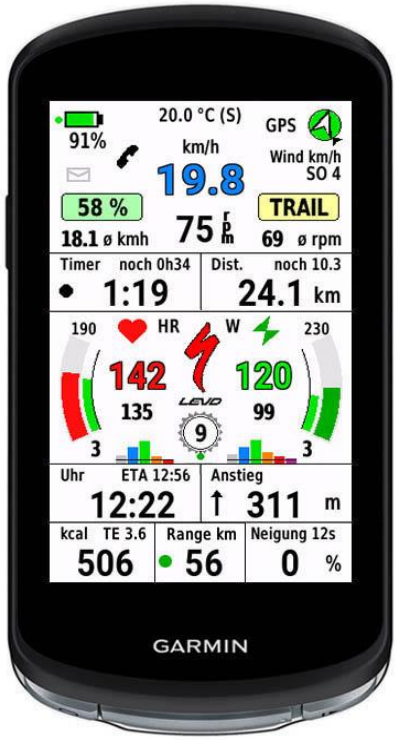
Edge 1 Ebike (for Edge 1030 Plus and Edge 1040 series)



Edge 1 Ebike is a single data field

Based on my datafield „Edge All in One“ I created this datafield first of all for my own use with my Specialized Turbo Levo 2019.

However, it may also work for all other ebikes that meet the ANT+ LEV (Light Electric Vehicle) convention. (Not for BOSCH and SHIMANO!)

After installing this datafield on your device, various settings can be made. This is best done with Garmin Express or Garmin IQ Mobile.

The following settings are supported:

-Ebike device number (0 for search new ebike)
-Ebike labels for your assist modes
-Optional disable notification envelope
-Optional: colored main data numbers
-Power gauge or Cadence gauge
-Optional: disable the LAP function
-Maximum value on gauge for HR, Power and Cadence selectable
-Power zones
-Optional: display of Power zone 7
-Optional: Grade display with one decimal place
-Period for smoothing the Grade display in seconds (5 - 20 sec)
-Optional: display of a pulsating timer indicator
-Optional: display Index of derailleur or alternative number of teeth
-Optional: Save Edge battery charge in FIT and display in Garmin Connect
-Optional: Save derailleur index in FIT and display in Garmin Connect
-Optional: Save Ebike Energy data in FIT and display in Garmin Connect
-Switch between kcal and Altitude by tapping (primary display in settings)
-Optional: display Radar Vehicle Speed - if a radar is connected

Both the **metric** and the **US-American system** of measurement are supported.
The following languages are supported: English, German, French, Spanish, Italian, Polish

PLEASE NOTE :

This ebike datafield works only with ebike systems which fulfill the ANT+ LEV standard! (LEV = Light Electric Vehicle)

It does not work with BOSCH Systems and it does not work with SHIMANO systems!

It is tested with my ebike - a Specialized Turbo Levo.

It may work not only with SPECIALIZED Systems (BROSE and MAHLE), but also FAZUA systems, YAMAHA systems and more, but I cannot guarantee that it will work on your bike!

To pair your ebike with this datafield:

Simply turn on your ebike, turn on your Edge device and load the datafield. Wait a few seconds and you will see the battery status and assist mode of your bike!

If it does not work - there might be 2 reasons:
1) your ebike does not fulfill the ANT+ LEV standard
2) your ebike is connected as ebike sensor to your Edge already

Note: to pair the ebike with the datafield your ebike must not be connected as ebike sensor. If it is - disable the connection under sensors.

On the other hand it is no problem, if your ebike is connected to your Edge as simple power sensor or/and speed sensor!

Once your ebike was paired successfully it will connect only to your bike for the future. If you want to pair with another bike, please set 0 (zero) into the line for "Device number"!

In the setup you can chose the labels of the assist modes. Default are numbers 0 to 7. First check, which numbers appear when you change levels, and then give (short) names to that numbers like:
OFF,ECO,2,TRAIL,4,TURBO,6,7,

Note: for Specialized ebikes this labels will appear without any change in setup!

E bike Data:

With a **tap onto the lightning /brand logo in the middle of the screen** you will see a pop up window with ebike data - if a ebike is connected:

Left picture shows the available data for my Specialized TURBO LEVO.

