled below) from the DTU and place it on the installation map.

B) Complete system information of the installation map shown as follows.



## Site Creation on HMP

A. Install Aptos Installer APP by searching "Aptos" at the App Store (IOS) or Play Store (Android).

B. Open the APP and login in with your installer account name and password. If you are a new installer with Aptos, please apply an Installer account from your distributor in advance.

C. Add Station, select the "Station" tab on the bottom, then select "⊕" on the right top side of the page.

D. Select "Quick" for Single-DTU and "Profession" for Multi-DTU.

E. Please fill in the station details accordingly, and press "Next" after completed.

F. Press "Add DTU ID", scan the DTU ID (or you can manually input ID) and press "Next" after complete.

G. Click "Start binding" and choose the angle and tilt base on the installation.

H. Scan the Microinverter ID (or manually input the ID) and click the check box after completing each ID input. Press "Finish" once all Microinverter ID has been input.

I. Disable the Scan function on the top of the right-hand side and design the Layout base on the installation. Click the tick box on the top of the right-hand side. Then select "Next" after completing the design.

J. Upload a picture of the site and select "Finish" to complete the site creation.

K. The new site will appear on the Station list from the Installer account.

L. Please click the "Networking" button after the power station is created.

M.Please wait about 30 minutes, the station will show online, and all the MI-IDs are found.

**Customer Login**

a. Please download the End User App. You can search "Aptos" at the App Store (IOS) or Play Store (Android).

b. Log in with the Password and Username that has been set up by Installer on the previous step (Section 6, step e), and press "Login".

c. Customers can view all details once data uploads. Estimated time: 30 minutes.

d. Customer can also view the Microinverter generating details by accessing the Aptos monitoring platform website at **https://world.hoymiles.com**.

**Browse the Web Station**

Log in your account and browse the web station.



**View Phone APP**

Download mobile phone application to view station information
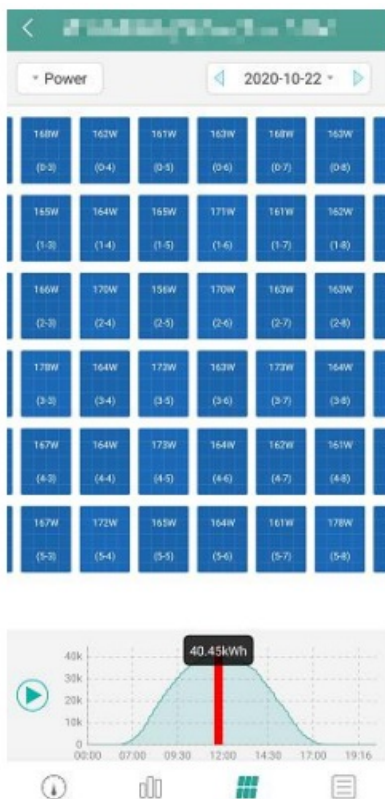
## LED Indicators

The system status can be viewed by Aptos local APP or LED indicators.

| LED mark | LED Color | Explanation |
|---|---|---|
| ⏻ | 🟩 | DTU power on or power off |
| ☁ | 🟩 | Network communication |
| ⇄ | 🟩 | Microinverter communication |
| ⚠ | 🟥 | Fault State |

## LED States

| LED Indicator | Status | Description |
|---|---|---|

| LED | Indicator | Status |
|---|---|---|
| All |  | Firmware upgrading |
| |  | Starting up |
| ⏻ | (solid green) | DTU power on |
| | (off) | DTU power off |
| ☁ | (solid green) | DTU are communicating with Aptos Monitoring Server |
| | (fast blink) | Internet disconnected |
| | (slow blink) | Internet connected, Server disconnected |
| | (intermittent blink) | Local APP connected |
| ⇄ | (solid green) | Microinverters are communicating |
| | (fast blink) | MI IDs Incomplete |
| | (slow blink) | No MI ID (Please perform Networking) |
| ⚠ | (off) | Normal |
| | (fast red blink) | DTU alarm occurred |
| | (red blink) | Microinverter alarm occurred |
| | (slow red blink) | Meter alarm occurred |

**Technical Data**

| Model | MAC™ DTU |
|---|---|
| Type | 2.4GHz Proprietary RF (Nordic) |
| Maximum distance (open space) | 200m |
| Monitoring data limit from solar panels | $99^2$ |
| **Communication to Cloud** | |
| Type | WIFI(802.11b/g/n)[1]/Ethernet |
| Sample rate | Per 15 minutes |
| **Communication to Meter** | |
| Signal | RS485 |
| Maximum distance (RS485 cable) | 500m |
| **Display** | |
| LED | LED Indicator * 4 – RUN, Cloud, MI, ALM |
| APP | Local APP |
| **Power Supply** | |
| Type | External plug-in adapter |

| | |
|---|---|
| Adapter input voltage/frequency | 100 to 240 V AC / 50 or 60Hz |
| Adapter output voltage/current | 5V / 2A |
| Power consumption | 2.5W (typical), 5W (maximum) |
| **Mechanical Data** | |
| Ambient temperature (℃) | -20℃ to 55℃ |
| Dimensions (W×H×D) | 200mm×101mm×29mm |
| Weight | 0.20 kg |
| Mounting system | Wall mounting / Desktop mounting |
| **Features** | |
| Compliance | FCC 15B, FCC 15C, EN60950-1, EN61000-3-2, EN61000-3-3, EN301489, EN300328, EN300440, RCM |

*1 If the DTU installation location is inside the metal box or under the metal/concrete roof, extended antenna will be suggested.

*2 Depending on the installation environment, please refer to user manual for more details.

## Documents / Resources

aptos MAC DTU Data Transfer Unit [pdf] User Manual
MAC DTU, Data Transfer Unit, MAC DTU Data Transfer Unit

## References

- **User Manual**