



USER MANUAL

RT-Strut

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Safety notice

A recent risk assessment highlighted concerns that, when mounted inside the cockpit of the vehicle, the OxTS RT-Strut mounting pole could come loose in specific situations, for example after a vehicle impact with consequential rapid deceleration, or an impact that caused roof or floor deformation. We would recommend that where possible RT-Struts should be mounted in an area separated from the driver/passenger compartment such as the boot (trunk) of the vehicle.

If fitting the RT-Strut within the passenger area of a vehicle, it wedges between the floor and the roof of the car, normally in front of the back seat and across the transmission tunnel. A built-in spring provides the necessary force required to keep the RT-Strut in place. A lever is used to release and engage the spring. Wide feet at the bottom of the RT-Strut ensure excellent yaw rigidity. The supplied supplementary retaining strap system should always be used.

You must inform your RT-Strut users of the safety concern and make them aware that we recommend that they include this information in their risk assessments.

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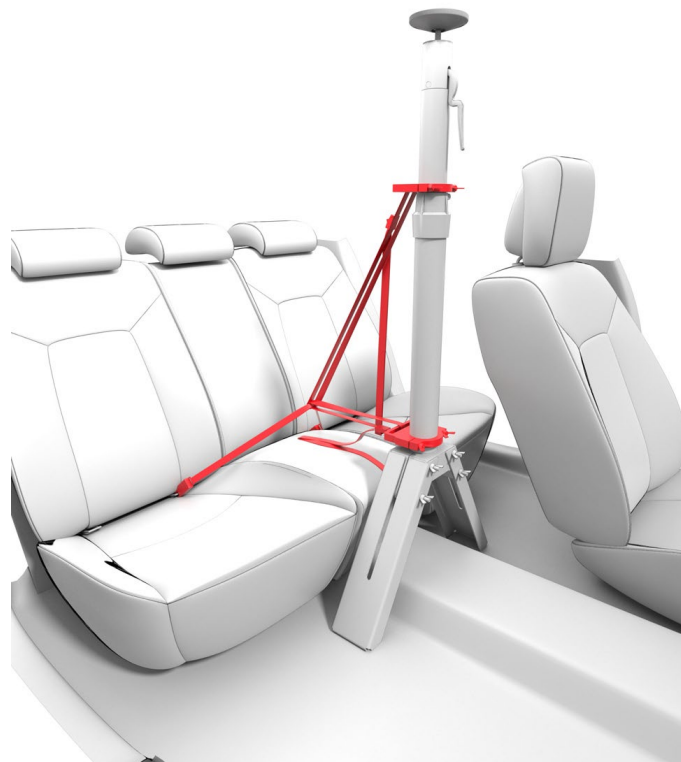
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Introduction

The RT-Strut is a fast car mounting system for the Inertial and GNSS navigation family of OxTS products. This includes the RT1003, RT2000, RT3000 and RT4000 series, the Inertial+, Survey+, xNAV, and xNAV650. The RT1003, xNAV and xNAV650 require additional mounting brackets, sold separately. Using the RT-Strut the OxTS Inertial Navigation Systems (INS) can be mounted securely in most vehicles in minutes.

The RT-Strut wedges between the floor and the roof of the car, normally in front of the back seat and across the transmission tunnel. A built-in spring provides the necessary force required to keep the RT-Strut in place. A lever is used to release and engage the spring. Wide feet at the bottom of the RT-Strut ensure excellent yaw rigidity.