As you can see - not all data are available!
This might be different from manufacturer to manufacturer and system to system.

Assist % for LEVO shows the setting you have done in the mobile Specialized app for the 3 assist modes.

Remain Range transmitted over ANT+ does not work for my LEVO, therefore I did my own routine for Remain Range.
Left: the "over all" based range / Right: the range based on the consumption of the current ride.

Consumption shows the "over all" average consumption in Wh/km.

The […..] line shows the distance of so far stored rides and the according battery consumption in percentage-points and consumption in Wh. It is used for the calculation of the "over all" based range (see later).
You can overrule this values in the settings.
This option is disabled by default in the settings!

At the bottom there are 2 areas for choosing the current used ebike battery. Please set the capacity of each battery in the settings.
Battery No 1 is the battery which is mainly used. Number 2 is helpful if you change batteries.
Note: after turning on the device, battery No 1 is always selected!
If only one battery is used, leave capacity for battery No 2 zero!

Battery Charge Cycles and Motor Temperature data are not available via ANT+ for my LEVO.

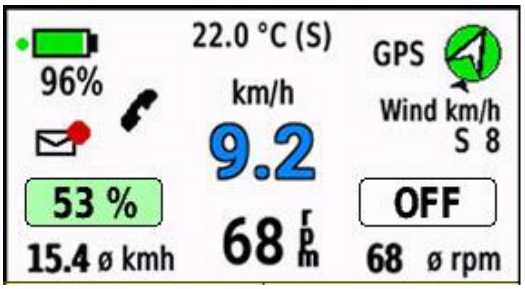
This lack of data is caused by the manufacturer who does not fulfill all possibilities of ANT+ LEV. There is nothing I can do.
You may say - but in the mobile app I can see this data! Yes, but the mobile app does not work via ANT+ but Bluetooth!

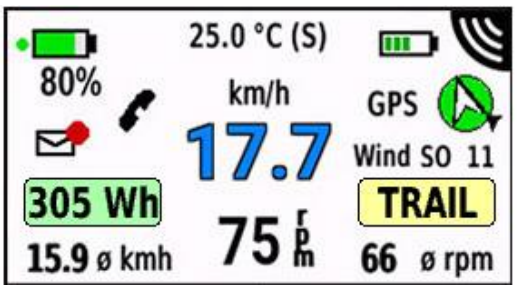
What you get will be different for different manufacturers!

To use the power section, your ebike must be paired as power meter sensor with the device and the values of the individual power zones must be stored in the settings.

For the heartrate graphs the heartrate zones are taken from your profile. It is therefore necessary that the zones are set in your device!

The upper section of the display without or with Varia Radar:
The datafield will recognize if there is a radar connected and will change the layout automatically.





Ebike Battery and Assist mode
shown in colored rectangles. Tap on Battery to toggle to display of remaining Wh.

Edge Battery status
of device battery on left - and if enabled, Varia battery on the right side.
Please note that Varia battery can take some time until it shows the status!

Notifications
For notifications there is a envelope symbol on the display.
If there are unread notifications, a red filled circle with the number of notifications pops up and blinks.
Note: on iPhone there are all kinds of notifications counted. So, be sure that all messages are deleted from the lock screen!

Phone connected
is shown by a phone symbol: grey if not connected, black if connected.

Weather data
For the display of wind bearing and wind force, as well as the outdoor temperature, the data of a nearby weather station (S) must be available via Garmin Connect Mobile.

GPS circle
The color of the circle depends on the current GPS signal strength.

red:	no GPS available - the GPS label blinks
light red:	no GPS available but last GPS Position is shown - the GPS label blinks
light green:	poor signal
green:	good signal

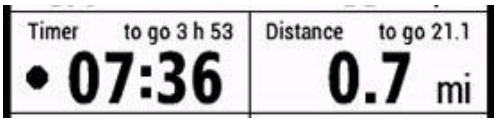
Compass
There is an arrow inside the circle indicating North direction.
If weather data are available, there is another small arrow outside indicating the wind bearing.

