Brake Test Unit

BTU-100

Edition 04/2020

D-C1-B-48699-EN-01

INSTALLATION AND OPERATING INSTRUCTIONS

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Safety Instructions

1. Risks and Safety Precautions

1.1 General safety instructions

The simulation device "Brake Test Unit" is identified below with the abbreviation "BTU".

1.1.1 Avoidance of risks to persons and property

- The BTU device may only be used for the intended purpose of brake testing.
- Modifications and changes to the BTU device are not permitted.
- Observe accident prevention regulations and system-specific safety instructions.
- Read and observe the commissioning and operating instructions.
- The device may only be used and put into operation by appropriate trained persons.
- The BTU may only be used for dynamic brake tests in specially designated and secure test areas. The operator/user of the BTU, or the person responsible for testing, is solely responsible for safeguarding and averting danger.
- The BTU must be secured for the driving tests and all the forces that occur during them (in particular those resulting from acceleration, deceleration and distance travelled) so that secure attachment to the vehicle is ensured in all driving situations.
- Before starting test drives/test series, check that the BTU is functioning properly. In addition to deactivating the BTU via the key function of the control unit, the safety shutdown by means of brake pressure activation (vehicle service brake) must be checked in particular.

1.1.2 Limitations of use

- The device may only be used in accordance with the information in these operating details or for the parameters agreed in the supply contract (see appliance rating plate) and the application.
- Approval for this device loses its validity if modifications not agreed with us have been made.
- If this device is inserted incorrectly, the function/protection expected from this device may be impaired.

1.1.3 Avoidance of risks and damage

- The commissioning and operating instructions must be made available to the responsible authorities.
- The current commissioning and operating instructions and the valid additional information are available via the manufacturer portal.
- If the device is given to a third party, the commissioning and operating instructions in the national language of the third party must also be handed over without fail.
- The BTU may only be commissioned and operated by trained personnel with special authority and expertise.
- Read and observe the commissioning and operating instructions carefully and keep them in a safe place.
- Take note of and follow the commissioning and operating instructions printed in bold and highlighted in the individual sections!
- During transport, avoid knocks and carelessly setting down the device etc. as this can lead to damage.
- For intermediate storage, ensure that the storage location is suitable for the device.
- The storage location must be dry, and the device must be secured against damage.
- This device must not be used in potentially explosive atmospheres.

1.1.4 Label

In these installation and operating instructions, safety instructions are specially marked with the following symbols:

Danger

means that if they are not observed there is risk to life and / or significant damage to property may occur.

Caution

means that attention is particularly drawn to technical requirements.

1.2 Exclusion of liability

IGEMA GmbH will assume no liability if the above-mentioned regulations, instructions and safety precautions are not noted and followed. If they are not expressly listed in the installation and operating instructions, changes to an IGEMA device are carried out at the risk of the user.

2. General information

Routine service must be carried out regularly:

- Pressure sensor maintenance including characteristic curve adjustment
- Pressure switch test/maintenance including switching point
- Checking all the functional areas of the safety shutdown

3. Introduction

The simulation device "Brake Test Unit" (hereinafter referred to as BTU) has been developed for testing the brakes of trailers with pneumatic braking systems. The BTU is coupled into the pneumatic brake line between the tractor and trailer. The desired brake pressure for the towed vehicle can be set and controlled electronically using BTU, independent of the tractor.

The BTU is used by experts, inspectors and other specialists entrusted with the inspection of vehicle brakes to assess the vehicle brake in dynamic road tests.

Caution

In accordance with the regulations listed below, BTU allows the control of the service brake system in the towed vehicle during the practical brake test.

particular ECE Regulation No. 13; Supplement 13 to the 11 series of amendments - Date of entry into force: 8 October 2015.
Annex 4 - Brake tests and performance of braking systems -> 1.4.4. type 0 test for motor vehicles of category O with compressed air braking systems

- Or with reference to DELEGATED REGULATION (EU) 2015/68 of 15 October 2014 Annex II - Requirements for the testing and performance of braking systems and trailer braking coupling and vehicles equipped therewith -> 2.2.3. type 0 test for vehicles of categories R and S

Danger

Due to the defined test procedure (generation of the braking effect now by the towed vehicle), driving situations can arise which can usually only be mastered by trained and experienced test drivers. In addition, the BTU can only be used for test drives on a specially designed and secured test site.

