



COMPUTER RIDE DIAGNOSTIC WHEEL BALANCER



BFH 1000
EEWB519A

OPERATION INSTRUCTIONS

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SAFETY INFORMATION

**For your safety, read this manual thoroughly
before operating the BFH 1000 Wheel Balancer**

The JBC BFH 1000 Ride Diagnostic Wheel Balancer is intended for use by properly trained automotive technicians. The safety messages presented in this section and throughout the manual are reminders to the operator to exercise extreme caution when servicing tires with these products.

There are many variations in procedures, techniques, tools, and parts for balancing tires, as well as the skill of the individual doing the work. Because of the vast number of wheel and tire applications and potential uses of the product, the manufacturer cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the wheels and tires being serviced. It is essential to use proper service methods in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area or the equipment or vehicle being serviced.

It is assumed that, prior to using the BFH 1000 Ride Diagnostic Wheel Balancer, the operator has a thorough understanding of the wheels and tires being serviced. In addition, it is assumed he has a thorough knowledge of the operation and safety features of the rack, lift, or floor jack being utilized, and has the proper hand and power tools necessary to service the vehicle in a safe manner.

Before using the BFH 1000 Ride Diagnostic Wheel Balancer, always refer to and follow the safety messages and service procedures provided by the manufacturers of the equipment being used and the vehicle being serviced.



IMPORTANT !! SAVE THESE INSTRUCTIONS -- DO NOT DISCARD !!

IMPORTANT SAFETY INSTRUCTIONS

When using this equipment, basic safety precautions should always be followed, including the following:

1. Read all instructions.
2. Do not operate equipment with a damaged power cord or if the equipment has been damaged - until it has been examined by a qualified authorized service technician.
3. If an extension cord is used, a cord with a current rating equal to or more than that of the machine should be used. Cords rated for less current than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
4. Always unplug equipment from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp plug and pull to disconnect.
5. To reduce the risk of fire, do not operate equipment in the vicinity of open containers of flammable liquids (gasoline).
6. Keep hair, loose fitting clothing, fingers and all parts of the body away from moving parts.
7. Adequate ventilation should be provided when working on operating internal combustion engines.
8. To reduce the risk of electric shock, do not use on wet surfaces or expose to rain.
9. Do not hammer on or hit any part of the control panel with weight pliers.
10. Do not allow unauthorized personnel to operate the equipment.
11. Do not disable the hood safety interlock system or bypass the intended operation.
12. Use only as described in this manual. Use only manufacturer's recommended attachments.
13. Always make sure the power clamp is secure before spinning the shaft.
14. ALWAYS WEAR SAFETY GLASSES. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.
15. Balancer is for indoor use only.
16. This equipment uses class II lasers. Do not look into or allow bystanders to look into the laser source.

SAVE THESE INSTRUCTIONS

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1.0 INTRODUCTION

Congratulations on purchasing the **BFH 1000** Computer Ride Diagnostic Wheel Balancer. This wheel balancer is designed for ease of operation, accuracy, reliability and speed. With proper maintenance and care your wheel balancer will provide many years of trouble-free operation.

BFH Ride Diagnostics Balancer - Precautions To Observe

Your BFH 1000 Ride Diagnostics Balancer utilizes the latest in electronics and instrumentation technology, incorporating three separate scanning lasers along with an embedded computer (PC). Following the precautions listed below will help to ensure continuous and satisfactory operation of your unit.

- 1) Install the balancer on a dedicated power line in order to avoid electrical noise and power line fluctuations. Avoid power cord length greater than 15 feet.
- 2) The BFH1000 Ride Diagnostic Wheel Balancer utilizes red scanning lasers which actually create an image of the wheel being diagnosed. Install the balancer away from direct sunlight so that the laser beams can be detected by the scanner. Avoid placing high intensity lamps and infrared heaters near the BFH balancer.
- 3) Diagnose and balance only those wheels which fit within the specifications of the BFH Balancer:
Rim width = 3 - 20 inches
Rim diameter = 13 - 30 inches
Max tire diameter = 44 inches
Minimum distance required from cabinet to rim edge = 56 mm (2.20 inches) for wheel sizes 13-18 inches in diameter.
Minimum distance required from cabinet to rim edge = 81 mm (3.19 inches) for wheel sizes 19-24 inches in diameter.
- 4) The BFH balancer is designed to properly scan the profile of existing rims. Extreme geometric combinations of rim diameter and flange offset can inhibit the proper viewing of the rim profile. These exceptional rims can be properly balanced by manually entering the distance, diameter, and width of the rim.
- 5) The wheel guard of the BFH1000 Ride Diagnostic Wheel Balancer also serves as the housing for one of the scanning lasers. Since the laser must remain stationary once the spin cycle begins, do not lean on or otherwise disturb the wheel guard until the spin cycle has been completed.

Instructions on use, operational requirements and routine maintenance of the machine are covered in this manual.

This unit uses an open source Linux operating system for its user interface. This open source code is available for the cost of shipping and handling to owners of the BFH1000 Ride Diagnostic Wheel Balancer. Requests must be made to the attention of balancer product management at the Conway AR address listed on the back of this manual. Please include the owners name, address and unit serial number with all requests.

**STORE THIS MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE.
READ THIS MANUAL THOROUGHLY BEFORE USING THE MACHINE.**

1.1 SAFETY NOTICE

This manual is a part of the balancer product.

Read carefully all warnings and instructions of this manual since they provide important information concerning safety and maintenance.

1.2 BALANCER APPLICATION

The John Bean BFH1000 Ride Diagnostic Wheel Balancer is intended to be used as a device to balance and diagnose and correct car, and light truck wheel vibration problems within the following range:

<i>Maximum tire diameter</i>	<i>:</i>	<i>44" (1117mm)</i>
<i>Maximum wheel diameter</i>	<i>:</i>	<i>30" (762mm)</i>
<i>Maximum wheel width</i>	<i>:</i>	<i>20" (381mm)</i>
<i>Maximum wheel weight</i>	<i>:</i>	<i>154 lbs (70 kg)</i>

This device is to be only used in the application for which it is specifically designed. Any other use shall be considered as improper and thus not reasonable.

The manufacturer shall not be considered liable for possible damages caused by improper, wrong or non reasonable use.

1.3 BFH 1000 SPECIFICATIONS

Weight Imbalance Accuracy	.05 oz / 1 gram
Weight Placement Resolution	± .7 degrees
Weight Imbalance Resolution:	
Roundoff Mode	.25 oz / 5 grams
Non-Roundoff Mode	.05 oz / 1 gram
Max. Shaft Weight Capacity	154 lbs / 70 kg
Max. Tire Diameter	44" / 1117 mm
Rim Width Capacity	3.0"-20" / 76 mm - 508 mm
Max. Tire Width	19" / 482 mm
Rim Diameter Capacity	13"-30"/330mm-762mm
Balancing Cycle Time.	20 seconds or less
Shaft Speed at calculation	>200 RPM
Electrical	230vac, 1ph, 50-60Hz, 3.2A
Required Work Area	64" x 64" (1626 x1626 mm)
Shipping Weight, complete	645 lbs/293kg
Shipping Dimensions	72"L X 73"W X 63"D (1829x1854x1600mm)
Machine Dimensions	64"h 64"w 64"d (1626x1626x1626mm)
Actual Weight with Accessories	558 lbs / 254 kg
Operating Temperature Range	32-122F / 0-50C

1.4 FEATURES

- Self test check with every power up cycle.
- Pre-programmed Error Codes indicate procedural errors or safety concerns.
- Fully Automatic All-Parameter Data Entry.
- Fully Automatic Rim/Tire Profiling.
- Fully Automatic Spoke/Split Weight Function for Hidden Weight Placement.
- Fully Automatic Left and Right Radial & Lateral Runout Measurements.
- Hands-Free Power Clamping for Precise Wheel Placement.
- Fast Tire/Wheel Diagnostic System Time, Floor-to-Floor.
- Captured back spring eliminates having to handle the backing spring.
- Automatic recalculation if weight positions are changed. No need for re-spinning the wheel.
- Common 40 mm diameter mounting shaft.
- Easy-to-Read Plasma Data Display Monitor.
- Dynamic and single weight Static capability.
- Stop-at-Top features simplifies weight imbalance location
- Optima Balance feature for reducing weight required.
- Built-in spin counter for monitoring balancer productivity.
- Service code access to all Balancer electronic functions for fast, easy diagnosis.
- Operator selectable roundoff mode.

