TUBU

SHENZHEN TUBU TECH CO., LTD

TB-T3L / H LED Intelligent Cruise Searchlight

USER MANUAL

Model: TB-T3L/H

Website: www.tu-bu.com

Email: sales@tu-bu.com

Table of Contents

Foreword

Chapter 1: Packing List & Device Assembly

1.1 Packing List

1.2 Device Assembly

Chapter 2: Precautions

Chapter 3: Operating Instructions

3.1 Connecting the Device and the Controller

3.2 Controller Operating Instructions

Chapter 4: Professional Control Commands

4.1 Device Command Description (Pelco-D)

4.2 Communication Parameter Settings

Chapter 5: Troubleshooting

Appendix I: Product Interface Description

Appendix II: Product Installation Dimensions

Foreword

Before installing this device, please read this user manual carefully and keep it in a safe place for future reference. All warnings on the device and in this manual must be observed.

Precautions

- Any incorrect wiring may cause permanent damage to the equipment. Make sure all devices are powered off before wiring.
- Communication cables between devices must use shielded twisted-pair cables. When routing cables, avoid high-voltage lines and other possible sources of interference.
- Operate the device within the temperature and humidity ranges specified in the technical specifications.
- Always follow the wiring instructions in this manual.

Disclaimer

The content described in this manual may differ from the version you are currently using. If you have any questions while using this manual, please contact our technical support for assistance. The content of this manual is subject to periodic updates without prior notice. The company reserves the right to make changes without notification.

Chapter 1: Packing List & Device Assembly

1.1 Packing List

Item	Quantity
Searchlight	1 pc
Pan/Tilt unit (PTZ)	1 pc
Hex key (Allen wrench)	1 pc
M16 stainless steel fixing bolts	4 sets
M5 hexagon socket studs	4 sets

1.2 Device Assembly

Step 1. Take out the PTZ unit and fix its base with the M16 stainless steel fixing bolts. Keep the base as level as possible during installation.



Step 2. Lift the searchlight and engage the fixing plate with the PTZ arm slots. Pay attention to the direction of the lamp cable and the PTZ cable socket, then fasten with the M5 hexagon socket studs (with spring washers).





Step 3. Connect the searchlight power aviation plug to the socket on the upper side of the PTZ. The connectors must be aligned with the mating keyway when connecting.



Step 4. Connect the power and signal cables at the PTZ base, aligning the pin positions of each connector. The 3-core cable with plug is the power cable — connect it to the AC 220V mains supply; the multi-core network cable is the signal cable.



Chapter 2: Precautions

1. Before installing this device, read the user manual carefully and keep it properly for future use.
2. Observe all warnings on the device and in this manual.
3. The PTZ may be powered on separately for testing. Once the lamp is installed, the PTZ base must be fixed before any power-on test. Use only the power type and voltage specified in this manual — this product uses 220V AC power supply.
4. Make sure the main power switch of the device is turned off before connecting or disconnecting any input/output cable, to avoid personal injury and equipment damage.
5. Protect the input/output power cables to avoid personal injury or equipment damage caused by electric leakage or short circuit.
6. To prevent lightning strikes, install lightning protection devices that comply with applicable standards.
7. The device must be installed on a firm platform or bracket to avoid personal injury and equipment damage.
8. Make sure there are no obstacles around the device, so that the rotation path of the device is not blocked.
9. Avoid installing and using this product in locations that are excessively humid, dusty, sooty, or close to heat sources.
10. If the PTZ or the lamp emits an abnormal smell or smoke, stop using it immediately, cut off the power, and contact our company.
11. Opening the housing without authorization may cause electric shock or equipment damage. Do not attempt to repair it yourself — contact our company for all repair matters. Do not wipe the housing with organic solvents, as this may affect the sealing of the machine and cause water ingress.
12. Before powering on the device, all exposed wire harnesses must be insulated to avoid product damage caused by short circuit after power-on.