In order to avoid critical driving situations, the default values for the controlled brake pressures, especially with regard to road conditions, load condition, etc., should always be increased in small steps from the lowest pressure value.

High brake pressures can cause the wheels of the vehicle to lock. This can result in uncontrolled driving behaviour.

For this reason, the brake test by means of BTU is only permissible for "straight" driving and "stretched" complete vehicle.

Danger

The BTU may only be used in conjunction with technically perfect vehicles. In particular, the overall functionality of the braking system and the homogeneous and symmetrical development of the braking forces of the vehicle must be tested and ensured before the BTU is used.

3.1 Scope of delivery

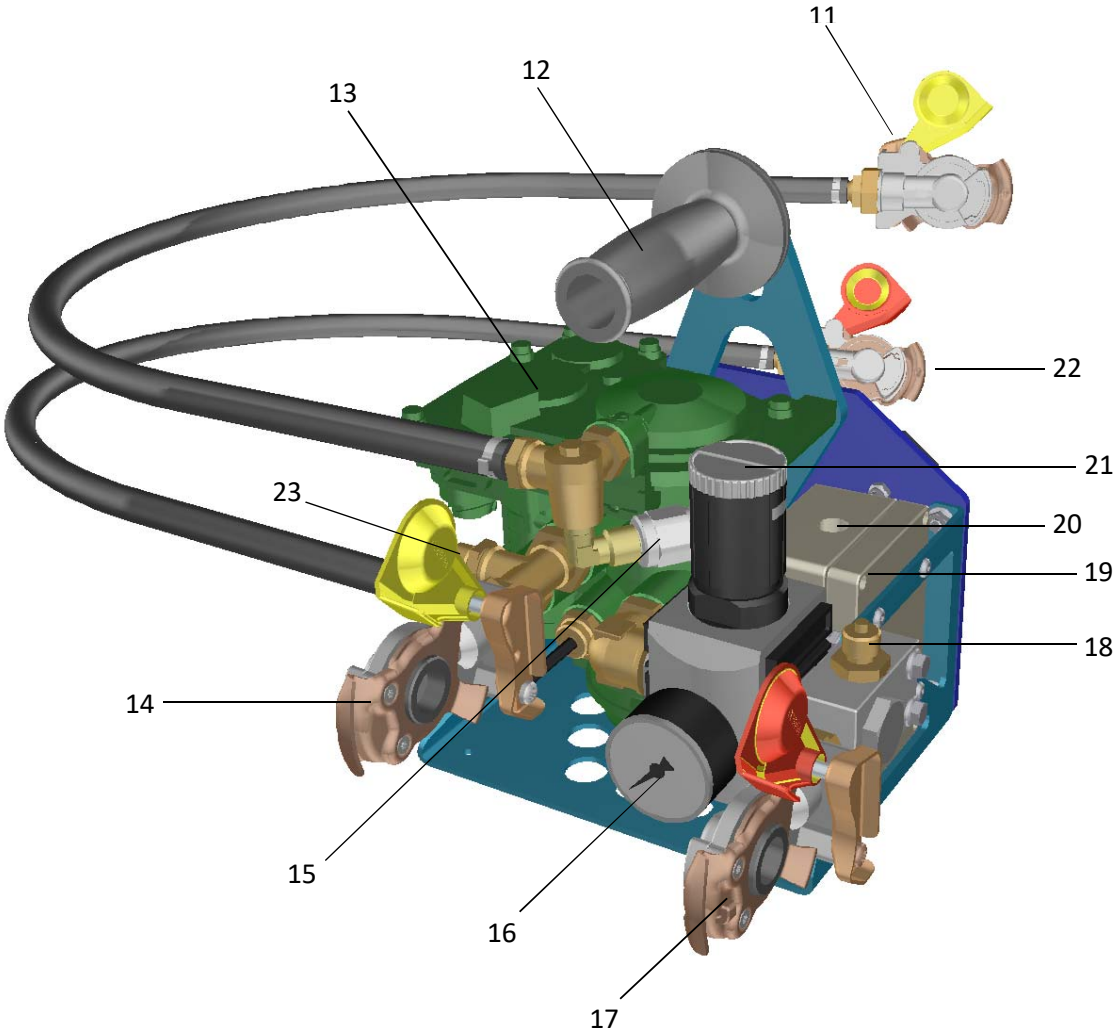
Number	Description	Index
1x	Control unit (hand-held)	a
1x	Pneumatic unit	b
1x	Connection cable control unit <-> pneumatic unit 5m	c
1x	Power supply cable 2m	d
1x	External start/stop button 1.5m	e
1x	VBox connection cable 1.5m	f
1x	Adapter cable power supply DIN9680 <-> standard vehicle plug 0.2m	g
1x	Protection and transport case Hand-held/Control unit and accessories	

