AR Assistant | User Manual

Advanced rider assistant system

1. Foreword

Congratulations on your purchase of the AR Assistant (ARA). Consider the AR Assistant a rider guardian angel! The ARA is a complete safety package in one tiny box, which may be installed on a wide range of street and track/race bikes that do not have factory-equipped safety features.

The ARA is the only safety module on the market that is managed wirelessly via Android and iOS devices using a free, easy to use application.

The product can be installed on any ABS-equipped bikes using the bike-specific harness kits. Non-ABS models may also use the ARA with the front wheel disc and sensor (included in the non-ABS kit).

Specific functions may be controlled on-the-fly while riding, using the supplied handlebar-mounted switch, e.g. in wet conditions, switch to the pre-programmed rain mode instantly with the flip of a switch.

For more information on this product, please visit: ***www.healtech-electronics.com/ARA***

2. Device compatibility

iOS devices:
Compatible with iPhone/iPad devices running iOS 11.0 or newer.

Android devices:
Compatible with Android devices running Android 5.0 (Lollipop) or newer.

3. Features

ANTI-WHEELIE & TRACTION CONTROL SYSTEM
Adjustable in 12 stages to match your riding style and road/track conditions. Can be completely disabled either in the ARA app or via the supplied On/Off switch. The ARA ensures optimal grip and maximum acceleration on all road conditions. Improves safety and your lap times too!

LAUNCH CONTROL
No more unwanted wheelies during launches. Enjoy thrilling acceleration combined with maximum efficiency. Customize launch settings for the rider/machine combination to the maximum.

PIT-LANE LIMITER
Limit the bike speed while the PIT switch is ON. Essential to keep the mandatory speed limit in the pit lane, but also a great feature as a top speed limiter for less-experienced riders.

AMAZING COMPATIBILITY
The ARA is compatible with all vehicles having one or more cylinders and Transistor Controlled Ignition (TCI). It is NOT compatible with old models having Capacitor Discharge Ignition (CDI). Non-ABS models require the ARA disc and sensor kit. Works together with all other HealTech products.

4. Warranty

HealTech Electronics Ltd. guarantees this product against defects in material and workmanship for a period of two (2) years.

The warranty period starts from the date of the original purchase as shown on the invoice.

5. Specifications

- Supply voltage: +8V to +20V
- Max. supply current at 12V: 150 mA
- Operating temp: -40°C to +80°C (-40°F to +176°F)
- Waterproof (IP68)
- Unit size: 50 x 57 x 17 mm (1.96 x 2.24 x 0.66 inches)
- Reverse polarity and transient protection

6. Installation

Due to its sophisticated nature, both the installation and set-up of the AR Assistant requires precision and patience.

The product can be installed on any ABS-equipped bikes using the bike model specific harness kits (ARA-Kxx). Non-ABS models may also use the ARA with our bike model specific front wheel disc and sensor kits (ARA-Dxx).

The wheel speed disc mounts under the brake disc bolts. We recommend observing the service manual of the motorcycle for repair instructions. Always tighten the bolts to factory torque values with a torque wrench and use the recommended type and amount of thread locks!

To make installations as straightforward as possible, we supply supplementary manuals on our website at the product's subpage in the Supplementary Manuals section.

Please check this link regularly, as these manuals are uploaded from time to time:
www.healtech-electronics.com/ARA

7. Operation

ANTI-WHEELIE AND TRACTION CONTROL

The traction control and the anti-wheelie system samples and compares front and rear wheel speed 100 times per second, so it can reduce the power output of the engine to the required level, helping the rear wheel regain traction and/or decrease front wheel lift. The sensitivity can be set from 1 to 12, where stage 1 hardly intervenes, while stage 12 is the most intrusive, suitable for wet and slippery surfaces (rain mode). After successful installation we recommend setting the sensitivity to stage 10. From that on reduce it step by step according to your riding preference, skills, road/track conditions, etc. A minimum and maximum RPM value can be set, meaning the traction control and anti-wheelie system won't interfere under and above these RPM values.

Attention:

- **The traction control and the anti-wheelie system are both DISABLED when either the launch control or Pit limiter are active.**

- **As the traction control and the anti-wheelie system is based on the wheel speed data, it is essential that there are speed signals from both wheels simultaneously. When using the accessory wheel speed sensor supplied with the ARA, ensure the installation is correct and the sensor is working. Without a front wheel signal the ARA is unable to work as intended!**

LAUNCH CONTROL / LAUNCH ASSISTANT

This function is primarily aimed at drag racers, but can be used on closed course racing as well to get that coveted hole-shot. For the most efficient launch process the rear tire has to grip perfectly, while the rider is keeping the engine in the sweet spot of the torque curve. Getting the launch sequence right requires a great deal of experience and skill. This is where the ARA launch assistant kicks in. It has to keep the revs as high as possible, without letting the rear wheel slip and maintaining an acceptable amount of front wheel lift, not letting the rider fall from an uncontrolled wheelie. As long as the clutch is slipping and the clutch lever is not totally released, the ARA will maintain the engine revs as per previously set in the app. This is the Launch RPM. Please note, that different conditions require different settings, e.g. track surface/temperature, tire profile and compound, air temperature/humidity all have an effect on traction.