Speed and Cadence
The speed display can optionally be set blue with outline.
Below average speed and average cadence are shown.

Timer and Distance

On the left side there is the timer for the activity recording.
The timer shows mm:ss for time below one hour and shows h:mm for time more than one hour.
A black pulsating dot is displayed by default, signaling that the timer is running.
This is helpful for activity durations of more than 1 hour because the display changes only every minute then.

During a pause, the dot is red. This indicator can be turned off in settings.



On the right side there is the elapsed distance displayed.

When a course is loaded, the data for **Time** and **Distance to Destination** and **ETA** appear at the according fields.
As long as no average speed is available - e.g. after loading the course but before the start - an avg speed of 10 km/h (6.2 mi/h) is used. After that the time is calculated continuously over the avg speed.

Since the digits for **Time and Distance to Destination** are very small, there is the possibility to read these values comfortably in a pop up window.

Heartrate field and Power field

To display the heart rate, a HR-belt or similar must be paired.
The heart rate display can optionally be set red with outline. At the bottom the current HR zone is shown.

The heart rate zones are read from the user profile stored on the device. It is therefore important that all information in the user profile is entered correctly.
The bar graph continuously shows the time in each zone as a percentage.

To display the power, connect your ebike as power sensor (not as ebike!).
The power display can optionally be set green with outline. At the bottom the current power zone is shown.

The maximum for the power gauge can be set in settings (100 - 500 W).
Since the power zones cannot be read from the user profile, they must be entered in the settings. Enter the values exactly as they are stored on the Edge under power zones. The bar graph continuously shows the time in each zone as a percentage. By default 6 zones are shown because zone 7 is hardly reached by most cyclists. In settings, however, it is also possible to set zone 7 is also shown.

Cadence field

Instead of power you can chose a cadence field in settings.
You'll get cadence if you connect your ebike as power sensor or/and as speed/cadence sensor.
Do not connect your bike as ebike under sensors!
The maximum of rpm on the gauge can be set in settings (110 - 200 rpm).

For all kind of gauges applies:

-the outer arc represents the current value.
-the inner arc represents the average value in color of the zone.

Derailleur (Gear shifter)

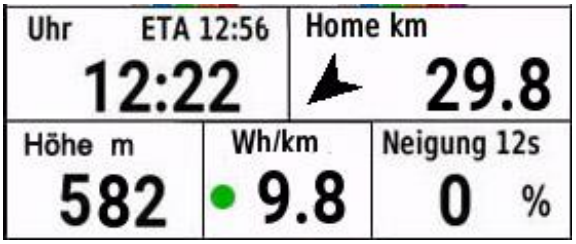
In addition you can set a cogwheel to the display showing the Index or the teeth numbers of the derailleur(s). See pictures above!

In setup you can chose:
0 … do not show
1 … for mechanical shifter, rear only (one chain ring only)
2 … for electric derailleurs, rear only
3 … for electric derailleurs, front and rear

For mechanical shifters in setup you have to set:
-rear wheel circumference in cm
-teeth of chain ring (**one chain ring only is supported!**)
-teeth of cogwheels from smallest to biggest
All values are separated by a semicolon.
For my Spesh Turbo Levo with 34 teeth chain ring and SRAM Eagle 12 gears:
220; 34; 10; 12; 14; 16; 18; 21; 24; 28; 32; 36; 42; 50;
Although the program checks the string for plausibility during the evaluation, it is important to enter this series of numbers correctly and not to forget the separating semicolons ";" !
If an error occurred during evaluation of the string, the index 99 is shown on the display.

For a meaningful display of the shift index for mechanical shifting, a speed sensor must be used!
If the display of the current shift index is not stable, you must vary the rear wheel circumference in the setup in 5 cm steps up or down.

The bottom section



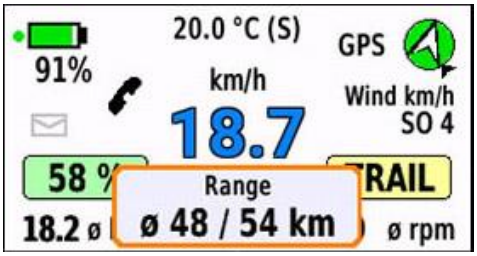
The bottom section of the display shows clock, total Ascent, kcal Consumption, Training Effect, Remain Range in km oer mi, and Grade or alternatively the Pause time (if paused).

