

Auto Alignment System

TTT-AAL Series

Introduction

The auto alignment system from TuoTuo technology is aiming to solve the laser position and power drift issues. The system is real time response, high precision, as well as easy to operate. It consists the parts below:

- 2 sets of piezoelectric driven mirror mounts (Yaw and Tilt adjustment)
- One controller set for piezoelectric adjustors (4 channels)
- One sensing core set for position & power info acquisition

A typical structure of the system is shown in the figure at the right side: The laser beam was adjusted by two mirrors (M1 & M2), while the position sensitive detectors (PSD A & PSD B) are monitoring the beam positions. When the system is activated, four piezoelectric motors will work in designed logic to recover the beam position and direction. The whole process will take tens of seconds to milliseconds depending on the level of misalignment and target accuracy.

Comparing to hand adjustments, the automatic system is much more efficient (7-24 fast beam stabilization/recovery), and far more accurate (0.75 μm position error) than human eyes. In able to handle different type of laser sources, two different sensing core modules have been developed for laser repetition rate 100 Hz – 10 kHz, and 1 MHz – CW respectively. Default sensors are silicon-based ones with active area of 9 mm \times 9 mm, however larger sensor area up to 20 mm \times 20 mm is available upon requests, and InGaAs based photodiodes are available for laser wavelength from 900 nm to 1700 nm.

The automatic optical power control module (shown in the figure above) and programable shutters are available upon requests. The optical power is adjusted by rotating an achromatic halfwave plate, and a pre-fixed broadband polarizer is installed after the waveplate. The module is able to recover the optical power to the pre-set values (feedback through the PSDs).

The TTT-AAL series can be independent instruments for “plug in & use”, and they are also suitable for integrating into wide range of systems. Comprehensive LabView (NI) program are provided for monitoring and operation. Feel free to contact us for more details.

Application notes: TTT recommends a minimum separation of 1.0 meter between PSD A and PSD B; a minimum separation of 0.5 meter between M1 and M2.

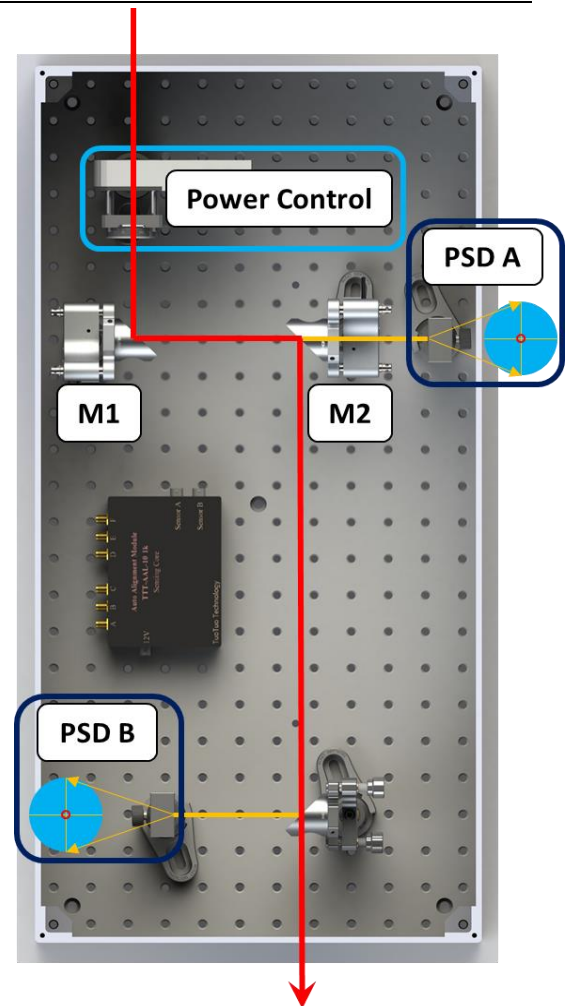
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Recommended combinations

TTT strongly recommends the auto alignment system (**TTT-AAL Series**) for regenerative amplifier system.

For optical measurement, we recommend **TTT-AFG series** preamplifier/photodetector is recommended for weak signal pre-amplification, **TTT-BPD Series or TTT-ABPD Series** balanced photodetection module for polarization variation measurement.

Specifications (TTT-AAL-10-XX)

Operation wavelength	320 to 1100 nm
Beam Position Accuracy	0.75 μ m
System Response	-1k Version: 50 ms (optimized for 0.1 kHz-10 kHz laser) -200k Version: 10 μ s (optimized for 1 MHz - CW laser)
Sensor Dimension	9 mm * 9 mm (default, -10) Larger Sensor Area, 20 mm * 20 mm available upon requests (-20 Version)
Control Connector	Micro USB
Power in	Hirose 4 pin, 12 \pm 1 VDC 1A
System Configuration	2 sets of piezoelectric driven mirror mounts (Yaw and Tile adjustment) 1 controller set for piezoelectric adjustors (4 channels) 1 Sensing Core set for position & power info acquisition
¹ Sensing Core Dimension	105 mm \times 76 mm \times 25 mm
System Dimensions	Merge into users' system, minimum extra space required
Notes: ¹ The dimensions exclude the electrical connectors.	

Product Code

Please contact us for the availability if your needs are beyond the listed terms

TTT	-AAL	-XX	-XX
↓	↓	↓	↓
A product of TuoTuo Technology	Auto Alignment System	Sensor size: 10 - 9 mm * 9 mm 20 - 20 mm * 20 mm	System bandwidth: 1k – Optimized for 0.1 – 10 kHz system 200k – Optimized for 1MHz – CW system

Caution!

- Precision instruments, handle with extra caution.
- Usage and storage out of controlled environment leads to lower performance.
- Disassemble the module with lead to the warranty void immediately.

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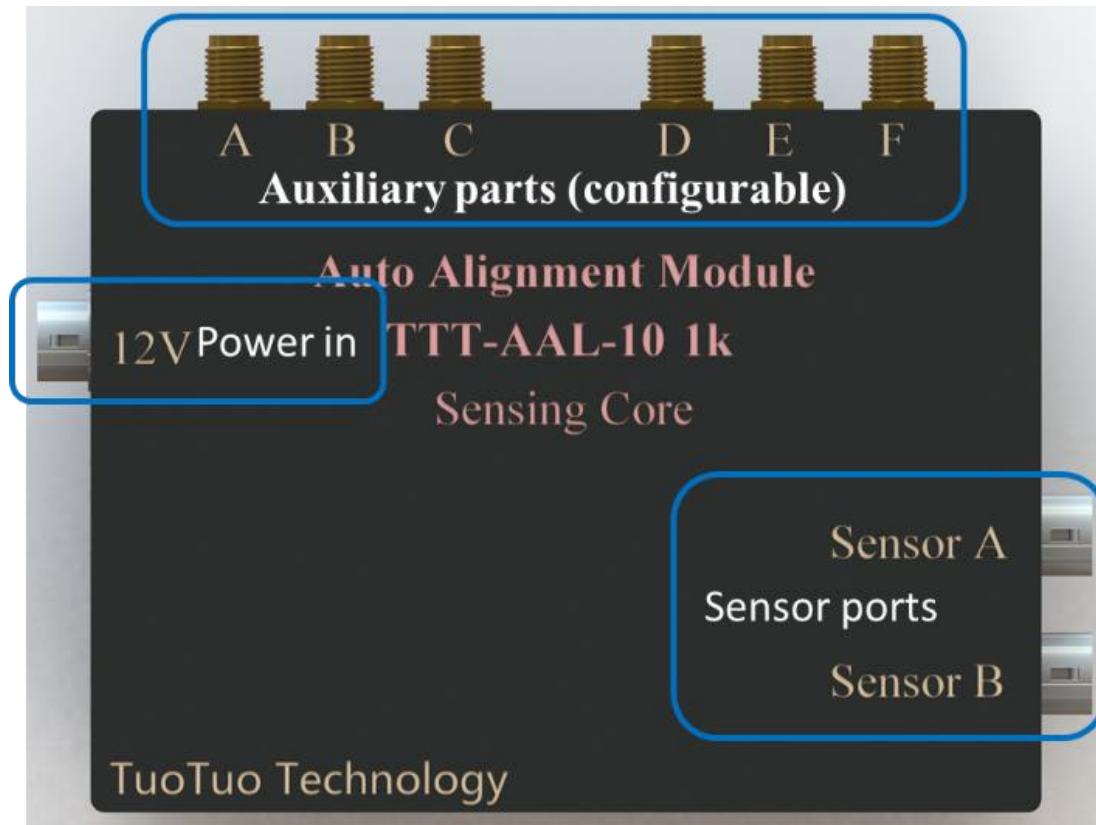
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Parts details

Please connect the power supply, sensors, and communication port before operation.

The Auxiliary ports are preconfigurable upon user requests:

1. Analog output
2. Analog in
3. Digital I/O
4. Power supplies



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