DIAG4 POWER®

Online manuals

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INSTRUCTIONS FOR USE
SMART POWER BENCH
version 2.0.2021

HELP@LINE

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CONTENTS

1. INTRODUCTION 3
2. STATION INSTALLATION – LOCATION 3
3. INSTALLING THE MOTORBIKE ON THE STATION 3
4. ENGINE POWER PARAMETERS MEASUREMENT 4
5. TYPES OF POWER TESTS 5
5.1 POWER TEST 5
5.2 POWER TEST WITH DIAG4BIKE 5
6. CHOOSING THE MEASUREMENT UNITS 5
7. LOGGING 6
8. MEASUREMENT PROCEDURE 6
8.1 NOTES ON THE MEASUREMENT PROCEDURE: 8
8.2 POWER LOSS CORRECTION - SETTINGS 9
8.3 ENGINE SPEED MEASUREMENT - SETTINGS 10
9. SPECIFICATIONS: 10
10. SAFETY PRECAUTIONS 11
10.1 SAFETY TRAFFIC LIGHT (DESCRIPTION) 12
10.2 GEARBOX SPB 12
11. ELECTRONIC CONTROL UNIT SPB – AT531 4188 13
12. MAINTENANCE 14
12.1 GREASING OF THE CHAIN WITH SPRAY LUBRICANTS 14
12.2 CHECKING THE CHAIN TENSION 14
12.3 BEARING LUBRICATION 14
12.4 VISUAL INSPECTION OF THE MECHANICAL AND ELECTRICAL PARTS 14
12.5 MAINTENANCE OF SPB CHECK 14
13. SPB TESTING UTILITY 15
14. SPARE PARTS LIST 16
15. TROUBLESHOOTING 16
15.1 CUSTOMER SUPPORT 16
16. STANDARD ACCESSORIES 16
16.1 MEASURING ENGINE TEMPERATURE - AT132 4012 16
16.2 MEASURING INTAKE AIR TEMPERATURE - AT132 4017 16
16.3 MEASURING TIRE TEMPERATURE - AT132 4013 16
16.4 WIRELESS REMOTE CONTROLLER - AT157 4006 16
16.5 IGNITION SENSOR SPB - AT102 3036 17
17. OPTIONAL ACCESSORIES 17
17.1 DIAG4BIKE 17
17.2 ADDITIONAL MOTORBIKE COOLING - AT131 4002 17
17.3 EXHAUST GAS EXTRACTOR - AT131 4001 17
17.4 PC STATIONS FOR SPB 18
17.5 TRANSPORT DETACHABLE WHEELS FOR SPB - AT533 4074 18
17.6 THROTTLE CONTROL LIMITER - AT531 4097 18
17.7 INSTALLATION SET LAMBDA - AT106 4020 18
17.8 AFR TUNING MONITOR – AT 106 4016 19
17.9 INSTALLATION SET LAMBDA MINI - AT106 4064 19
17.10 MULTI DONGLE 19

1. INTRODUCTION

Station Smart Power Bench (hereinafter referred to as the Station or SPB) is used for the measurement of power related parameters and characteristics, the measuring and optimization of VE maps and the diagnostics of motorbikes.

The following text deals with the basic procedures of the station installation, mounting the bike on the station, as well as the measurement of power related parameters and characteristics by Diag4Power software. **Diag4Bike** is used for the diagnostics of motorbikes. **Diag4Tune** is developed for the measuring and optimization of VE maps. For more information visit our website www.atal.cz

2. STATION INSTALLATION – LOCATION

- The station must be installed on a level, stable surface to rule out any contact of the roller with the surface below.
- The location of the station must conform to generally applicable regulations for engine testing stations.
- The station is designed for indoor use and must be protected from the rain.
- During the measuring procedure, reliable exhaust gas extraction must be provided.
- The station requires power supply of 230V AC (use of adaptor necessary), or 12V DC, with the power input of 24 W. (Power supply can thus be provided even from a 12V vehicle battery)
- Operating temperature range: +10 to +40 °C.

3. INSTALLING THE MOTORBIKE ON THE STATION

- Using a strap (see Fig. 1), fix the front wheel securely to the adjustable part of the SPB frame which must be secured with a securing pin.
- The axis of the rear wheel must be moved forward from the roller axis by **20-30 mm** (see Fig. 2).

Fig. 1

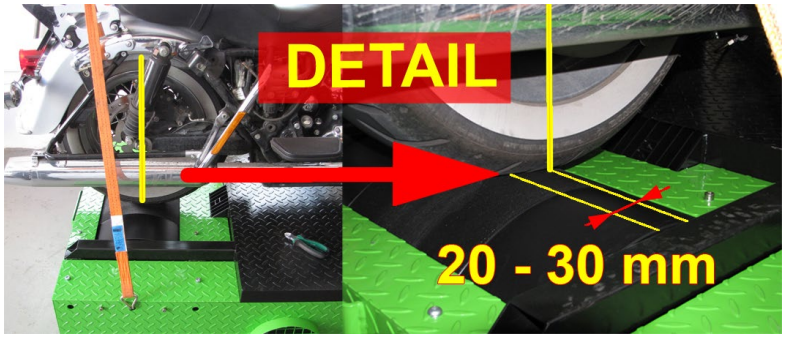
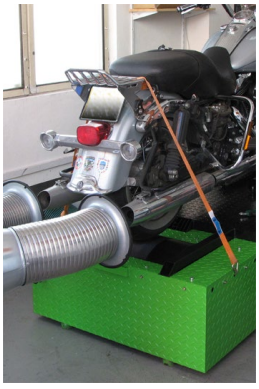
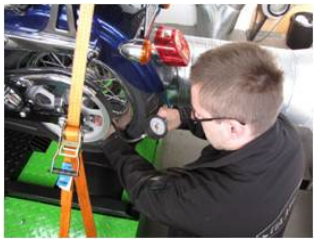


Fig. 2

- In the rear part, fix the motorbike securely to the SPB by a strap attached to the SPB side holes, placed symmetrically at both sides of the station. The motorbike must be securely fixed, preferably by the load-bearing frame, in an upright position.
- Tighten the securing strap to simulate operating load and prevent the rear wheel from slippering on the roller. Make sure the straps do not touch or near the exhaust pipe.
- For securing the motorbike use a certified strap only, with no modifications, with rated strength of 1000 kg.
- Any loose ends should be fixed to the straps.