4. Design

4.1 Control unit (a)

Index	Description
1	Display
2	Button 1 (Red)
3	Button 3 (Yellow)
4	External start/stop button connection
5	Power supply connection 12-24V DC
6	VBox connection
7	ECU connection
8	LED attention
9	Button 4 (Green)
10	Button 2 (Purple)

4.2 Pneumatic unit (b)



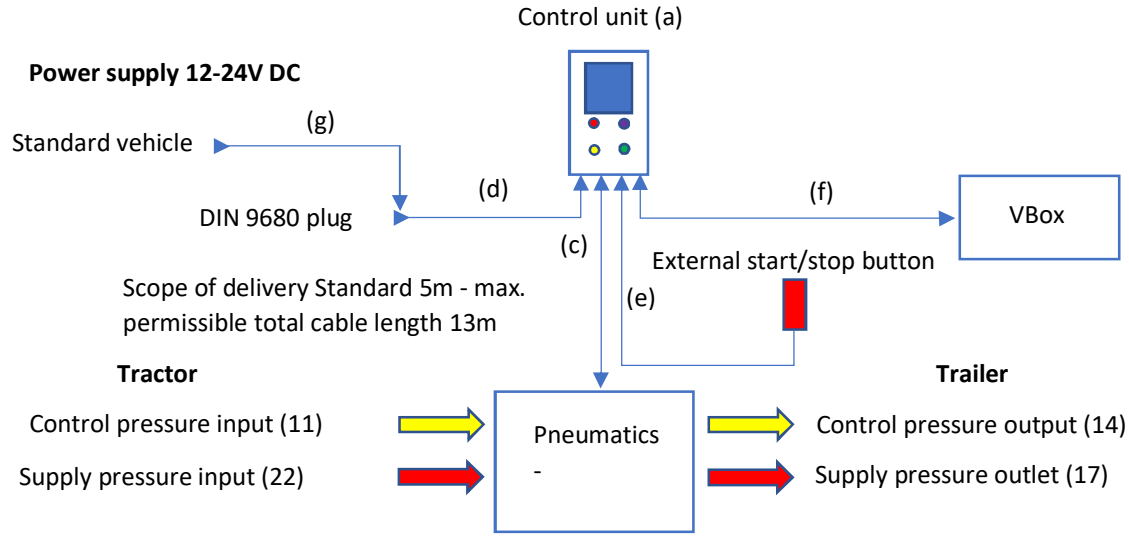
Index	Description
11	Control pressure input (Yellow)
12	Carrying handle
13	Control valve
14	Control pressure output (Yellow)
15	Pressure switch 0.3/0.5/0.8 bar (30, 50, 80 kPa)
16	Pressure gauge for supply pressure outlet
17	Supply pressure outlet (Red)
18	Test connection M16x1.5 external thread
19	Electronics box ECU
20	Cable connection to the control unit
21	Precision pressure regulator for supply pressure outlet
22	Supply pressure input (Red)
23	Test connection M16x1.5 external thread

5. Commissioning

5.1 Power supply

The device is designed for a voltage of 12-24V DC. A DIN 9680 plug and a standard vehicle plug (in the form of an adapter cable) are available as connection options.

