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Instruction manual

De-icing system for trolleybus line

Order no. of the ZPPN and its parts: 1070

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Version 002.0

Contents

1. Description, it´s function and parts of the device

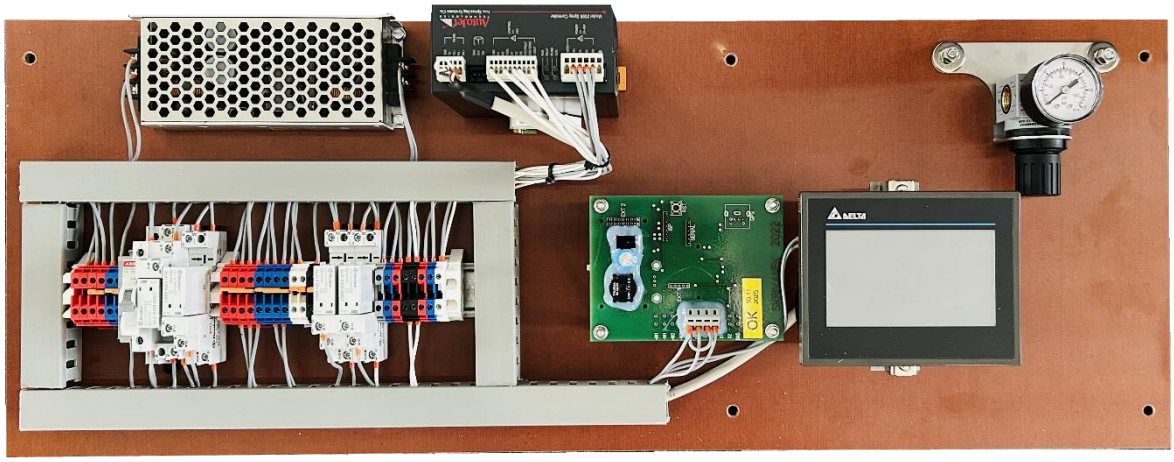
The device for prevention of icing is spraying a special anti-icing solution on a catenary line to prevent ice on trolleybus lines. It can be mounted on any vehicle. The device has approval of the railway authority for driving with passengers and it is ideal for a dual-mode bus. The device does not restrict a use of the vehicle in traffic with passengers.

Parts of the device:

1. Control panel
2. Pressure tank
3. Collector head

1.1 Control panel

The control board is mounted inside the vehicle behind the ceiling panel, keeping it hidden during passenger operation. This protects it from passengers and restricts access to authorized persons only.



The control panel has a separate vehicle potential.

1.2 Pressure tank

The pressure tank with a volume of 9,5 liters (2.51 gal) is located on the vehicle's roof nearest the collectors, or on the undercarriage under a panel.

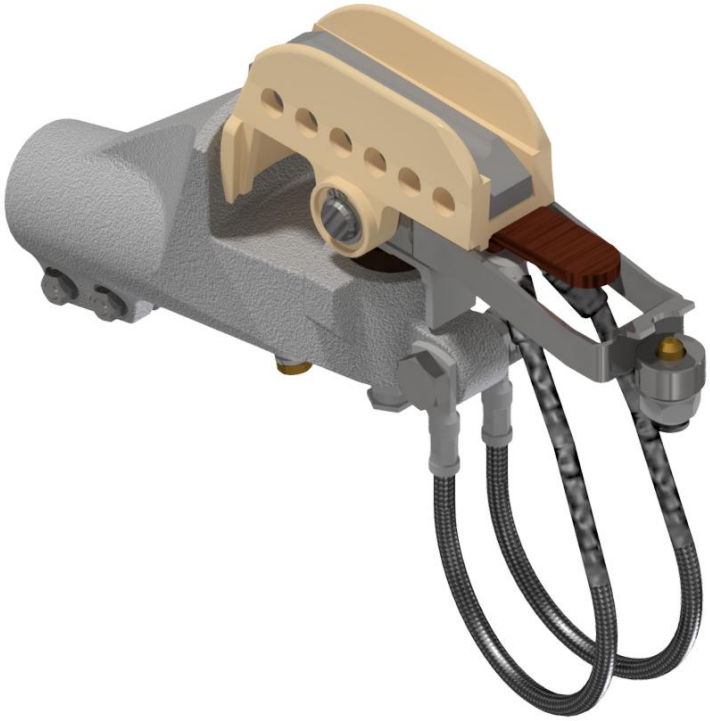
1.3 Collector head

The collector heads are Type 102/3 with a carrier modification for fastening the nozzle holder, or Type 5 heads. The hose routing to the heads is carried out along the underside of the collector poles within a conduit (protective sleeve) and secured with plastic ties. Alternatively, on new vehicles, it is possible to route the hose inside the poles. The hoses are fitted with a quick-release coupling at the ends for easier head maintenance, or their removal outside of the icing season.