1.5 STANDARD ACCESSORIES

Standard accessories (Figure 1) included with the BFH 1000 are:

- | | | |
|----|-------------|------------------------------|
| 1 | EAM0003J08A | Cone, 85-132 mm / 3.3"-5.2" |
| 2 | EAM0003J07A | Cone, 71-99 mm / 2.8"-3.9" |
| 3 | EAM0003J06A | Cone, 56-84 mm / 2.2"-3.3" |
| 4 | EAM0003J05A | Cone, 43-63 mm / 1.7" - 2.5" |
| 5 | EAC0058D07A | Cup - Large Pressure |
| 6 | EAM0005D54A | Plastic Sleeve |
| 7 | EAA0283D53A | Power Clamp Nut |
| 8 | EAM0005D40A | Weight - Shaft Calibration |
| 9 | EAC0058D08A | Small Pressure Disk |
| 10 | EAA0247G21A | Caliper - Rim Width |
| 11 | EAC0060G02A | Flange - Cover, Hook |
| 12 | EAM0006G01A | Pin - Accessory |
| 13 | 58839 | Weight Pliers |
| 14 | EAC0058D15A | Soft Protective Ring |

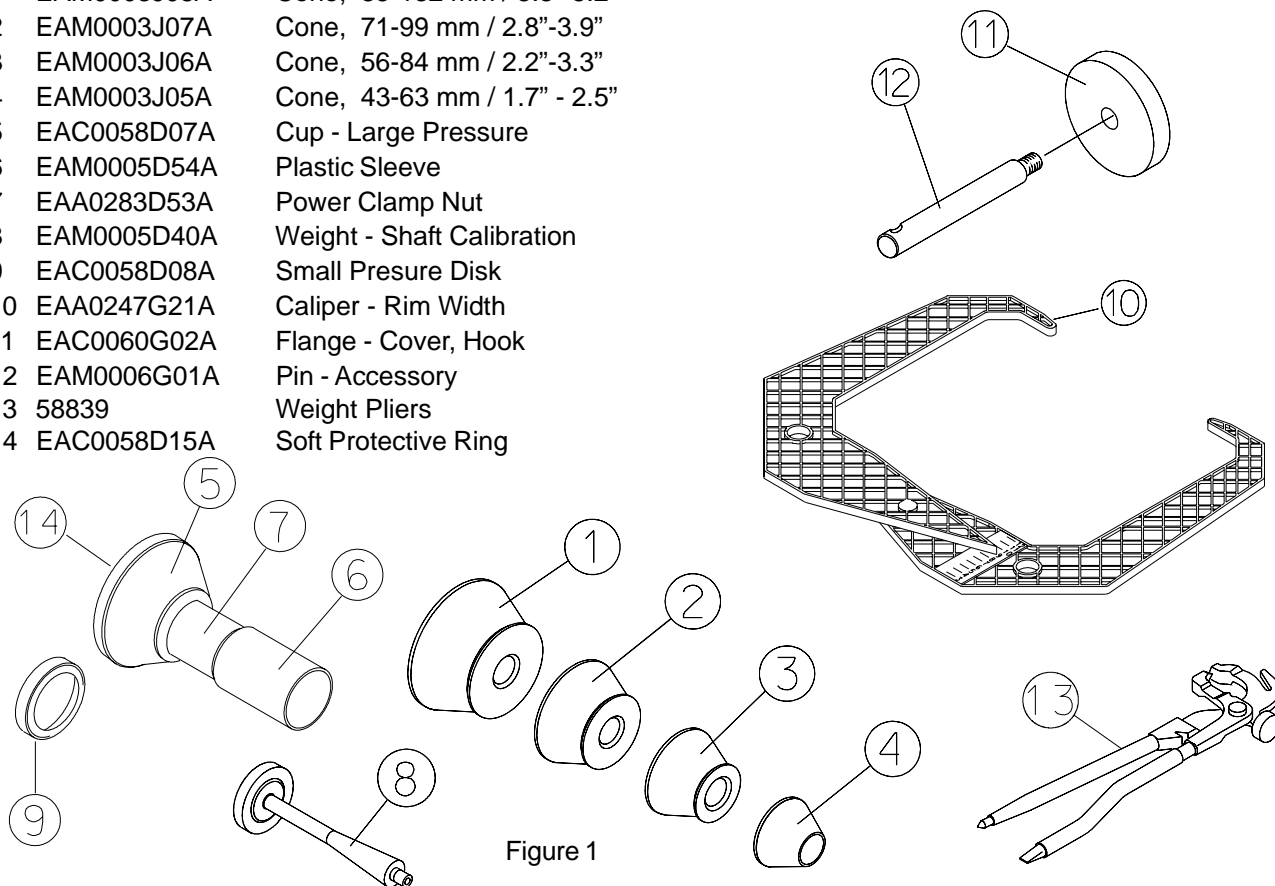


Figure 1

1.6 OPTIONAL ACCESSORIES - SEE FIGURE 2



Wheel Lift - EAK0221J27A



Printer Kit - EAK0221J26A

Figure 2



Stick-on Weight Removal Tool
EEHT300A



Flange Plates - Kit of 4
EAK0221J22A



Flange Plate Cart
EAS2081J30A

PRE-INSTALLATION CONSIDERATIONS

1.7 DIMENSIONS OF THE MACHINE

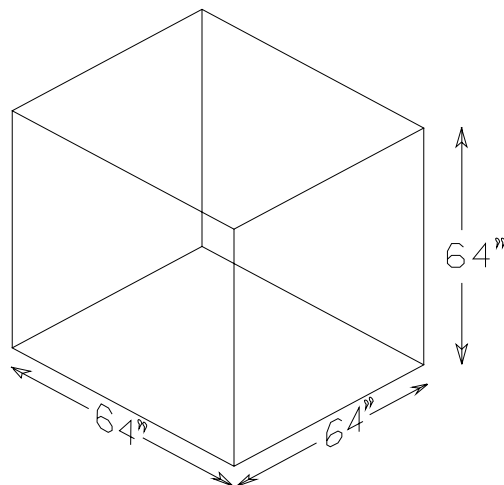


Figure 3 - Footprint Requirements

1.8 INSTALLATION AREA REQUIREMENTS

Make sure that from the operating position the user can see all of the machine and the surrounding area.

The operator should prevent non authorized persons and/or objects from entering the area which may create potential hazards.

The machine should be installed on a stable level floor. Do not install the machine on a uneven floor.

If the balancer is to be installed on a raised floor, the floor must have a capacity of at least 110lbs per sq ft. (5000 N/m² - 500 kg/m²).

It is not required to secure the machine to the floor but is recommended.

Install the machine in a dry, covered area.

The installation of the machine requires a working area of at least 64" x 64" (1626 x1626 mm). See Figure 3

1.9 INSTALLATION PRECAUTIONS

CAUTION! CAREFULLY REMOVE THE BALANCER FROM THE PALLET.

Remove the hardware that secures the machine to the pallet and slide the balancer onto the floor where it is to be installed.

THE UNIT IS HEAVY AND THE WEIGHT IS NOT EVENLY DISTRIBUTED.

DO NOT LIFT THE BALANCER BY THE SHAFT OR WHEEL GUARD FRAME.

DROPPING THE UNIT MAY CAUSE PERSONAL INJURY OR EQUIPMENT DAMAGE.

2.0 INSTALL ACCESSORY PINS

A. Install the accessory pins (Figure 4). Tighten firmly.

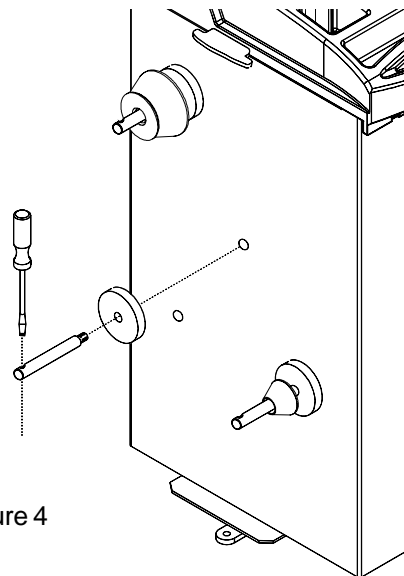


Figure 4

B. Place accessories onto the accessory pins.

2.1 ELECTRIC INSTALLATION

ANY ELECTRICAL WIRING MUST BE PERFORMED BY LICENSED PERSONNEL.

ALL SERVICE MUST BE PERFORMED BY AN AUTHORIZED SERVICE TECHNICIAN.

Check on the plate of the machine that the electrical specifications of the power source are the same as the machine. The machine uses 230VAC (+/- 15%), 50-60Hz, 1Ph, 3.2 Ampere.

NOTE:

ANY ELECTRICAL OUTLET INSTALLATION MUST BE VERIFIED BY A LICENSED ELECTRICIAN BEFORE CONNECTING THE BALANCER.

NOTE:

THIS MACHINE PERFORMS A SELF-TEST ROUTINE ON START-UP. THERE WILL BE A DELAY OF SEVERAL MOMENTS BEFORE UNIT IS READY FOR OPERATION. ANY PROBLEMS DETECTED AT START-UP WILL RESULT IN THE DISPLAY OF AN ERROR CODE. PROBLEMS DETECTED DURING OPERATION ARE SAVED TO A LOG FILE WHICH CAN BE RETRIEVED FOR DIAGNOSIS BY A TECHNICIAN.

2.2 SETUP

Every shop has different procedural requirements meaning each machine should be customized to the unique services performed at that location. Most attributes are set from the Main Function menu. A second “Optima” menu allows further customizing.

