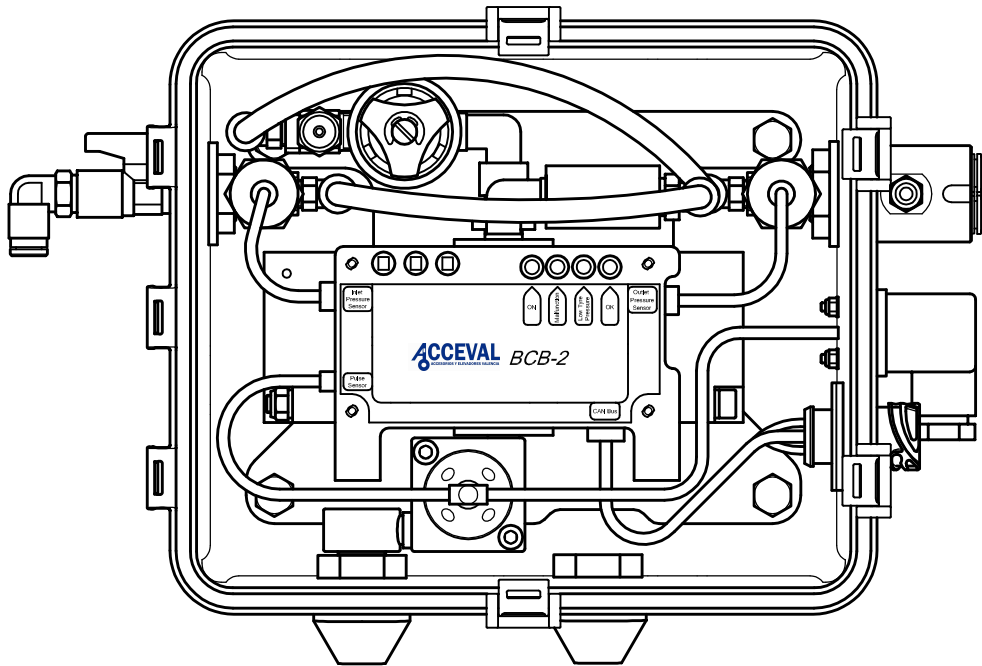


MANUAL

Acceval BCB-2



TPRS Control Box

for Trailers and Semi-Trailers

(According to UN ECE R141 Regulation)

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1. TPRS Control Box

The Acceval BCB-2 Control Box is used to control the TPRS system (Tire Pressure Refill System) of trailers and semi-trailers.

TPRS systems maintain the preset tire pressure to minimize tire wear, maximize fuel economy and prevent potential blowouts.

In the event of a puncture in a tire, the system automatically introduces air into said tire so that the vehicle can temporarily continue moving and warns the driver of this, thus avoiding the danger and difficulties of having to stop on site to change the wheel.

In the event of such a large air leak that the system could not compensate, the driver would be warned to stop as soon as possible.

To achieve this, the Control Box takes compressed air from vehicle's pneumatic system and, when necessary, refills the tires with air through its connection to the TPRS system wheel elements (stators, rotors, hoses, etc...) that are not part of the control box.

The Control Box also has an electrical connection port to plug a cable that reaches a warning light, visible to the driver, to notify him of the events described above.

The Control Box has a small electric turbo-generator that is driven by the exhaust air from the pressure booster for electrical activation of the warning light, so this function is autonomous and independent of the power supply from the vehicle.

The installation, adjustment, maintenance and repairs of this Control Box can only be carried out by workshops authorized by Acceval s.l..

2. UN ECE R141 Regulation

The Acceval BCB-2 Control Box meets the conditions of the UN ECE R141 regulation, referring to the control of the tire pressure, which allows the vehicle manufacturer to carry out its approval according to this regulation.