Note

You can find spare parts catalogue for download on our website right here.

(Catalogue / Download / Manuals, catalogues, brochures / 1070 De-Icing



2. Device functions

The device operates by being switched to STANDBY mode using the main switch in the control cabinet, thereby becoming ready for operation.

If there is sufficient amount of liquid in the tank, the device is ready to respond to the driver's command. When the driver activates the switch and starts driving, at approximately 4 km/h (2.5 mph) the device begins spraying depending on the vehicle's speed. The driver may switch the device on or off at any time while driving. The maximum dosage is usually reached at approximately 40 km/h (25 mph). Once the liquid in the tank is depleted, a warning light illuminates for the driver and the device shuts down automatically. After refilling the tank, it is ready for operation again.

The vehicle's air distribution system and 24 V power supply are used to power the device. The device is equipped with its own air-pressure reducing valve, its own isolated power supply, a GPS antenna, fuses, and a main switch. The product does not include a switch and warning light for the driver's dashboard.

The device is supplied as a complete set of all components; before ordering, it is necessary to survey the installation in the specific vehicle.

Only trained personnel are permitted to install, service, and commission the device. Personnel performing installation, operation, maintenance, or repair must always follow the safety instructions applicable to the respective work environment. Typical examples include working on the roof of a vehicle under overhead trolley wires, where there is a risk of electric shock.

2.1 Correct device settings

For the device to function properly, values and parameters must be set on the control display. This chapter is an excerpt from the document "Display Settings," which is available upon request.

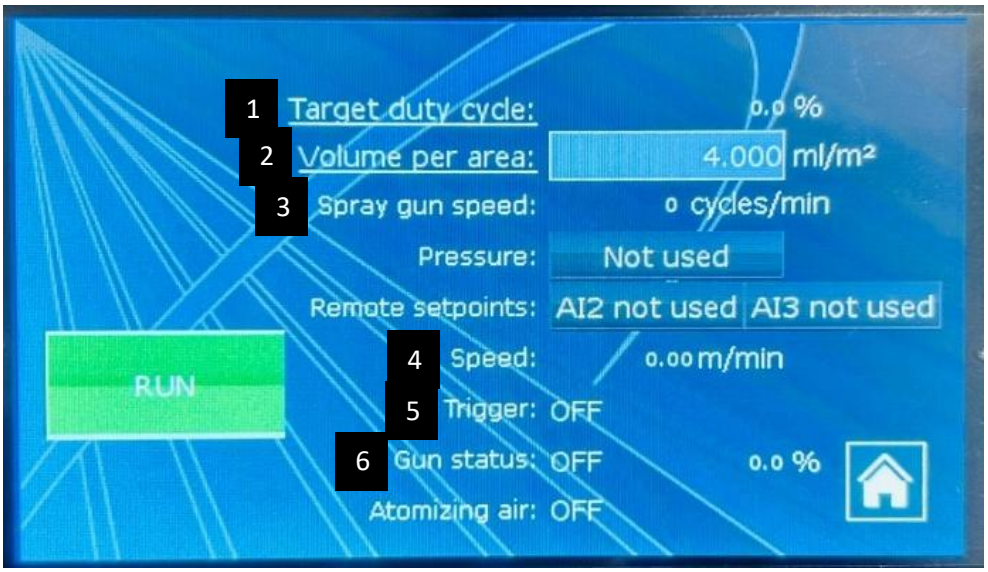
Impotant !!!

When setting values, it is important to pay attention to the procedures mentioned here and follow the individual steps step by step, if so indicated.

