



## Charging Your Vehicle

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**ROADSTER 2 / ROADSTER SPORT**

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## SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions that must be followed when using the Tesla Motors High Power Connector.


## Grounding instructions


The High Power Connector must be connected to a grounded, metal, permanent wiring system; or an equipment-grounding conductor is to be run with circuit conductors and connected to equipment-grounding terminal or lead on battery charger. Connections to battery charger shall comply with all local codes and ordinances.


Temperature rating of wire that is used to connect the unit	Copper conductors only
75°C	Use (a) AWG, 75°C copper wire
90°C	Use (a) AWG, 90°C copper wire


(a) The conductor size shall be no smaller than the 75° C wire size based on the ampacities given in Table 310-16 of the National Electrical Code, ANSI/NFPA 70.


## Warnings and cautions


 Warning: The High Power Connector must be installed by a Tesla-recommended installer or a licensed electrician of your choice. The installer will test the unit to ensure that it is operating correctly. Installation performed by installers who are not electricians, or who are not Tesla-recommended installers may result in fire, serious injury, or death.▲


 Warning: The High Power Connector must be grounded through a permanent wiring system or an equipment grounding conductor. Failure to properly ground the High Power Connector could result in fire, serious injury or death.▲


 Warning: Do not install the High Power Connector near flammable, explosive, or combustible materials.▲

 Caution: Do not expose the High Power Connector to temperatures outside its operating range of -22°F to 122°F (-30°C to +50°C).

 Caution: Incorrect installation and testing of the High Power Connector could result in damage to the vehicle's Battery and to the High Power Connector itself.

 Caution: Store the High Power Connector in temperatures between -58°F and +176°F (-50°C and +80°C) to protect it from damages that may be caused by storing it at temperatures outside of this range.

 Caution: When transporting the High Power Connector, handle with care to prevent its internal components from being damaged.

 Caution: Do not use cleaning solvents to clean any of the High Power Connector's components. The outside of the High Power Connector, the charge cable, and the connector end of the charge cable should be regularly cleaned with a clean dry or damp cloth to remove any accumulation of dust and dirt.

## Communications regulations

### FCC declaration of conformity

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. See instructions if interference to radio or television reception is suspected.

### Radio and television interference

The equipment described in this manual generates, uses, and can radiate radio-frequency energy. If it is not installed and used properly - that is, in strict accordance with Tesla Motors' instructions - it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications

# Safety and regulatory information

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in Part 15 of FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If necessary, consult a Tesla Motors authorized service technician.

## **Important!**


Changes or modifications to this product not authorized by Tesla Motors could void the FCC certification and negate your authority to operate the product.


## **Copyright**


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## Important!

 Caution: If the Battery's charge level falls to 0%, it must be plugged in immediately. Failure to do so can permanently damage the Battery and this damage is not covered by the New Vehicle Limited Warranty. Also, if you allow the Battery to fall to a critically low level it may not be possible to charge the vehicle. If you are unable to charge the vehicle, contact Tesla Motors.

 **WARNING:** The Battery has no parts that an owner, or a non-Tesla authorized technician can service. Under no circumstances should you open or tamper with the Battery. Always contact Tesla Motors to arrange for Battery servicing. ▲

 At the end of its service life, the Battery will be recycled. Contact Tesla Motors for recycling arrangements.

## The Battery

The Tesla Roadster's Battery provides power to the motor as well as all the other electrical systems on the vehicle, such as lights, instruments, audio system, etc.

The Battery is one of the largest and most advanced battery packs in the world, consisting of several thousand lithium-ion battery cells that store enough energy for the vehicle to travel over 200 miles (320 kms) without recharging.

**Note:** Actual range will vary based on driving style. The vehicle consumes more energy if you are driving aggressively, driving up hills,

or are using more resources such as air conditioning. Also, over time, the Battery experiences a gradual loss of capacity, inherent in all lithium-ion batteries. So, as your vehicle ages, the capacity of the Battery declines.

As you drive your vehicle, the level of charge in the Battery is depleted and you'll need to recharge it. The Roadster's built-in charging system allows you to easily recharge it by connecting an electrical power supply to the vehicle's charging port.

## Designed to be plugged in

The Tesla Roadster is designed to be plugged in when not in use. This ensures that the next time you use the vehicle, it is fully charged and ready to go. There is no advantage to waiting until battery level is low before charging. Plugging in every night eliminates the risk of damage that could be caused by over-discharging the battery.