Figure 1. RT-Strut mounted in a car



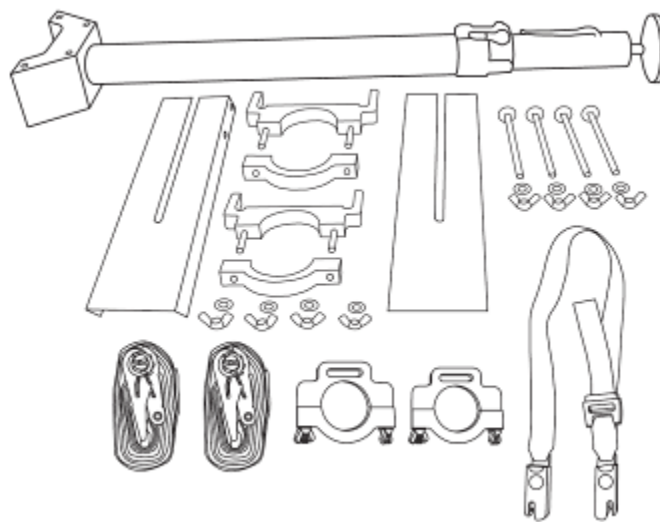
Scope of delivery

Table 1 lists all of the items that are delivered with each RT-Strut.

Table 1: Summary of the RT-Strut components

Manual	Description
1	RT-Strut main body
2	RT-Strut extension legs
2	RT mounting brackets
2	RT-Strut clamps
5	M8×110 carriage bolts (1 spare)
9	M8 washer (1 spare)
9	M8 wing nuts (1 spare)
5	M4×16 RT screws (1 spare)
5	M4 washers (1 spare)
1	RT-Strut bag
2	Retaining strap mounting brackets
2	Ratchet straps
1	ISO strap

Figure 2. RT-Strut key components



Specification

The technical specification of the RT-Strut unit is shown in Table 2.

Table 2: Technical specification

Parameter	Specification Normal version	Specification Extended version
Weight	4.4 kg [including extension feet but not including supplementary safety straps]	5.3 kg [including extension feet but not including supplementary safety straps]
Maximum extension	1.50 m	2.40 m
Minimum extension	1.05 m [using extension feet] 0.81 m [excluding extension feet and supplementary safety straps]	2.05 m [using extension feet] 1.80 m [excluding extension feet and supplementary safety straps]
Temperature range	-10° to +70°C	-10° to +70°C

Installation

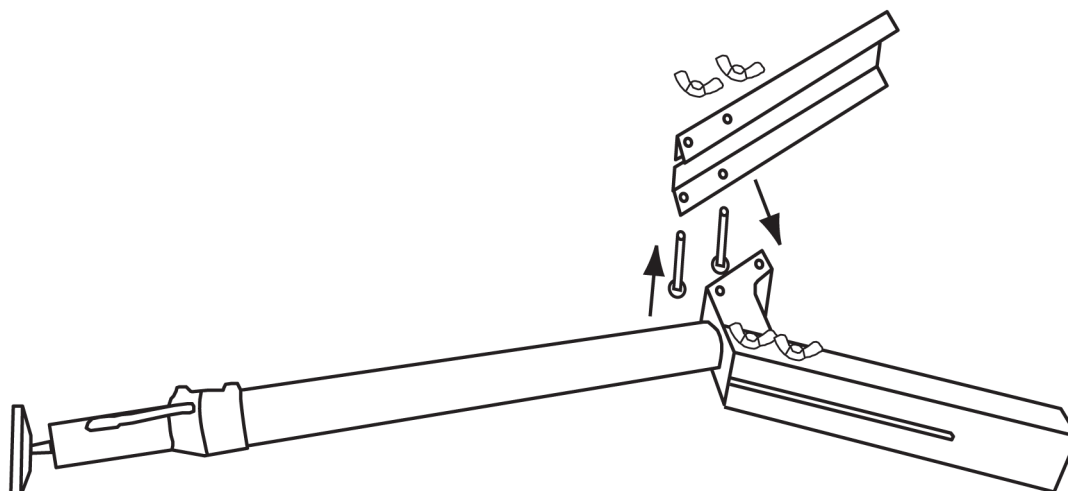
It is best to fit the INS to the RT-Strut after the RT-Strut is mounted in the vehicle. Although the OXTS INSs are robust systems, high shocks such as dropping or impacts against metal objects may cause damage.

The extension legs have some edges that may be sharp. Take care not to injure yourself on the sharp edges.

Fit the extension legs to the base of the RT-Strut using the M8×110 carriage bolts provided, see Figure 3. Fit the M8 washers and M8 wing nuts to the carriage bolts and tighten. The carriage bolts have a square section at the top so that they cannot rotate when the wing nut is tightened.