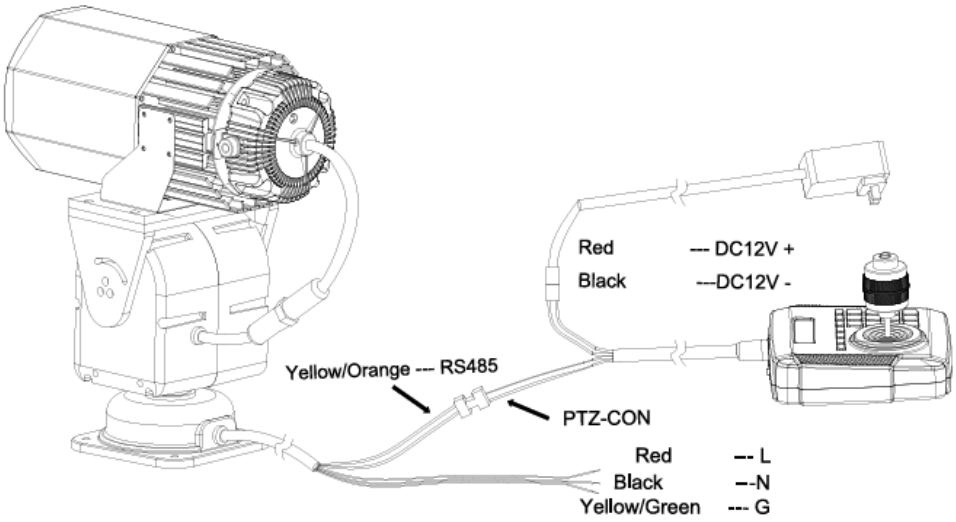
Chapter 3: Operating Instructions

3.1 Connecting the Device and the Controller

Connect the RS485 communication terminal of the controller to the RS485 communication terminal of the device signal cable, then connect the DC 12V power converter to the controller.



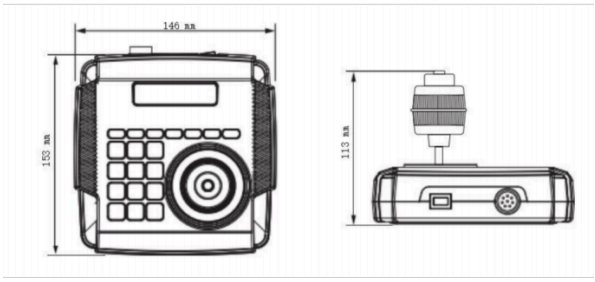
When finished, connect the device and the controller power converter to the AC 220V mains. After power-on, the device will automatically run one full self-test cycle. Once the self-test is complete, the controller can be used to operate the device.



Wiring diagram

3.2 Controller Operating Instructions

1) Keyboard Panel





Control keyboard panel

2) Installation & Connection

Note: Before wiring, read the user manuals of the keyboard and the lamp carefully. Any incorrect wiring may cause permanent damage to the equipment. Disconnect power from all devices before wiring. Communication cables between devices must use shielded twisted-pair cables. When routing cables, avoid high-voltage lines and other possible interference sources as much as possible.

3) Shortcut Key Definitions and Usage



LED: Light on/off. Press once to turn the light on, press again to turn it off.



RESET: Set. Used to set preset positions.
Example: press numeric key 1, then press this key and release — preset position No. 1 is set.
Press numeric key 2, then press this key and release — preset position No. 2 is set.



CALL: Call. Press this key to call a preset position.
Example: press numeric key 1, then press this key — preset No. 1 is called and the lamp rotates automatically to the stored No. 1 position.
Press numeric key 2, then press this key — preset No. 2 is called and the lamp rotates automatically to the stored No. 2 position.



ENTER: Speed command. 5 speed levels in total; each press cycles to the next speed level.

Joystick: controls the lamp to rotate up, down, left and right. Example: push the joystick left and the lamp rotates left; push it right and the lamp rotates right. See the joystick operation diagrams in section 4) below.