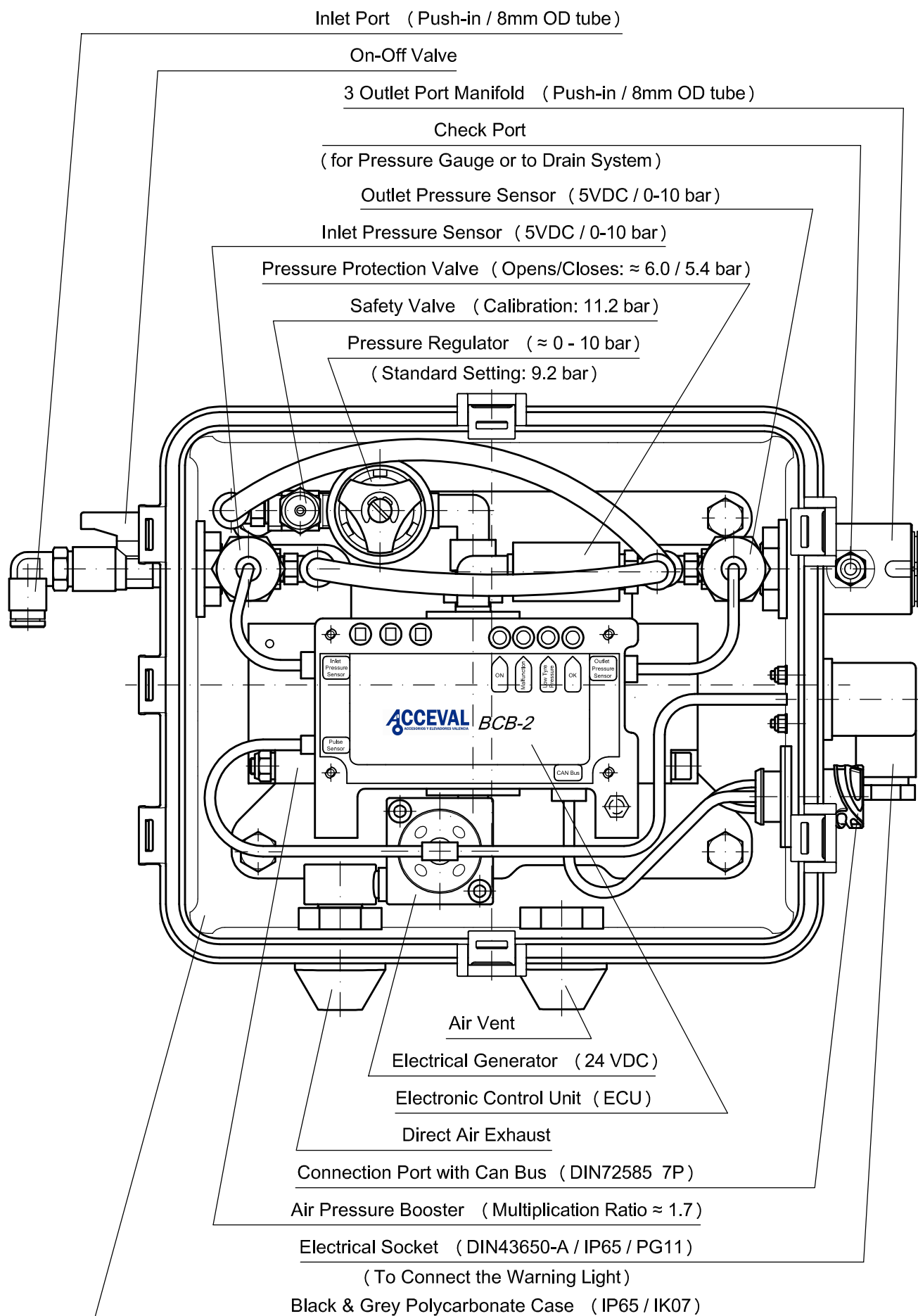
In addition to meeting the tire pressure refilling conditions of Annex 4 of said regulation, specific for TPRS systems, the BCB-2 control box communicates with the EBS system of the towed vehicle, through the CAN Bus line, to send warning messages to the towing vehicle.

Basically, a "Low Tire Pressure" message will be sent when the tire pressure is being refilled to compensate for an air leak.

A "Malfunction" message will be sent when other events occur, such as insufficient power supply, insufficient inlet air pressure, disconnection or failure of any main component, etc...

The diagnostic section will explain the detection of the different type of specific errors.

