

SmartDrive

Questions & Answers



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General

Q 0.1: Where to find documentation on SmartDrive

Answer:

User manual and instructions can be found on our Websites Permobil .com and MaxMobility.com. (some of our Websites have this protected with a login). Service/Technical documentation is available on our Permobil Websites at the same location as where you find the Permobil Power Product documents in group "Service Manuals"

Q 0.2: Where can I find if a specific manual chair is compatible with SmartDrive

Answer:

A "compatibility tool" can be found on <https://permobilus/smart>.

In the "compatibility tool" you can select country (UK and Europe) to get your correct power leads for the charger as well as brand and model.

Additionally, a search field helps you to find your model quickly.

If the search does not give any result, please contact: Engineering.Smartdrive@Permobil.com.

Bluetooth Issues / connections to SD and PT-App

Q 1.1: Bluetooth (BT) connection (how to..)

Answer:

PushTracker needs to be "paired" to the phone using the pairing function through the PushTracker App.

In the PushTracker App goto "Settings" and select "PushTracker pairing"
Follow the instructions in the App to complete the pairing.

Every next time you want to use the App you will have to "connect" the PushTracker to the App. In order to conserve the charge on the PushTracker for when not wanting to be connected to the App (as the Bluetooth chip draws current) it will NOT connect automatically to the App (like your phone does with your car). This means that every next time the PushTracker needs to be connected to the App, press the right button on the PushTracker to establish the Bluetooth connection.

See instruction video explaining PushTracker and the App:

<http://www.max-mobility.com/device-information/#instructional-videos>

Q 1.2: Install the PT app on Android (>5.0) not always works. How to handle

Answer:

We have not heard any feedback that an Android device (with 5.0 and up) not being able to be installed. That sounds like it might be an issue with the Android device itself, the privileges they have, etc. One issue with Android specifically is that there are over 12,000 devices that run Android, and we have done our best to support as many of those device as we can; BUT there are some serious limitations with many (especially older devices). Some smartphone models do not support Bluetooth (Low Energy or BLE) in "peripheral" / slave mode, where another device is the "central" / master. Almost all new smartphones are able to switch between the two depending on what it is doing, but some new and older ones do not contain the hardware / software to do this. This "peripheral" / slave mode is needed by the smartphone / device as the PushTracker is REQUIRED to be the "central" / master. As iOS has been supporting this for a long time, this is not an issue we hear with Apple devices.

The PushTracker app requires:

For iOS 10.0 or later.

For Android: Android 5.0 and up.

May not work on older Android devices, as it requires Bluetooth peripheral mode (advertisement) support. [Click here](#) for a list of older Android devices that support this and may work.

Q 1.3: Difficulties to pair device to iPhone App.

Answer:

We have not heard this feedback. There was an early iOS 11.X release that was out shortly had some Bluetooth API issues, that Apple came out with a new follow-up release quickly after. So I would recommend that for the case you mentioned to have them make sure they are running the most up-to-date version of iOS. Other than that we have had almost no cases where the PushTracker was unable to pair / connect to an iOS device, as long as it was 10.0 or later. If this is followed and you are still unable to pair to the Apple device, I would start basic troubleshooting by replacing / trying to pair with another PushTracker. If that one pairs, there must be some malfunction on the PushTracker.

Q 1.4: Spontaneous deactivation of Drive / Interruption Bluetooth connection

Answer:

We have to walk the line between safe and effective design, so we would rather it deactivate when not intended than have it not deactivate when needed. While the SmartDrive is a great addition to a manual wheelchair, it is not designed to completely eliminate pushing but reduce the total number of pushes. We get users' frustration when it deactivates, but to some extent we hope there is an understanding and acceptance of the limitations of the device in certain situations / environments.

There are a handful of things that can cause the motor to deactivate, and we do our best to give different indications to help with troubleshooting.

What type of indication are you getting from the PushTracker / Wristband and SmartDrive / Drive Unit (single beep, double beep, must be turned off-back on to get it to work again, etc.)?

The motor deactivation with the single beep from the SmartDrive is an indication of a loss of Bluetooth connection between it and the Wristband. I would like to note that wearing the Wristband on the right wrist does minimize the distance between the two Bluetooth chips, so it's a good place to start with user's if they say they are having a problem with frequent loss of connection. But if they are driving 5-10 minutes and then having it deactivate, it seems like there might not be anything wrong with the unit. The SmartDrive is designed to reduce the total number of pushes, not designed to completely eliminate it.