By **tapping on the kcal field**, the display can be changed to Altitude.

By **tapping on the Range field**, the display can be changed to average Wh/km consumption of the actual ride.

By **tapping on the Ascent field**, the display can be changed to Start Point distance and direction.

Range:



Remaining Range showed on PopUp or/and bottom datafield is calculated by a routine from Ebike Field. (For PopUp tap onto Assist Mode rectangle.)

There are 2 values of Remain Range:

Left: the **Over All Range**. It is a value that will be learned by the datafield with every ride and shows the remaining range of the ride based on average battery consumption over the last (stored and learned) rides.
You can set new stored Over All values in the settings. Fill in the new values for total km, total battery %-points and the new value for total consumed Wh.
Leaving 0 (zero) in that field means - zero will be ignored.
This 3 values are shown on bottom of the eBike Data Pop Up in line […..] and are the base of Over All Range calculation.
Example: common values for ebikes are e.g:
Battery 500 Wh, average km-consumption: 8 Wh/km
For a distance of 100 km this means: [100 km, 160 %pt, 800 Wh]
Over All Range is disabled by default in the settings!

Right: the **Current Range** calculated by the battery consumption of this ride so far.
This value is shown also in the bottom field "Range".
In addition, the bottom field shows a colored dot (not for the first ride and not if "Over All Range" is disabled):

Green:	the current range is within or better than the average long time range
Red:	the current range is lower than the average long time range
Red blinking:	the current range is below 10 km

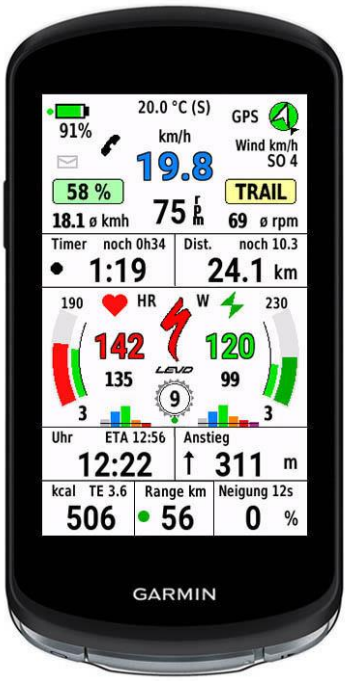
Grade:

The display is calculated via the distance traveled and the associated change in altitude. This has to be done in small steps in order to display the current situation in the best possible way.
To get a good compromise between display stability and delay, the time over which the values are averaged can be selected in settings (5 - 20 sec).
The faster the average speed is the smaller the value of seconds may be.
For my mountain bike the best compromise is around 12 sec.

It is also possible to set a decimal place for grade in settings. Though I think, this is overkill considering the calculation situation - but each as he likes!

Log values to the FIT Activity file and show them in Garmin Connect:

Battery Charge and **Assist Mode** are written to the fit file without doing anything in settings!



