FJDynamics
P1 Trion 3D LiDAR Scanner

FJDynamics P1 Trion 3D LiDAR Scanner Instruction Manual

Contents

FJDynamics

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Tips for best scanning results

The P1 can be used indoors, outdoors, and underground without the need for GNSS or a light source. Buildings, rooms, parking lots, mine tunnels, bridges, and parks are some of the typical scenarios where the P1 performs best.

Environment

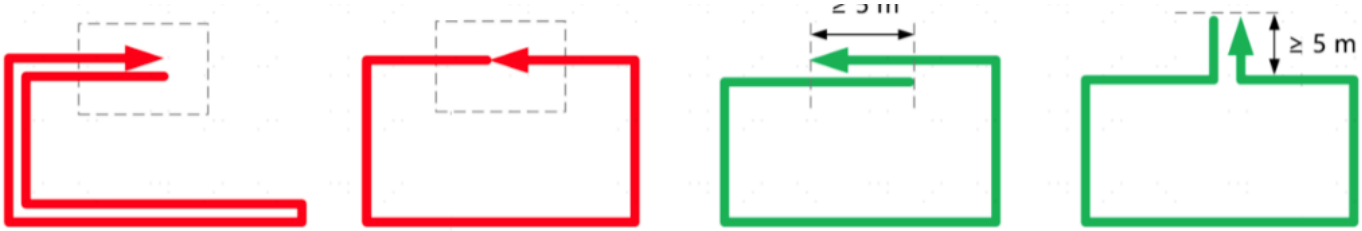
- Operate the P1 alone during scanning; partners should stay behind to avoid being scanned.
- Avoid scanning areas that contain
  - Large amounts of glass or mirrors
  - Similar structures, for example, long corridors with uniform walls and floors
  - Large open spaces without any buildings or objects
- Clear the area around P1 during initialization and point the LiDAR toward a feature-rich environment.
- Don’t scan areas with moving people and vehicles, like crossroads or plazas.

Loop Closure

LiDAR sensors accumulate error as time goes on, and loop closures involve revisiting a known location during scanning, allowing the system to correct any accumulated errors, align the newly acquired data with previously captured data, and minimize drift.

- Plan your path ahead of the scan for maximum accuracy.
- Close the loop at start and end positions to reduce cumulative errors.

- To close the loop, resurvey a known position with at least a 5 m overlap.
- The green paths below indicate best scanning patterns:



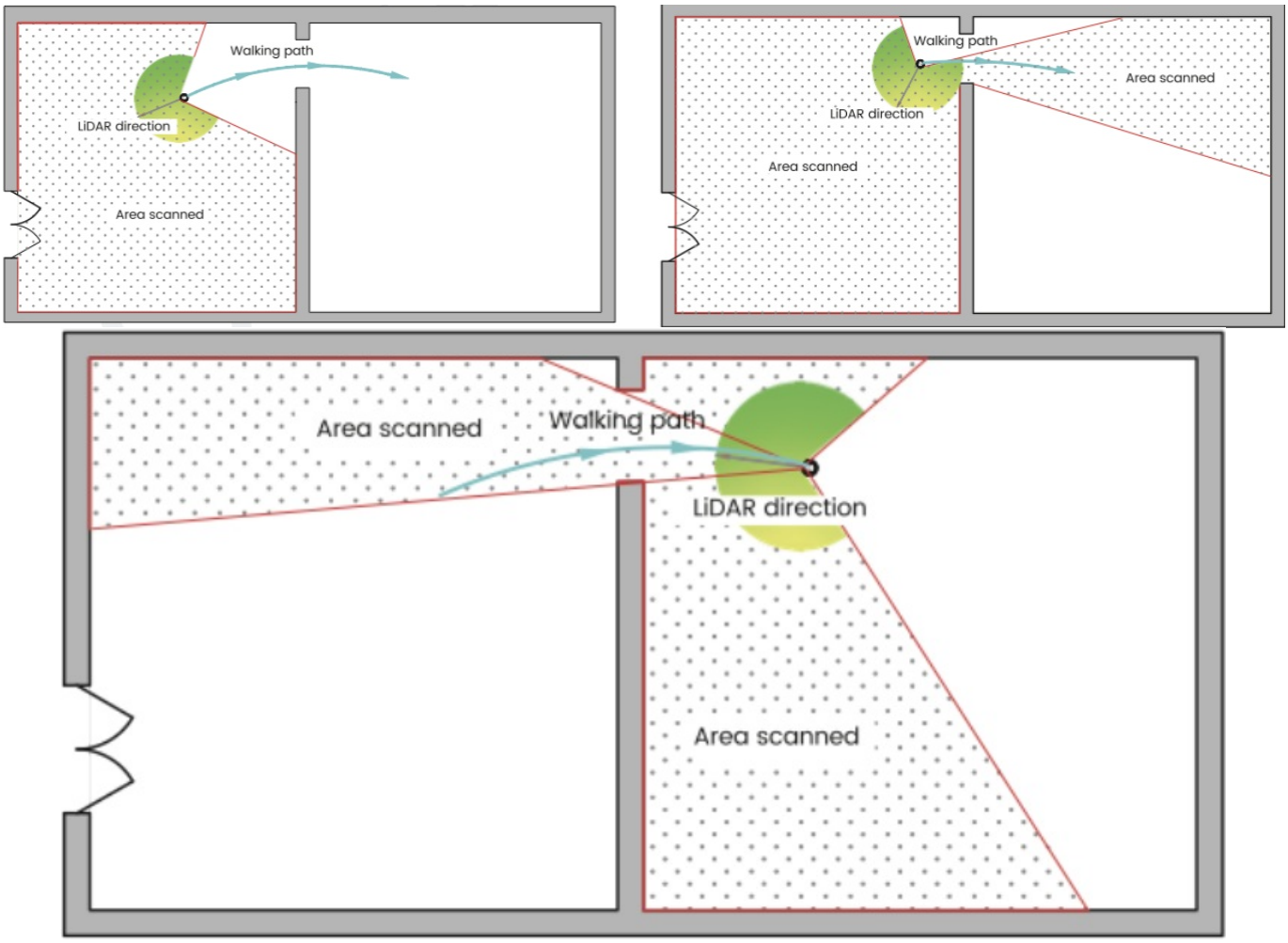
- To minimize tracking errors and drift, close loops as often as possible. For example: close 4 smaller loops in a larger space instead of 1 big loop.