- The rear tire of the motorbike should be inflated to the maximum recommended pressure as specified by the tire manufacturer.



- The cooling of the motorbike is provided in large part by an integrated fan by means of attached hoses. Adjust the hoses to provide cooling of the engine as well as the exhaust pipe especially in the area where the motor is attached.

Notes on the installation of the motorbike:

- For long-term testing (VE maps measuring), we recommend to use an additional cooling fan (AT131 4002).

4. ENGINE POWER PARAMETERS MEASUREMENT

The measurement results are the power and torque characteristics depending on the engine speed related to the (converted) crankshaft of the engine. The results are standardized to the existing ambient conditions (temperature of the induced air and barometric pressure).
DIAG4POWER supports three correction options: DIN 70 020, ECE-85-R and ATAL. For correction variant setting, see Chapter 6 Fig. 7. (Reference point for the ATAL variant is represented by temperature of 20° C and barometric pressure of 100 kPa.)

Information about the correction variant used for each displayed characteristic can be obtained by clicking the info icon, (see Fig. 3) and also on each measurement results printout.

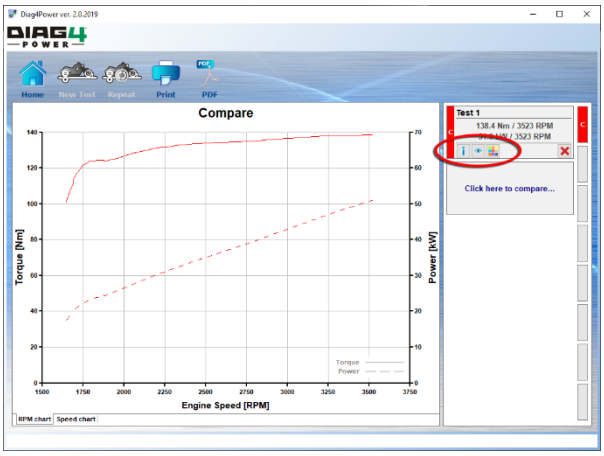


Fig. 3 - *Test comparison*

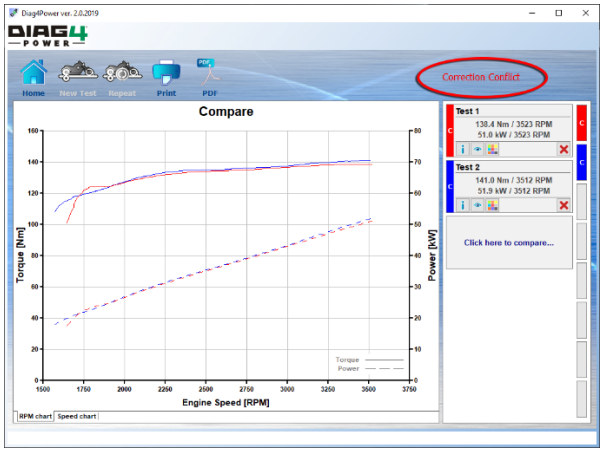


Fig. 4. - *Comparison invalid, different corrections applied*

Note: It is impossible to compare output and torque characteristics that use different results correction methods for the reference temperature and pressure values (DIN 70 020, ECE-85-R, ATAL). In the event that the charts loaded use different correction variants, a red message will appear stating: Reference conflict, see Fig. 4

The Station
The measurement of the power characteristics is carried out only at load gear 1 of the SPB
Before measurement it is necessary to heat the rear tire by a running test up to the temperature recommended by the tire manufacturer (usually from 50 to 70°C).

5. TYPES OF POWER TESTS

There are two ways of the engine power measurement:

1. By the ignition sensor and IR thermometer (engine temperature measuring) - **Power Test**
2. By reading the motorbike engine speed and temperature from the motorbike - **Power Test with DIAG4BIKE** for H-D® (only for H-D® motorcycles with EFI DELPHI).

5.1 POWER TEST

- Connect the ignition sensor and IR thermometer to the SPB
- Connect the ignition sensor clamp to the motorbike ignition cable
- Point the thermometer towards the engine of the motorbike.
    - Check the engine temperature by a diagnostic device, if possible.
    - Try to choose the best place of the engine to get similar temperatures.
- For further information see chap 7

5.2 POWER TEST WITH DIAG4BIKE

- Install **DIAG4BIKE** version 18.2. or higher
- Connect **DIAG4BIKE** interface to your computer **using a USB cable**
    - Bluetooth is not supported by **DIAG4BIKE**
- Connect **DIAG4BIKE** to your motorbike using a diagnostic cable AT531 5049 (see Fig. 5)
- For further information see chap 7

Fig. 5 – Connecting DIAG4BIKE to your motorbike

Notes:

- **DIAG4POWER** Power supports VCI2 interface only (Product reference AT532 5006 and AT532 5007)
- **DIAG4BIKE** supports Delphi-equipped Harley-Davidson®