Home screen:

When touched, **main screen** pops up**:**

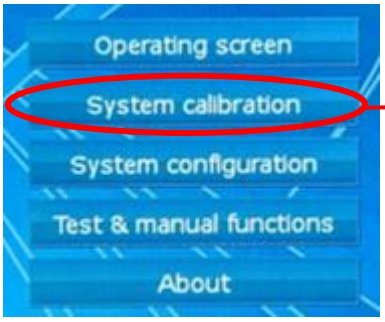
The data on the main screen indicates:



1. **Target duty cycle** = information about the amount of liquid at a given speed
2. **Volume per area** = Fixed amount of liquid
3. **Spray gun speed** = Number of valve cycles per minute
4. **Speed** = Speed of the vehicle in meters per minute (1 m/min = 0,06 km/h) – here, the vehicle is stationary
5. **Trigger** = Switch at the drivers booth (here its turned off)
6. **Gun status** = Valve status (here its turned off, vehicle is not moving)

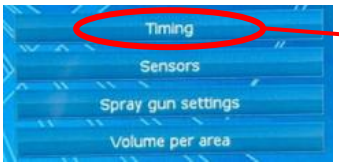
Home symbol  on main screen will get us to the **main menu**:

In the main menu, select item ***„System calibration“*** and this menu pops up:

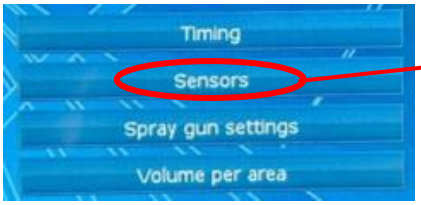


Here, select item ***„Timing“*** and set these values:

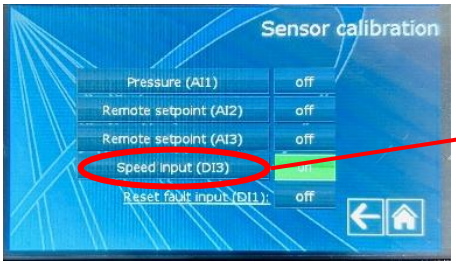
- in section ***„Timing functions“*** set parameter ***„Variable spray distance“***:



Go back by clicking this arrow  and select second item ***„Sensors“***:

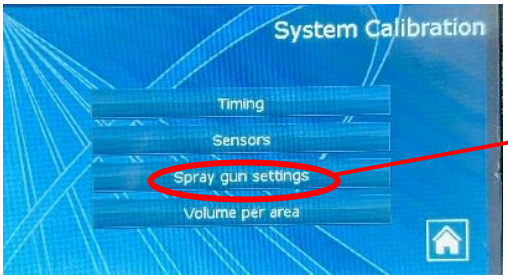


Here in ***„Sensor calibration“*** section click on ***„Speed input (DI3)“***:



Set data…

Go back using arrow  to this menu ***„System calibration“*** and select ***„Spray gun settings“.***

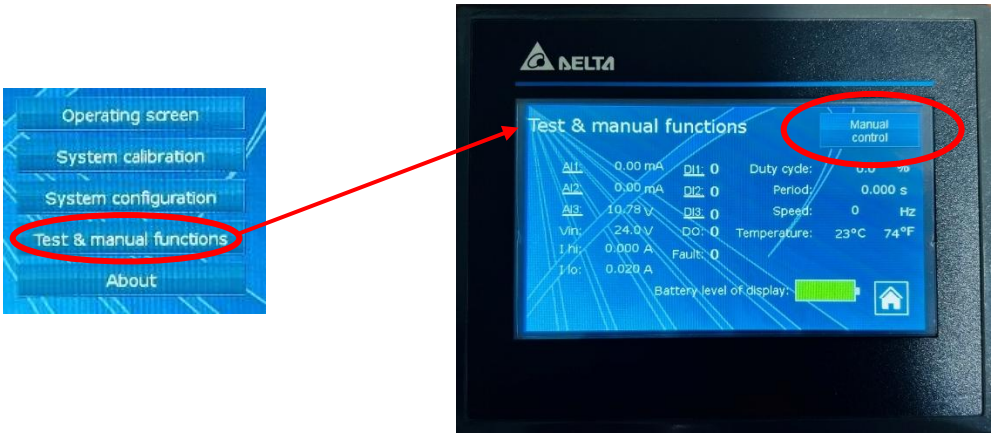


Go back to the menu ***„System calibration“*** and select last item ***„Volume per area“***.

After setting these parameters, go back via  and in the menu select item ***„System configuration“***:

- Here, set ***„input DI2“*** and ***„no check on run“***.