3. Main Elements of the Control Box



4. Working Scheme

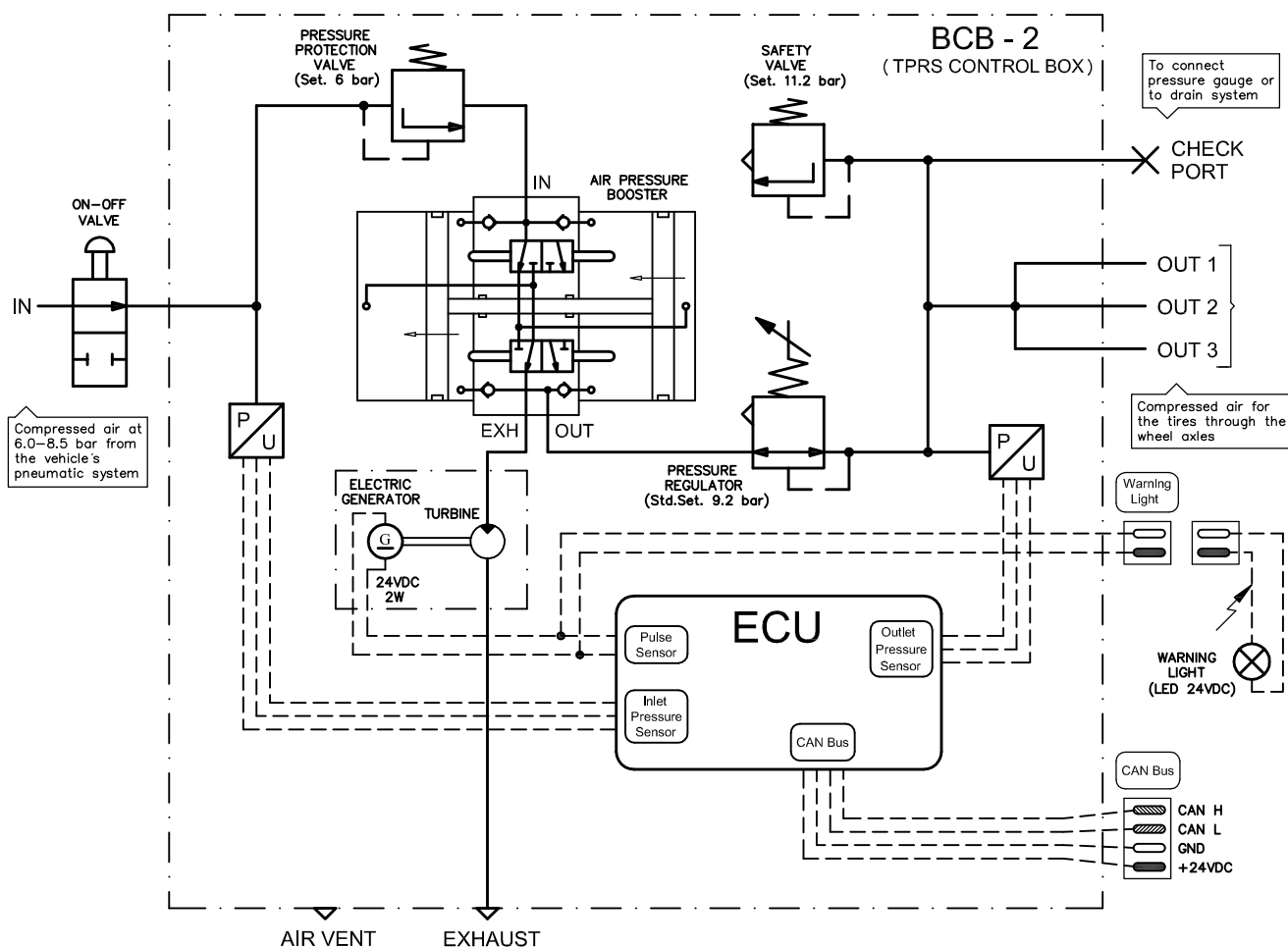
The Acceval BCB-2 Control Box has a mixed configuration because the refill control is mechanical and the message management is electronic.

Refill Control: The "Pressure Regulator" will allow the air passing when the outlet pressure is lower than the set value and then the "Pressure Booster" will start.