Installation surface - The RT-Strut is designed to be used on soft furnished vehicle boundaries such as roof lining and carpeting. **It is not designed to be used on surfaces with a smooth finish, such as glass sunroofs or plastic trim.**

Figure 3. RT-Strut attaching the extension legs

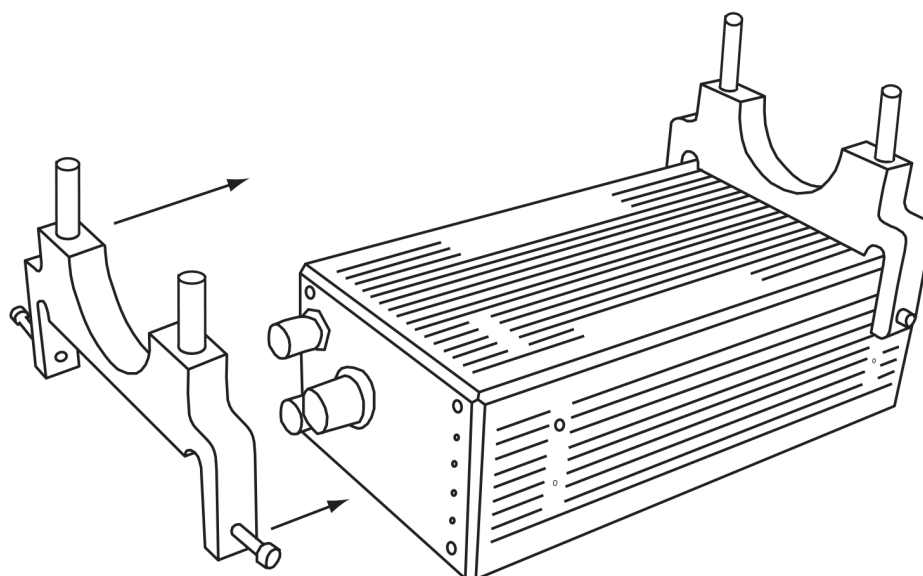


The extension legs provide additional safety as well as increased yaw stiffness. Before use, check the presence and condition of the velcro pads on the bottom of the extension legs and on the top mount and replace if necessary. In addition, check the general condition of all parts prior to use and ensure that there are no signs of damage that may pose a risk to the structural integrity of the RT-Strut.

Installing the RT-Strut

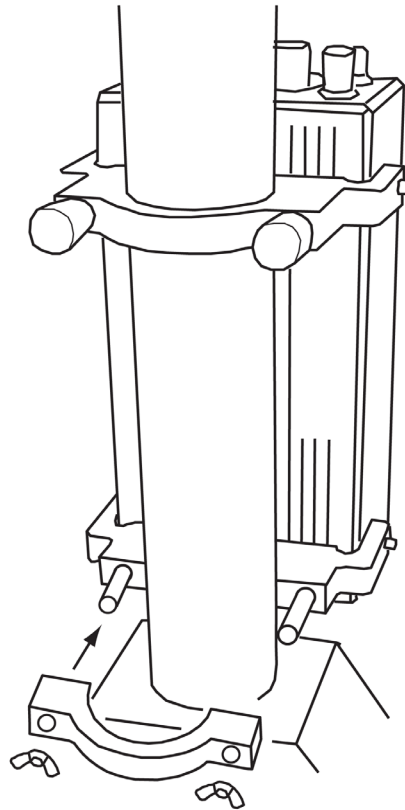
1. Open the black clamping lever on the pole and push the pole down to its minimum height.
2. Fit the RT-Strut inside the car and open the silver lever at the top to compress the spring.
3. Extend the pole up until it presses firmly against the roof of the car, then close the black clamping lever on the pole. Release the silver lever carefully, minding your fingers, to allow the spring to push on the roof.
4. Check the RT-Strut is securely mounted by attempting to move it. Ensure the central clamp can hold the inner telescoping tube in position without slipping. If this is not possible then turn the locking handle clockwise to tighten further. The recommended torque for this is 5 Nm. It's also advised that once a satisfactory torque is achieved that the bolt is re-aligned in its recess to allow the lever to fold perpendicular to the RT-Strut tube.
5. Next fit the RT mounting brackets on to the INS, see Figure 4.