As another note, you have all kinds of different things that affect the strength of the wireless signal; distance between the wristband / drive unit, orientation of each, items and their materials in between the two (carbon-fiber is a strong blocker), and competition with other wireless signals in the area (radio / WiFi / Bluetooth) being the major ones. The body (made mostly up of water) is actually a strong blocker of Bluetooth, so if you rest your Wristband wearing hand on your lap (close to your stomach) you run the risk of the Bluetooth signal getting blocked / lost - which will cause the motor to deactivate. We say in this case the user is getting a bit too relaxed, and your hands should be on your hand rims (where you shouldn't lose Bluetooth connection), steering and braking, prepared to deactivate the motor and stop as needed.

Settings and options

Q 2.1: Guidelines about Settings? or trial and error what fits user best?

Answer:

3 settings are relevant:

Mode: Mode MX2+ is the best functioning mode with all features in

MX2 and MX1 mode should only be used if the user does not manage to operate a double tap properly

Speed: The default 70% (6kmh) matches “normal” use. Only to be increased if user requires a higher speed. Keep in mind that there is an increased risk when you have to make an emergency stop at higher speeds. Limiting speed is a good consideration for users that are new to using a wheelchair, children and users with less physical strength / ability.

Acceleration: The default 30% matches “normal” use. A to high acceleration will make harder to use it in limited spaces. Limiting acceleration at lower rates is a good consideration for users that are new to using a wheelchair, children and users with less physical strength / ability.

Firmware related

Q 3.1: Menu Setting does not show “About”

Answer:

The “About” has been added in Firmware Version 1.2, so older versions are not showing the “About”.

-Firmware history describing the firmware changes:

<http://www.max-mobility.com/device-information/#firmware>

Q 3.2: How to update my MX2+ to newer Firmware version?

Answer:

The MX2+ is updated by using the OTA (Over The Air) update in the PushTracker app.

Full instructions can be found on:

<http://www.max-mobility.com/device-information/#resources>

-SmartDrive MX2 + Pushtracker OTA Instructions describing the OTA process:

<http://www.max-mobility.com/device-information/#ota>

Q 3.3: Can a MX2 be upgraded to an MX2+?

Answer:

A MX2 can be upgraded to an MX2+. This needs to be done in the Permobil workshop or by trained dealers.

Please note that an update should only be done if the MX2+ drive mode is required not because of a “like to have” pushtracker and App.

Using an MX2+ in the MX2 mode is NOT the same push/activate behavior and can result in a poor acceptance.

Q 3.4: How to update without using the app

Answer:

For updating MX2+ always use the App.

Q 3.5: Response MX2 mode in a MX2+ is different than in an original MX2?

Answer:

After upgrading an MX2 to MX2+, the MX2 mode behaves different than in an original MX2.

Explanation:

There is a difference between the MX2 and an MX2+ in MX2 mode

This is because we necessarily had to re-write the code for the MX2+ function (and to support OTA). The motor control specifically is different, since it uses feedback control (which is how it maintains speed). The MX2 could not maintain speed before - meaning it would slow down on hills and speed up when cresting a hill - but with feedback control we can maintain speed throughout environmental changes (within certain limits). These differences do lead to a detectable difference in their behavior. Finally, these changes meant the way we performed push detection had to change slightly - which means that the MX2 and the MX2+ in MX2 mode may feel a little different to push around in.

Conclusion: An update should only be done if the MX2+ drive mode is required not because of a “like to have” pushtracker and App.

Using an MX2+ in the MX2 mode is NOT the same push/activate behavior and can result in a poor acceptance.

Service

Q 4.1: When to decide to replace parts (Motor Roller Assy) of OMNI Wheel

Answer:

If rollers are not rolling smooth or have extreme damage.

Anytime that the rollers develop significant flats or any miss-shaping so you can feel the bumpy ride of the SmartDrive behind the wheelchair, much more than what is tolerable. Another thing to check is that the rollers or their bearings get locked to the point that they do not roll freely. When they get locked then they do not wear evenly, eventually leading to a bumpy ride.

Then if there is damage or wear to the rollers or the plastic to the point that it compromises the effectiveness of the SmartDrive (it loses traction, the rollers are on the verge of falling out, etc.) then it would be time to get a roller replacement kit to replace the rollers and plastic

Functional Q&A

Q 5.1: What to do with battery when system is not used for longer period...

Answer:

Although Lithium Ion batteries can be stored when they are fully discharged it is recommended to:
Charge SmartDrive and PushTracker to 75% before storage
Store in a cool dry place
Charge SmartDrive and PushTracker once every 3-4 months

Q 5.2: When driving in MX1 mode it seems difficult to stop the SmartDrive.

Sometimes it is difficult to stop by holding the rims. It does not seem to be consistent?

Answer:

The stopping is based on current measurement. When driving at low speed (Low current) it is easier to measure a current increase due to the manual braking. The higher the speed (higher current) it gets harder to detect a current increase due to braking.

Also the way to brake "slowly increase braking force" or a "hard stop" differs in measurement. This is one of the reasons that the MX2+ mode with a double tap to stop is way more reliable.

Q 5.3: We cannot adjust the speed on the thumb throttle buttons / attendant control.

Answer:

The thumb throttle buttons can either be used as drive buttons for the user for manoeuvring indoor in tight spaces or as drive buttons for the attendant to support the user when driving over curbs or ramps.

The top speed ever able to be reached by holding a Thumb Throttle Button is a comfortable walking pace (1.5 mph / 2.4 km/h) unless it is limited by the maximum speed setting in the PushTracker.

But regardless of the top speed limit set, the Thumb Throttle Buttons will never activate the motor faster than the walking pace. This is essentially for safety reasons. We don't want the unit to be able to drive faster than what may be controllable to control. If a user is going to be driving at a speed faster, we essentially require for them to have their hands on the handrims (by operating with the PushTracker) and not have them positioned away actively pressing one of the buttons. The request does come that an attendant might walk quickly and want to be able to drive faster than the 1.5 mph / 2.4 km/h, in which case technically speaking they can use the PushTracker / taps on the push handles to activate / deactivate the motor (and limit the top speed to be whatever they want it to be).

Q 5.4: Can you have the SD (switched off) attached to the chair and use a hand bike at high speed.

Answer:

There is not an issue with having the SmartDrive attached to the chair (but "SD OFF") while using a hand bike. The motor is essentially an e-bike motor and mechanically freewheels, so there is no limit to its speed in freewheel and it won't do any damage internally. The only issue is that you are putting unnecessary or extreme wear-and-tear on the omni-wheel / rollers.

Q5.5: Driving range less than on the spec. sheet.**Answer:**

The distance that is specified on the Spec. Sheet / User's Manual is the value reached from the Power Wheelchair Standards (ISO) test, which is the Internationally standardized calculation / tested value across all powered mobility devices. It should be noted that it also says "level / no resistance" on the Spec. Sheet, which implies that this value is for continuous driving (no starts / stops) on a completely flat, smooth cement floor (with almost no rolling resistance) and not a realistic value.

The FDA (medical device regulations here in the U.S.) and testing standards / facilities require us to put that testing result value on the Spec. Sheet, which is higher than the actual unfortunately.

Situations that influence driving:

- Start driving from a dead stop requires more power to accelerate than when you start while coasting. This will reduce the driving range significantly.
- Driving surface, rough terrain has more driving resistance so uses more power
- Uphill driving, is of course an added load and increase power consumption.
- Temperatures below 10° Celsius are significantly affecting the battery capacity. It drops down to 70% at minus 20° Celsius.

Either way, we would make the argument that if you charge your SmartDrive each night and start the day with a full charge, 6 - 8 miles (10 to 13 km) should be more than enough for a full days ambulation.

Q5.6: How to interpret Battery charge indication with remaining mileage?**Answer:**

The SmartDrive Battery charge is displayed in the PushTracker with an additional remaining mileage which is below the spec sheet driving range (see Q5.6). The PushTracker displays appr. 8 miles (13km)

This indication is based on average use.

Dependent on usage such as frequent start from dead stop, going up inclines, rough terrain etc this indication will be recalculated. So high demanding users will drain batteries faster and the predicted remain mileage drops faster than expected than users that only use it as additional drive support in situations where needed.

The remaining mileage should be compared to your remaining mileage in your car. When driving very aggressive, your remaining mileage drops faster than when you have a very gentle driving behavior

Q5.7: The speed is set to 100%, but the SmartDrive only goes 6kmh**Answer:**

According to regulations in some markets and the specification that indicates that the max speed is 6kmh, all SmartDrive units from s/n 223001 are limited to 6kmh. Any setting higher than 70% has no effect on the actual max speed of 6kmh. Contact your dealer if this needs to be changed.

Q5.8: How fast do I need to double tap?**Answer:**

To turn on the SmartDrive motor you must perform two taps (a "double tap" gesture) within a certain amount of time (0.7 seconds) from each other, and these taps must come from the back of the PushTracker - meaning that tapping the screen or the top of the PushTracker with your finger will never trigger a double-tap motor activation gesture.

To turn off the SmartDrive motor, you also perform a double tap gesture. The requirements for the double tap gesture to turn off the motor are less stringent than for turning on the motor - what this means is that you have more time to perform the taps (1.5 seconds), and a deactivation double tap gesture can be triggered by taps coming from the back or the front of the PushTracker.

Furthermore, you do not have to worry about accidentally turning the motor back on if you tap too much - after turning the motor off, it will wait until you have stopped tapping for at least one second before responding to a double tap activation gesture. This means that you can triple tap, quadruple tap, or even just continue tapping and the motor will remain off.

Q5.9: What can I do to increase driving range?**Answer:**

Battery Power consumption can be compared to fuel consumption when driving a car.

-City usage consumes more fuel:

For SmartDrive this means that many starts/stops, specifically frequently starting from a full stand still, consumes more battery power than driving at a constant speed. Activate driving (double tap) after you have propelled yourself will help to reduce battery power consumption.

-Fast acceleration – "sportive" driving" consumes more fuel:

For SmartDrive this means that high acceleration settings use more battery power. The acceleration setting is at time of delivery set to 30%. So do not increase the acceleration setting as this will consume more battery power.

-Off Road driving consumes more fuel:

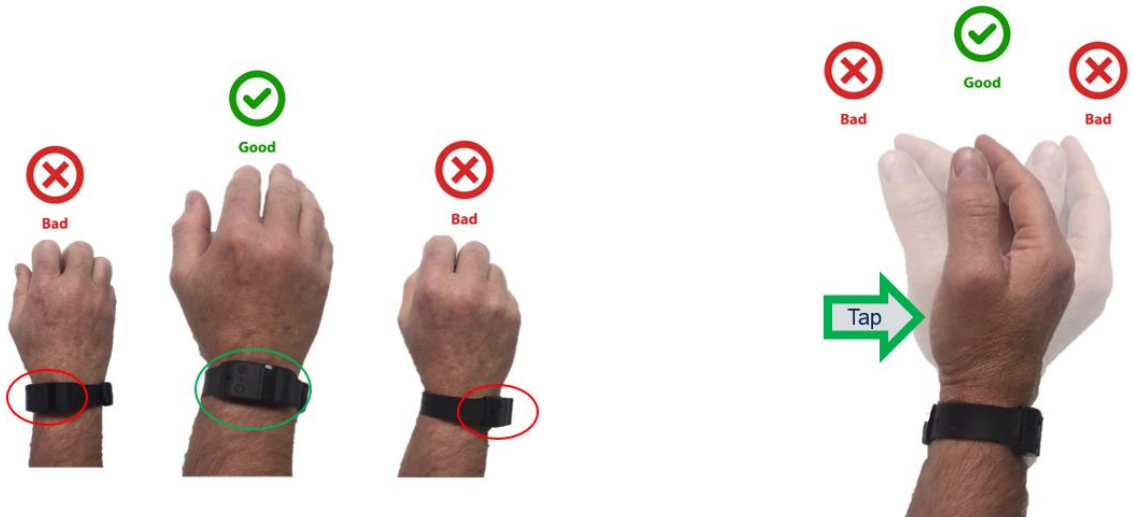
For SmartDrive this means that you should drive on the smoothest part of a road/path. Every uneven/rough path is consuming more battery power, so find the most even and smoothest part of a road/path to save battery power.

Q5.10: Is the position of the PushTracker on your wrist important?

Answer:

The position of the PushTracker on your wrist affects the functionality of the tapping sensors very much.

The start drive is activated by a double tap from the bottom side. This means if that the PushTracker is not worn properly the taps sensors might not work properly. Wear it as shown in the picture below. Tapping with a rigid wrist and not a waving hand is required to detect the tapping properly. See below.



PushTracker attached to wrist

Tapping with rigid wrist not with a waving hand.

Failures

Q 6.1: EZ-on/off in PT does not react > by horizontal position of PT blue led does not show

Answer:

After verifying that EZ-On is activated, try resetting the PushTracker by putting it to sleep (by pressing and holding the left PushTracker wristband button). If after turning back on EZ-On still does not work, there must be something wrong with the PushTracker.

Q 6.2: Battery in PushTracker is empty and cannot be charged

Answer:

There seems to be a problem inside the PushTracker. Have it sent in for repair.