2.2.1 Customizing the System

A. Select the “Function” key (F1) from the “Welcome” menu. See Figure 5

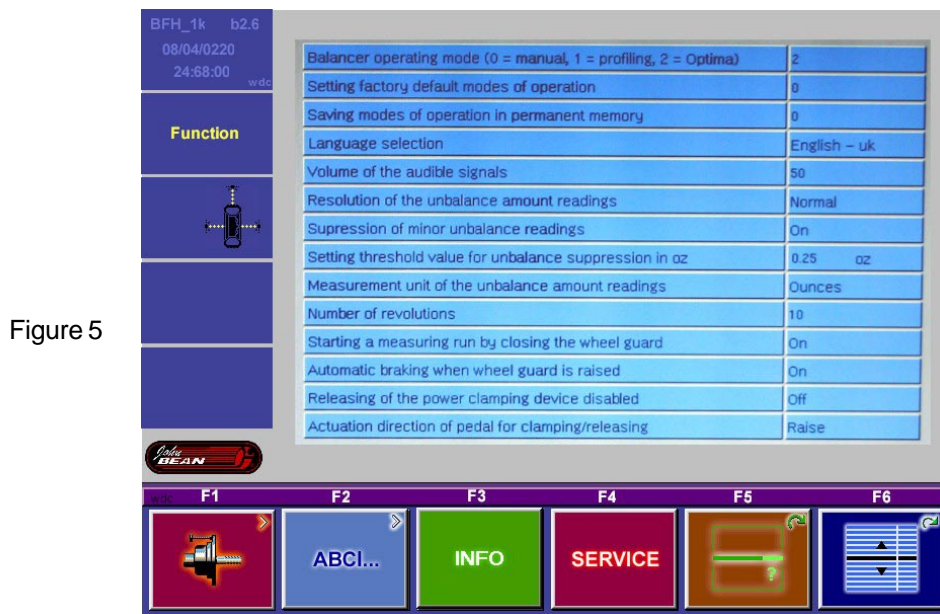


Figure 5

B. Press and hold the “F6” button and rotate the wheel to scroll up or down to the desired line item.

C. Press and hold the “F5” button and rotate the wheel to change selected topic to desired value or function.

D. When the desired features have been selected, save selections to permanent memory by selecting line item “3”. Hold the F5 button while rotating the shaft, enter a value of “1”, release to **Save to Permanent Memory**.

E. Select the “ESC” button on the keyboard to return to the main screen.

2.2.2 CUSTOMIZING OPTIMA FEATURES

- A. From the “Welcome” Screen, select the “F6” Optima button.
- B. Select the “F3” Key to enter the menu used to set the limits required for an Optimization procedure.
- C. Set the values for each measurement limits as required by the shop. See Figure 6

Figure 6



D. Line Item 4 allows the user to select the option of making a profile measurement with each spin or only after a clamping cycle. Select option “0” (only after clamping) allows a quicker floor to floor time. The unit will then profile the next wheel assembly after it is clamped. It considers each subsequent spin to be a check spin using the same parameters and profile.

E. Save the values selected by scrolling down to line item 8, (Save to Memory) while rotating the shaft, enter a value of “1”, release to **Save to Permanent Memory**



Figure 7

3.0 Physical Layout.

Refer to Figure 7. - Functional description of the unit:

1. The screen
2. Input panel
3. Gauge arm
4. Stub shaft with power clamp nut
5. Brake pedal
6. Weight compartments
7. Storage areas for cones or clamping devices
8. Tilting frame and hood guard
9. Outer scanner
10. Rear scanner
11. Inner scanner
12. Main Power switch (ON/OFF), rear

3.1 The Display Screen

See Figure 8, Screen with display fields

- 1-5 Information fields
- 6 Menu fields and Function descriptors.
- 7 Display field of screen
The screen reads out inputs, helpful information, all measured data and error codes.

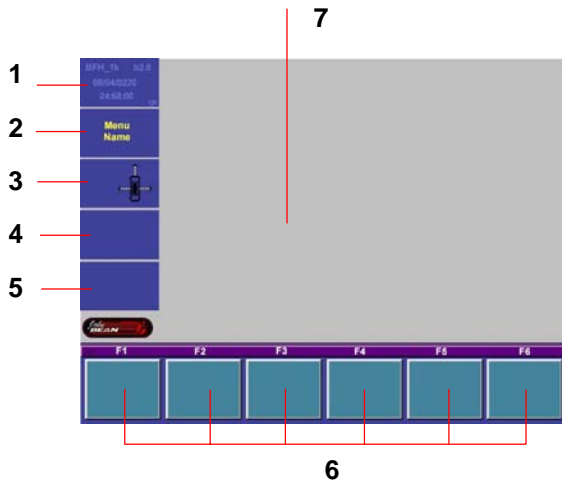


Figure 8

Detailed description of display fields

The screen is subdivided into various display fields, each of which is associated with a certain type of information.

Information fields

- 1 Number of the installed program version
Machine name
Date and time
- 2 Selected Menu name
- 3 Selected profiling mode
- 4 Electrical compensation
- 5 Error codes

6 Menu fields

Icons illustrating special features or functions are viewed in the six menu fields. Under every menu field is the associated menu "F key" which is used to call the feature illustrated.

7 Display field

Wheel type and rim dimensions
Balancing modes
Amount of unbalance
Direction of orientation and correction position
Optima procedures
Function and Setup Menus

3.2 Menu Keys

3.2.1 Description of Menu Keys

The assignment of the menu keys **F1** to **F6** is shown in the menu fields above the relative keys on the screen. The menu keys have different functions and initiate different actions, depending on the program step.

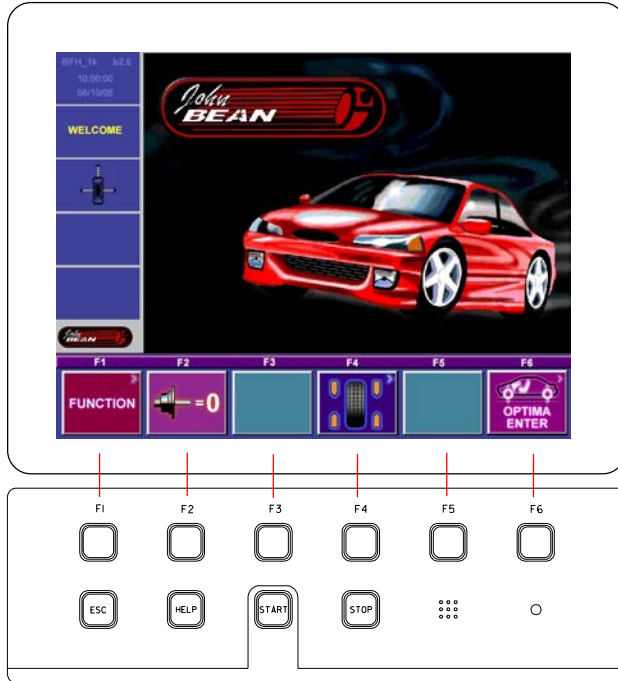


Figure 9

- Keys without a symbol in the upper right-hand corner or at the edge initiate an action immediately, such as F2 on the main screen means to perform a compensation process. See Figure 9.

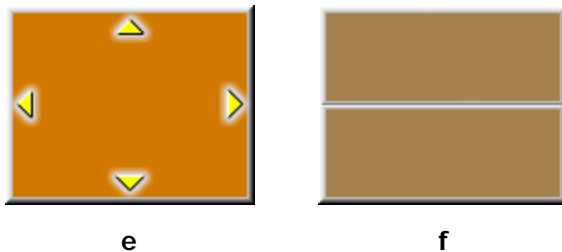
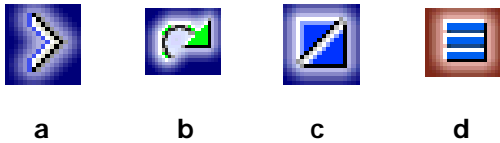
- Keys with one or more symbols in the upper right-hand corner of the menu field or at the edges initiate various actions:

a - Press key to access a sub-menu, e.g. key F4 Balancing.

b - Press and hold key down while rotating wheel at same time, e.g. key F11 Number of spokes.

c - Press key to toggle between two options or states, e.g. key F9 Static / dynamic unbalance.

d - Press key to toggle between several options or states, e.g. key F21 Weight position for correction plane.

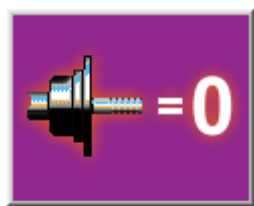


e - Toggle switch (4 functions): Press edge of key to carry out the highlighted action, e.g. key F32 Character set: move the cursor in the character set to the left, to the right, up or down.

f - Toggle switch (2 functions): Press key on top or bottom to select the highlighted function, e.g. key F8 Precision reading of unbalance and mode select.



Icon 1

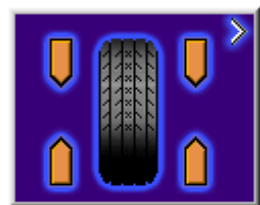


Icon 2

3.2.2 MAIN MENU FUNCTIONS

Icon 1 Change to the Function screen

Icon 2 Perform adapter compensation run



Icon 3

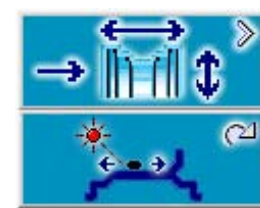


Icon 4

Icon 4 Change to the Balancing screen

Icon 5 Change to the OPTIMIZATION MENU

3.2.3 BALANCING



Icon 7



Icon 8

Icon 7 Toggle switch, two functions:

Pressed on top:
View and/or edit Data Input (wheel parameters)

Pressed on bottom:
Move the laser position pointer to the desired location. Button must be held down as the shaft is rotated. (only when stick-on weights are selected)



Icon 9a



Icon 9b

Icon 8 Toggle switch, two functions; reading only as long as the key is pressed (quick reading):

Pressed on top:
Precision reading of unbalance, no suppression of minor unbalance readings.