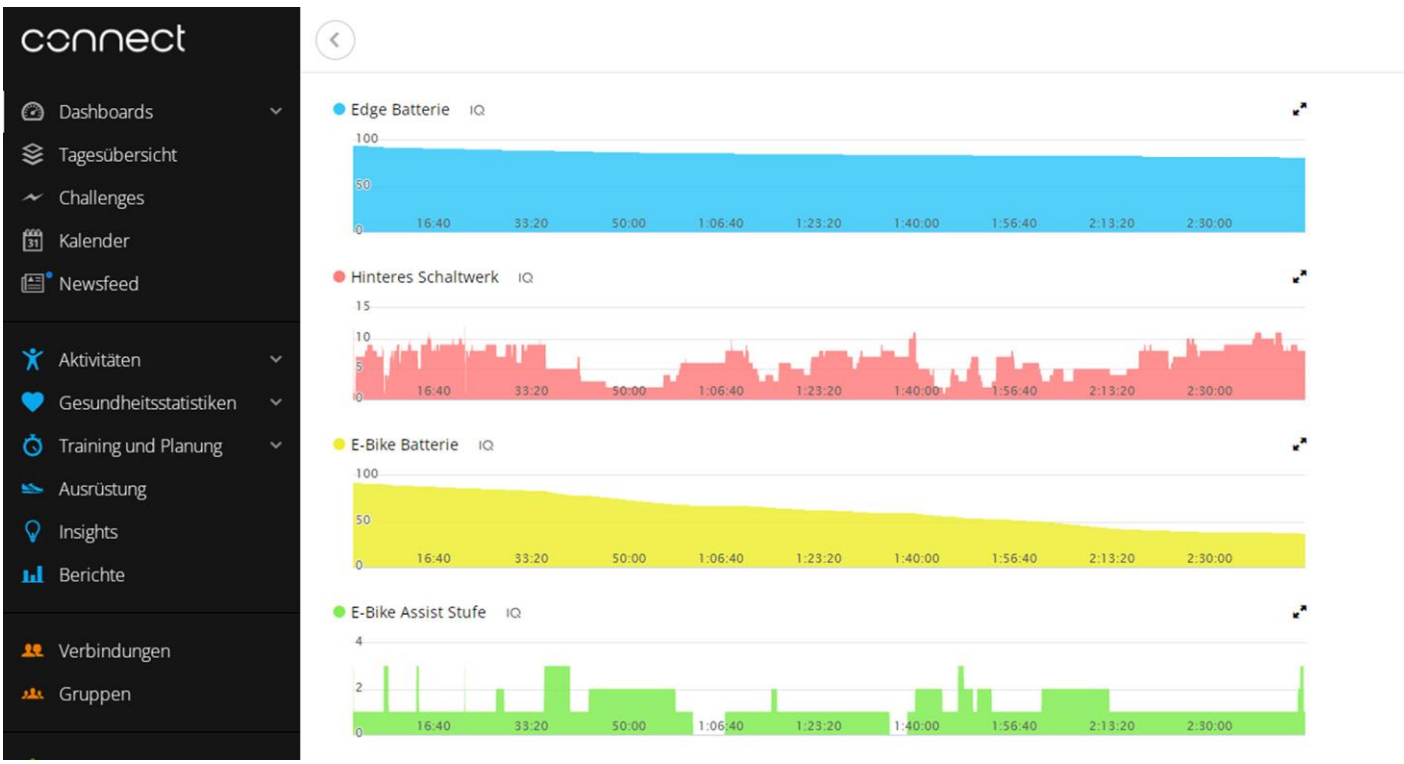
In addition, the following values can be logged and displayed in Garmin Connect:

-Edge Battery Status in %
-Shift index for front and rear
-Ebike Energy data (summary page)

These options must be enabled in the setup.

The readiness to log these values is confirmed by a small green dot beside/beneath the symbols.

ATTENTION:
After activation in the setup,
the device must be restarted!



Ebike Energy Data

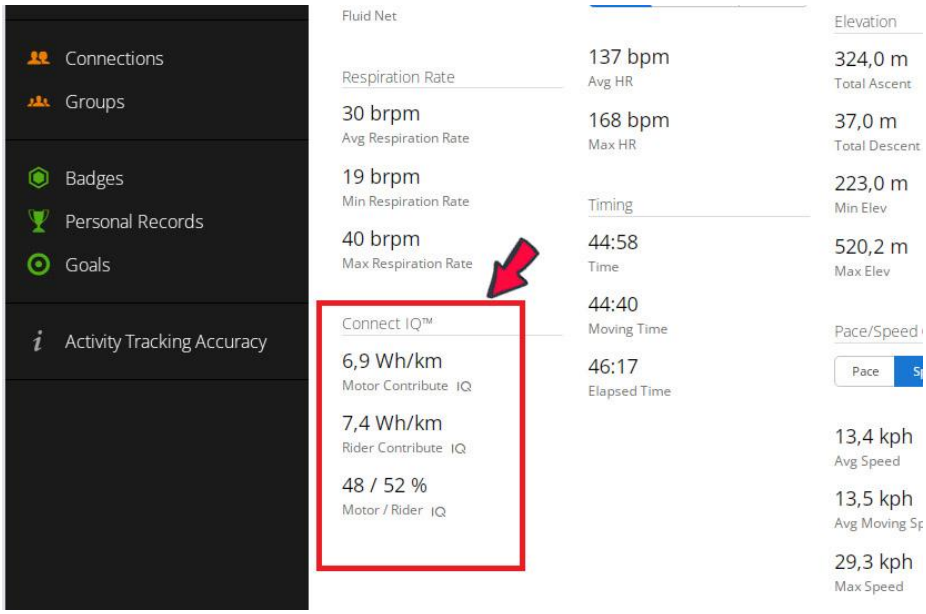
In the settings, you can activate the recording of ebike energy data in the activity fit file and the display in Garmin Connect.

