

Technical Specification for **SMART BRAKE TECHNOLOGY**

Model: Wireless hydraulic brakes – 2019

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Glossary

BU	Brake unit
BL	Brake lever
BC	Brake control
BT	Brake trigger
BR	common term brakecontrols
*	reservation discrepancies

1. USAGE

1.1 Setup

1.1.1 Before use

- It may be necessary to charge both BL and BU before use
 - Brake lever:** Tilt the silicon lid on the side of the product.
 - Braking Unit:** Unscrew the lid on the front of the product. Use the included RollerSafe adapter to charge both BL and BU.
- When the products are charging, a blinking **red** light will appear in both BL and BU.
 - Brake lever:** The lights can be seen at the top and bottom of the control.
 - Brake Unit:** The light can be seen around the charging point on the unit.
- At 100% battery capacity, the light indicator on the products changes to a blinking **Green** light.

1.1.2 Start and preparations

- Press one time at the connection button on the BU to boot the system. The system will now perform a calibration test.
- Calibration = System checks the brake pads' condition, to optimize lead-time in hydraulic pump. The system performs a fully automatic brake force test from minimum to maximum (more about the pump system in 1.3.2).

The system is based on the main units and clones that follow the motions. One master can control 7 clones at once. The first unit that get connected with a brake control is the master, the rest is works as clones.

a. If you use 1 BU and 1 or more BCs

1. The brake unit needs to be turned on to start the process. (If off, push the connection button one time)
2. On the master BU, push and hold in the connection button for 6 seconds until the LED beside the USB starts to light red. When releasing the button, the unit will turn off and then the brake light start light constantly. The constant brake light signal indicates that the unit is ready to start synchronizing.
3. Place the brake control to be used close to the brake unit.
 - i) Squeeze the lever/button on the control.
 When BC and BU are connected the light signal will disappear.
4. Start up the system by pushing the connection button once.
5. To connect multiple brake controls, repeat the proses.

b. If you use 2 BUs and 1 or more BCs

1. The brake units need to be turned on to start the process. (If off, push the connection button one time)
6. On the master BU, push and hold in the connection button for 6 seconds until the LED beside the USB starts to light red. When releasing the button, the unit will turn off and then the brake light start light constantly. The constant brake light signal indicates that the unit is ready to start synchronizing.
2. On the clone BU, push and hold in the connection button for 10 seconds until the LED beside the USB starts to light purple. The light signal indicates that the unit is ready to start synchronizing.
3. The clone will automatically connect to the main brake unit. When the brake units are connected the brake light signal will disappear.
4. Start up the system by pushing the connection button once on both units.
5. To connect multiple brake units, repeat the proses.

1.1.3 Leading time

It takes 1.6* seconds from pulling the lever until the wheels are fully locked.

1.1.4 Communication

The system uses a two-way RF communication system, which means that BC communicates with BU and vice versa.

a) If BC loses contact with the BU, a rapidly flashing blue light will occur in the control that lost the signal.

b) Main control: If the main control loses contact with BU or has a battery capacity below 15%, **fail-safe mode** will be activated. (Read more about fail-safe in section 3)

d) Battery BU

- i) When the battery capacity in BU is below 25%, the brake light at BU will flash 2 second every 10 second.
- ii) When the battery capacity in the BU is below 15%, the brake lights will start flashing fast and repetitive until it is charged or out of power. The system will not be able to be used until it is charged over 15%.

e) Battery BC

- i) When the battery capacity in BC is below 25%, the light indicator in BC will flash red 2 second every 10 second.
- ii) When the battery capacity in BC is below 15%, a red light will start flashing fast and repetitive until it is charged or out of power. The system will not be able to be used until it is charged over 15%.

1.1.5 On/off activation

1. Push one time to start up the system. When starting you will hear the motor preform a braking test and the brake light will flash once.

MARK: The first time you push the connection button after receiving the product the accelerometer will be activated. That is why it is clever to mount SMART BRAKE on your device before turning it on. After the accelerometer is activated the braking system will automatically turn on when SMART BRAKE is being moved. To turn off the system, press the connection button on brake unit one time. The brake light will flash 2 times.

2. SMART BRAKE never turns off completely, it goes into a sleeping mode after 30 minutes of inactivity where it does not use any power. It has this function, so it always is easy to power up thru movement from the accelerometer.

By activating the parking brake from the control, the unit locks the brakes and goes into a sleeping mode where SMART BRAKE does not use any power. The accelerometer cannot be started thru movement while in parking brake.

1.2 Brake Controllers

1.2.1 Brake lever (BL)

- BL has a resolution of 100 points, providing a linear and seamless brake force.
- If the LED lights in the controller are not visible, check the battery capacity.
- The brake control is in standby mode when not in use, thus no “on / off” button.

1.2.2 Positions

Brake (B)

The range of movement (mm) for the brake lever is given by the position of the control, to fit with different hand sizes. Regardless of the range (mm), the brake will provide a linear force from 0% to 100%.