Pressed on bottom:
Toggles through possible placement locations of weight placement for conventional balancing run.



Icon 11



Icon 12

Icons 9a and b Select static unbalance or Select dynamic unbalance

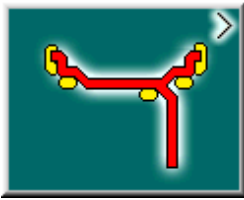
Icon 11 Number of spokes has been selected and entered.

Icon 12 Number of spokes has not been detected and must be entered manually if required. Hold the F key while rotating the shaft until the desired value is displayed.



Icon 13

Icon 13 Wheel with 6 spokes selected



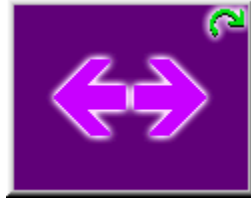
Icon 15



Icon 16



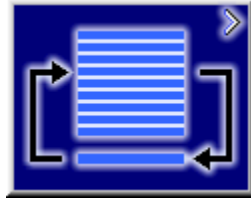
Icon 17



Icon 18



Icon 19



Icon 20



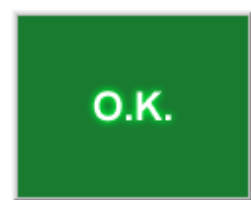
Icon 21



Icon 22



Icon 23



Icon 24



Icon 25



Icon 26

3.2.4 RIM DATA INPUT

Icon 15 Change to the WEIGHT PLACEMENT (mode) screen.

Icon 16 Change to the RIM TYPE screen

Icon 17 Hold key down and enter the distance rim/machine by rotating the wheel

Icon 18 Hold key down and enter the rim width by rotating the wheel

Icon 19 Hold key down and enter rim diameter by rotating the wheel

Icon 20 Change to the Stored Parameter menu. Must be in the "Manual" parameter mode

3.2.5 PROFILES SCREEN, STORED PARAMETERS

Icon 21 Select or store a wheel profile. Hold key down and select copy or store by rotating the wheel.

Icon 22 Store a parameter. Select memory location to store current wheel profile for later retrieval (yellow arrow). Select "OK" to enter the values currently in use to a stored location.

Icon 23 Copy a stored parameter. Select memory location for retrieval (yellow arrow). Select "OK" to enter the values stored for use in the next balance run.

Icon 24 Accept or enter the selected parameters.

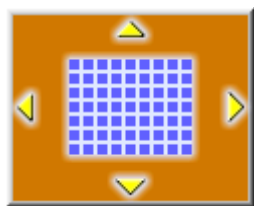
3.2.6 FUNCTION MENU

Icon 25 From the Main Menu, Select FUNCTION to access screens used to prepare the unit for desired operation.

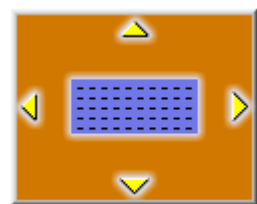
Icon 26 Change to the screen USER CALIBRATION, see Maintenance chapter for user calibration procedures.



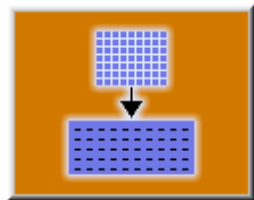
Icon 27



Icon 28



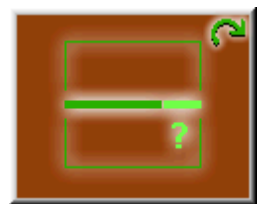
Icon 29



Icon 30



Icon 31



Icon 34



Icon 35

3.2.7 TEXT EDITOR

Icon 27 Change to the screen TEXT EDITOR

Icon 28 Toggle key, four functions: Move the cursor within the character set (right, left, up, down) to the desired character.

Icon 29 Toggle key, four functions: Move the cursor within the text field (right, left, up, down) to the desired text box location

Icon 30 Transfer characters from the character set to the text field

Icon 31 Save text

3.2.8 FUNCTION (SETUP)

Icon 34 Change selected topic to desired value or function.

Icon 35 Hold button and rotate the wheel to scroll up or down to the desired line item.

Icon 36 Setup screen illustration. When desired features have been selected, save to permanent memory by selecting line item "3", Save to Permanent memory, enter a value of "1" with the F5 button while rotating the shaft. Release button to save. Select the "ESC" button to return to the main screen. See Figure 10.



Figure 10

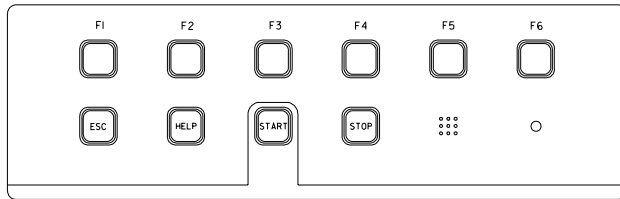


Figure 11

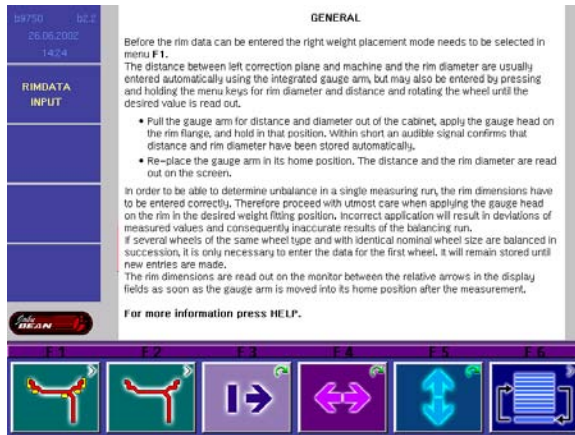


Figure 12

4.0 Help information

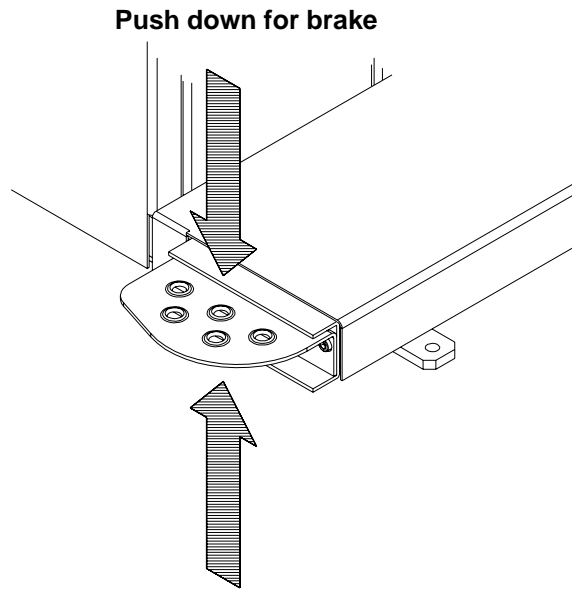
Help information explains the current action and, in the case of an error code, provides hints for remedy. See Figure 11.

Display help information

- Press the HELP key (See Figure 12)
- The first screen with help information appears, e. g. to the screen RIM DATA INPUT.
- Press the HELP key once more to display any additional screen with information.

Quit help information

- Press the ESC key



Lift up for power clamp operation
Figure 13

5.0 POWER CLAMP

5.1 POWER CLAMP PEDAL

Shaft Lock

The main shaft is locked when the pedal is **depressed**. This holds the wheel in the correction position for correct fitting of the correction weights. See Figure 13.

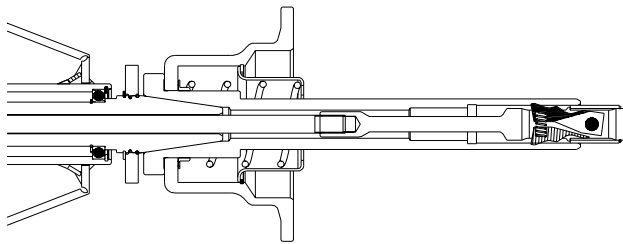
This lock is designed only to facilitate orientation of the wheel and must not be used for braking the main shaft.

Power Clamp Operation.

Lift upward to engage the power clamp jaws when the lock nut is placed on the shaft.

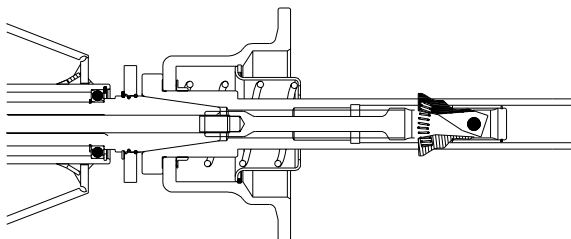
Lift upward again to release the clamp nut.

NOTE: The first time the unit is operated after power-up, make sure the power clamp engaging jaws are in the outer most position and ready for use. An Error of “E14” may result if the unit cannot accurately determine the clamping jaw position. Simple press “ESC” to continue, lift the pedal again to cycle and the power clamp will learn its new position. See Figures 14 and 15.