Transitioning between environments

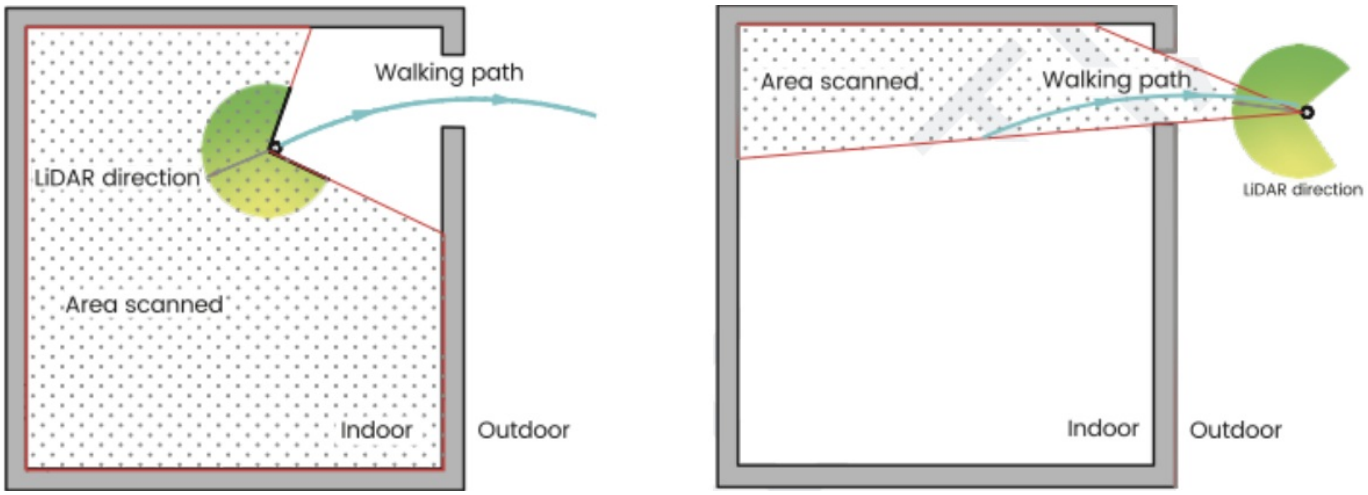
Be cautious during environment transitions like moving between rooms, from indoors to outdoors, and when making turns.