When plugged in, the vehicle optimizes the lifetime of the Battery by managing its charge level and temperature. The vehicle wakes up every 24 hours and, if needed, automatically initiates the charging process to keep the Battery at an optimum charge level.

If you're not driving your vehicle every day, see Storing your vehicle on page 4.

## Leaving the vehicle unplugged

Even when you're not driving the vehicle, the Battery will slowly lose its charge. Therefore, when you're not using the vehicle, you should leave it plugged in. However, situations may arise in which you must leave the vehicle unplugged for an extended time (for example, at an airport when travelling for a couple of weeks). If this is the case, it is your responsibility to ensure that the Battery does not become fully depleted. Charge the Battery to a maximum level before leaving it. Keep in mind that when the vehicle is left unplugged with a full Battery, the initial rate of decline can be significant. When fully charged, the Battery's charge level can drop as much as 7% a day and 50% within the first week. When the Battery's charge level falls below 50%, the rate of decline slows down to approximately 5% per week. Over-discharge can permanently damage the Battery.

If for some reason, you are unable to keep the vehicle plugged in when it is not being used, it is up to you to preserve battery life by paying attention to the charge level and the temperature (see bulleted list below). If leaving your vehicle unplugged for more than 24 hours, follow these do's and don'ts to avoid prematurely decreasing the life of your vehicle's Battery:

- DO leave the vehicle plugged in whenever possible.
- DO maintain at least a 15% charge level in the Battery if leaving it unplugged for more than 48 hours.

# General information about charging

- DO charge the Battery to a full charge before leaving it unplugged. This maintains the charge level needed to keep the Battery's electronics operational. If storing for more than 15 days, it is strongly recommended that you keep it plugged in.
- DO NOT expose an unplugged vehicle to ambient temperatures below -20°F (-29°C) or above 120°F (49°C).

Use the vehicle's Touch Screen to determine the charge level and temperature of the Battery. For details, refer to the Touch Screen Users Manual, provided in your owners package.

## Storing your vehicle

If you plan to leave the vehicle unused for longer than 15 days, it is recommended that you leave the vehicle connected to the High Power Connector and select the 'Storage' charge setting using the Touch Screen. When you charge the vehicle using the Storage charge setting, the vehicle is automatically kept at a reduced charge level to optimize the life of the individual cells within the Battery. Keep in mind that the reduced charge level also reduces the vehicle's available driving range. So remember to change the setting back to 'Standard' before taking the vehicle on an extended drive. For details on how to select the Storage charge setting, refer to the Touch Screen Users Manual, provided in your owners package.

## Maximum level of charge

The maximum level of charge the Battery will be charged to depends on the charge setting you select (see About charge settings on page 5). The Standard charge setting is the preferred setting for normal use. Selecting the Range or Performance charge settings will charge the Battery to its maximum allowable charge level, whereas selecting the Storage charge setting will charge the Battery to a relatively low level.

## Charge level and range are estimates

The vehicle's Touch Screen displays the charge level and number of miles you can drive on the remaining charge. The numbers that are displayed are estimates only. The Touch Screen allows you to display these estimates based on how you've been driving for the last 40 miles (64 kms) (EST RANGE) or how many miles you can achieve in ideal driving situations (IDEAL RANGE). Therefore, if you have been driving on hills for the past 40 miles (64 kms), and you are now driving on a flat highway, the number of miles you can drive on the remaining charge will actually be more than the estimate that is displayed when EST RANGE is selected. Likewise, if you are displaying remaining miles based on IDEAL RANGE, but are using the vehicle's air conditioning system and driving aggressively, the number of miles you can drive on the remaining charge will be less than the estimate that is displayed. Charge level

and estimated remaining mileage are also displayed on the vehicle's LCD panel (see page 11).

The charge level and estimated mileage are continuously updated. Also, they may be lower or higher after a period of rest. For example, when parking your vehicle you notice that the estimated remaining mileage is 85. When returning to your vehicle a few hours later, you notice that the estimated mileage is now 91. This is normal behavior and is not a cause for concern. The mileage that is displayed when the vehicle has been at rest is more accurate.