Next go back to the main menu and select item ***„Test and manual functions“***:

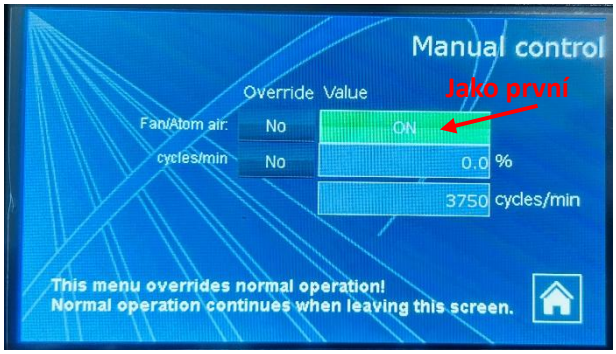


Here on the top right corner select ***„Manual control“***, confirm with ***„YES“***.

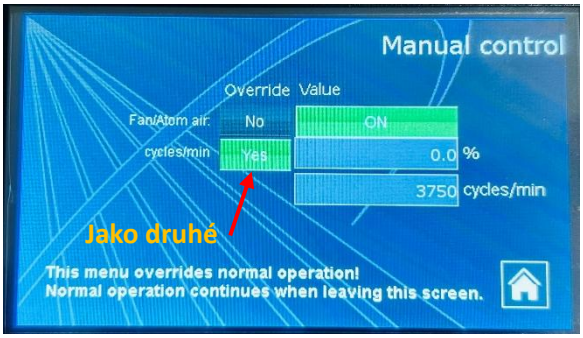
Then please follow the procedure described here, step by step:

0. Default:

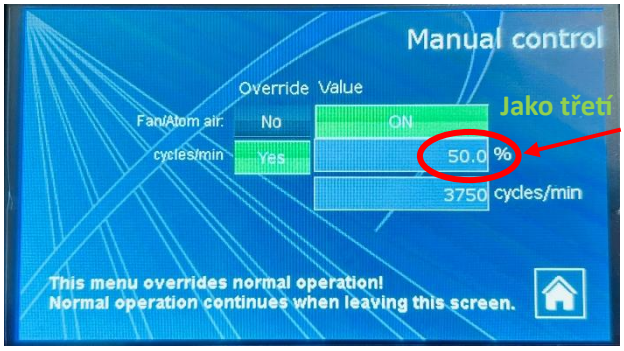
1. Click on ***„Fan/Atom air“***: on ***OFF***, so that ***ON*** is lit up:



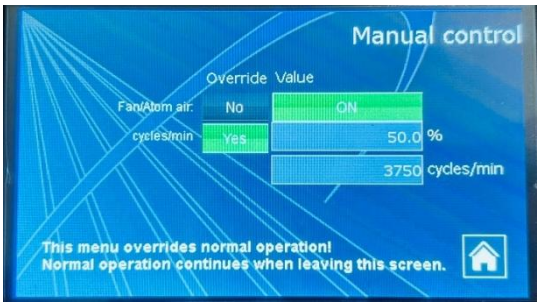
2. In section ***„cycles/min“*** on ***„No“*** so that ***„Yes“*** is lit up:



3. Select percentage <u>%</u> of amount ***„cycles/min“*** 50%:



4. How it should look:



Next, we will look at how the main screen appears in various states:

- Switch off at the driver's station
- Switch on at the driver's station – vehicle stationary
- Switch on at the driver's station – vehicle in motion
- Switch off at the driver's station – vehicle in motion

Explanatory notes for the main screen on page 3 or here.