- **Launch RPM:**
  Let the bike idle, pull the clutch and the ARA enters launch mode automatically. The module won't let the engine rev above the set RPM value.

- **Maximum RPM:**
  The ARA will shut down the launch sequence when this RPM value has been reached.

- **Maximum speed:**
  As soon as the bike reaches the set speed value, the ARA will shut down the launch sequence. We recommend setting this value high enough, so the launch sequence won't shut down accidentally due to a wheel slip.

- **Drive stabilization time:**
  This is the timeframe the rider has from a fully pulled clutch lever to a totally released one. Engine speed won't exceed the maximum RPM set in the app during this time.

- **Launch-max reach time:**
  Amount of time the engine speed can rise after drive stabilization. In theory for the best possible launch the rear tire needs perfect grip, the bike has a perfect weight distribution and no front wheel lift occurs. In practice rarely go things in an ideal way, so is the launch on a bike. The rear tire slips, while the front wheel lifts off the ground. Some front wheel lift even gains some traction, but beyond a point (approx. 23 degrees)

it won't add any extra grip, and the chance of tip over is getting bigger. When setting launch-max reach time, start with a larger value and decrease it gradually. During this time engine torque delivery shouldn't result in an excessive front wheel lift (above 23 degrees = approx. one front wheel height), while the launch process has to feel relatively safe. As soon as the launch-max reach time has been reached, the ARA will shut down the launch sequence and re-activates the traction control and anti-wheelie functions.

- **Maximum launch time:**
  Amount of time the AR Assistant allows to keep the engine at the launch RPM.

- **Cool down time:**
  While the launch control is running, a lot of heat is being generated that might overheat the exhaust system. In case of the "Maximum launch time" is elapsed, the AR Assistant does not let to start the launch control again for the given amount of time.

- **Professional mode:**
  Use it at your own risk! The ARA will ignore maximum launch time while this mode is active.

- **Drag control:**
  This function requires the Professional mode to be active as well. The drag control function reduces engine performance in a different way, which might interfere with non-racing ECUs, resulting in a false FI trouble code on the dashboard.

As you can see, the ARA offers a vast amount of adjustment possibilities. If there's no safe way to test these launch settings, we recommend the following:
- *Set Launch RPM to the desired value.*
- *Set Drive stabilization time to 0.*
- *Set Launch-max reach time to 0.*
- *Turn on the traction control and anti-wheelie function.*

The above settings make up for a safe and easy launch procedure and as soon as the clutch is fully released, the traction control and anti-wheelie starts to work, providing additional stability and security.

Attention:
- **The launch mode will disable the traction control and anti-wheelie system during the launch sequence! The launch process generates an excessive amount of heat. In order to avoid malfunction and damage to the bike, while reducing the polluting effect, the default launch time duration is 5 seconds.**

TOP SPEED / PIT-LANE LIMITER

The top speed limiter / pit-lane speed limiter function won't let the bike exceed the pre-set speed value. We designed this function with race use in mind, as it's essential to observe the mandatory speed limit in the pit-lane, but can be a great safety feature as a top speed limiter for less-experienced riders as well. The ARA will decrease engine performance to maintain the pre-set speed. However, for a comfortable ride keep the throttle just slightly open, giving the bike and the ARA an easier time reducing the bike's performance and speed.

Attention:
- **The pit-lane limiter will disable the traction control and anti-wheelie function while being active.**

- **As a side note it's worth to mention, that sometimes a crash/collision could be avoided with a swift manoeuvre, and to achieve that, the rider needs to accelerate instead of braking. Please keep that in mind when limiting the top speed of the bike!**

8a. Manual set-up

After successful installation an extensive setup is required in order to get the best out of the ARA. Failure to do so might result faulty working – or its features won't work at all. So be careful and patient while setting the ARA up!

General
- **Pulses per rev:**
  For precise RPM display (and calculations) the 'pulses per rev' number must be set in the ARA app. If unsure, please check the user manual of your motorcycle, whether the ignition system delivers an ignition signal (pulse) one or two times per revolution. On bikes with one ignition coil per cylinder the pulse is 2 per rev, so 0.5 must be set. In other cases set the number to 1.

- **Speed unit:**
  Choose whether the displayed speed unit is km/h or mph.

- **WiFi postfix:**
  If you own more than one ARA equipped bikes, we recommend renaming the WiFi networks for easy differentiation.

- **ARA – iLE connectivity:**
  We offer a full-on data acquisition and logger

system (telemetry) as well, the iLogger easy (iLE) that could be easily connected with the ARA. After successful connection the data collected by the ARA's sensors are transmitted to the iLogger, that records these values in each session. You can later analyse these data. The channels that are being submitted by the ARA are: front/rear wheel speed, engine speed, status of clutch and auxiliary switch, type/reason of ARA intervention, etc. As long as the ARA doesn't receive an RPM signal, it won't connect to the iLogger easy. Turn the ignition on first and then connect to the iLogger via the ARA app. As soon as the ARA receives the RPM signal, the unit won't be reachable until the next ignition-on phase.

- **LED brightness:**
  Adjust the brightness of the signal LED to your liking or according to the ambient lighting, or turn it off completely. The ARA will light up the LED in case of an error even if it has been switched off in the app.

Front sensor setup

- **Sensor impulse number:**
  If your bike is factory ABS equipped, you have to count the segments on the ABS disc. Mark the first segment with a permanent marker slightly and rotate the wheel one full turn while counting the segments.
  If you are using the supplied sensor disc, the segment count is 24.

- **Tire circumference (mm):**
  For precise calculations the app requires both tire circumference data in millimetres. We recommend lifting the bike up with paddock stands and measuring the tire with a soft measuring tape. If you don't have stands, you can try alternative methods, just make sure the measuring would be precise.

- **Speed sensor type:**
  3W: 3 three wire digital sensor, 0-5V pulse output. (The supplied sensor with the ARA is a 3W sensor.)

  2W ind.: two wire inductive sensor, usually on older ABS bikes (until 2008).

  2W curr.: two wire current sensor. Most common sensor type, most of the modern ABS bikes are equipped with it. This kind of sensor needs calibration, full rotation of the wheel is required after choosing this option.

Rear sensor setup

- The same applies here as at the first 3 steps of the front sensor setup.

- **Rear speed sensor:**
  Choose from where the rear speed sensor receives its signal: rear wheel mounted or secondary drive shaft of the engine (front sprocket shaft).

- **Front sprocket teeth count:**
  If the rear speed sensor is monitoring the front sprocket shaft, the ARA app requires exact front sprocket count.

- **Rear sprocket teeth count:**
  Fill in the rear sprocket teeth count here. On most sprockets teeth count is engraved. If the number is not visible or missing, mark one tooth and rotate the wheel while counting the teeth. The ARA app requires exact rear sprocket count.

Switch configuration

- **Clutch switch polarity:** The most common setting is normal, however in some cases reverse must be set. Check the clutch switch polarity display on the first main screen. For proper operation, always check that the module detects the clutch input correctly – when engaged it has to show 'ENGAGED', when released 'RELEASED'. Set it to 'REVERSE' if you experience reverse display. On some models the clutch switch is in connected with the side stand switch/neutral display on the dashboard. If you don't see any change when engaging/releasing the clutch lever, try with the side stand folded up. The clutch switch is only required if you are using the launch control functionality.

- **Switch functionality:**
  The ARA comes with a supported external handlebar mount switch. You can configure it in the following modes:

a) **PIT switch:**
   In this mode the switch engages/disengages the pit lane speed limiter (PIT).

b) **AW-TC off switch:**
   In this mode the switch turns on/off the anti-wheelie – traction control function.

c) **AW-TC rain mode switch:**
   This is the so called rain mode. You can set the traction control sensitivity to level 12, which is the most sensitive. Switch polarity can be reversed in the app.

Attention:

- **The current settings of the ARA only apply to the current state of your motorcycle. As soon as you swap a part on the bike, which has an effect of the wheel speeds (e.g. different tire size, different sized sprockets), the ARA module needs to be set-up again or verify the validity of the previously set values!**

8b. Automatic set-up (Wizard)

As you could see in paragraph 8a, the proper setup of the ARA module requires precise and patient approach with some occasional tweaking and workshop labour (e.g. determining the front sprocket count on bikes with the factory sprocket cover fitted, or mounting the front wheel sensor on non-ABS bikes, etc.). We included a Setup Wizard in the app, in order to help our customers setting up their ARA modules on their own. Although in some cases the wizard might measure and submit only approximate values to the app, these values are perfectly in co-relation with each other, meaning the ARA will function flawlessly (despite the values being just approximates).

The Setup Wizard guides you through the setup process in 6 easy to understand steps. You will see clear description of the requirements of each step. Please follow these instructions carefully. Please note that the bike has to be moving during the setup process.

Attention:

- **Do not alter anything other than the Switch settings after the Setup Wizard ran successfully. Values that are from manual setup mustn't be mixed with Setup Wizard values (8a vs 8b)!**

- **None of the safety features of the ARA work, while the Setup Wizard is in progress! Carry the Wizard assisted setup out at locations without any traffic like an empty parking space or service road of a race track, etc. to avoid a collision or a crash, minimizing the risk of accidents and injuries!**

9. ARA application – Misc. settings

Open/Save:
Here you can save or open your favourite settings for different bikes/riders/racetracks. When the connection is active, settings are uploaded to the ARA module instantly.

Security:
You can set a personal security code, so others can't connect to the module without the code. The code must contain 4 digits. When connecting from a difference device, you have to enter the security code at the first time. The ARA app will store the code on the new device, so it is only required at the first time. This code won't replace the WiFi password, which is 'HealTech' in each case.
Try to give a password that you can remember, as not even we, the manufacturer of the ARA module can read your previously set password. However, we can assign an unlock code (master password) to the unit, which we can submit to the owner when requested. Should you need an unlock code to your ARA module, please contact us via email at *support@healtech-electronics.com*.

Language:
Choose the preferred language of the AR Assistant app here. Should you have a translation / language related request or remark, please contact us via email at *sales@healtech-electronics.com.*

Factory reset:
Reset the device to the factory settings! This function will reset all your previously set data and replace them with factory values! Use this feature when moving the module from one bike to another.

Connection:
Depending on the OS of your device, connection to the ARA module can be automatic or password protected. Should the device require a WiFi password, type in 'HealTech'.

Speed sensor & configuration check:
A long tap on the speed sign at the first menu screen while the bike is idling, will reveal a small window displaying the front and rear wheel speed signal and the difference between in percent. Mount your phone or tablet in front of the dashboard of the bike and go for a test ride. The difference between the front and rear wheel speed sensor mustn't exceed 2%!

Attention:

- **When test riding, please ride your motorcycle with extreme care and alertness, minding traffic and road conditions. We advise test riding at empty parking spaces, service roads without any traffic. Choose a moderate speed for your vehicle! This test does not require a faster pace. 20 Km/h / 10 mph is sufficient. Try to maintain your focus on the road ahead, and observe the screen of the phone/tablet as briefly as you can to avoid crashing. Screen recording feature is very common on most of the current devices, which is factory implemented in the OS of the device. If you can't locate or its missing, download a screen recording application from the App Store / Play Store.**

10. LED statuses / error warnings

AR Assistant module built-in bi-color status LED (red/green) signal explanations:

Continuous red:	No RPM signal.
Continuous green:	RPM signal present.
Flashing green:	No RPM signal, but vehicle speed signal is present.
Flashing red:	Engine performance being reduced / ignition cut-off.

External LED signal status explanations (red):
(Should light up for a few seconds after ignition, then turns off.)

Continuous red:	AR Assistant module is turned off.
Slowly flashing red:	Possible errors – no vehicle speed signal or difference between front and rear wheel speed is beyond tolerance. (Possible low tire pressure!).
Swiftly flashing red:	Engine performance being reduced / ignition cut-off.
Inactive:	When no faults are present or the system is inactive, the LED is off.

ATTENTION:
We have developed the AR Assistant with rider safety as the primary objective. To make riding as safe as it can be. The traction control and the anti-wheelie system can help to prevent crashing, but they are not a substitute for riding appropriately for the conditions. No riding aids can prevent loss of control / accidents resulting from rider error, careless riding, inappropriate speeds for the road/traffic conditions or inexperience.

Stay within your limits! Never exceed your riding abilities, choose your speed and lean angle according to the road/track and traffic conditions. No traction control system can maintain tire grip on all road/track surfaces (riding in the rain, muddy road surface, oil or petrol spill, etc.). Motorcycles are single-track vehicles, which means front end traction is essential. There will always be situations when front wheel slip is unavoidable.

Ensure your bike is always properly maintained and is in the best possible condition, especially the tires. Do not use a motorcycle that is not in a safe condition! Do not lend your motorcycle to inexperienced riders! It is important to note that track use places a much greater demand on the bike and rider than road use. This demands an even greater attention to safety, and we recommend that drivers thoroughly inspect their vehicles prior to use on a circuit.

We advise all riders to be pro-active in their education and join rider training groups. Those are the best ways to get road/track experience while learning and perfecting the operation and control of the motorcycle. Always wear quality protective equipment such as an approved helmet, leather suit, gloves and boots, back protector etc.

HealTech Electronics Ltd. may not be held liable in any case after an accident!

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Smart Tech for your Ride!