5.2 Connection diagram



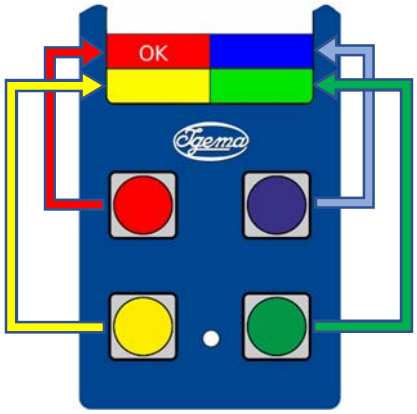
5.3 Pin assignment

Control unit (a)	Cable	Pneumatic unit (b)
(a)(7)	(c)	(b)(20)
(a)(4)	(e)	
(a)(6)	(f)	
(a)(5)	(d)	

6. Operation

6.1 Key configuration

The interactive display shows the function of each key.
The display and keys are configured as follows:



6.2 Startup

After commissioning, the manufacturer's logo appears on the display (1) for approx. 3 seconds. Afterwards the customer's logo with the following information is displayed:

- Last service
- Serial number

This information can also be displayed later under the menu item "Info".
Press the "OK" button (2) to enter the main menu.

6.3 Main menu

The main menu has the following sub-items:

- Brake TEST
- Zero calibration
- Settings
- Info

The " " (10) and " " (⇧) keys are used (⇩) to select the desired sub-item and they are confirmed by pressing the "Enter" key. To leave a sub-item, use the "Exit" key (3).

6.4 Brake TEST

Under "brake-TEST", a predefined pressure is applied to the trailer brake line. The display (1) shows the set target brake pressure under "p target" and the current pressure in the trailer brake line under "p actual". The values have the unit [kPa]. The operating status of the device is listed under "Status".

The operating states are as follows:

- Status: Stop
- Status: Atten. (Attention)
- Status: Run

"Status: Stop."
In the "Stop" status, no brake pressure is applied to the trailer brake line. The control valve is de-energised. The sub-item "brake-TEST" always starts in the status "Stop". It is also only possible to exit the sub-item in the "Stop" status by pressing the "Exit" key (3).

"Status: Atten."
To activate the locking function, press the "Atten. (2) changed from status "Stop" to status "Attention". The red LED (8) in the control unit now lights up. The unit is now ready to control the set brake pressure.

Caution

If the brake is actuated in the "Atten." status, the locking function goes out and the red LED (8) switches off. Continuing by pressing the "Start" button (2) would result in an error message "Pressure switch triggered". Use the purple/yellow button (10, 3) to switch back to the "Stop" status and then activate the locking function.

"Status: Run":
By pressing the "Start" button (2) from the "Atten." status, the set brake pressure is controlled and the VBox trigger signal is set. If an external start/stop button is connected, it is only possible to start via this button. Starting via the keyboard is only possible without a connected external start/stop button. Any key can be used to cancel the print output. Triggering the pressure switch (15) also leads to an abort and the red LED (8) switches off.

Adjust the target pressure: The target pressure can only be changed in the "Stop" status. The two arrow keys " " (10) and " " (9) are used for this purpose. Briefly pressing on the button changes the value by 10 kPa and if held for longer it will change by 100 kPa. The target pressure can be adjusted in the range from 0 to 800 kPa.

Start/stop VBox recording: Under Status "Atten." the whole recording can be started or stopped by VBox. If recording is active, "Rec ON" (green background) appears in the upper left of the display (1). By pressing the "Rec OFF" button (9) the recording is deactivated and "Rec OFF" (yellow background) is shown in the display (1).

6.5 Zero calibration

The internal pressure sensor should be calibrated once daily before use. Zero calibration is used for this purpose. The sub-item "Zero calibration" contains the following options:

- Type
- Start 0kPa

The adjustment type is factory set to "one point" and cannot be changed in v1.00.