## How long does it take to charge?

The amount of time it takes to fully charge the vehicle will vary depending on current and voltage. Charge time is also impacted by both the ambient temperature and the vehicle's Battery temperature—if out of the optimal range, the HVAC system starts up and diverts a portion of the energy. It also depends on the charge setting you are using. For example, a full charge at Range or Performance takes approximately 15% longer.

Use the following table as a guideline when estimating how long it will take to charge your vehicle. This table assumes you are charging a fully depleted Battery to a full charge using the Standard or Range charge setting. Charge times are estimates only.

Charge Specification (amps/voltage)	Charge Time in Standard mode	Charge Time in Range mode
12A/120V	48 hours	54 hours
15A/120V	37 hours	41.5 hours
10A/240V	23.5 hours	26.5 hours
13A/240V	18 hours	20 hours
16A/240V	14.5 hours	16 hours
24A/240V	10 hours	11 hours
30A/240V	8 hours	9 hours
32A/240V	7.5 hours	8 hours
40A/240V	6.2 hours	7 hours
48A/240V	5.3 hours	6 hours
56A/240V	4.7 hours	5 hours
64A/240V	4.2 hours	4.7 hours
70A/240V	4 hours	4.5 hours

**Note:** The charge process slows down as the Battery approaches a full charge. Therefore, reaching a high level of charge is much quicker than reaching a full charge.

## About charge settings

Your vehicle has been set up with default charging settings. However, you can override these default settings. You may want to optimize the charging environment when storing your vehicle, or you may want to extend the vehicle's driving range. You can also reduce the default charge current, set a time that you want charging to begin, and display your electrical cost per charge.

Charge settings can be changed using the Touch Screen. The various charge settings are summarized below. For details on how to use the Touch Screen to adjust settings, refer to the Touch Screen Users Manual, provided in your owners package.

## Four charge modes

The charge mode always defaults to Standard charge. In other words, changing the charge type is a one-time event—the charge type reverts back to Standard the next time the charging port door is opened after the vehicle has been driven over a tenth of a mile (.16 kms).

### Storage

If you are not using the vehicle for an extended period of time, Tesla recommends leaving the vehicle plugged in and setting the charge type to Storage.

This setting charges the Battery to a medium level of charge to ensure the maximum lifetime of the cells within the Battery, while also maintaining the integrity of the vehicle's electronic systems, such as the security system.

This charge setting is automatically cancelled and reverts back to Standard if the vehicle's charging port door is opened after the vehicle has been driven over a tenth of a mile (.16 kms).

If the vehicle is driven after being charged using the Storage setting, the range of the vehicle will be limited because the charge level is lower than the other charge types.

This is temporary and returns to normal after charging the vehicle using the Standard setting.


### Standard

By default, the vehicle is set up to charge using the Standard charge setting—this setting provides the best performance while also maximizing the life of the Battery.

### Range

This setting charges the Battery to the maximum available level. It also limits the vehicle's power by 50%. The result is that the vehicle can achieve the maximum number of miles possible on a single charge.

To preserve the life of the Battery, this charge setting is automatically cancelled and reverts back to Standard after 72 hours or when the vehicle's charging port door is opened after the vehicle has been driven over a tenth of a mile (.16 kms).

 **Caution:** Repeated use of the Range charge setting reduces the lifetime of the cells within the Battery.

### Performance

This setting is available for those rare times in which you want to achieve maximum power and hence, minimize the time it takes to accelerate from 0-60 mph (0-100 kmh). Use this setting with caution because it allows the Battery to run at a higher temperature—which reduces the life of the cells within the Battery. Frequent use of this setting is strongly discouraged.



# Charge settings

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This setting also charges the cells within the Battery to the maximum available level.

To preserve the life of the Battery, this charge setting is automatically cancelled and reverts back to Standard after 72 hours or if the vehicle's charging port door is opened after the vehicle has been driven over a tenth of a mile (.16 kms).



Caution: Repeated use of the Performance setting reduces the lifetime of the cells within the Battery.

## Schedule the charge time

If you don't want the vehicle to begin charging immediately after you plug it in, you can set a charge start time. This is a useful way to charge the vehicle during non-peak hours when there is less demand on your electrical system and your electricity may cost less.