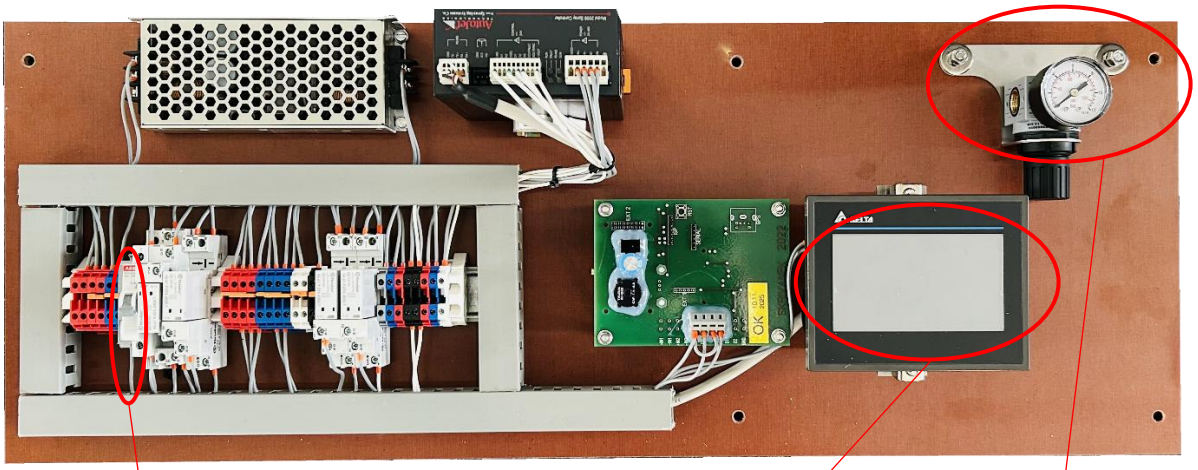
Switch off at the driver's station:

Switch on at the driver's station – vehicle stationary:

Switch on at the driver's station – vehicle in motion:

Switch off at the driver's station – vehicle in motion:

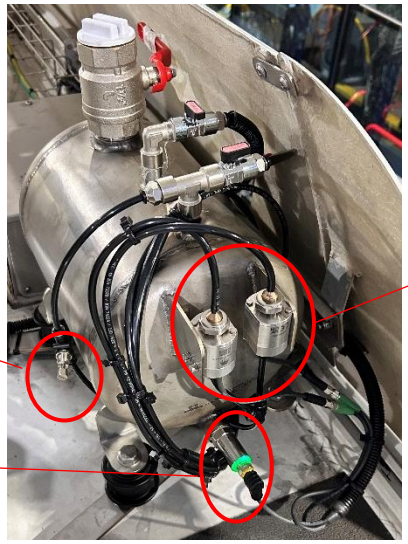
3. Description of controls



Display

Air valve

Main switch
1



Air mixture regulator (fixed setting from factory)

Liquid valve
2

Liquid status **3**

The control cabinet is typically located in the ceiling area on the left side, approximately halfway along the vehicle. It is powered from the vehicle via the fuse box.

From the control unit, cabling runs to the roof to the control valve **2**, the status sensor **3** on the pressure tank, and the GPS antenna. The liquid control valve **3** is located on the pantograph base in the center (alternatively on the tank).

The control switch is typically located within the driver's reach on the left side near the elbow (installed by the transport operator).

The main switch 1 (positions I – 0) is located between the terminal blocks and the relays on the main DIN rail. It is suitable, for example, for long-term deactivation of the system. A fuse is located to the left of the switch.

The GPS antenna is positioned as feasible along the cable routing near the cable entry to the roof, or on the entry cover. It must be placed so that it is neither interfered with nor obstructed. The cable leading to the GPS antenna is susceptible to damage (especially breakage).

The GPS antenna cable must be routed in a protective conduit completely separated from the rest of the vehicle's installation and structure. The antenna must be mounted separately from the vehicle chassis on an insulated bracket.

Note

Pressure settings, air admixtures, etc. are set once during installation of the device, and thereafter only under exceptional operating conditions (different climatic conditions, etc.).

3.1 Filling up the tank

Attention:

- **The tank is under pressure**, even when the vehicle is without air
- The liquid **must not be diluted**
- The device may be operated **only by authorized personnel**
- **Danger of injury**
- Danger of injury by **electric current**
- The hose line must be of **specific type** – danger of **electric shock**
- When filling the tank, pay attention when moving under power lines and **safety protocols must be followed** – work on roof, work under high voltage power lines, load handling, safety protective equipment etc.