Perform one-point zero calibration: First, please make sure that the control line is de-energised. The easiest way to achieve this is by decoupling the two control lines (11) and (14) and keeping them at ambient pressure. **Secure the vehicle against "rolling away" beforehand!** Select the sub-item "Start 0kPa". Zero calibration is performed via "Enter" (3). If the calibration is successful, the message "Zero calibration successful!" appears on the display, which must be acknowledged with "OK" (3).

6.6 Pressure adjustment in the supply line

To provide a defined air pressure in the supply line (17), the BTU is equipped with an adjustable precision pressure regulator. This regulator can be used to set the required supply pressure for supplying the test vehicle. A test connection (18) for measuring and recording by means of external devices is available.

Additional information about the precision pressure regulator:
The system is set up to provide the precision pressure regulator with its own air consumption.
This means that some noise is audible at the vent outlet, depending on the set pressure value.

6.7 Measuring point "control pressure"

Via the test connection (23), the pressure in the control line is available for measurement and recording using external devices.

6.8 Settings

In the settings you can define the system startup state of the REC pin (VBox recording) to the VBox. You can choose between the following states:

Rec ON: The REC pin is open at system startup. The VBox is recording.
Rec OFF: The REC pin is closed at system startup. The VBox does not record.

Furthermore, the language can be changed. The following languages are available:

DE (German)
EN (English)

To change an option, the desired point is selected using "arrow keys". Press "Enter" to change the option. The changes are saved only when you exit the settings via "Exit".

6.9 Info

Under "Info" you can safely display device information. It includes the following:

- ECU firmware version (pneumatic unit)
- HH firmware version (control unit)
- Serial number
- Last service

7. External start/stop button

The device has an external start/stop button connection. This can be used to start or stop the braking process.

To prevent a braking process from being triggered both by the control unit and the external start/stop button, the device has a cable connection detection feature. If the external start/stop button is connected, the device blocks triggering via the control unit.

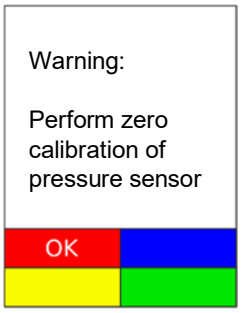
8. Alerts

The following alerts may appear on the display during operation:

- Warning: Perform zero calibration of the pressure sensor
- Beware: Pressure switch triggered!
- Error: Timeout on receiving ECU

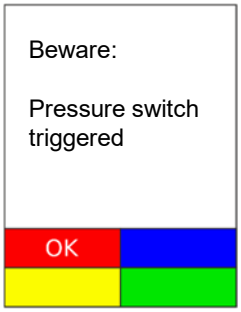
8.1 Alert: "Warning: Perform zero calibration of pressure sensor".

This alert appears if the last zero calibration was made more than 24 hours ago. The alert serves exclusively as an indication and can be acknowledged with "OK" (2). If zero calibration is not carried out within the next hour, the alert appears again. For safety reasons, this alert is not displayed when a print is controlled (status: Run).



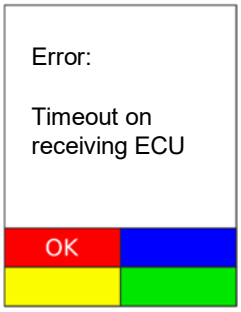
8.2 Alert: "Beware: Pressure switch triggered"

If a pressure of > 0.3/0.5/0.8 bar (30.50.80 kPa) is applied to the control line, the locking function is interrupted in the "Attention" and "Run" status. This means that during operation the active control is deactivated and the brake pressure from the towing vehicle is available in the control line.