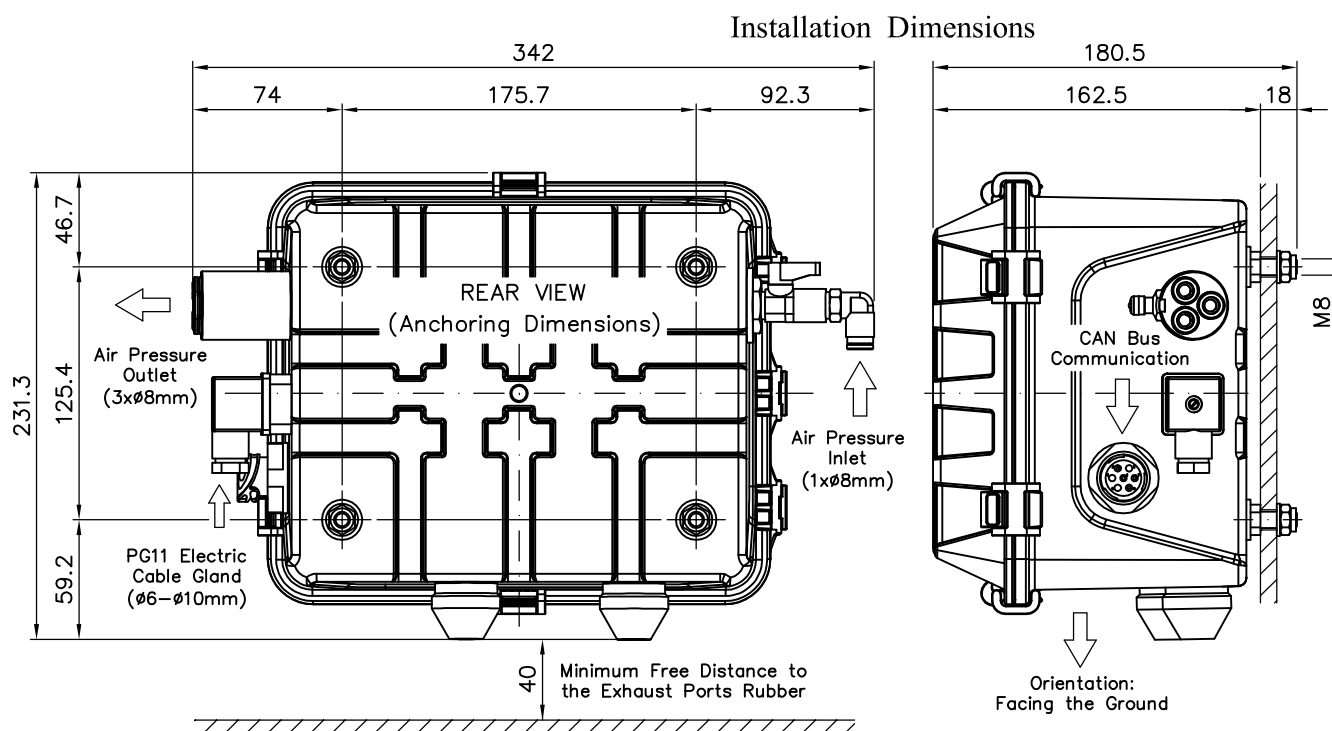
Message Management: The "Electronic Control Unit" (ECU) is electrically powered from the "CAN Bus Port" and receives the information detected by the two "Pressure Sensors" (Inlet + Outlet) and by the "Pulse Sensor" (Turbine + Electric Generator) to send the messages, according to its programming, through of the CAN Bus Line (H + L).

This mixed configuration allows the BCB-2 control box to have "Double Security" because it can continue the refilling process, as long as there is air in the tank, even if it has no power supply or even if there is an electronic fault.

We also have double security in the messages because the "Pulse Sensor" (Turbine + Electric Generator), driven by the exhaust air of the pressure booster, is also connected directly to the external "Warning Light", installed on the towed vehicle, to be able to give the warning messages even if electronic communication fails or if the towing vehicle does not support R141 messages.