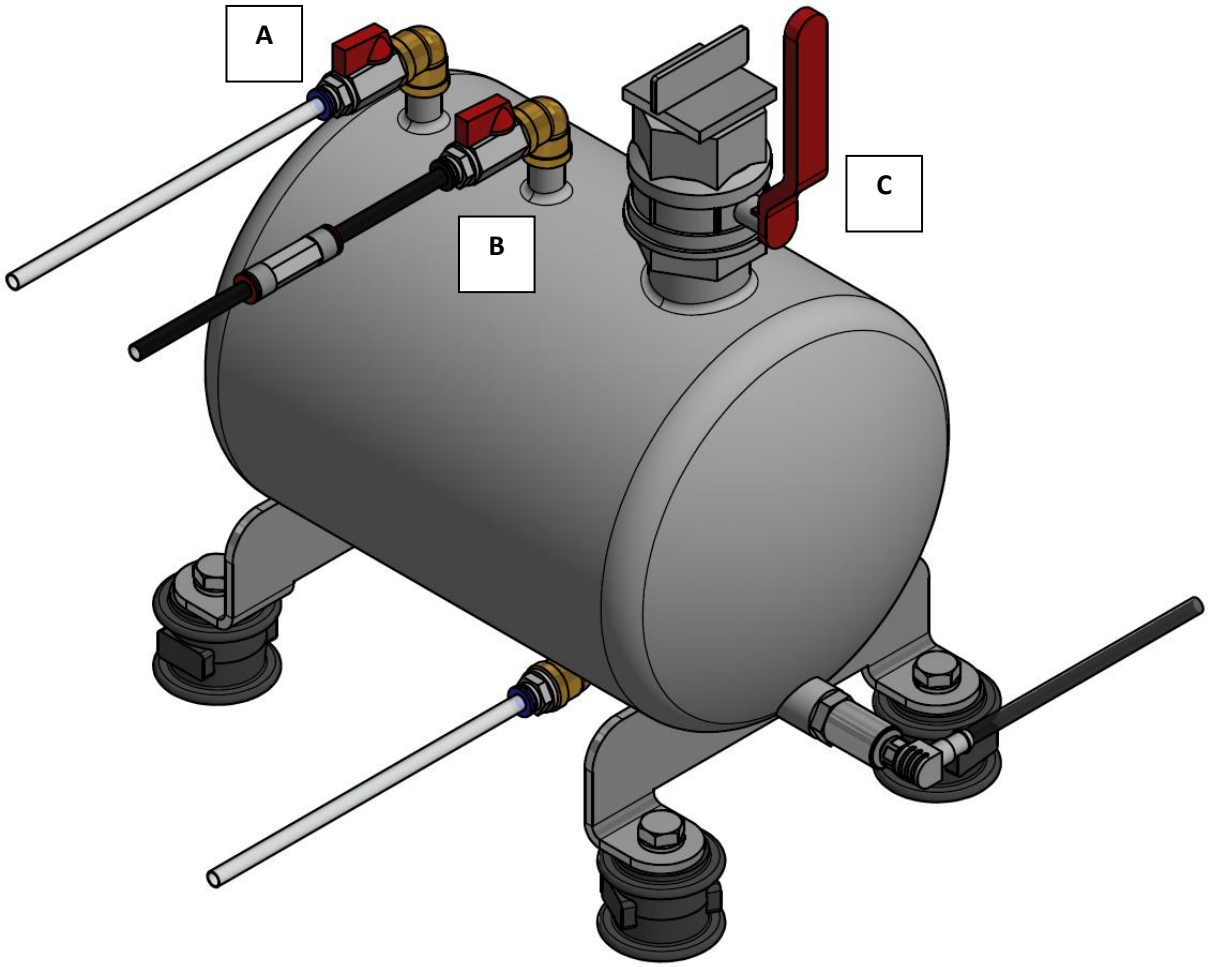
Filling:

The pressure tank is filled by this process: Close valve **B** – this will close air supply.

Then **slowly** open valve **A** which will bleed air from the tank. On the valve **C** unscrew the cover and using a lever open the valve. Now, the liquid can be poured. A Funnel with a strainer is recommended.

After filling:

After filling the tank (9,5l or 2,5 US gal) proceed in an opposite sequence. That is: Close valve **C** and screw the cover back on, close valve **A** and **slowly** open valve **B**. After filling, look around for any leaks of liquid or air.



4. Maintenance

ATTENTION

THE DEVICE MAY BE OPERATED, REPAIRED AND ASSEMBLED ONLY BY TRAINED PERSONEL. THE OPERATOR WHO PERFORMS ANY OPERATIONS ON THE DEVICE MUST OBEY SAFETY RULES AND PROTOCOLS FOR THE WORK ENVIRONMENT.