6. CHOOSING THE MEASUREMENT UNITS

- Run the program **DIAG4POWER,** enter the software settings (see Fig. 6)
- Select the measurement units (see Fig. 7)

Fig. 6 – Run the program

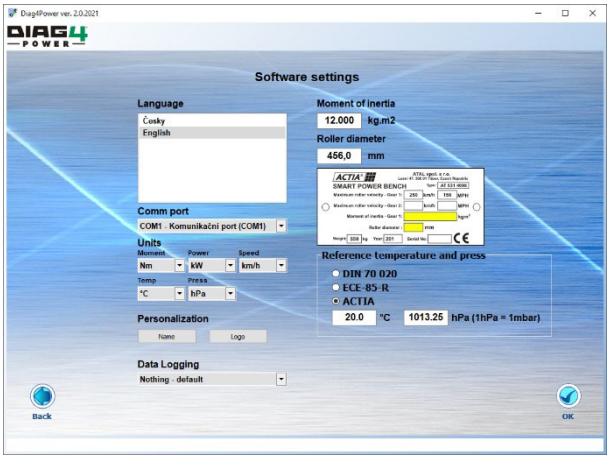


Fig. 7 – Choose the measurement units

7. LOGGING

- It is used to record and save the measured values of the station. This data is intended for back analysis of program or part of device errors. Data logging can be set in three levels:
  - Nothing - Default - only the most important information about the last ten measurements of motorcycle performance is logged.
  - Basic - in addition to the most important information, data from the electronic control unit SPB are recorded when measuring the performance of the motorcycle
  - Advanced - all data is stored even with the motorcycle control unit
- The measured records are stored in the Documents / Diag4Power / logs folder. If there are problems with the station, our helpdesk will probably request these records and this will speed up the solution of your problem.

8. MEASUREMENT PROCEDURE

- Start the **DIAG4POWER** program.
- Choose the type of measurement:
  - Power test (see Fig. 8)
  - Power test with **DIAG4BIKE** (see Fig. 9).

    Note: If the **DIAG4BIKE** *is not installed, the icon is grey. The Power test with Diag4Bike is not available* (see Fig. 12).
- Enter the test name and write notes if you like (see Fig. 11).

Fig. 8 – Power test

Fig. 9 – Power test with DIAG4BIKE

Fig. 10 – DIAG4Bike is not available

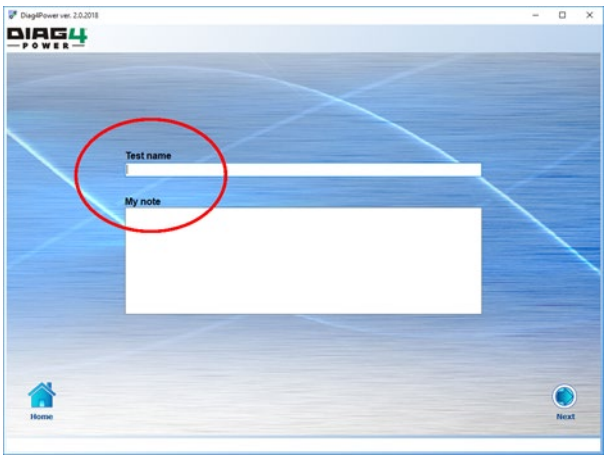


Fig. 11 – Notes to measurement

- Set the default measurement conditions (see Fig. 12) and the correction of performance loss (see chap 7.2):
  - Maximum engine speed required for the measurement. This speed should be set at least 200 rpm below the maximum permitted engine speed.
  - Ambient temperature (default 20˚C)
  - Reference atmospheric pressure (default 100 kPa)
  - Value TPS (throttle position sensor) is reported for each measurement performance motorcycle.
- Click on the „**NEXT**" button to start the measurement (see Fig. 12)

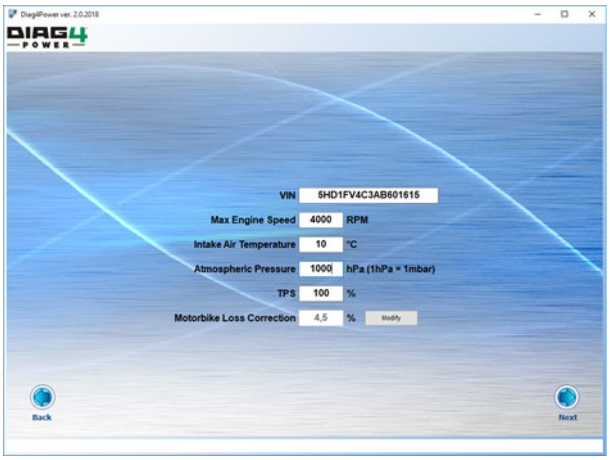


Fig. 12 – Set default measurement conditions

Fig. 13 – Variations of measurement start

- Start the motorbike and run in the **appropriate** (see chap. 7.1, point 1) gear and keep the engine speed to a minimum, but still running smoothly (see chap. 7.1, point 3).
- To start the measurement:
  - press the **START** button in the program (see Fig. 13)
    or
  - press the **ENTER** button on the wireless remote control (AT157 - Fig. 13)

- The measurement starts by a countdown (see Fig. 14), followed by the **GO** command (see Fig. 15)
- Upon the **GO** command, it is necessary to quickly set the throttle (see chap 7.1, point 2) to **fully open** (by turning the grip accelerator to full position).
- In this measurement phase, the engine accelerates and on reaching the top measuring speed the program displays a symbol for the clutch disengagement (see Fig. 16)
- Immediately after this symbol is displayed, the operator must simultaneously disengage the clutch of the engine and close the throttle to the idle position (accelerator kept to a minimum). It is necessary to maintain this status until the end of the deceleration measurement when processing of the measured data is being displayed (see Fig. 17).
- Speed characteristics of the torque and power with the parameters of the maximum engine power achieved in kW and the rotational torque in Nm appear on the display (see Fig. 18).