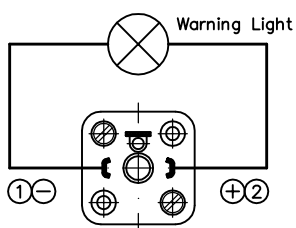


5. Installation and Connection



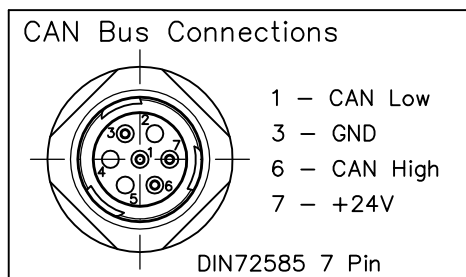
1. The Control Box must be installed in a protected and easily accessible area in the vehicle, with enough space for the inlet and outlet air tubes, the electrical cables (Warning light and CAN Bus), a minimum vertical clearance of 40mm with exhaust rubber and space to open the box cover.
2. Four holes with a diameter of 9-10mm must be drilled according to the distances indicated in the drawing above, for which the template at the end of this manual can be used.
3. The control Box must be placed in its location by inserting its four rear anchoring screws into the corresponding four holes in the vehicle.
4. Now the four washers and the four m8 lock nuts must be installed on the box anchor screws, on the back of the vehicle anchor plate, and tighten them with a torque of 25 Nm.
5. An 8mm OD air tube (PA) will connect the inlet port of the box with the vehicle's 6.0-8.5 bar compressed air supply (Air suspension circuit or air suspension tank. Never to the brake circuit).
6. Up to 3x 8mm OD air tubes (PA) will be used to connect the three outlet ports of the control box to the axles and wheel elements of the TPRS system (Fit plugs if less than 3 or T-fittings if more than 3).

Electrical Connections



7. Our DIN43650-A PG11 connector must be removed to be installed at the free end of the electrical cable (Round with a diameter of 6-10mm) of the warning light, taking into account the polarity indicated in the drawing on the left (Base where said connector plugs to the box). Plug the connector to the box and lightly tighten its central security screw.

8. The standard CAN Bus connection base of the BCB-2 control box with the EBS system of the towed vehicle will be a DIN72585 7-way receptacle, but other alternative connections may also be offered depending on the cables used by each of the EBS manufacturers.



The cable that plugs into the EBS device must be an original part from the manufacturer of the corresponding EBS system that is not included in our kits and that our client must purchase through the appropriate channel. In the case of adapter cables, intermediate between BCB-2 Control box and the original EBS cable, they will be supplied by us.

The standard base of the BCB-2 box will serve to directly connect the following original Wabco cables to Wabco TEBS E6 systems with V6.5 software:

- * 449 913 050 0
- * 449 916 182 0
- * 449 916 243 0
- * 449 916 253 0
- * 449 934 330 0

BCB-2 box will need an intermediate adapter cable (Acceval ref. CADAP-01) to connect with the Knorr-Bremse EBS system, from version TEBS G2.2 and version iTEBS X, using the following original Knorr-Bremse cables:

- | | | | |
|-----------|-------------|-----------|-----------|
| * K027867 | } TEBS G2.2 | * K208350 | } iTEBS X |
| * K027869 | | * K208351 | |
| * K027859 | | | |
| * K097070 | | | |

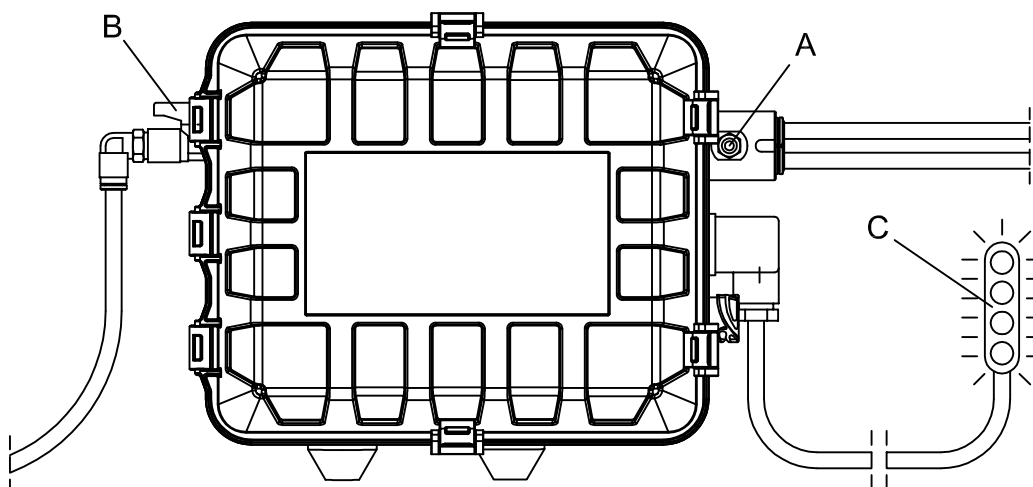
BCB-2 box must be ordered in its BCB-2B version (4-pin CAN bus connector) to directly connect with the Haldex EBS system, from version EB+ 4.0, using the following original Haldex cable:

- * 844 521 010 (1m)
- * 844 521 120 (12m)

If necessary, use the CAN Y-Splitter 844 542 001 (1.25m) .

9. The corresponding EBS system must be configured, following the instructions of its manufacturer, to be able to replicate the messages from our TPRS so that they can reach the towing vehicle.

6. Commissioning Check



The On-Off Valve (B) must be kept close before connecting the system to the wheels to start working.

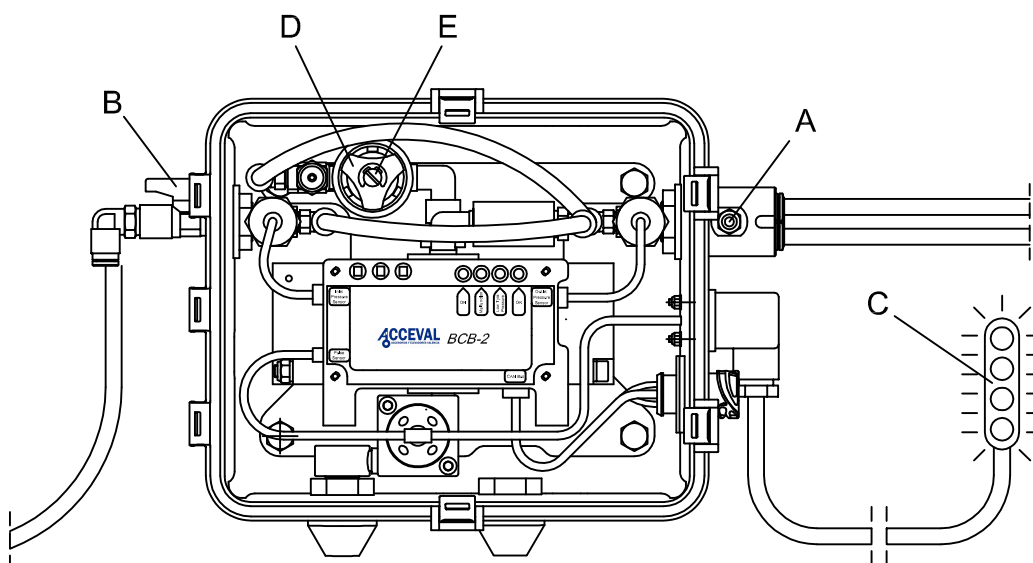
Take into account that, due to the non-return valves in the wheel hoses, the pressure in the Tires may be approximately 0.2 bar less than the output pressure of the Control Box.

The Control Box outlet pressure is pre-set at 9.2 bar as standard.

1. Remove the cap from the Check Point (A) and connect a pressure gauge (8V1 thread) .
2. Open On-Off Valve (B) and check the pressure value on the pressure gauge when booster finishes pumping.
3. Remove the pressure gauge and relieve the output pressure by pressing on the schrader valve of the Check Point (A) .
4. Check that the Warning Light (C) is flashing while the booster is pumping.
5. Wait for the end of the booster pumping process and reconnect the pressure gauge to check the correct output pressure value of the control box.
6. Remove the pressure gauge and put the cap back at the Check Point (A) .