## Setting current limit

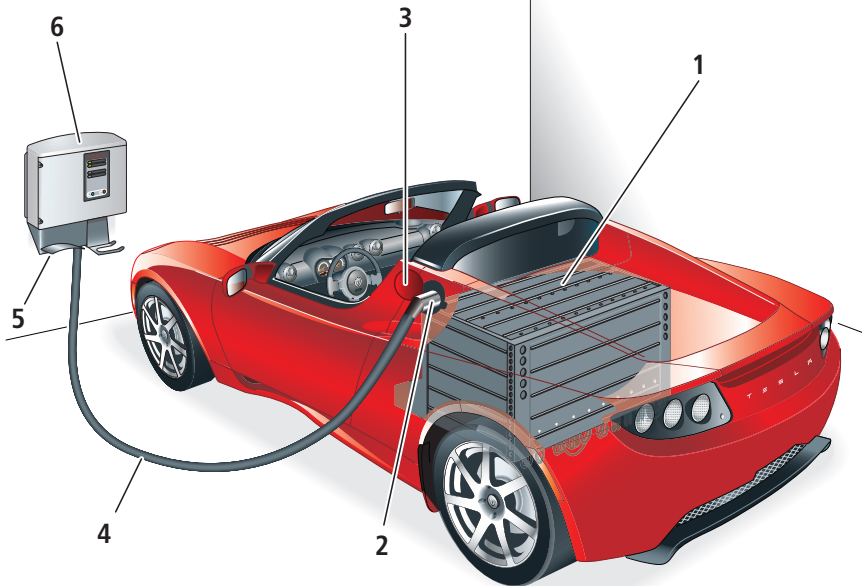
The charging current is automatically set to the maximum possible value available from the attached power supply. With the charging port door open, you can use the Touch Screen's charge settings screen to manually change the current. If you do so, the changed value remains in effect for the current location until you manually change it. The vehicle location is determined by the internal global positioning system (GPS). This allows you to set a different current limit for each of your charging locations.

## Cost

You can display the cost of a charge on the Touch Screen when the vehicle has finished charging. You can obtain an accurate reading of your power cost for each charge cycle by entering the cost of power (in kWh) on the Cost Settings screen. In most areas, you can obtain your power costs from your utility bill. For details on setting charge costs, refer to the Touch Screen Users Manual provided in your owners package.

# Charging components

1. Battery
2. Charging cable connector
3. Charging port door
4. Charging cable
5. Cable hanger
6. High Power Connector



## Charging components

A Tesla Motors High Power Connector is the fastest way to recharge your vehicle.

During normal use, the High Power Connector should be left on, even when the charging cable is not connected to the vehicle. The READY light on the control panel illuminates green to indicate that the High Power Connector is operating correctly.

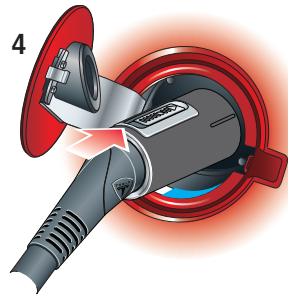
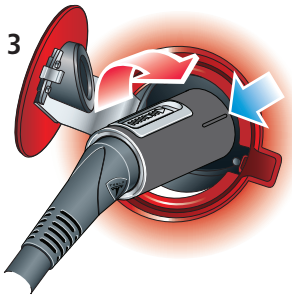
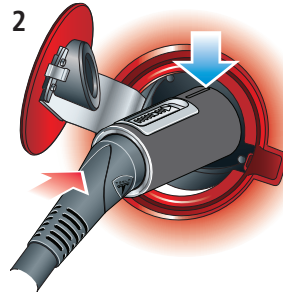
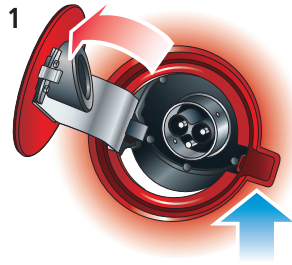
Although the High Power Connector is on and ready, no electricity is supplied until you connect the charging cable to the vehicle, and both the vehicle and the High Power Connector determine that it is safe for charging to begin.

For more details on the High Power Connector, refer to the documentation provided with your High Power Connector.

## Mobile connector

The Tesla Motors Mobile Connector connects into most power outlets to allow you to charge your vehicle when you are away from home. Its small size allows it to be carried in the vehicle's trunk. Keep in mind that it takes longer to charge the vehicle using the Mobile Connector than when using the High Power Connector. Always check the vehicle's charge level before driving and plan your drive and charging requirements accordingly. For more details on the Mobile Connector, refer to the documentation provided with your Mobile Connector.