Joystick Operation Diagrams

In PTZ control mode:

Operation	Output Control	Operation	Output Control	Operation	Output Control	Operation	Output Control
	Up		Down		Left		Right

4) Routine Operation

Connect the aviation connector of the control keyboard to the power supply and the lamp-related equipment, then turn on the power key. After confirming the connections are correct, follow the steps below to set parameters and operate:

1. Long press the **"ADD"** key to enter the setup interface.
2. The setup interface has two options: **"Baud Rate Setting"** and **"Restore Default Settings"**. An "*" symbol in front of an option indicates the currently selected option. Toggle the joystick up/down and the "*" symbol moves accordingly; the option marked with "*" is the one to be entered.
   For baud rate setting, toggle the joystick left/right and the baud rate of the speed dome cycles through 2400, 4800, 9600, 19200 and 38400. Press the joystick center button to confirm and store the baud rate shown on the display. The factory default is 2400 bps and it is already set at the factory — no further setting is required.
   For restoring factory defaults, similarly, the option marked with "*" is the selected one. Press the joystick center button to confirm and restore factory settings.
3. Press the **"ENTER"** key to cycle through the five dome movement speed levels ①～⑤. Level ① is the slowest and level ⑤ is the fastest.
4. Press any numeric key once, then press the **"RESET"** key once — the current position is saved as the preset position with that number. 0～255 (256 presets) are supported.
5. Press any numeric key once, then press the **"CALL"** key once — the preset position with that number is called.
6. If the lamp has a zoom function, rotate the joystick handle to adjust the spot size: turning left enlarges the spot, turning right narrows it.
7. Press the **"LED"** key once to turn the light on; press again to turn it off.

5) Controller Technical Specifications

1. Communication between PTZ and keyboard: point-to-multipoint half-duplex communication
2. Monitor: 2-inch LED backlit display, resolution 1024×600, brightness 350 nit
3. Communication interface: RS-485
4. Up to 200 preset positions supported
5. Wiper control and light control supported; real-time monitoring snapshot supported
6. Baud rate: 2400 / 4800 / 9600 / 19200 bps adjustable
7. Wired communication distance: max. 1200 m
8. Weight (excluding cable): approx. 0.37 kg

Chapter 4: Professional Control Commands

4.1 Device Command Description

Pelco-D Basic Command Format

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
FF	Addr	Cmd1	Cmd2	Data1	Data2	Checksum

- **FF**: synchronization byte, always 0xFF
- **Addr**: address, range 0x00～0xFF, default address 1
- **Cmd1, Cmd2**: command codes
- **Data1, Data2**: data codes
- **Checksum**: Checksum = Addr + Cmd1 + Cmd2 + Data1 + Data2

1) Standard PTZ Enhanced Functions

Note: these functions can be controlled from the control keyboard or the interface software, or by sending commands directly. Taking Pelco-D as an example, the command formats are as follows (XX is hexadecimal):

Open auxiliary switch	FF Addr 00 09 00 XX Checksum
Close auxiliary switch	FF Addr 00 0B 00 XX Checksum
Set preset	FF Addr 00 03 00 XX Checksum
Delete preset	FF Addr 00 05 00 XX Checksum
Call preset	FF Addr 00 07 00 XX Checksum

Opening and closing auxiliary switches

1. Open/close auxiliary switch No. 1 — turn the top-mounted searchlight on/off
2. Open/close auxiliary switch No. 5 — turn real-time angle feedback on/off (only for full-duplex control interfaces such as RS422 and RS232)

Cruise dwell time setting

Preset / Setting	100	101	102	103	104	105	106	107
Dwell time / s	4	10	20	30	60	120	180	240

Cruise call

1. Call preset No. 100 — start cruise route No. 1, calling presets No. 1 to No. 10;
2. ……
3. Call preset No. 107 — start cruise route No. 8, calling presets No. 71 to No. 80.

Watch (auto-return) function

1. Call preset No. 112 — enable the auto-return function: after all movements finish, the PTZ automatically calls preset No. 1 when the set time elapses;
2. Call preset No. 113 — disable the auto-return function.

Watch (auto-return) time setting

Preset / Setting	81	82	83	84	85	86	87	88	89	90
Return time / min	1	2	5	10	15	20	30	40	50	60

Line scan setting and calling

1. Set preset No. 93 — set the scan start point
2. Delete preset No. 93 — set the scan end point
3. Call preset No. 93 — start scanning

PTZ reference point setting

Set preset No. 0 (99). Once set successfully, the position of preset No. 0 (99) becomes the reference point — the reference for PTZ angle feedback and PTZ angle positioning. This function does not affect previously set presets; after the power-on self-test is complete, the PTZ automatically returns to preset No. 0 (99).

Power-on self-test

1. Set preset No. 119 — power-on self-test enabled
2. Delete preset No. 119 — power-on self-test disabled
3. Call preset No. 119 — run the self-test once again

Remote reboot

Call preset No. 120 — enable the PTZ remote reboot function; the PTZ restarts and runs the self-test again.

2) Detailed Command Control Information

No.	Function	Command	Note
1	Pan right	FF Addr 00 02 HSPD 00 Checksum	①
2	Pan left	FF Addr 00 04 HSPD 00 Checksum	
3	Tilt up	FF Addr 00 08 00 VSPD Checksum	②
4	Tilt down	FF Addr 00 10 00 VSPD Checksum	
5	Zoom in	FF Addr 00 20 00 00 Checksum	
6	Zoom out	FF Addr 00 40 00 00 Checksum	
7	Light on	FF Addr 00 09 00 01 Sum	
8	Light off	FF Addr 00 0B 00 01 Sum	
9	Stop	FF Addr 00 00 00 00 Checksum	
10	Pan angle positioning	FF Addr 00 4B DataH DataL Checksum	③
11	Tilt angle positioning	FF Addr 00 4D DataH DataL Checksum	④
12	Positioning speed setting	FF Addr 00 5F HSPD VSPD Checksum	
13	Set pan scan start point	FF Addr 00 11 00 00 Checksum	
14	Set pan scan end point	FF Addr 00 13 00 00 Checksum	
15	Run pan line scan	FF Addr 00 1B 00 00 Checksum	
16	Stop pan line scan	FF Addr 00 1D 00 00 Checksum	
17	Scan speed setting	FF Addr 00 31 HSPD VSPD Checksum	
18	Line scan tilt step setting	FF Addr 00 33 DataH DataL Checksum	⑤
19	Cruise / preset speed setting	FF Addr 00 67 HSPD VSPD Checksum	
20	Pan angle query	FF Addr 00 51 00 00 Checksum	
21	Tilt angle query	FF Addr 00 53 00 00 Checksum	
22	Pan angle feedback format	FF Addr 00 59 DataH DataL Checksum	③
23	Tilt angle feedback format	FF Addr 00 5B DataH DataL Checksum	④
24	Restore factory defaults	FF Addr 00 29 00 00 Checksum	
25	Remote reboot	FF Addr 00 0F 00 00 Checksum	
26	Preset speed query	FF Addr 00 71 00 00 Checksum	
27	Preset speed feedback	FF Addr 00 71 HSPD VSPD Checksum	
28	Positioning speed query	FF Addr 00 73 00 00 Checksum	
29	Positioning speed feedback	FF Addr 00 73 HSPD VSPD Checksum	
30	Scan speed query	FF Addr 00 75 00 00 Checksum	
31	Scan speed feedback	FF Addr 00 75 HSPD VSPD Checksum	
32	Cruise dwell time query	FF Addr 00 77 00 00 Checksum	
33	Cruise dwell time feedback	FF Addr 00 77 00 time Checksum	⑥
34	Watch time query	FF Addr 00 79 00 00 Checksum	
35	Watch time feedback	FF Addr 00 79 00 time Checksum	⑦

Note 1:

① HSPD: pan speed level, range 0x00～0x40, 64 levels in total.

② VSPD: tilt speed level, range 0x00～0x40, 64 levels in total.

③ DataH and DataL are hexadecimal values between 0 and 36000, corresponding to a pan angle of 0～360°.

④ Tilt angle format: 0 = horizontal; 90 = straight down; 270 = straight up. Range: 0～9000 and 27000～35999 (the actual angle range is subject to the technical requirements).

⑤ Line scan tilt step: angle = (DataH × 256 + DataL) / 100, default 5°.

⑥ time is 1～8, corresponding to cruise dwell intervals of 4 s, 10 s, 20 s, 30 s, 1 min, 2 min, 3 min and 4 min.

⑦ time is 1～60, corresponding to an auto-return time of 1～60 min.

Note 2: In the commands above, Byte 3 determines the command to be executed; DataH and DataL are the high and low bytes of the command value. For other basic movement and lens control commands, refer to the standard Pelco protocol.

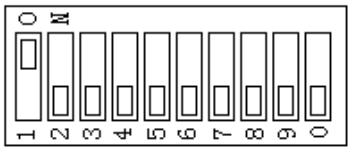
4.2 Communication Parameter Settings

(Do not change these settings unless you are a professional.)

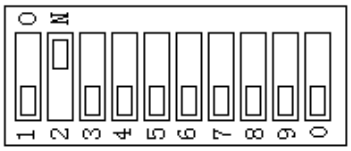
1) Address Setting

To set the address DIP switch and the function DIP switch, open the front cover of the PTZ. DIP settings are as follows:

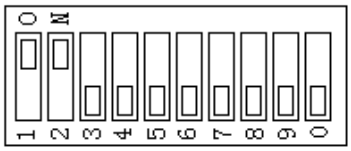
Address	DIP-1	DIP-2	DIP-3	DIP-4	DIP-5	DIP-6	DIP-7	DIP-8
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
…	…							
254	OFF	ON	ON	ON	ON	ON	ON	ON
255	ON	ON	ON	ON	ON	ON	ON	ON



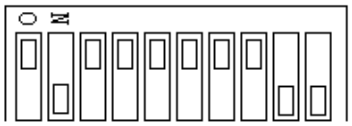
Address = 1



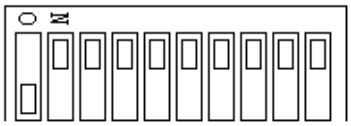
Address = 2



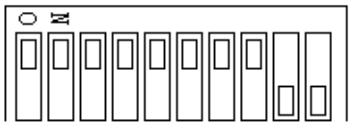
Address = 3



Address = 253



Address = 254



Address = 255

Only part of the address codes are listed above; the remaining addresses follow binary coding in the same way.

2) Baud Rate Setting

The PTZ provides several communication baud rates such as 2400 bps, 4800 bps, 9600 bps and 19200 bps, which can be set with bits 9 and 10 of DIP switch SW1, as shown in the table below.

Baud Rate	SW1-9	SW1-10
2400	OFF	OFF
4800	ON	OFF
9600	OFF	ON
19200	ON	ON

3) Communication Protocol Setting

Bit 1 of the function DIP switch SW2 is used to select the PTZ control protocol (see the table below).

Protocol	SW2-1
Pelco-D	OFF
Pelco-P	ON

Note: Pelco-D and Pelco-P are general-purpose control protocols; the device can be controlled with a control keyboard or general control software. When operations such as angle feedback are required, set the communication protocol to the PTZ control protocol.

Note: After setting the address, protocol and baud rate, reinstall the cover plate and the right panel in turn. Take care not to lose the silicone sealing strip at the cover plate.

Chapter 5: Troubleshooting

Symptom	Possible Cause	Solution
No self-test after power-on	Power adapter damaged	Replace the power supply
	Site wiring fault	Check and eliminate the fault
Abnormal self-test	Insufficient power adapter capacity	Replace the power supply
	Mechanical fault	Repair required
Self-test succeeds after power-on, but the PTZ cannot be controlled	Control cable reversed or open circuit	Rewire
	PTZ address, protocol or baud rate set incorrectly	Reset the PTZ DIP switches
	Address, protocol or baud rate does not match the PTZ	Reset the keyboard or control software
Self-test succeeds and PTZ control is normal, but the light does not turn on	Wiring fault	Check and eliminate the fault
	Power adapter damaged	Replace the power supply
	Light source damaged	Replace the light source

Appendix I: Product Interface Description

Bottom Cable Outlet

Aviation plug outlet SP1312P3

Pin	Color	Definition
1	Brown	AC 220V - L
2	Blue	AC 220V - N
3	Yellow	AC 220V - GND

Aviation plug outlet SP1312P4

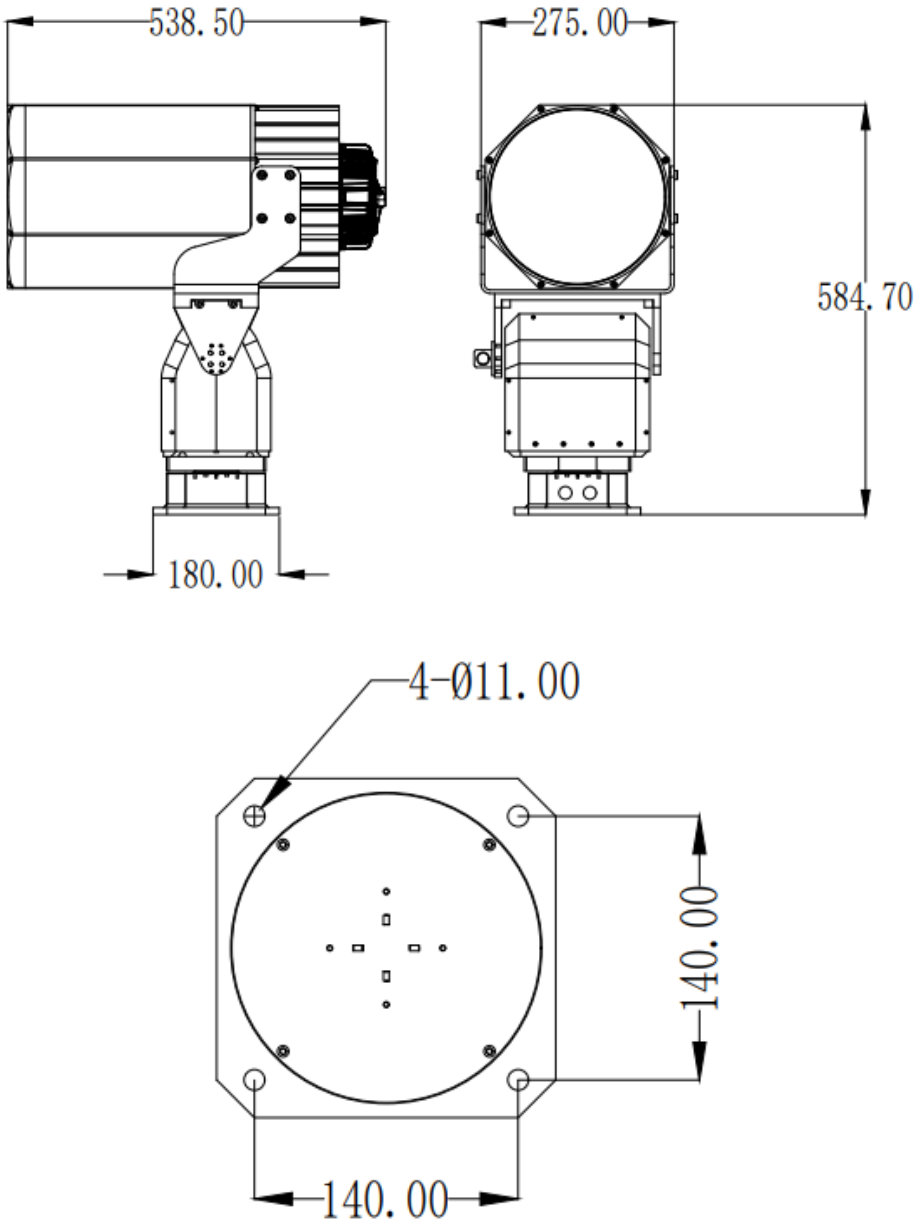
Pin	Color	Definition
1	Network cable - Orange/White	RS422A
2	Network cable - Orange	RS422B
3	Network cable - Green/White	RS422Y
4	Network cable - Green	RS422Z

Top Cable Outlet

Aviation socket outlet SP1312S3

Pin	Color	Definition
1	Brown	AC 220V - L
2	Blue	AC 220V - N
3	Yellow	AC 220V - GND

Appendix II: Product Installation Dimensions



Outline and installation dimensions

Note: all dimensions are in millimeters unless otherwise specified.