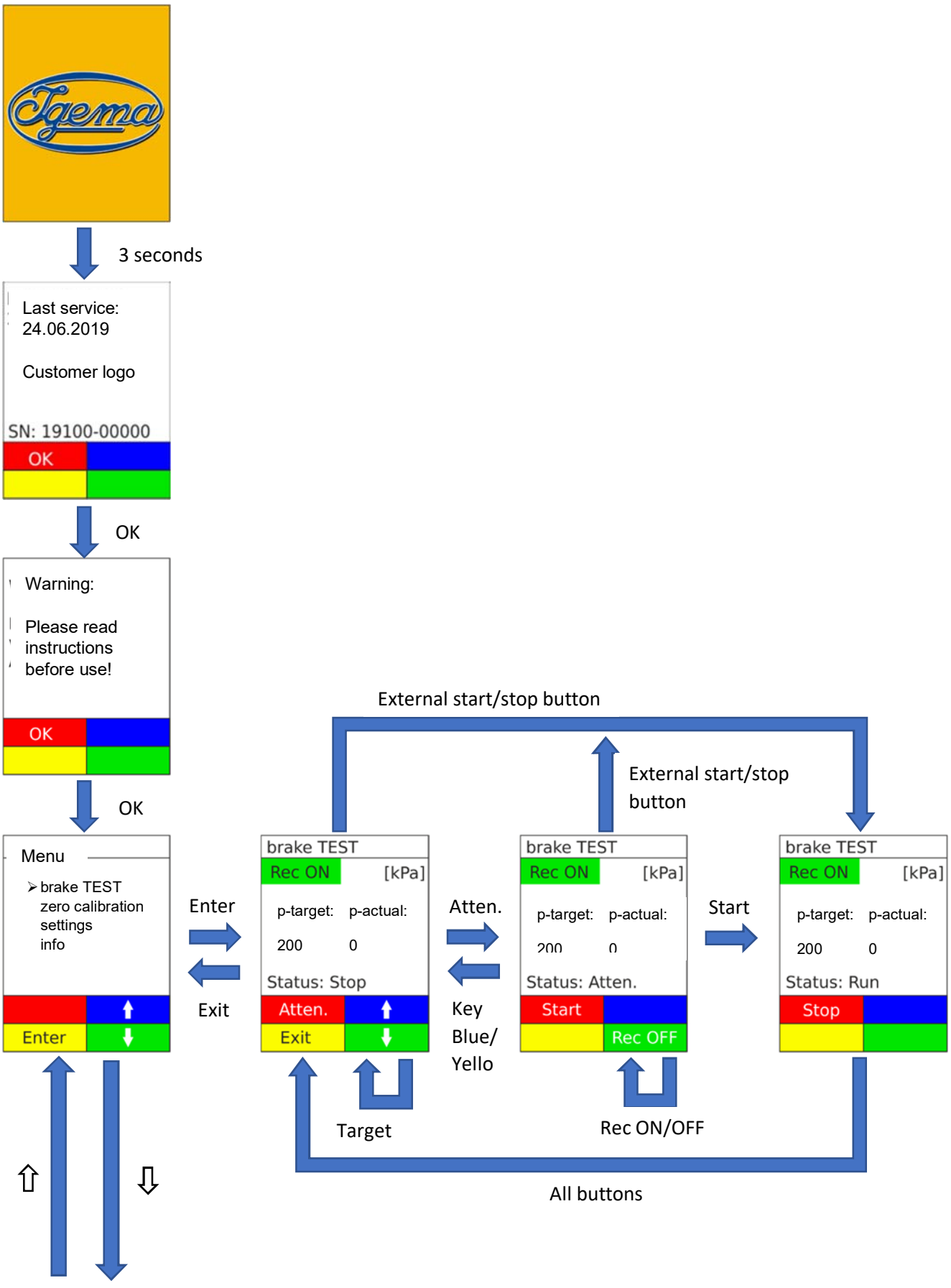


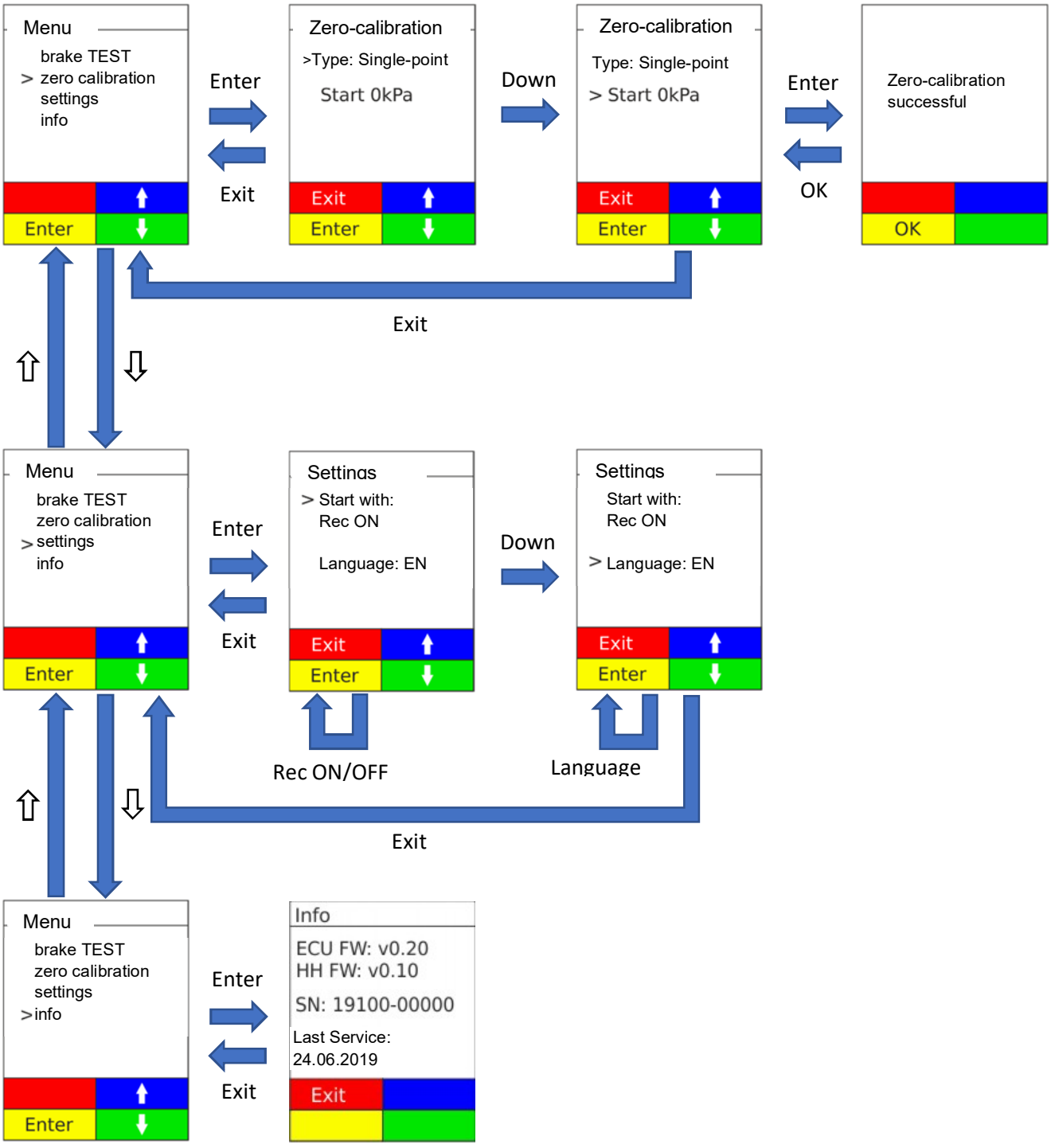
8.3 Alert: "Error: Timeout on receiving ECU"

Problem with the connection between the ECU and control unit. Please check wiring (c).



9. Menu layout




Menu
brake TEST
> zero calibration
settings
info
Enter
Exit
Zero-calibration
>Type: Single-point
Start 0kPa
Down
Zero-calibration
Type: Single-point
> Start 0kPa
Enter
OK
Zero-calibration
successful
Exit
Menu
brake TEST
zero calibration
> settings
info
Settings
> Start with:
Rec ON
Language: EN
Rec ON/OFF
Language
Menu
brake TEST
zero calibration
settings
>info
Info
ECU FW: v0.20
HH FW: v0.10
SN: 19100-00000
Last Service:
24.06.2019

10. Technical data

Voltage	12-24 V DC
Power	33 W
Max. operating pressure	1000 kPa

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