Power Clamp with jaws all the way OUT

Figure 14



Power Clamp with jaws all the way IN

Figure 15

6.0 OPERATION OF THE BALANCER

WARNING: For operator safety please read and follow the precautions outlined on pages 1 and 2 of this manual.

NOTE: READ ALL INSTRUCTIONS BEFORE PROCEEDING WITH OPERATION OF THE BALANCER.

All balancer functions are input into the main computer through the large easy to read touch panel. Although each wheel tire assembly differ in some ways all balancing jobs require basically the same procedure. The order of events to take place are:

1. Inspection of the wheel/tire assembly
2. Mounting wheel onto shaft
3. Scanner entry of wheel profile
4. Applying the recommended weight
5. Optima Mode diagnosis if required, or Check spin if desired
6. Dismounting the wheel

The following operation instructions will follow the basic outline above.

6.1 CHECK LIST - INSPECTION

Observe Before Balancing Wheel

1. Check for proper air pressure. If not correct, inflate to correct pressure.
2. Check for any foreign material inside tire. If present, remove before balancing tire.
WATER IS FOREIGN MATERIAL!
3. Remove old weights — old weights may be improper value or in wrong location.
4. Be sure tire and wheel are free of excessive dirt, rust and large stones. Use wire brush on back side of wheel if necessary.

Figure 16



Begin Balance procedures - See Figure 16

From the Main Menu, select "F4" to enter the balance mode of operation.



6.2 WHEEL MOUNTING

Most standard wheels and many alloy wheels have accurately machined center holes, and they should be mounted with center cones. Accurate balancing depends on accurate mounting of the wheel and correct seating of the cone in the pilot hole. Insure that the wheel is centered on the shaft exactly as it will be mounted to the vehicle.

Before starting any balancing procedure it is very important that the wheel is mounted on the machine with the proper adaptors. An incorrect centering of the wheel will result in considerable imbalance.

There are many types of wheels and John Bean supplies adaptors of high quality and durability for the large majority. However if you meet special wheels which may require a specific adaptor, call your authorized John Bean distributor.

Rims may be divided into these major groups:

1. *Car rims with a true center hole.*
2. *Car rims without a center hole.*
3. *Car rims with an untrue center hole.*
4. *Light truck rims.*

6.2.1 STANDARD WHEELS (BACK CONE MOUNT)

Mount the wheel as detailed below in Figure 16.

1. Mount proper cone against spring plate.
2. Mount wheel on shaft in the same manner as you would on the car.
3. Mount the Power Clamp nut along with proper pressure cup.
4. To operate the power clamp, lift the foot pedal to engage the clamp. Lift pedal again to release the nut.

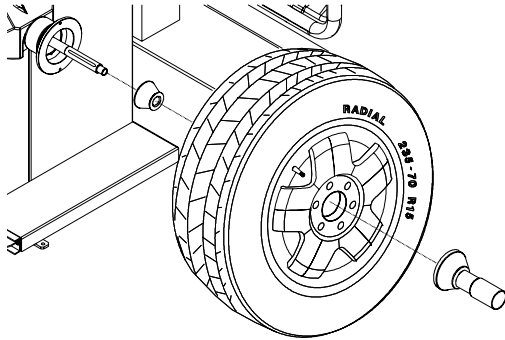


Figure 17 - Standard rear cone mount

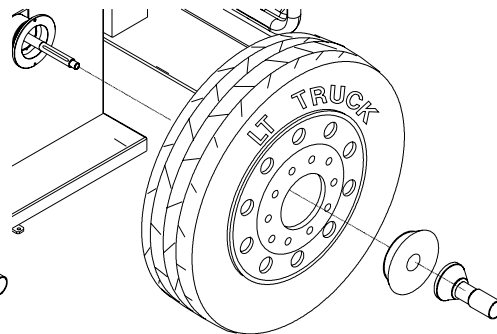


Figure 18 - Truck cone - outside cone mount

6.2.2 CENTERING LIGHT-TRUCK WHEELS

Install the wheel, using the front cone method, See Figure 18.

An optional offset spacer may be required for some light truck wheels and reverse-offset wheels that must be moved away from the balancer mounting flange. The extension adaptor is often used with the 5-1/4 inch diameter light truck cone.



WARNING - HOLD THE POWER CLAMP NUT BY THE PLASTIC END CAP ONLY!! THE POWER CLAMP WILL NOT STOP UNTIL THE WHEEL IS SECURE AGAINST THE FLANGE. SEVERE PERSONAL INJURY WILL OCCUR IF FINGERS OR HAND IS PINCHED BETWEEN THE NUT, WHEEL OR FLANGE.

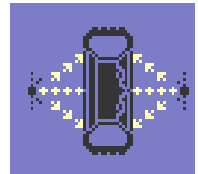


6.3 SCAN MODE SELECTION

The BFH 1000 can be operated in 2 automatic scan modes and one manual mode. Default factory setting is the OPTIMA mode. The BFH 1000 can easily be set to PROFILING mode if OPTIMA functionality is not required or wanted for every balance job. To access PROFILING OR OPTIMA modes, depress the F6 key for approximately 3 seconds. The mode will change with each depression. Pressing the F6 key momentarily activates the OPTIMA procedure.

PROFILING mode is used when wheels only need to be balanced and the operator does not want to monitor the ride performance of the wheel and includes:

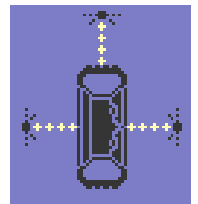
- Rim profiling to get rim data including ALU wheel weight position
- Spoke count when ALU mode is detected
- Balancing



The PROFILING mode is indicated by the following symbol that is visible in information box 3 in the left upper corner of the screen.

OPTIMA mode is used for checking the ride performance of the wheel and includes:

- Rim profiling to get rim data including ALU wheel weight position
- Spoke count when ALU mode is detected
- Balancing
- Radial tire run out
- Left radial rim run out
- Left lateral rim run out
- Right lateral rim run out
- Right radial rim run out



The OPTIMA mode is indicated by the following symbol that is visible in information box 3 in the left upper corner of the screen.

Manual Parameter Entry - Read the rim diameter marked on the sidewall of the tire (Figure 20). Enter the stated rim diameter by pressing and holding the diameter button and rotating the wheel assembly until the desired value is displayed.

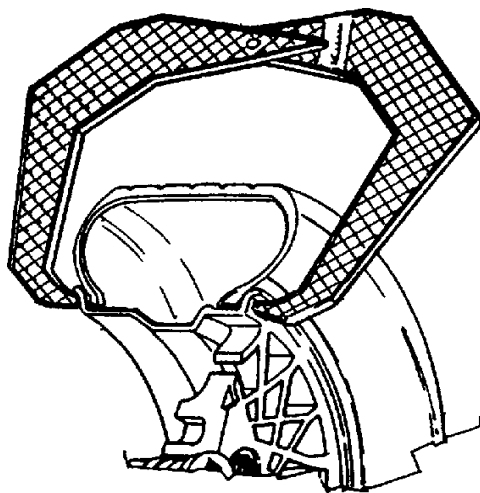


Figure 19

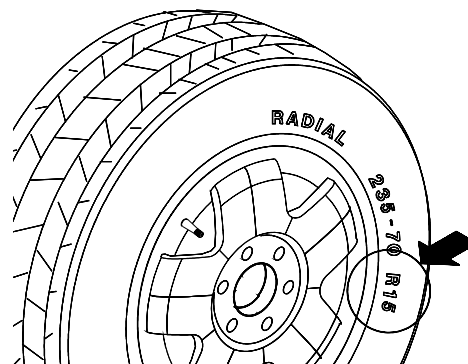


Figure 20

6.4 SPINNING THE WHEEL

NOTE: Before spinning the wheel, make sure proper eye protection is worn by all personnel in the vicinity of the balancer.

A. Spin the wheel by lowering the wheel guard. If auto-spin is not activated press “Start” to begin balancer run.. When the balancing cycle is completed the wheel will stop automatically and the imbalance values will appear on the screen.

B. In the Standard or Profiling Mode, the machine first measures the amount of imbalance at a higher rpm, the speed is then reduced and the profilers measure the rim distance, wheel diameter and rim width. Spokes are counted during this action as well.

If the unit is operating in the Optima mode the unit will measure the above plus the unit will measure the amount of rim radial and lateral runout and wheel assembly radial runout. If the software has determined a clip-on weight can be used on the right rim edge, then the right radial and lateral runout are measured.

After runout values along with the imbalance date are collected and stored, the BFH1000 then determines if an “Optimization” procedure will benefit this assembly. Thresholds can be set in the Optima setup menu to determine the “break” point.