Figure 4. Fitting RT mounting brackets to the INS



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6. Fit the RT mounting brackets to the pole.
 7. Although the pole is very stiff, mounting the INS as low as possible minimises the accelerations caused by any bending of the pole.
 8. Fit the INS and mounting brackets to the pole using the RT-Strut clamps, the M8 washers and the M8 wing nuts provided, see Figure 5. The default orientation when using the RT-Strut is to have the main connector of the INS facing up and the top of the unit facing the rear of the vehicle. In the default orientation the x-axis points down, the y-axis point left and the z-axis points forwards in the vehicle. Align the INS in the vehicle as accurately as possible to minimise slip angle offsets.

Figure 5. Attaching the INS to the RT-Strut



9. Tighten the screws on the mounting brackets.

Installing the supplementary retaining strap system

To mitigate increasingly stringent risk assessment protocols, the RT-Strut is supplied with supplementary retaining straps to prevent it moving forwards in the cabin in the event of an accident or collision. While the use of the strap system does not affect performance in any way, we recommend that it is used.

To fit the supplementary retaining strap system:

1. The larger diameter clamp should be fixed as low as possible on the bottom tube, while the smaller diameter clamp should be fitted as low as possible on the upper tube. The bolts on each clamp should face forwards.
2. Clip the ISOFIX strap to the two ISOFIX mounts closest to the RT-Strut. Adjust the strap so that when the main part is pulled, it reaches about half-way to the RT-Strut as shown in Figure 6.
3. Loop the other straps through the retaining fixtures and the ISOFIX belt as show below. These straps should be adjusted so they are taut, but not so tight that they dislodge the RT-Strut at all.
4. Always perform your own risk assessment and visually check the retaining strap system for signs of wear, prior to each use and replace as appropriate.

Figure 6. Fitting the retaining strap system

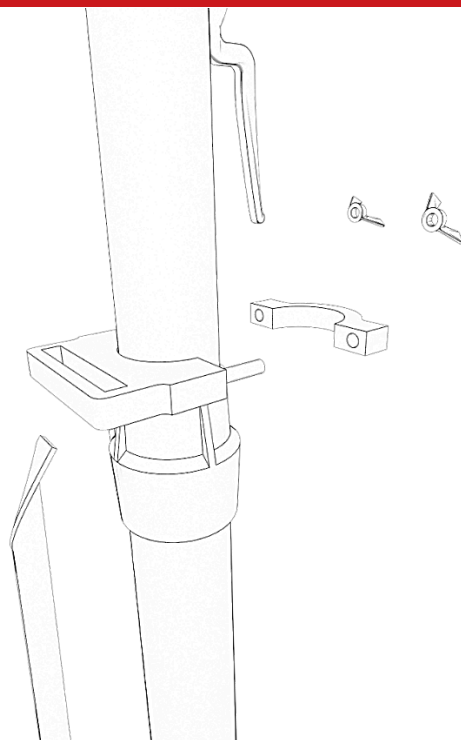
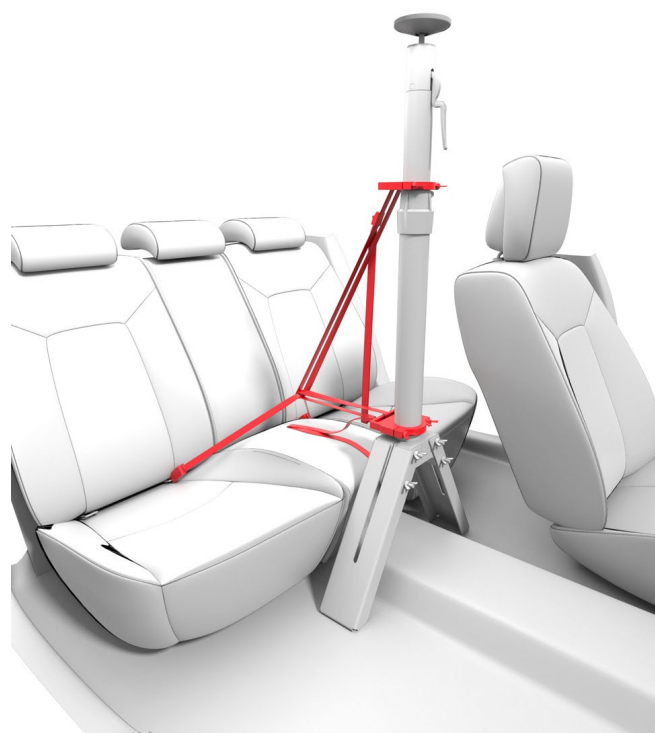


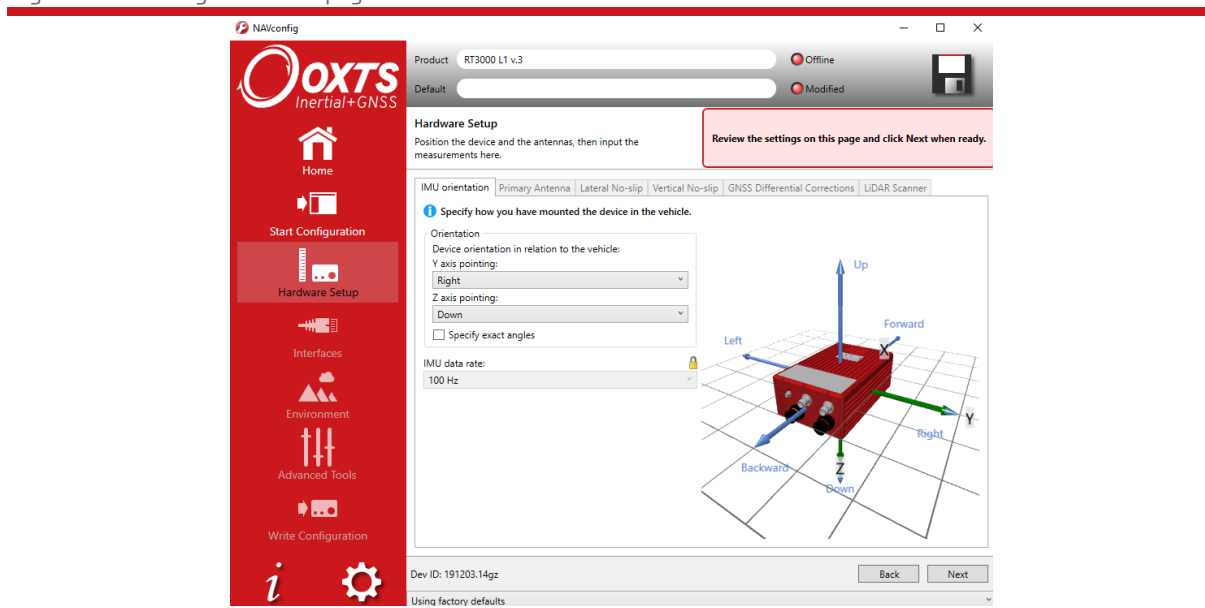
Figure 7. RT-Strut with supplementary retaining strap system mounted in a car



Configuration

After mounting the INS in the vehicle, it is essential to use the NAVconfig software to tell the INS what orientation it is in. Run the NAVconfig software and change the values on the Orientation page to match the installed orientation being used. Also check the position of the primary and secondary antenna values, since these may also be wrong in the new orientation.

Figure 8. NAVconfig Orientation page



Revision history

Table 3. Revision history

Revision	Comments
041004	Initial version
050503	Updates for RT-Strut revision 2
070312	Updated images
130611	Updated images, new mounting brackets, new software screenshot
130917	Included Survey+. Replaced RT-Config with NAVconfig
180316	Included RT1003. New logo update. Added safety notice to manual
180322	Extended safety notice
180510	Added clamp locking information
210903	Added supplementary retaining straps information and rebranded throughout

211018	Amended to reflect updated specification
211216	Technical specification table updated
220711	Updated safety notice and formatting amendments