Very Important: Do not connect the control box to the tires if the nominal pressure of those tires is lower than the pressure setting of this control box. In this case, the pressure adjustment of the control box must be carried out prior to its connection to the tires or the box must be ordered from Acceval with the necessary setting if it is different to the standard.

7. Pressure Adjustment



1. Unlock the fixing tabs and open the cover-door.
2. Remove the cap from the Check Point (A) and connect a pressure gauge (8V1 thread) to check the output pressure value.
3. Remove the pressure gauge and relieve the output pressure by pressing on the schrader valve of the Check Point (A) .
4. Check that the Warning Light (C) is flashing while the booster is pumping.
5. Wait for the end of the booster pumping process and reconnect the pressure gauge to check the output pressure value.
6. Loosen by hand the Lock Nut (D) of the Pressure Regulator by turning it anti-clockwise while keeping the Adjustment Screw (E) immobile with a screwdriver.
7. Use the screwdriver to increase the outlet pressure by turning the Adjustente Screw (E) clockwise or decrease it by turning the screw counterclockwise (Responsive adjustment, turn little) .
8. Tighten by hand the Lock Nut (D) of the Pressure Regulator by turning it clockwise while keeping the Adjustment Screw (E) immobile with a screwdriver.
9. Remove the pressure gauge and relieve the output pressure by pressing on the schrader valve of the Check Point (A) .
10. Wait for the end of the booster pumping process and reconnect the pressure gauge to check again the output pressure value.
11. If necessary, repeat points 7 to 10 until the correct setting is achieved.
12. Remove the pressure gauge and put the cap back at the check point.
13. Close the cover-door and lock the fixing tabs.

8. Warning Levels

A. "Low Tire Pressure" Message in the Cab or Flashing External Warning Light

- * The Journey must not be interrupted.
- * The TPRS system is compensating the pressure loss.
- * Tires and the system must be checked when stopped.

B. "Malfunction" Message in the Cab or Lighted External Warning Light (Constantly Illuminated)

- * The vehicle must stop as soon as possible.
- * The TPRS system cannot compensate the pressure loss.
- * Tire or the system must be repaired by an authorized workshop.

9. Maintenance

Annually check the setting of the outlet pressure, possible indications of malfunction in the ECU and the operation of the warning light.

10. Functional Specifications

* Category of Vehicle:	O ₃ , O ₄
* Tyre Class:	C2, C3
* Number of Axles:	1 - 5
* Number of Tires:	2 - 20
* Pressure Settings Range:	7.2 - 9.2 bar
* Power Supply:	24 VDC
* Inlet Pressure Range:	6.0 - 8.5 bar
* Working Temperature:	-35°C to +80°C

Very Important: It will be essential to install the LED warning light (supplied) on the semi-trailer and connect it to the control box to have safety warnings in case these are not displayed on the tractor unit (Tractor incompatible with R141 messages, interruption of CAN bus communication due to electronic breakdown, power supply interruption, etc...)

11. Diagnostics

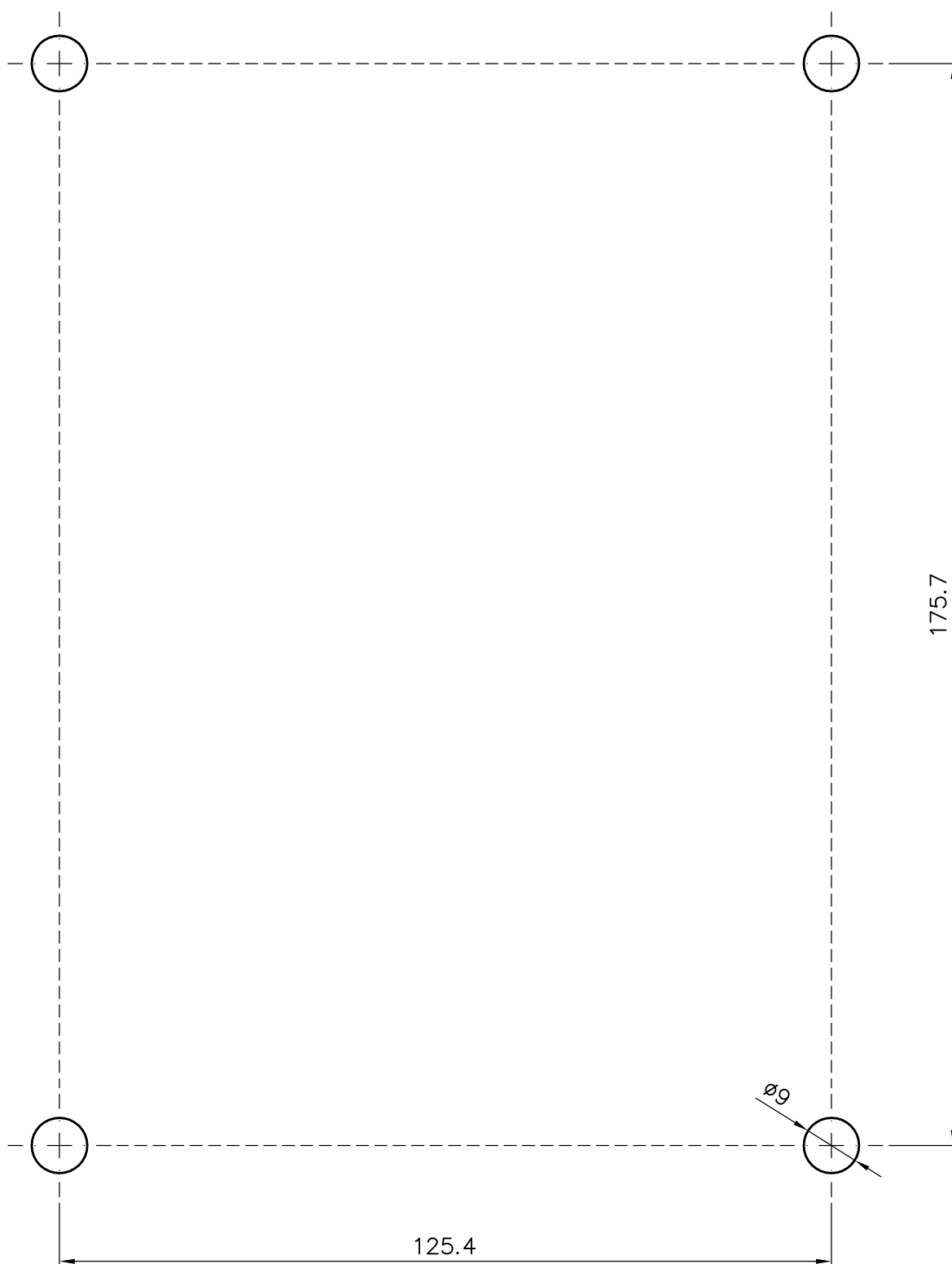
The ECU of the BCB-2 Control Box informs us about different types of breakdown or anomaly depending on the number of consecutive flashes of its "ON" light:

Number of Flashes	Type of Breakdown or Anomaly
0	Without Errors
1	Inlet Pressure Sensor Failure or Disconnection
2	Insuficient Inlet Pressure (P < 5 bar)
3	Outlet Pressure Sensor Failure or Disconnection
4	
5	Low Supply Voltage (V < 19 volts)
6	Insuficient Inlet Pressure for adjustment auto-detection (P < 6 bar)
7	Detecting Pressure Regulator Adjustment

Depending on the symptoms observed, possible causes and solutions can be proposed:

Symptom	Cause	Solution
Tire pressure is too low	On-Off valve is closed	Open the On-Off valve
	Outlet pressure setting is too low	Increase the outlet pressure
Tire pressure is too high	Manual tire inflation was excessive	Deflate the tire
	Outlet pressure setting is too high	Reduce the outlet pressure
Warning light is switched on	Leak in a tire	Repair the tire
	Leak in the system	Repair the system
	During Commissioning	This is normal
Warning light is switched off during pumping operation	Faulty led warning light	Replace led warning light
	Faulty electrical generator	Replace electrical generator
	Damaged or disconnected wire	Check wire & connections
Control box not working	Inlet pressure less than 6 bar	Check inlet pressure
	Faulty box item	Locate & replace the faulty item

12. Anchoring Drills Template





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