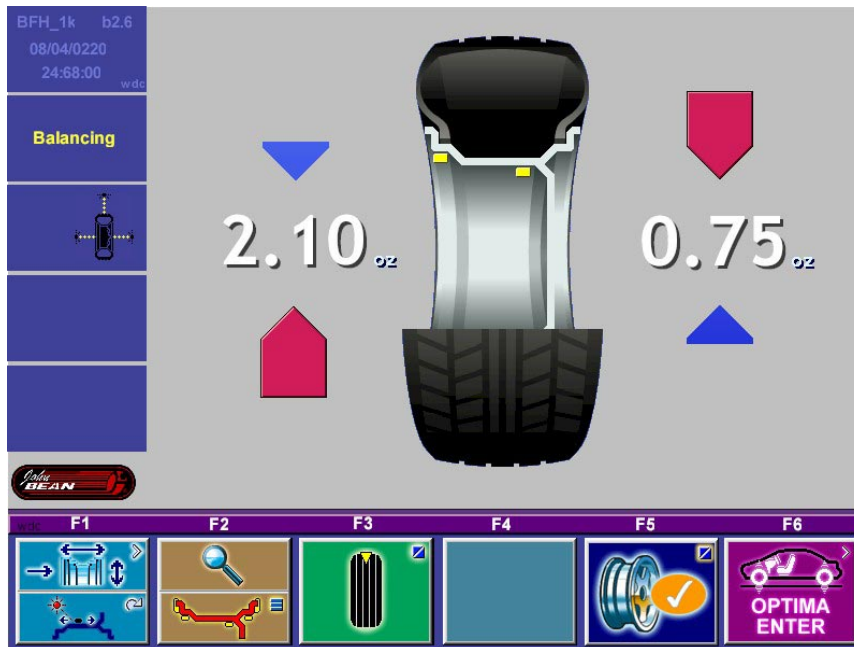


Figure 21

6.5 SELECTING THE WEIGHT PLACEMENT MODE

A. 2-Plane - Choose the appropriate balancing mode for the wheel. To select the various **2-plane** weight placement modes press the **Mode** button (Lower part of F2) until the placement graphic indicates desired corrective weight placement position. Press and hold the lower button for 3 seconds goes directly to clip-clip without having to prompt through all the modes. Fig 21

- or -

B. Select STATIC mode. Use a single corrective weight placed in the center or inner edge of rim. Select Static by pressing the “F3” key on the balancing screen. Pressing “F3” again will toggle operation back to Dynamic 2-plane operation.

NOTE: If in the “clip-weight static mode”, the weight placement position will be at top dead center. While in “stick-on mode”, weights will be placed at bottom center where the laser indicates.



6.6 CORRECTION OF THE IMBALANCE

- A. The wheel assembly automatically stops near the right weight correction plane.
- B. Read the imbalance value of the right side. Values are displayed in ounces but can be displayed in grams if required and are automatically rounded to the nearest commercial wheel weight.
- C. Place the amount of weight called for. Use the foot operated shaft lock to stabilize the shaft during weight placement if required.
- D. Press “Start” with the hood up to rotate the assembly to the left or inner correction plane.
- E. Place the amount of weight called for. Use the foot operated shaft lock to stabilize the shaft during weight placement if required.

PROCEDURE WHEN SCANNER FAILS TO ACQUIRE A VALID PROFILE

If data for distance, diameter or width are missing it is not possible to balance any wheel since the balancer does not have any wheel data. If the software detects an invalid profile or parameter after spin, the screen will automatically respond with the “Data-Entry” screen, the mode will revert to manual mode.

The unit will display the data (distance / diameter / width and weight placement mode) of the last wheel measured in RED color to indicate those data fields which might not be correct.

Modify the data by pushing and holding F3, F4 and F5 and turning the wheel until the desired value is displayed.

After the wheel has been unclamped from the balancer, the balancer will switch back to the mode it was in for the previous wheel assembly.

6.7 VERIFICATION OF THE RESULTS

Lower the wheel guard to spin the wheel again and check that the readout is “0.00” “0.00” If a residual imbalance is displayed: Reference Graphic 1 next page for diagnostics explanation below.

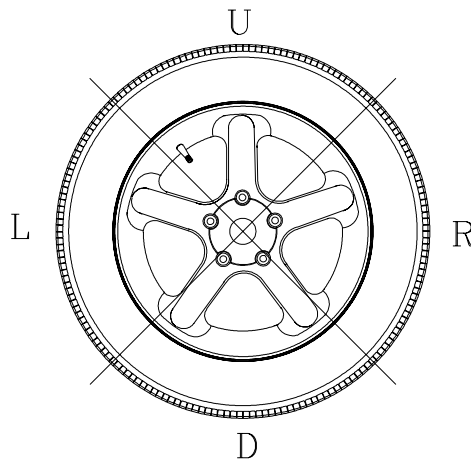
- A. Check the rim parameters, if entered value is incorrect, correct as needed. Imbalance values will be automatically re-computed.
- B. Check if the balancing mode selected is the most appropriate. If not, choose the right mode and re-spin.
- C. The wheel weight could have been placed at a wrong position. To check this, position the wheel at the correction position for the outer plane. If the wheel weight previously attached is in sector ‘L’ or ‘R’ (Graphic 1, page 20), move the wheel weight up about 1” (2.54cm).

If the wheel weight is in sector ‘D’ cut a piece of the wheel weight of an approximate value corresponding to the value shown on the right display, or replace the wheel weight with a lighter one.

If the wheel weight is in sector ‘U’ add a weight of value indicated by the display or replace the wheel weight with a heavier one. Repeat the same operation for the inner plane.

NOTE: If this situation is repeated, your machine may be out of calibration and a calibration operation might be required, contact a service representative for re-calibration.

- D. If an *ALU* function was selected ensure the wheel weights have been placed in accordance to the program chosen.
- E. Check that the wheel is not slipping against the backing collar.
- F. Check that the wheel and adaptors are clean.



Graphic 1.

6.8 VIBRATION PROBLEMS

If vibration is still present after balancing, check the following possible sources of vibration:

1. Stones caught in the tire tread.
2. Tire slippage on the wheel.
3. Incorrectly mounted wheel.
4. Imbalanced wheel covers.
5. Excessive radial or lateral runout in the tire or wheel.
6. Damaged wheel bolt holes.
7. Worn universal joints.
8. Imbalanced brake rotors or drums.
9. Worn or damaged balancer accessories.

7.0 SPOKE BALANCING MODE

A standard dynamic balance in ALU mode places compensation weight in two planes, inner and outer, at the bottom dead center for each plane of calculated imbalance. Sometimes the outside weight placement may be unsightly on a custom wheel. The Spoke Mode is designed to “hide” outer plane corrective weight by placing the required weight behind selected spokes in order to retain the esthetic appeal of the wheel.

1. Press the Spoke button, F5.
2. Outer weights will be divided. Weights may not be equal depending on the spoke positions relative to the imbalance position.
3. Place stick-on weights where indicated by the laser pointer.
4. Perform a check spin if desired.

NOTE: *Stick-on weight position can be “tweaked” by depressing the lower part of “F1” while rotating the shaft fore or aft until the laser locates in the desired position. Inner or Outer placement indicator must be “in the green” before depressing the button.*



Figure 22



Figure 23

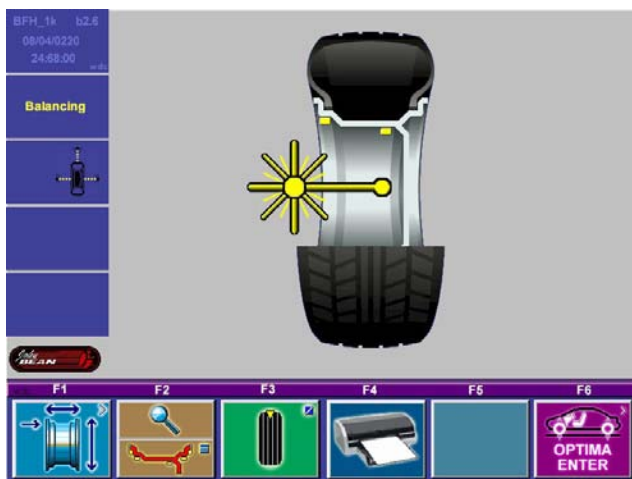


Figure 24

8.0 Optima Procedures

OPTIMA MODE is a feature which improves wheel running conditions through enhanced optimization capabilities while improving wheel balancer productivity without the need to measure the radial force.

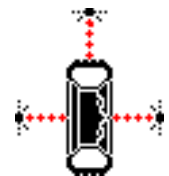
In the OPTIMA mode the following parameters are measured in one measuring run only:

- Radial and lateral rim run out for the left side is measured by non touch devices.
- Radial and lateral rim run out for the right side is measured by non touch devices.
- Bead seat radial run out (if required) on the rim is measured by a non touch device.
- Radial tire run out is measured by a non touch device.

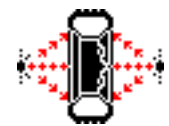
Subsequent to balancing results and run out measurement geometric matching of tire to rim is performed to improve ride performance. The possible improvement of ride performance is displayed in percent in the Optima Results Screen.

8.1 Selecting Mode

Select the desired profiling mode for the balance run. Press and hold the “F6” Optima Softkey for 3 seconds to toggle between Profiling mode and full Optima mode. See “F6” Key in Figure 22.



Full Optima



Profiling

The corresponding indicator icon will appear in box 3 on the Welcome screen to indicate the current mode.

8.2 Begin Diagnostic Run

From the “Welcome” screen, Figure 22, select the “F4” Softkey to begin the Optima procedure.



Press “Start”, see Figure 23.

Imbalance Calculations

The Wheel/tire imbalance values are calculated first at the higher RPM.

The assembly then slows for the Profiling mode.

Profiling the wheel

The laser scanners are activated next which create a virtual profile of both the inner and outer rim. Rim distance, diameter and rim width are determined.