Parking brake (P)

To activate parking brake push the lever one or two notch forward from neutral position. When parking brake is activated, BC signals a **red** flashing light.



Positioning

The system automatically adjusts brake force per degree of lever movement when setting the control in a new position.

If the control is sat in a position where it does not use its full scope – squeeze the lever all the way in until it stops, **5 times**. The system then recognizes the length and concludes that it is full brake.



1.3 Brake Unit

1.3.1 Braking lights

The braking lights on brake unit will be activated when the lever is activated for brake/parking brake mode. P-brake light will be switched off after 20 sec to save battery.

Connection button

Charging point



1.4 Brake control (BC)

The brake control is a one-handed remote control. It has a neck strap attached so it can easily be carried.

1.4.1 Function

a. Brake

- i) By press and holding the brake button the force linearly increases from 0-100%.
- ii) By releasing the pressure on the button the brake force quickly release pressure on brakes

b. Park brake

- i) Push the button once to activate park brake. The force will linearly increase up to 100% and hold the pressure.
- ii) Push the button once to deactivate park brake.

c. Signal range

The control has a range of 15 meters (radius).



1.5 Brake trigger (BT)

The pole control is controlled by one finger and apply force linearly from 0-100%.



2. TECHNICAL INFO

2.1 Communication platform

- | | |
|------------------------|--|
| 1. Brake lever (BL): | Bidirectional 2,4 GHz RF, BLE, 3.7V, Micro USB type B charging point |
| 2. Brake Unit (BU): | Bidirectional 2,4 GHz RF, BLE, 3.7, Micro USB type B charging point |
| 3. Brake control (BC): | Directional 2,4 GHz RF, BLE, 3V, battery: CR2032 |
| 4. Brake trigger (BT): | Directional 2,4 GHz RF, BLE, 3V, battery: CR2032 |
| 5. Charge cable: | 2 x Micro USB type B, 1 mete |
| 6. Charger: | Double contact - 280mAh |
| 7. APP: | TBD (Firmware update functionality) BLE. (IOS/Android) |

2.2 Interaction LED signals

Constant light:	Performing / >15% battery capacity
Flashing light:	Contact with unit / Warning / <15% battery capacity / charging
White light signal:	Fully charged battery brake lever
Green light signal:	Connection activated / fully charged brake unit
Red light signal:	Low battery / Error / P-brake ON

2.3 Battery

Brake lever

Battery capacity:	3.7V, 190mAh, Li-Polymer, rechargeable battery
Charging time:	2.5 hours to fully charge
Re-charge:	Two times a year

Brake Unit

Battery capacity:	3,7V, 3500mAh, Li-Polymer, rechargeable battery
Charging time:	3.5 hours to fully charge
Active usages:	4000 brakes*

Brake control

Battery capacity:	3V, 220mAh, Cr2032, non rechargeable battery
Battery life:	One year.

Brake trigger

Battery capacity:	3V, 220mAh, Cr2032, non rechargeable battery
Battery life:	One year.

2.4 Force

The number of kilos a brake unit can stop is 100 kg*

2.5 Weights and Measures

See form: product brochure.

2.6 Brake pads

Tektro Auriga Twin HD-T525 calipers included. Can be delivered with other models, or brackets to fit your caliper.

3. FAIL-SAFE

Fail-safe mode is an automatic security feature built into the technology and will be activated in the unlikely event that an error occurs on the system.

When fail-safe mode is activated, the brakes start at 1% braking force and act linearly up to 100% over a period of 30 seconds. Then the brake locks. To put the brake in a neutral position, press the connection button on the BU for one time.

Sources that activate fail-safe are:

- a. Brake unit battery capacity is less than 15%.
- b. The master control loses the signal with BU or has a battery capacity lower than 15%

Brake controllers set up as clones do not have fail-safe activation

6. WARNING

To avoid damage to the components, or potential serious malfunction to SMART BRAKE, follow these safety instructions carefully. Violation of these safety instructions can cause serious and / or fatal injuries, and potentially damage the battery or charger that may cause fire, chemical burns, and / or electrolyte leakage.

1. Use only the included RollerSafe adapter and USB cable. Using other adapters and USB cables can cause the battery to overheat, catch fire, and / or explode.
2. Do not change or disassemble the battery or charger. Avoid draining the battery or charger. Do not use a battery or charger that has been damaged. Signs of damage include discoloration, cracks, punctures, or leakage. If you notice any abnormalities, immediately remove the charger from the equipment.
3. Avoid exposure to extreme heat or cold (+40/-40 Celsius). Do not place the battery or charger in or near a fire or in a place where static electricity occurs.
4. Do not charge the battery in damp or wet places. Avoid exposure to moisture and / or water during charging.
5. Do not leave the battery connected to the charger after full charging. Store the battery at room temperature.

7. CONTACT



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