Moving Between Rooms

- Open all doors before scanning.
- Avoid scanning while doors are opening.
- If there aren't many features ahead, slow down your pace.
- Point the P1 towards the room you've already scanned, then walk back slowly through the door. See below:



Indoor-Outdoor Transitions



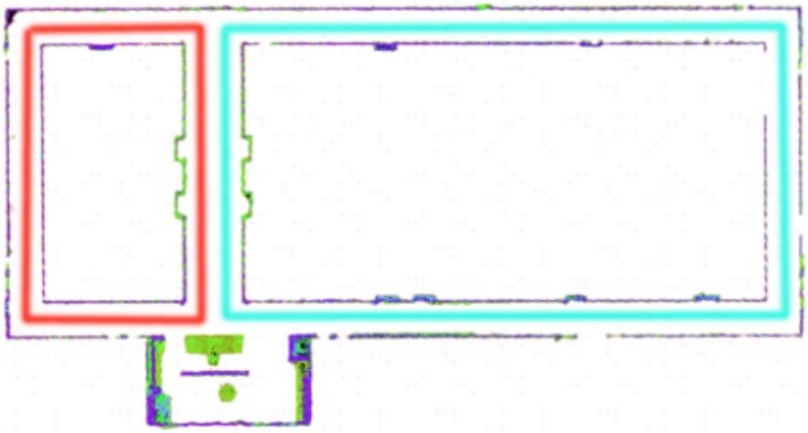
Making U-Turns or Turns

- Reduce your walking speed significantly.
- Make the turn slowly, and pause for 1-2 seconds with the P1 facing the corridor.
- This ensures P1 captures features on both sides of the turn.

Long Corridors

Long corridors with smooth walls on both sides and few features may result in poor scanning accuracy. Follow these recommendations to improve mapping accuracy:

1. In narrow spaces or long corridors, tilt the P1 at an angle of 70° to 90° as shown.
2. Scan separately: If there is a long corridor in the area to be scanned, scan the corridor separately.
3. Add features manually: For a corridor with smooth walls on both sides and without obvious features, add features such as chairs manually. Place chairs in the farther half of the long corridor at random intervals of 5 m – 10 m.
4. Form small closed loops: Plan as many small closed loops as possible when scanning a long corridor or a large space.



5. Turn slowly: Walk and turn as slowly as possible at the end of the corridor. If the corner is followed by another long corridor, stay where you are for 1s – 2s after the turn to collect as much point cloud data as possible.

Walking Speed
We recommend you walk at a constant speed (1 m/s) in typically-sized environments, and reduce the speed to 0.5 m/s or slower when passing through narrow spaces, such as long corridors, tunnels, and stair corners, so that the scanner can scan the spaces properly.

Scanning Range

- P1's effective range is 0.5 m to 70 m.
- Minimum distance: Maintain a 0.5 m distance from targets for accurate data. Avoid having the P1 too close to walls and ceilings. In narrow spaces, stay in the middle for better results.
- Maximum distance: In ideal conditions, P1 can scan up to 70 m, but accuracy is best up to 40 m. For the best

data quality, plan scans within a 30 m range.

Scanning Duration
For large surveys, divide the project into 20-minute scan tasks to manage map size and storage limitations.

Maintenance

- After use, wipe P1 with a clean cloth and store it in the case.
- Avoid rough handling, impacts, bending, or disassembly of P1, and keep it free from debris.
- Do not attempt to disassemble P1; contact the local dealer if you are concerned.
- Never hot-swap the P1 batteries.
- On the rare occasion that you hear abnormal sounds of loose screws coming out of the LiDAR body, inspect the screws and contact your local dealer for repairs.
- Only qualified personnel should perform P1 repairs.

Troubleshooting

Issue	Solution
P1 cannot be powered on.	Check whether the battery is properly installed. Ensure that the battery power is sufficient.
The phone or PC cannot detect the Wi-Fi signal of P1.	Check the available storage of P1. Disable the cellular data service on the phone, and try agai n.
The phone or PC cannot access the scanning scre en.	Check whether the phone or PC is connected to the P1 W i-Fi. Refresh the screen and try again.
Initialization fails.	Keep the P1 still, and avoid vertical movement.
P1 shuts down during use.	Check whether the battery level is low. Check whether the battery is properly connected.

Product Specifications

- **Effective Scanning Range**: 0.5 m to 70 m
- **Minimum Scanning Distance**: 0.5 m
- **Maximum Scanning Distance for Best Accuracy**: Up to 40 m
- **Ideal Scanning Range for Best Data Quality** : Up to 30 m

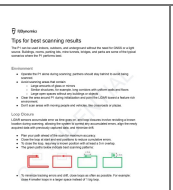
Frequently Asked Questions (FAQ)

Q: Can the P1 be used in areas with a lot of glass or mirrors?

A: It is recommended to avoid scanning areas with large amounts of glass or mirrors as they can affect scanning accuracy.

Q: What is loop closure, and why is it important?
A: Loop closure involves revisiting a known location during scanning to correct errors, align data, and minimize drift, ensuring accurate mapping results.

Documents / Resources

	FJDynamics P1 Trion 3D LiDAR Scanner [pdf] Instruction Manual P1 Trion 3D LiDAR Scanner, P1, Trion 3D LiDAR Scanner, 3D LiDAR Scanner, LiDAR Scanner, Scanner

References

- User Manual