# Charging instructions



TR0083

## Connecting the charge cable



Caution: The connector end of the charge cable is heavy and can damage the vehicle's paint if dropped when connecting or disconnecting.

Charging the vehicle is as simple as connecting the charge cable. Follow these steps:

1. Position the vehicle so that the charge cable easily reaches the charging port on the vehicle.

2. If you are not using the Standard charge setting, use the Touch Screen to set a different charge setting. See Four charge modes on page 5.

3. Remove the key.

If the key is in the starter switch, the vehicle will not charge.

4. Open the charging port door on the driver's side of the vehicle.

Within a few seconds, the ring around the charging port illuminates white.

**Note:** If the charging port door is open but the charge cable is not connected, the charging port light will eventually extinguish. The door will need to be closed and opened again to re-initiate the charge process.

5. Align the charge cable connector to the charging port and insert fully. The READY light on the High Power Connector illuminates amber when the vehicle has successfully communicated with the High Power Connector.
6. Push the collar on the connector forward while rotating it clockwise to secure the connector to the charging port.
7. Push the tab on the connector forward to lock it into place.

The ring around the charging port flashes blue for approximately 15 seconds to indicate that the vehicle is communicating with the charging equipment. You may hear "clunking" sounds as the contacts close. The ring around the charging port will then begin to pulse amber, which indicates that charging has

started successfully. The frequency at which this ring pulses will slow down as the charge level approaches full.

**Note:** If the vehicle's doors are locked during charging, the light around the charging port will not illuminate during the charging process.

Depending on the temperature of the Battery, heating or cooling may be required before it can be charged. This is activated automatically but may result in a significant delay before charging begins.



While the vehicle is charging, the charge indicator on the instrument panel will flash.

When charging is complete, the ring around the charging port stops pulsing and illuminates green.

If the ring around the charging port illuminates red while charging, a fault has been detected. Check the Touch Screen for an error message that describes the fault.

**Note:** A fault condition can occur due to something as common as a power outage. Try pressing the Fault Reset button on the High Power Connector to clear the fault. In the case of a power outage, you may also need to press the Ground Fault Reset button on the side of the High Power Connector. The Fault Reset button on the front of the High Power Connector will not reset the GFCI.

## Stopping the charge process

The charging process can be stopped at any time using the Touch Screen. For details, refer to the Touch Screen Reference Guide provided in your owners package.

## Charging port light

Color	Charging state
White	Charging port door is open and charge mode is initiated.
Blue	The vehicle is successfully connected to the charging system.
Blue (pulsing)	The vehicle is preparing to charge.
Amber (pulsing)	Charging is in progress. The rate of pulsing decreases as charging progresses.
Green	Charging is complete.
Red (flashing)	A fault is detected and charging has stopped.

**Note:** If you are charging a locked vehicle, the charging port light will not illuminate.

## Disconnecting the charge cable

**Note:** Tesla Motors strongly recommends leaving the charge cable connected whenever the vehicle is not in use. This will maintain the vehicle at the selected level of

charge. However, before operating the vehicle, don't forget to disconnect the charge cable.

To disconnect the charge cable from the vehicle:

1. Pull the locking tab on the connector towards you.
2. Rotate the locking ring on the connector counterclockwise.
3. Pull the charge cable connector to release from the charging port.
4. Coil the charge cable around the cable hanger and ensure the connector is at least 18" above the floor.
5. Close the charging port door.

# Maintenance and care

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## Cleaning the High Power Connector



**WARNING:** Do not use cleaning solvents to clean the High Power Connector, its charge cable or the vehicle's charging port.▲

The High Power Connector has no user serviceable components within it. If the unit is not operating correctly, seek assistance from a Tesla-certified electrician.

Regularly inspect the High Power Connector and charge cable for signs of damage. If any damage is found contact Tesla Motors.

Always ensure that after charging, the charge cable is returned to the cable hanger and the charging connector is clear of the floor.

The outside of the High Power Connector, the charge cable, and the connector end of the charge cable should be regularly cleaned with a clean dry or damp cloth to remove any accumulation of dust and dirt.