Spokes are counted during the initial scan process for use during the correction steps if required, Figure 24.

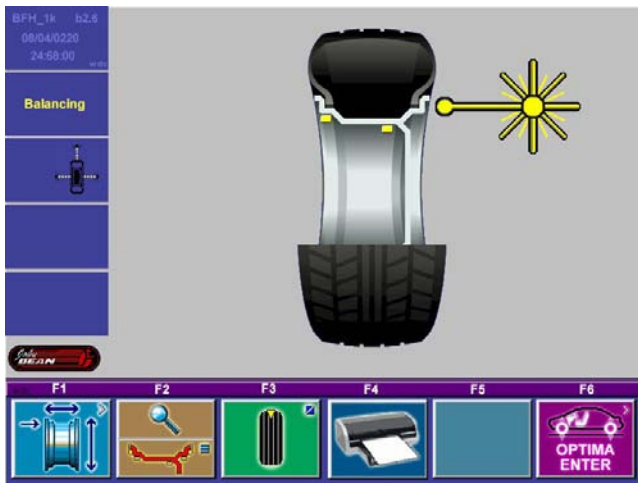


Figure 25

The inner rim radial and lateral runout is measured next.

If the profile scan determines the rim to be a steel or stamped rim, the outer rim radial and lateral runout is measured. See Figure 25

The wheel assembly radial runout is measured.

Calculations are made with all input data and stored for display when recalled.

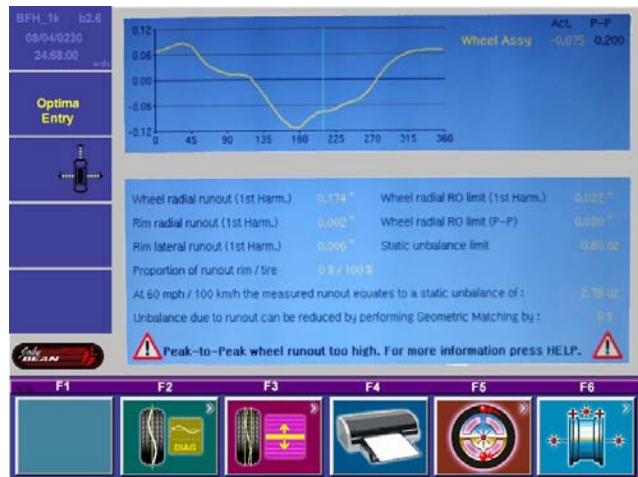


Figure 26

If Optima thresholds have been exceeded the Optima Diagnostics screen will indicate the assembly radial runout amount and make a recommendation of performing a full Optima compensation procedure.

Several other ride diagnostics variables are determined and displayed for reference. See Figure 26.

- Wheel radial runout
- Rim radial runout
- Rim Lateral runout
- The proportion of rim and tire runout

The amount of static imbalance influence

The amount of correction possible by a geometric correction.

A Warning note if an excessive amount of radial runout is detected on the wheel assembly. Press the "HELP" softkey to read about suggestions to remedy the problem.

Select softkey "F2" to display the assembly radial runout and the rim radial runout at the same time. Fig.27.



Figure 27

The graphs indicate where the runout is relative to a radial position. As the assembly is rotated, note the location of high or low spots. The Geometric correction procedure uses this information for matching.

Select the Softkey "F3" to display rim radial and lateral runout graphically at the same time.

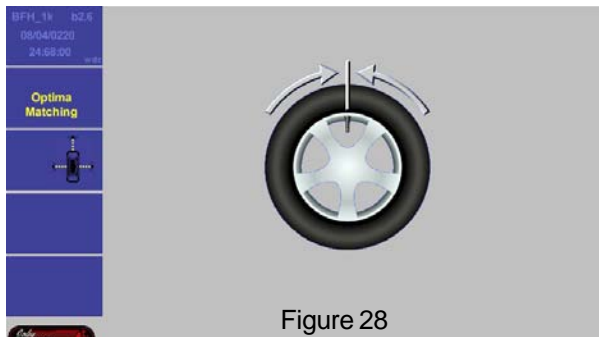


Figure 28

8.3 Optima Geometric Matching

Select softkey "F5" to continue to the matching process if desired. See Figure 27.

Rotate the assembly so the valve stem is located at top dead center. Press "F6", to continue. See Figure 28.

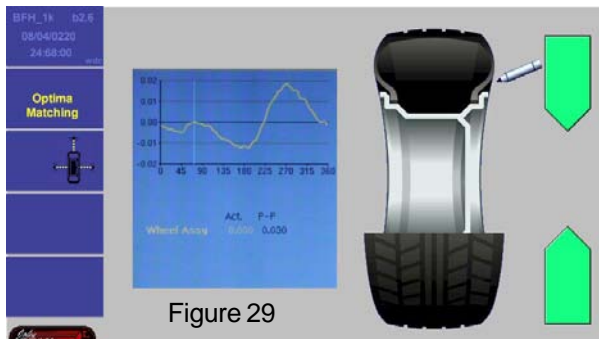
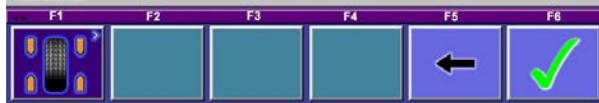
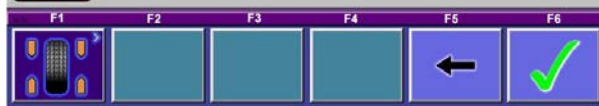


Figure 29

Rotate the assembly so the arrows are both GREEN, as shown in Figure 29. Mark the tire at top dead center. Select "F6" to continue.



Remove the Wheel assembly from the balancer and break the bead using a tire changer. Rotate the tire on the rim so the mark and valve stem are lined up. See Figure 30.

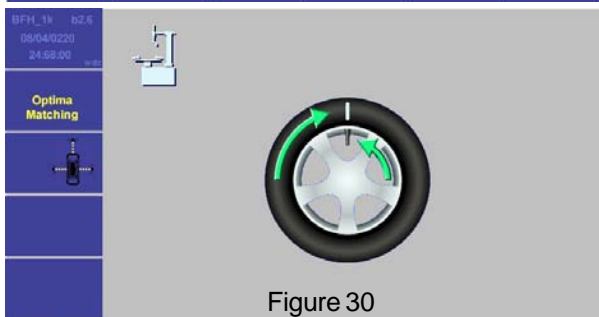


Figure 30



Reinflate the tire to specifications.

Mount the assembly back onto the balancer as before.

Select "Start" See Figure 31.



Figure 31



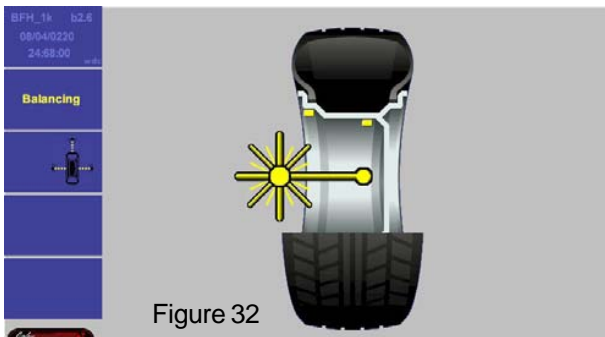


Figure 32

The unit will re-profile and recalculate based on the new tire-rim combination. See Figure 32.

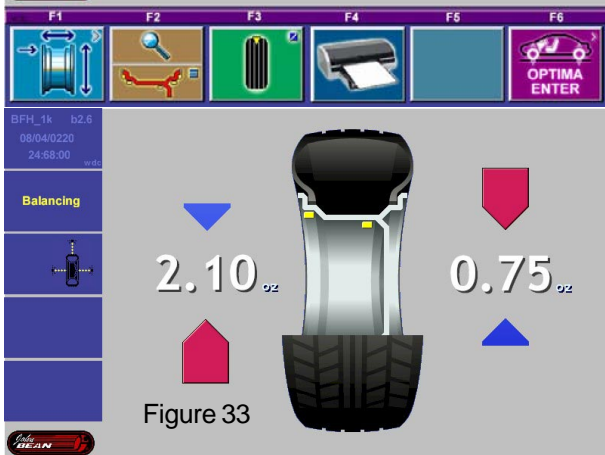


Figure 33

Corrective weight amounts and locations will be displayed. If the assembly again exceeded the threshold, the Optima screen would be displayed with additional suggestions. See Figure 33.

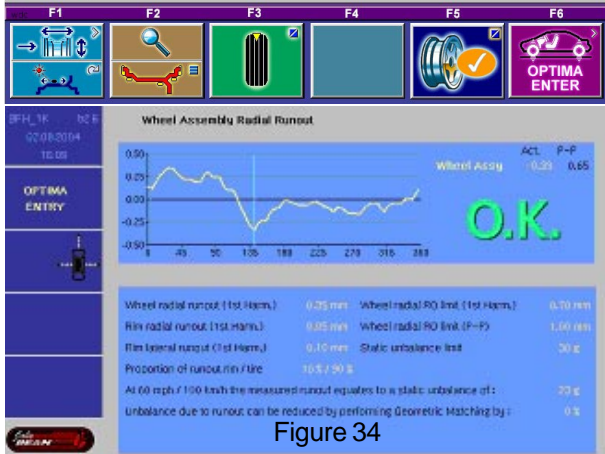


Figure 34

If the assembly passed this time the Optima display would say "OK". See Figure 34.

