### Product Specification

7/2018

<table>
<thead>
<tr>
<th>Product</th>
<th>TFT Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>APT TFT850C</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>850C</td>
</tr>
</tbody>
</table>

**Client**

**Supplier**

Tianjin APT Science and Technology Co., Ltd.

1001, Building 5 HuaDing, No.1 HuaKe 3 Road, Binhai hi-tech Industrial Development Zone, Tianjin, China

**Tel**

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**Email**

yzhao@aptdevelop.com
1. **Product Name**
   - TFT display
   - Model: APT TFT 850C

2. **Suppliers**
   - Tianjin APT Science and Technology Co., Ltd.
   - Email: yzhao@aptdevelop.com  apt@aptdevelop.com

3. **Electrical Parameters**
   - 3.2 inch IPS screen
   - 24V/36V/48V battery supply
   - Rated operating current: 40mA
   - Max operating current: 100mA (36V battery, with USB equipment changed)
   - USB changing port: 5V 500mA
   - Off leakage current < 1uA
   - Max output current to controller: 100mA
   - Operating temperature: -20～70℃, Storage temperature: -30～80℃

4. **Dimensions & Material**
   - Product shell is ABS, transparent window is made with high strength Acrylic.
   - Dimensions: host/L92mm*W60mm*H14mm

5. **Features**
 Suitable for low temperature, Max -20℃.
 High-contrast 3.2inch IPS colorful matrix screen.
 Ergonomic external button design, easy to operate.
 **Speed display** : AVG SPEED, MAX SPEED, SPEED(Real-time).
 **Kilometer / Mile** : Can be set according to customers’ habits.
 **Smart battery indicator** : Provide a reliable battery indicator.
 **9-level Assist** : 3-level/5-level/9-level optional.
 **Mileage indicator** : Odometer/Trip distance/ Clock/ Riding time.
 **Power indicator** : real time power indicator, digital or analog.
 **Battery information**  (needs to be supported by battery communication)
 **DST indicator**  (needs to be supported by battery communication)
 **Self-Testing**
 **Error code indicator.**
 **Software upgraded** : Software can be upgraded through UART.
 **USB charging port** : 5V/500mA

6. **TFT screen instructions**
7. Functional Description

7.1 Power On/Off

Press and hold the Power button for 1 second can turn on/off the display. The Display can automatically shut down when there is no operate & ride for X minutes (X could be 0~9).

*If the display has been set password power on, you need to input the right password before start.

7.2 Assist level operating

Short press the UP/DOWN button can change the assist level. Top assist level is 5, 0 for neutral. Level quantities can be adjusted according to the customer requirements.

7.3 Speed & Mileage mode switch

Short press the POWER button can change the speed and mileage mode, TRIP->ODO->RANGE-> TRIP -> TIME -> MAX SPD->AVG SPD.
**If there is no operation for 10 seconds, display will return Speed (Real-Time) display automatically.**

### 7.4 Headlight/backlight On/Off

Press and hold **UP** button for 1 second can turn on/off the headlight, and the screen will switch to the corresponding mode.

*The motor does not work when the battery voltage is low, Display still can keep the headlight on for a while when E-bike is in riding.*

### 7.5 Walking mode (6km)

Press and hold **DOWN** button for 2 seconds can get into walking mode, out of the mode when release the button.
7.6 Data cleanup

Press and hold [UP & DOWN] buttons together for 1 second can reset several temporary data, temporary data include AVG Speed / MAX Speed / Trip / Time.

* These temporary data can’t be erased by power off.

8. Parameter setting

Double press [POWER] button (press interval less than 0.3 second) can get into setting menus, press [UP/DOWN] buttons to change the parameter setting, press [POWER] button can switch to next item. Double press [POWER] button will exit from menu.

* Display will automatically quit menu when there is no operation for 30 seconds.

* For safety reasons, display can’t get into MENU when riding.

* Display will quit MENU when start riding.

The order of parameters are as follow.

```
Language  System  Brightness  Auto off  Scenes
Start password  Clock  Pow Ind  Battery IND
```

8.1 Language: Nonadjustable.
8.2 System: Press Up / Down button to switch between Metric / Imperial.

8.3 Brightness: Press Up / Down button to change the brightness of the backlight, 0 is darkness, 11111 is brightness. Daytime mode default 11111, night mode default 0.

8.4 Auto off: Press UP/DOWN button to change the auto power off time, from 1 to 9 and OFF, the number represent time (minutes) to shutdown, default value is 5 minutes.
8.5 Scenes : Nonadjustable.

8.6 Battery Ind : Press UP/DOWN button to change the battery indicator, Voltage / Percentage / OFF.

*Accurate percentage needs communication with battery.

8.7 Pow Ind : Press UP/DOWN button to change the Power indicator, Power / Current.

* This data represent power output of the battery (not motor).
8.8 Clock: Clock setting, press POWER button get into the clock setting menu, press UP/DOWN button to set Year/Month/Day/Hour/Min/Sec.

8.9 Start password: Press POWER button get into the password setting menu. If you had set Start input ON, you must input right password before power on, password is accorded to your setting.
You need to input the right password before start with 30 seconds, display will power off automatically if the password was wrong.

**Basic Setting**

- Wheel
- Battery
- USB Port
- Light sensor
- Information
- Factory setting
- Advance setting

*Press DOWN button to move the red arrow to , press POWER button can show all items of the Basic Setting.*
8.10 **Wheel**: Press UP/DOWN can change the wheel setting, optional wheel diameter is 12/14/16/18/20/22/24/26/27.5/28/29/30/31 inch, 51cm~255cm represent wheel circumference (this needs controller support). Wrong value for wheel diameter will cause speed & mileage abnormal.

8.11 **Battery**: Press UP/DOWN will change battery voltage setting, optional value is 24V/36V/48V/Ube, UBE means user define value.

8.12 **USB**: press UP/DOWN button, select press OFF/ON. Will be no Voltage/Current output after switching off.

8.13 **Light sensor**: No light sensor, this item nonadjustable. Light sensor item, press POWER, enter into Light sensor interface, Press UP/DOWN button select OFF/ON: select Sensitivity. press UP/DOWN to Select sensitivity of light sensation HI/MID/LO.
8.14 **Advance setting**: Press POWER button can get into the advance setting menu, default password is '1919'.

8.15 **Speed limit**: Press UP/DOWN will change speed limit, range 10km/h~60km/h. Default value is 25km/h.
8.16 Current limit: Press UP/DOWN will change current limit, range 6A~50A. Default value is 15A.

*Speed limit and current limit are restricted by controller and motor.

8.17 Poles in motor: Magnetic poles inside the motor, press UP/DOWN will change pole number, range 1~10. Default value is 1.

8.18 Start after poles: How many poles (speed sensor) need to be detected by controller before starting motor. Default value is 3.
8.19 **Clockwise start**: This parameter represents the speed sensor turn direction, the default value is Y (forward).

8.20 **Throttle 6KM**: This parameter can set the throttle function, N represents max speed, Y represents 6Km.

8.21 **Throttle Level**: This parameter is functional when Throttle 6KM is set to N, pressing UP/DOWN will change Y/N. N represents Throttle start max speed, Y represents throttle's speed is according to the assist level.
8.22 **Start mode**: Pow/ECO/STD (default) represent Power/ECO/Standard, Power mode means use maximum current when speed up, ECO mode means use minimum current.

*This function is optional, may not supported by each mode.

8.23 **Assist levels**: This parameter can customize assist levels, options are 3/5/9/UBE, UBE represent factory default settings.

8.24 **Key antijam**: Press UP/DOWN to select Y or N, Y indicates key antijam effectiveness.
8.25 Factory setting: Press POWER button enter Restore Factory settings item, set YES will restore all parameter to factory settings.

8.26 Information: Show information of the E-bike.

8.27 Product info: Get into this item can show hardware version software version...
8.28 **Battery info**: Get into this item can show all information of battery, including Voltage, Capacity, Cycle times, Health, Temperature of battery, Remaining Capacity, Full Charge Capacity, Initial Capacity, **Max Charge Times**.

- **Information**
  - Speed
    - AVG: 15.4 Km/h
    - Max: 32.4 Km/h
  - Mileage
    - Trip: 9999.9 Km
    - ODO: 99999.9 Km
    - Range: 59.9 Km

- **Battery Information**
  - Voltage: 42.0V
  - Capacity: 100%
  - Cycle times: 5
  - Health: 95%
  - Temperature: 35 ℃
  - Remaining Capacity: 11400mAh
  - Full Charge Capacity: 11400mAh

*These information needs to be supported by battery communication.

8.29 **Self-Testing**: Get into this item can Self-testing, and show testing information of the BIKE, including Controller→PAS sensor→Speed sensor→Throttle→Motor hall sensor→Brake sensor. Follow the prompts requires the operator.

- **Last Test Info**
  - Step 6-1 **Controller** OK
  - Step 6-2 **PAS sensor** OK
  - Step 6-3 **Speed sensor** OK
  - Step 6-4 **Throttle** **- -**
  - Step 6-5 **Motor hall sensor** **NG**
  - Step 6-6 **Brake sensor** OK

  **NEXT PAGE**

*This indicates ignore detection, NG test will not pass.

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  **NEXT PAGE**

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9. **Error Code define**

850C can show warning message, icon shows on the screen, and show error code at the bottom of the screen, error code from 01~25, definition see the table below.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error description</th>
<th>Handle</th>
</tr>
</thead>
<tbody>
<tr>
<td>01H</td>
<td>Communication checksum error</td>
<td>Check the cable connection</td>
</tr>
<tr>
<td>02H</td>
<td>Controller protection</td>
<td>Check three-phase power line.</td>
</tr>
<tr>
<td>03H</td>
<td>three-phase power error</td>
<td>Check three-phase power line connection</td>
</tr>
<tr>
<td>04H</td>
<td>Battery low</td>
<td>Charge the battery</td>
</tr>
<tr>
<td>05H</td>
<td>Brake error</td>
<td>Check the brake connection.</td>
</tr>
<tr>
<td>06H</td>
<td>Turn error</td>
<td>Check throttle and connection.</td>
</tr>
<tr>
<td>07H</td>
<td>Hall error</td>
<td>Check the hall connection</td>
</tr>
<tr>
<td>08-FFH</td>
<td>Reserved</td>
<td>Please contact the controller’s manufacturer for error definitions</td>
</tr>
<tr>
<td>30H</td>
<td>Communication Error</td>
<td>Check the cable connection</td>
</tr>
</tbody>
</table>

10. **Assembly instructions**

Please pay attention to the screw’s torque value, damaged caused by excessive torque is not within the scope of the warranty.
There are 2 directions for the clamp installation, forward or backward.

Clamps suit for 3 size of handlebar, 31.8mm, 25.4mm, 22.2mm, there are transfer rings for 25.4mm and 22.2mm, transfer ring must be assembled with the special directions, pay attention to the green arrow below.
11. Connector descriptions

1. Red wire: Anode (24v/36v/48V)
2. Blue wire: Power cord to the controller
3. Black wire: GND
4. Green wire: RxD (controller -> display)
5. Yellow wire: TxD (display -> controller)

12. Assist level instructions

Assist level can be customized, the highest level is 9, common used assist level see the table below:

<table>
<thead>
<tr>
<th>3 level</th>
<th>5 level</th>
<th>9 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
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<td>8</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

13. Certification
CE / IP65 (water proof) / ROHS.