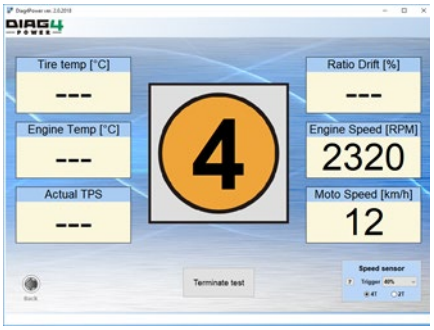


Fig. 14 – Symbol for countdown

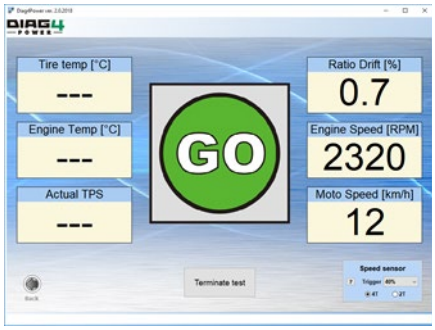


Fig. 15 – Symbol for maximum speed

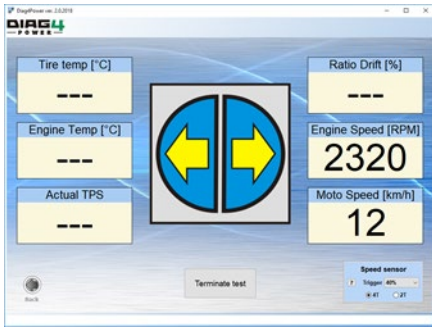


Fig. 16 – Symbol for clutch disengagement

Fig. 17 – Data processing

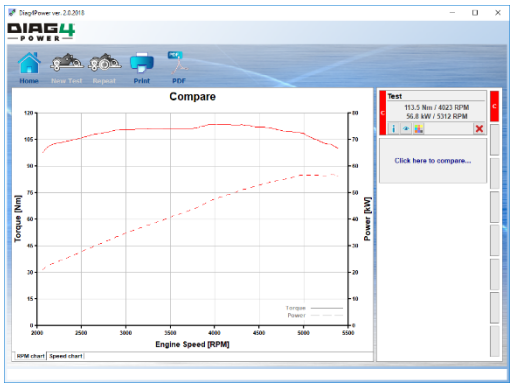


Fig. 18 – Parameters of maximum engine power.

8.1 NOTES ON THE MEASUREMENT PROCEDURE:

(1) Appropriate gear must be chosen before the actual measurement through an acceleration test. Start the test by slow acceleration in the top gear.

- If the maximum permissible speed can be achieved, it is the most appropriate gear for measuring.
- If the maximum speed cannot be achieved, downshift one gear and repeat the test until the maximum speed is reached.
- In case of non-standard signs of the engine or the motorbike construction indicating excessive wear or a fault of the motorbike, discontinue the test immediately.
- The test should not be resumed until all defects are eliminated.

(2) The procedure as described above deals with the measurement of the external power parameters of the engine (measured at 100% throttle opening, TPS = 100 %). The measurement of the power characteristics for a different throttle opening can be achieved by using the **Throttle Control Limiter** (see Fig. 19.) This way, parametric performance characteristics can be obtained. At the end of the acceleration the TPS value is saved by **DIAG4BIKE**; otherwise enter the value of TPS to the program parameters (Fig. 12).

Fig. 19 – Throttle Control Limiter

(3) For the Harley-Davidson® engines, the speed range is from 1500 to 2000 rpm

8.2 POWER LOSS CORRECTION - SETTINGS

The program for measuring performance parameters features the correction of measurement results. The ATAL performance parameter measurement is a high-precision measurement system. This ensures repeatability of measurements in various climatic conditions on a single motorbike over the course of several days.

The only limitation of the method is the influence of mass moments of inertia of the rotating parts within the motorbike. Due to high moment of inertia of the SPB station, the significance of the above limitation is negligible; systemic error of measurement in the very heavy systems of H-D® motorbikes is at **-4% to -5%**. The influence is one-directional and decreases the measured performance compared to reality. From experience, we learned that it is important for a tuning centre to be able to accurately measure improvements in performance by comparing the measurement results before and after modification. Here, no correction is needed. However, motorbike owners care about the highest measurement results they can later discuss with friends. To this end, we equipped the measurement system with an option to set a correction factor which is determined by the motorbike design. The main factor is the estimation of weight parameters of two key components.

A/ ENGINE
B/ REAR WHEEL

We set the following as parameters for a reference motorbike:
A/ ENGINE HD Twin Cam 1500 ccm (correction factor **2.5%**)
B/ REAR WHEEL fitted with 160/70 R17 tire (correction factor **2%**)
Therefore, this reference motorbike's correction factor is 4.5%. This factor is set as default in the system.

The user can make their own adjustments of both correction factors in the range of **0-9%**.
You can use the following examples as a rough guide for custom settings:

A/ ENGINE Vtwin 2000 ccm – correction factor **3.3%**
REAR WHEEL fitted with 300 mm (R17) wide tire – correction factor 3.8%
For this motorbike, the estimated total correction factor is 7.1%.

B/ ENGINE Evolution 883 ccm – correction factor **1.5%**
REAR WHEEL fitted with 150/120 R16 tire – correction factor 1.8%
For this motorbike, the estimated total correction factor is 3.3%.

The above examples show that when using the default correction of **4.5%** on such different classes of motorbikes (without further adjustment) as H-D SPORTSTER 883 and custom motorbike with a 2000 ccm engine and 300 mm wide tires, measurement errors are within **2.6%**. This systemic error is within parameters for laboratory class equipment and is completely negligible in relation to the influence of engine temperature stability, fuel heating value, quality of anchoring of the motorbike on the station (prevention of the wheel slipping on the roller) etc.

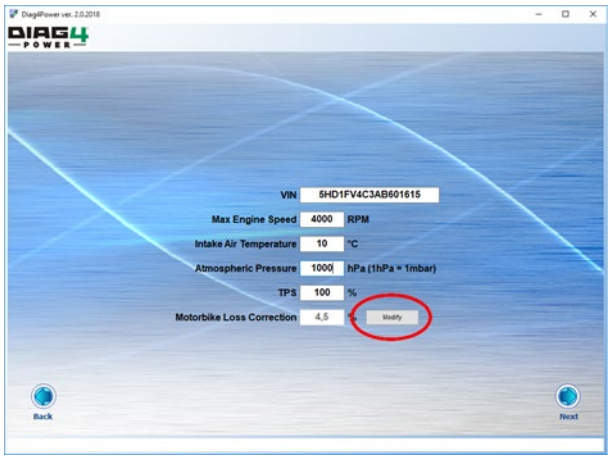


Fig. 20 – Motorbike correction factor setting

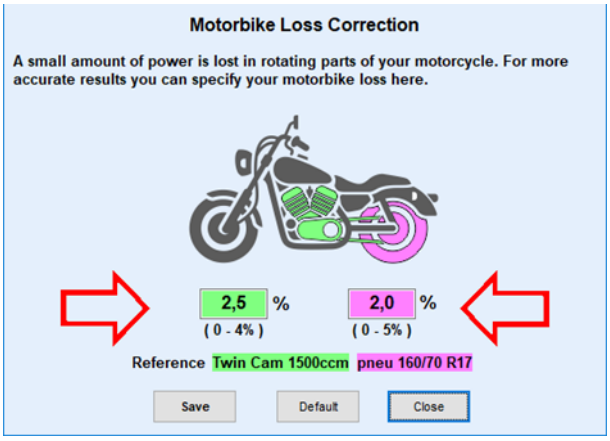


Fig. 21 – Set a value for your motorbike

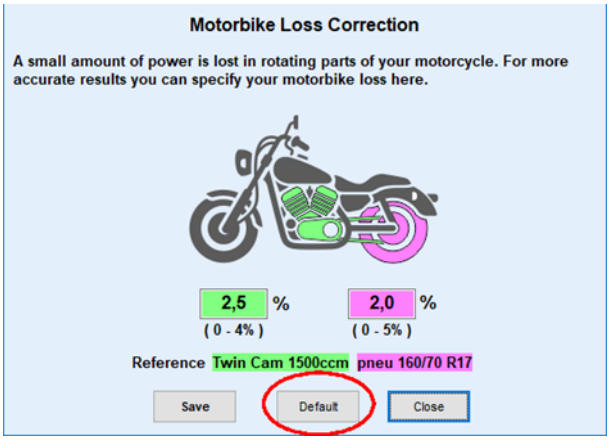


Fig. 22 – Basic settings

8.3 ENGINE SPEED MEASUREMENT - SETTINGS

- Setting the input sensitivity of the ignition speed sensor (trigger)
  - In case of problems with the measurement of the engine speed during measurement you can change the sensitivity setting to get the right speed measurement (see Fig. 23).
- If the measured speeds are twice the actual engine speed, change settings 4T to 2T and vice versa (see Fig. 24).

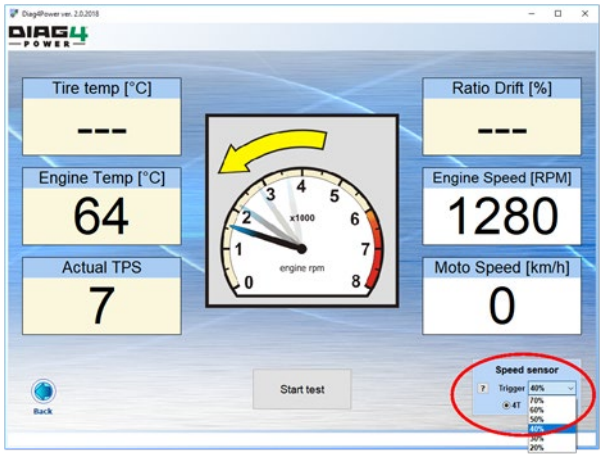


Fig. 23 – Sensitivity setting

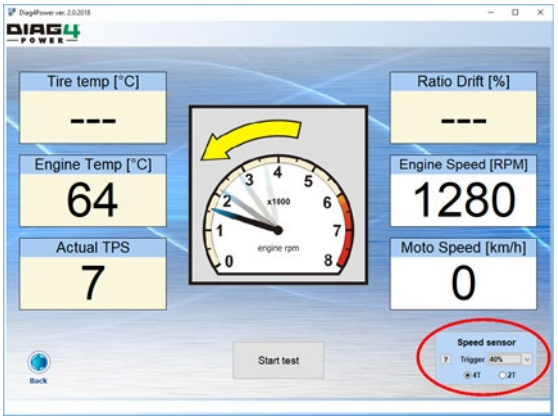


Fig. 24 – 2T/4T setting

9. SPECIFICATIONS:

- **Weight:** 550 kg

- **Dimensions:** 2,8m x 0,5m x 1m (w x d x l), 110" x 20" x 40"
- **Roller diameter:** 450 mm, 18"
- **Mass moment of inertia of the system:** ~12 kgm2 (see label on SPB) – **Gear 1**
- **Measurement range of engine power:** 10 – 250 kW
- At load, power input of the fan is mainly given by the built-in load fan, and is dependent on the engaged gear of the station (the following data are for illustration only):

  Gear 1:
  - 10 kW at 100 km/h (60 MPH)
  - 30 kW at 150 km/h (90 MPH)
  - 70 kW at 200 km/h (120 MPH)

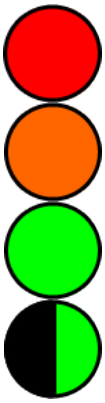
  Gear 2:
  - 10 kW at 50 km/h (30 MPH)
  - 30 kW at 75 km/h (45 MPH)
  - 70 kW at 100 km/h (60 MPH)
- **Maximum driving speed (peripheral speed of the roller):**
  - Gear 1: 225 km/h, 140 MPH
  - Gear 2: 110 km/h, 68 MPH
- **Connection to PC:** RS 232 or USB
- **Required PC operation system:** W7, W8, W10
- **Power supply of the station:** 230V AC or 12V DC with power of 24 W. Power supply can therefore be provided from a 12V vehicle battery.
- **The operating temperature range of the station:** +10 to +40 °C.
- **Cooling of rear tire:** provided automatically by the built-in fan
- **Temperature measurement of the rear tire:** IR measurement
- **Remote control:** IR (infra-red)
- **Measuring ambient air pressure:** 870 to 1100 hPa (at sea level)

10. SAFETY PRECAUTIONS

- Read all of the instructions in this section before using the station.
- Be sure to follow all warnings and instructions marked on the station.
- **These safety precautions must be posted near the Smart Power Bench station.**
- The station may be operated by trained person only.
- When using the SPB, the operator must protect their eyes and ears and wear tight-fitting work clothing and safety boots.
- When in operation, the station must be in perfect condition and must be connected to the power supply of 230V/12V, 24W.
- Before starting the measurements, always make sure that the measured motorbike is in perfect condition and is securely attached to the station.
- In the rear part, fix the motorbike securely to the SPB, using one strap attached to the side SPB holes. The bike should be securely fixed, preferably on the load-bearing frame, in an upright position.
- Tighten the securing strap so that it simulates the operating load and prevents slippage of the rear wheel on the roller.
- Make sure the straps do not touch or near the exhaust pipe.
- Any loose ends should be fixed to the straps.
- During the acceleration measurement, there should be no tire slippage by using inappropriate (too low) gear.
- The rear tire of the motorbike should be inflated to the maximum allowable pressure specified by the tire manufacturer.
- During the SPB operation, there should be no other person within a radius of two meters from the station and 10 meters behind the station, except for the engineer performing the measurement.
- During the SPB operation, within a radius of 4 meters the station should be free from objects that might be sucked into the air inlet hole of the station.
- The maximum allowable speed of rear tire may not be exceeded.
- Maximum design speed and RPM of the motorbike engine may not be exceeded.
- **The maximum allowable speed of the station: may not be exceeded:**
  - **I.gear has maximum speed 225 Km/h**
  - **II.gear has maximum speed 110 Km/h**
- For strapping, only a certified strap may be used, with no modifications, rated for a load of 1000 Kg.

- During measurement, it is necessary to provide proper extraction of the exhaust gases outside the measurement area.
- SPB must not be used if the **green light** of the warning lights is not **ON** (or is not **flashing**).
- During measurement, the temperature of the tire should be checked, and if the tire temperature exceeds the maximum allowable temperature of the manufacturer, the measurement must be discontinued immediately.
- On the station, gears may only be changed if the **green light** on the safety warning lights is **flashing**. **Flashing green light** indicates that the fan has stopped. Stopping of the roller does not mean stopping of the fan!

10.1 SAFETY TRAFFIC LIGHT (DESCRIPTION)



Exceeding the specified speed is indicated by the **red light** on the safety set of warning lights placed in front of the station and always in the operator's field of vision.

The **Orange light** indicates a level exceeding 90 % of the maximum speed.

Green light indicates the operating status with the built-in fan rotating

Blinking green light indicates a rotating fan within the permitted speed.
In this status it is possible to change load gears of the station (I - II)

10.2 GEARBOX SPB

- **While changing gear 1 to gear 2:**
  - move the shift lever to position 2, then turn the roller slowly in any direction until the gear is changed
  - you will hear a click of the gears and feel more resistance when turning the roller
- **While changing gear 2 to gear 1:**
  - move the shift lever to position 1
  - no need to turn the roller

11. ELECTRONIC CONTROL UNIT SPB – AT531 4188

Fig. 25

Fig. 26

K1 .....Control of the motorbike engine cooling fan
K2 .....Redundant

K3 ..... Redundant
K4 ..... Inductive sensor of the SPB fan speed (loading)
K5 ..... Cylinder speed sensor
K6 ..... Ignition sensor of the motorbike engine speed
K7 ..... Thermometer measuring the intake air temperature
K8 ..... Thermometer measuring the motorbike rear tire surface temperature (IR thermometer = Infra-Red)
LED ..... "ON" indicator
K9 ..... Communication between RS232 and PC
K10 ..... Supply voltage:12V DC
K11 ..... Thermometer measuring the motorbike engine temperature (IR thermometer)
K12 ..... Redundant
K13 ..... Warning lights

12. MAINTENANCE

Maintenance and cleaning of the station, as well as removing or lifting the protective equipment, may only be performed with the rotating parts of the station stopped.

12.1 GREASING OF THE CHAIN WITH SPRAY LUBRICANTS

- We recommend that only high quality, certified lubricants for sealed chains should be used
- The application is done by spraying the chain. After greasing, it is necessary to leave the chain at rest for about 15 min in order to let the solvents evaporate to prevent any squirt-off of the lubricant.
- The chain re-greasing is recommended every 5 hours of the station operation.
- Confirm maintenance by program **DIAG4POWER**, see chap 11.5

12.2 CHECKING THE CHAIN TENSION

- Performed after 20 hours of the station operation.
- The slack of the lower part of the chain in the middle must be within the range of 5-10 mm.
- Confirm maintenance by program **DIAG4POWER**, see chap 11.5

12.3 BEARING LUBRICATION

- Performed through a grease nipple
- Performed every 200 hours of the station operation
- Lubricant type - plastic industrial grease NLGI 2-3, ISO 6743/9 CCEB2/3, DIN 51 502 KP2/3K-30.
- Confirm maintenance by program **DIAG4POWER**, see chap 11.5

12.4 VISUAL INSPECTION OF THE MECHANICAL AND ELECTRICAL PARTS

- Before each measurement.

12.5 MAINTENANCE OF SPB CHECK

- Run the program **DIAG4POWER** and choose **SPB** (see Fig. 27)
- In Maintenance of SPB window the SPB moto-hours are displayed, the maintenance information and time intervals (see Fig. 28). Time to next maintenance is displayed to inform you how long you can use the SPB without maintenance. If the time is negative and red the time interval is over and this information is then shown every day (see Fig. 29).
- Each maintenance must be confirmed by **DIAG4POWER** program (see Fig. 29). It restarts the time interval.

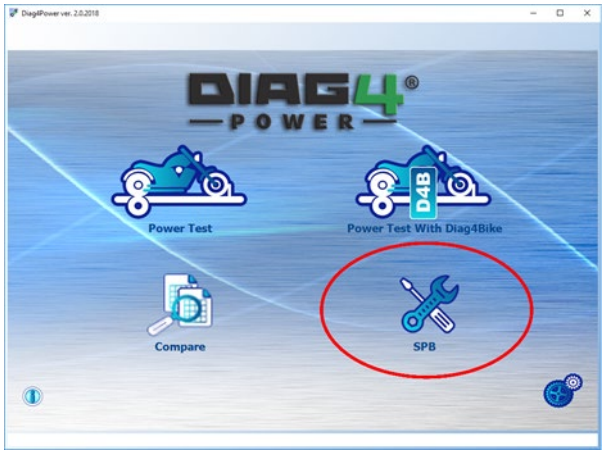


Fig. 27 – SPB maintenance

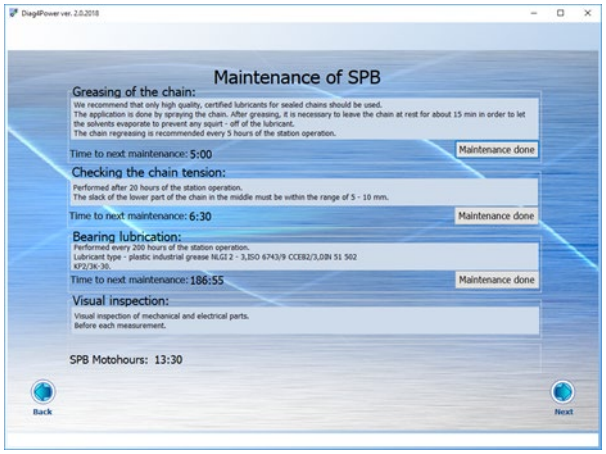


Fig. 28 – SPB maintenance

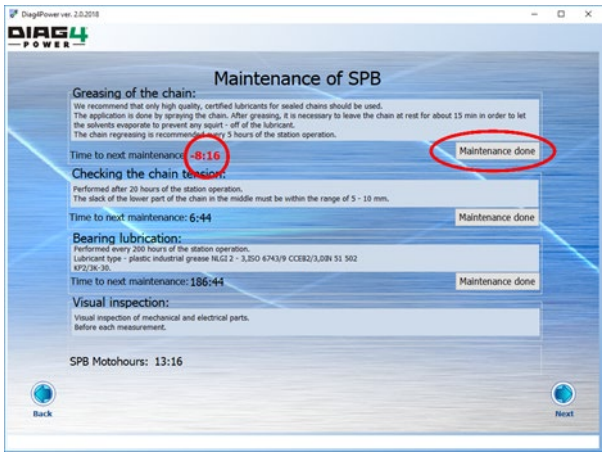


Fig. 29 – SPB Motohours (Maintenance interval exceeded)

13. SPB TESTING UTILITY

Before you start SPB testing, set the comm port, units and roller diameter (see chap 6.)

- Run the program **DIAG4POWER**, choose SPB (see Fig. 27) and then choose "**NEXT**"
- Press the button START. The information about SPB is displayed.
- **Error** - SPB fails to communicate
- **Red value** – value is out of range
- **n/A** – sensor is not available

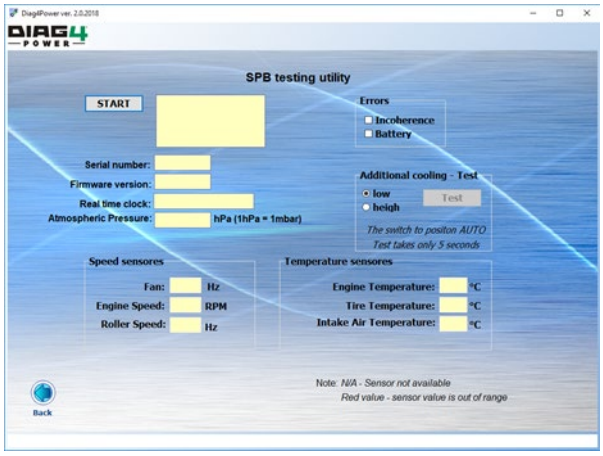


Fig. 30 – SPB test interface

14. SPARE PARTS LIST

- Chains
- Gears
- Straps

15. TROUBLESHOOTING

15.1 CUSTOMER SUPPORT

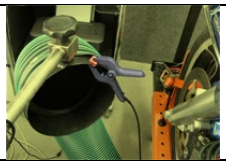
- Customer support contact (servicing)
- ATAL s.r.o.
- Lesní 47, 390 01 Tábor – Horky
- Czech Republic
- Phone: +420 381 410 100
- e-mail: help@diag4bike.eu
- web: www.diag4bike.eu

16. STANDARD ACCESSORIES

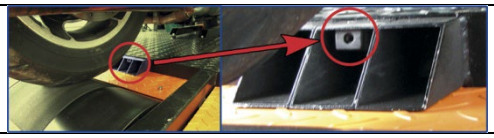
16.1 MEASURING ENGINE TEMPERATURE - AT132 4012

• 0°C to 200°C • Contactless infrared thermometer		

16.2 MEASURING INTAKE AIR TEMPERATURE - AT132 4017

• -9°C to 70°C		

16.3 MEASURING TIRE TEMPERATURE - AT132 4013

• 0°C to 200°C • Contactless infrared thermometer	

16.4 WIRELESS REMOTE CONTROLLER - AT157 4006

• Infrared	

16.5 IGNITION SENSOR SPB - AT102 3036

• Rpm measurement	

17. OPTIONAL ACCESSORIES

17.1 DIAG4BIKE

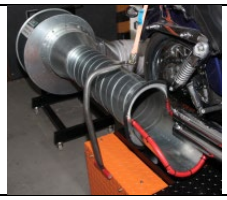
AT532 5006 - Communication interface USB AT532 5007 - Communication interface USB+Bluetooth*) ..... *) Bluetooth is not supported by **DIAG4POWER**	
AT531 5049 – Diagnostic program for H-D®	

17.2 ADDITIONAL MOTORBIKE COOLING - AT131 4002

This powerful Axial Fan is useful equipment for additional engine cooling while using the Smart Power Bench. The fan is equipped with two power levels. Power levels are switchable between level 1, level 2 and auto. The Auto level is used for Tuning Measurements (VE maps measurement). The Smart Power Bench automatically controls the power level of the fan depending on the engine temperature. **Level 1** - Electric Power 0.5 kW, Airflow 4 700 m3/h, Air speed 26 km/h **Level 2** - Electric Power 2 kW, Airflow 11 000 m3/h, Air speed 60 km/h	

17.3 EXHAUST GAS EXTRACTOR - AT131 4001

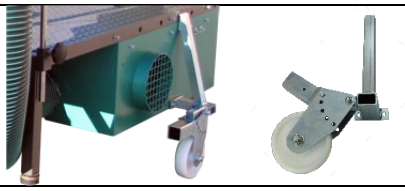
This powerful Radial Fan is designed for extraction of exhaust gases from motorbikes during power tests and during tuning measurements. The fan is equipped with adapters for one side and two side motorbike exhaust pipe configurations. The fan output is connected to the hose diameter of 305 mm with a length of 3 m. Electric power 3 kW, Airflow 6000 m3/h.	
a) One side exhaust pipe – diameter 250 mm	
b) Duo sides exhaust pipe – diameter 2x200 mm	

c) Yoke (adaptor for the fixing strap)		

17.4 PC STATIONS FOR SPB

• AT857 5015 – Trolley with PC for SPB without Touchscreen • AT857 5016 – Trolley with PC for SPB with Touchscreen	

17.5 TRANSPORT DETACHABLE WHEELS FOR SPB - AT533 4074

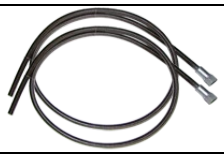
Set of wheels for easy transport of SPB	

17.6 Throttle control limiter - AT531 4097

Throttle control limiter is a useful option for the VE maps measuring. This tool helps to set constant throttle position during acceleration or deceleration.	

17.7 INSTALLATION SET LAMBDA - AT106 4020

• This set is an accessory to the AFR Tuning Monitor. • It will allow you to install a pair of broadband lambda probes to any exhaust where replacing original probes is difficult (M18 thread). • The kit contains a powerful pump that guarantees high accuracy of measurement of real AFR on each cylinder. The pump is powered by 12 V and can therefore be used even during a road test. • All the necessary tools are included in the kit.	
1. Fitting for lambda probe in the exhaust is M18 x 1,5 1.1. Direct Installation (enough space for Wide Band lambda probe installation) 1.2. Radial Installation (not enough space for Wide Band lambda probe installation) 1.3. Tangential Installation *) (not enough space for Wide Band lambda probe installation) 2. Fitting for lambda probe in the exhaust is M12 x 1,25 2.1. Direct Radial Installation 2.2. Radial Installation 2.3. Tangential Installation 3. Exhaust is not equipped with any fitting **) Tangential Installation only	

*) Example 1.1.3 - Tangential Installation	
**) AT106 4037 Adapter for open exhaust – replaces the additional fitting of lambda probe.	

17.8 AFR TUNING MONITOR – AT 106 4016

The AFR Tuning Monitor is used for the Professional Tuning level and consists of two Wideband Air/Fuel Ratio Sensors and a compact electronic unit.	

17.9 INSTALLATION SET LAMBDA MINI - AT106 4064

This kit includes all accessories needed for installing a pair of broadband lambda probes directly onto the exhaust.	

17.10 MULTI DONGLE

AT531 4094 – Multi Dongle