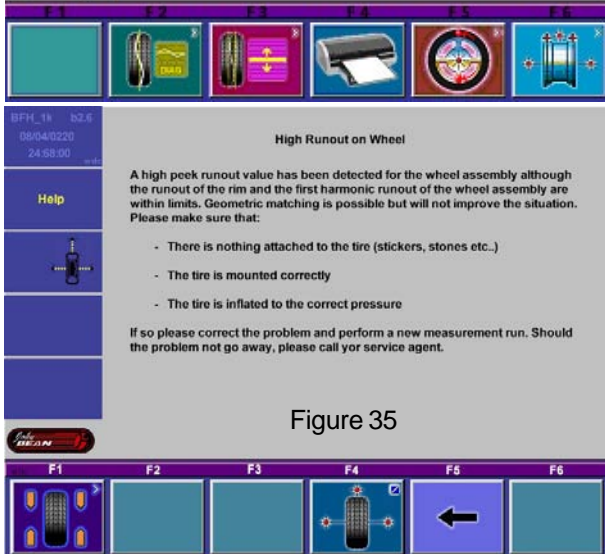


Figure 35

If at any time the process is in question, press the "HELP" key on the keyboard for more information regarding the current process. See Figure 35.

9.0 USER CALIBRATION

The BFH 1000 Balancer features a user calibration program which requires only a few minutes to complete. Perform this procedure when the balancer has been moved, disturbed, or whenever accuracy is questioned. Occasional field calibration will ensure years of reliable service.

Follow these 3 simple steps for shaft calibration:

1. Press and release the **“Function”** key (F1) from the **“Welcome or Main Screen”**.
2. Press and release the **“Calibration”** key (F1). Fig 36.

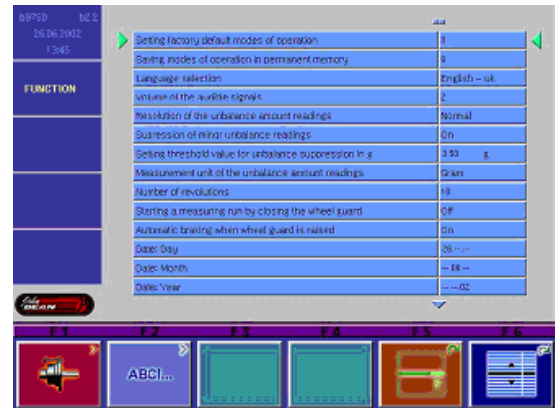


Figure 36

3. Place 2 cones followed by the clamping nut (no retainer) onto the shaft. Lift the pedal to clamp. See Figure 37.

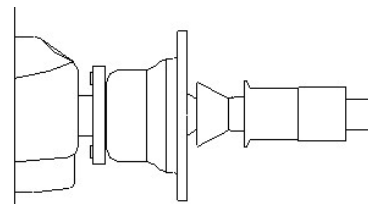


Figure 37 - 2 cones & clamping nut only

4. Lower the wheel guard and press the **“SPIN”** key. The balancer should spin and come to a complete stop. See Figure 38.

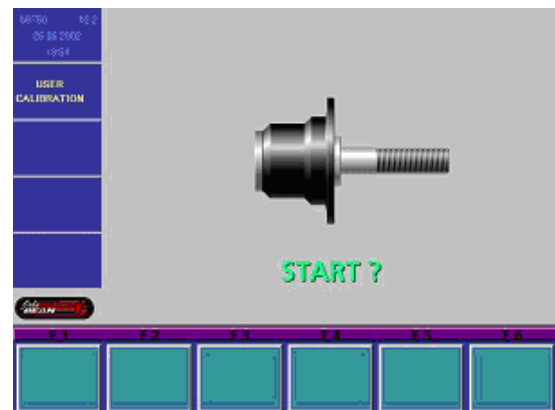


Figure 38

4. After the balancer comes to a stop raise the wheel guard and screw the calibration slug into left side of the flange plate. Lower the wheel guard and press the **“SPIN”** key. The balancer should spin and come to a complete stop. Once the shaft stops the display should display **“OK”** and the speaker sounds the Snap-on **“TüDüLü”**. See Figure 39.



Figure 39

SHAFT CALIBRATION IS COMPLETE

10.0 EXPLANATION OF PROGRAM CODES

In the event of damage or malfunction, a code may be displayed indicating the area or location of the detected error. These codes are important to the service agent when he services the unit. Note any codes or error messages before calling for service or assistance.

- 1. Communication between micro-controller and embedded PC (Blue screen)**
Service Codes: No service code available Communication between micro-controller and embedded PC is not OK (check connecting cable). This can also indicate a bad connection to the keyboard.
- 2. Check availability of keyboard (E 300)**
Service Codes : No service code available The microcontroller was not able to detect a keyboard. Check cabling between microcontroller and keyboard.
- 5. Check keyboard (E 89)**
One of the keys F1 to F6, HELP, ESC, START supplies a "Stuck key" code. The machine will proceed with the next step only if the trouble is remedied.
- 6. Check pedal switches (E 89)**
Press STOP or ESC key to check the pedal switch once to delete the error code reading. If the trouble cannot be remedied, the pedal is made inoperative.
- 7. Check BFH Calibration (E 360)**
The optima hardware requires wheel profiler position calibration.
When the camera controller board is replaced on the machine, the SW detected that calibration data is missing. A Service Calibration procedure is required to calibrate the actual position of the laser scanners with respect to the balancer reference plane. Contact a Service Representative.
- 8. Check BFH Hardware (E 361)**
Wheel profiler is not present or responding during the self test. The balancer controller board was not able to communicate with the camera controller board during startup test.
Possible causes:
 - The camera controller board is missing or dead.
 - The cable connecting the balancer controller board and the camera controller board is unplugged, damaged or missing.
- 9. Check BFH Hardware (E 362)**
Service Codes : All codes available for this model
Main camera board self test failed.
Balancing is not possible since wheel data cannot be scanned.
Problem during power up. Switch power off and on again. Possible camera board failure.
- 10. Check BFH Inner Scanner (E 363)**
Service Codes : All codes available for this model
Left side scanner self test failed or CCD not calibrated or zero mark not detected.
Balancing is not possible since wheel data cannot be scanned.
- 11. Check BFH Outer Scanner (E 364)**
Service Codes : All codes available for this model
Right side scanner self test failed or CCD not calibrated or zero mark not detected.
Balancing is not possible since wheel data cannot be scanned.
- 12. Check BFH Rear Scanner (E 365)**
Service Codes : All codes available for this model
Rear scanner self test failed or CCD not calibrated or zero mark not detected.
Wheel data can be scanned, balancing is possible. Runout measurement of the wheel is not possible.

A. Hardware test -common errors

C10F02 -Test returned with an error. No valid test results available

C10F07-Test function reported an unknown error

C10F18-Test timed out. No valid test results available

B. Hardware test -Power supply voltage

C10800

C10801

C10804

If the line voltage is below or above a limit the error code is displayed.

C. Hardware test -5V line

C10810

C10811

If the 5V voltage is below or above a limit the error code is displayed.

D. Hardware test -Current of optoelectronic LED

C10705

C10706

C10707

C10708

If the current / voltage is below or above a limit the error code is displayed.

E. Hardware test -Transducer signals

C10410

C10420

C10430

Checks transimpedance and signal amplifiers and transducer values. If no signals from the transducers are detected the error code is displayed.

F. Hardware test -Auto stop system

C10380

C10381

C10382

C10383

Checks voltage on capacitor of the auto stop system.

If the voltage is below or above a limit or the recharging time is above a limit the error code is displayed.

14. Hardware test disturbed H 82

15. Power clamp service interval expired E93

11.0 MAINTENANCE

BEFORE ANY MAINTENANCE OR REPAIRS ARE ATTEMPTED THE MACHINE MUST BE DISCONNECTED FROM THE ELECTRIC SUPPLY.

This balancer does not require any special maintenance, but the following precautions are required:

- A. Periodically clean all plastic parts with a glass cleaner. Wipe with a dry cloth.
- B. Clean all adapters regularly with a nonflammable liquid detergent all. Lubricate with a thin layer of oil.
- C. Periodically perform a routine shaft calibration as outlined on page 24 of this manual.

12.0 TROUBLE SHOOTING

<u>TROUBLE</u>	<u>CAUSE</u>	<u>REMEDY</u>
When turning the machine on, the displays do not light	No electric power Defect in the electric/electronic system	Check the input voltage Call the Equiserv service center for assistance
The machine gives random readouts.	Machine unstable on the floor Water in the tire Loose adaptor Defective electronic board	Check that machine is stable Remove water from tire. Tighten the adaptor firmly Call the Equiserv service center for assistance
The machine does not stop after balancing cycle	Defective electronic component	Stop using the machine immediately and call the Equiserv service center for assistance
The balancer is slow to display when powering machine up.	This machine performs a self-test routine on start-up. There will be a delay of several seconds before the display is activated.	This is a normal characteristic of the machine
If the balancer ceases to properly measure parameter values	Malfunction of one of the scanners, A failure of the AWP system, or harness connection failure.	Call the Equiserv service center for assistance

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