The datafield calculates both - the motor energy on the spider/chainring and the rider energy on the spider/chainring.
For this option you have to use the "Show Power Gauge" setting (not Cadence) and connect your ebike as powersensor.

The ebike energy is calculated from the consumption of the ebike battery, taking various efficiency levels into account:

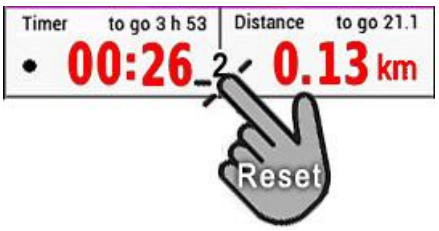
-Battery and converter efficiency 93%
-Motor efficiency 93%
-Battery efficiency loss due to low ambiente temperature (15° to -5° are taken into account)
-Efficiency loss due to not working in the optimum rpm range (lower than 60 rpm on chainring)
 (set rpm counting without zero values on your Edge settings).

Due to all these losses the total efficiency can range from 86% to 70%.



LAP function:

After a lap event, the figures for Timer, Distance, avg. Speed and avg. RPM toggle between elapsed and lap data (red) every 10 seconds.
To reset/discard the lap function: tap (exactly) on the lap counter in the middle.
(This has no effect on Garmin's lap data recording!)
You can disable this LAP function in the setup



Disable Notification Envelope:

You can completely disable the display of the notification's envelope in the setup.
If you enable the envelope in setup, you can switch between full display and reduced display of the envelope by tapping on it.

RADAR Target-vehicle Speed

If your Edge is connected to a radar, you can show the target vehicle speed by switching in the setup.
(It is turned on by default!)

Note: there is a orange dot on screen upon the Range / TE datafield, proving that this datafield will show the speed.
Without orange dot - no such speed will be shown.

RADAR Vehicle Count:

If your Edge is connected to a radar, you can show Vehicle Count by switching in the setup. It shows the number of passing vehicles from behind.

It is shown as small figure on orange ground in the bottom area of your Edge:

In addition, the time history graph is shown in Garmin Connect after saving the activity.

Sun Events:

If you enable Sun Events in the settings, the position of the sun is shown in the upper area of your Edge, with the arc representing 24 hours of the day, the blue part of the arc showing the time from sunrise to sunset, and the yellow dot showing the current position of the sun.

With a tap onto the GPS circle you will get the time for sunrise and sunset.

RADAR Tail Light Control (WITHDRAWN!)

If your Edge is connected to a radar, you can show a pop up for radar tail light control.

By tapping on the radar battery icon, a tail light control window will open:

-Light Mode Button: shows and changes light modes
-Auto Button: switches on/off Auto Modus
-On/Off Button: turns tail light on/off

Auto Modus:

If Auto Modus is ON, your tail light switches on only if a vehicle approaches from behind. If there's no vehicle threat, the tail light stays off. That state saves battery life.
This mode shows an "A" left from the radar battery icon.

NOTE:

This tail light control modes are testet with Radar RTL515 (blinking version) and Edge 1040 only!

Logos:

If the data field detects a registered trademark for the ebike, the company's logo is displayed in the center of the screen.

Available logos:

If you see no special logo on your Edge, but detect a Manufacturer ID on the ebike data screen: tell me brand and Manufacturer ID, I will create the logo for you.

Summary of TAP functions on your EDGE: