1. **Product Name**
   - TFT LCD display
   - Model: APT TFT 500C

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

3. **Electrical Parameters**
   - 2.2inch IPS screen
   - 24V/36V/48V battery supply
   - Rated operating current: 40mA
   - Off leakage current < 1μA
   - Max output current to controller: 100mA
   - Operating temperature: -20°C to 70°C, Storage temperature: -30°C to 80°C

4. **Dimensions & Material**
   - Product shell is ABS, transparent window is made with high strength Acrylic.
   - Dimensions: host/L79mm*W40mm*H18mm

5. **Features**
   - Suitable for low temperature, Max -20°C.
   - High-contrast 2.2inch 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/Riding time.
 **Power indicator** : real time power indicator, digital or analog.
 **Speed limit value indicator**
 **Error code indicator**.
 **Software upgraded** : Software can be upgraded through UART.

6. **TFT screen instructions**

7. **Functional Description**
7.1 Power On/Off
Press and hold 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 UP/DOWN button can change the assist level. Top assist level is 9, 0 for neutral. Level quantities can be adjusted according to the customer requirements.

7.3 Speed & Mileage mode switch
Short press POWER button can change the speed and mileage mode, TRIP→TIME→ODO→AVG SPEED→MAX SPEED.

**If there is no operation for 5 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.

*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 second 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

Press **M** button (press no less than 2 second) can get into setting menus, press **UP/DOWN** buttons to change the parameter setting, press **M** button can switch to next item. Press **M** (press no less than 2 second) 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.

- **System**
  - Metric
  - Auto off 5 min
  - Battery Ind
  - Voltage

- **Brightness**
  - More >

- **Advanced Setting**
  - Wheel 27.5 inch
  - Speed Limit 25 km/h
  - Speed Poles 1
  - Start Poles 1
  - Assist 5
  - EXIT

8.1 **System** : Press Up / Down button to switch between Metric / Imperial.

8.2 **Brightness** : Press Up / Down button to change the brightness of the backlight,  is darkness,  is brightness.
8.3 **Auto off**: Press UP/DOWN button to change the auto power off time, from 1 to 9/OFF, the number represent time (minutes) to shutdown, OFF means disable auto off function, default value is 5 minutes.

8.4 **Battery**: Press UP/DOWN will change battery voltage setting, optional value is 24V/36V/48V.

8.5 **Battery Ind**: Press UP/DOWN button to change the battery indicator, Voltage / Percentage / OFF.  
*Accurate percentage needs communication with battery.

8.6 **Wheel**: Press UP/DOWN can change the wheel setting, optional wheel diameter is 12/14/16/18/20/22/24/26/27/27.5/28/29/30/31 inch.

8.7 **Advance setting**: Press M button can get into the advance setting menu, default password is ‘1919’.

8.8 **Speed limit**: Press UP/DOWN will change speed limit, range 10km/h~60km/h. Default value is 25km/h.
8.9 Poles in motor: This item is invalid.

8.10 Start after poles: This item is invalid.

8.11 Assist levels: This parameter can customize assist levels, options are 3/5/9.

9. Error Code define

500C can show warning message, icon shows on the screen, and show error code at the bottom of the screen, error code is from 21~30, definition see the table below.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error description</th>
<th>Handle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x21</td>
<td>Current protection</td>
<td>Check controller.</td>
</tr>
<tr>
<td>0x22</td>
<td>Throttle error</td>
<td>Check turn to connect.</td>
</tr>
<tr>
<td>0x23</td>
<td>three-phase power error</td>
<td>Check three-phase power line connection</td>
</tr>
<tr>
<td>0x24</td>
<td>Hall error</td>
<td>Check the hall connection</td>
</tr>
<tr>
<td>0x25</td>
<td>Brake error</td>
<td>Check the brake connection</td>
</tr>
<tr>
<td>26-99</td>
<td>Reserved</td>
<td>Please contact the manufacturer for error definitions</td>
</tr>
<tr>
<td>0x30</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.

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>Level</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No power assist</td>
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<td>-----------------</td>
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<tr>
<td>0</td>
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<td>6</td>
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<td>4</td>
<td>7</td>
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<tr>
<td></td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

13. **Certification**

CE / IP65 (water proof) / ROHS.