HOSES ON TROLLEY POLES MUST BE OF SPECIFIC TYPES – RISK OF ELECTRIC SHOCK

WHEN MAINTENANCE OR MOVEMENT NEAR POWER LINES OR ON THE ROOF OF THE VEHICLE, PAY ATTENTION AND OBEY SAFETY RULES AND PROTOCOLS. RISK OF ELECTRO SHOCK, FALLING FROM HEIGHTS, ETC.

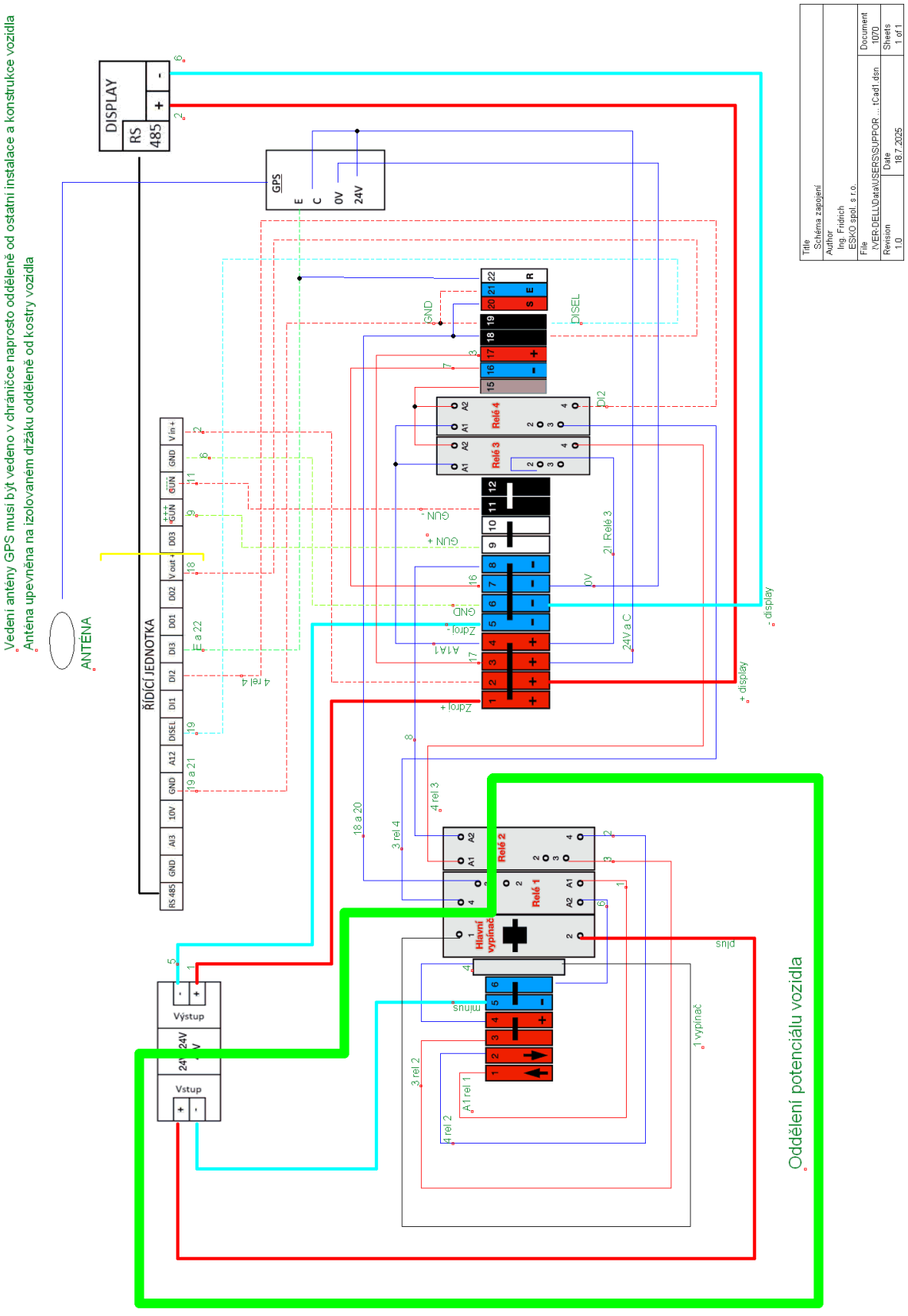
ALWAYS WEAR SAFETY EQUIPMENT

No special maintenance is required.

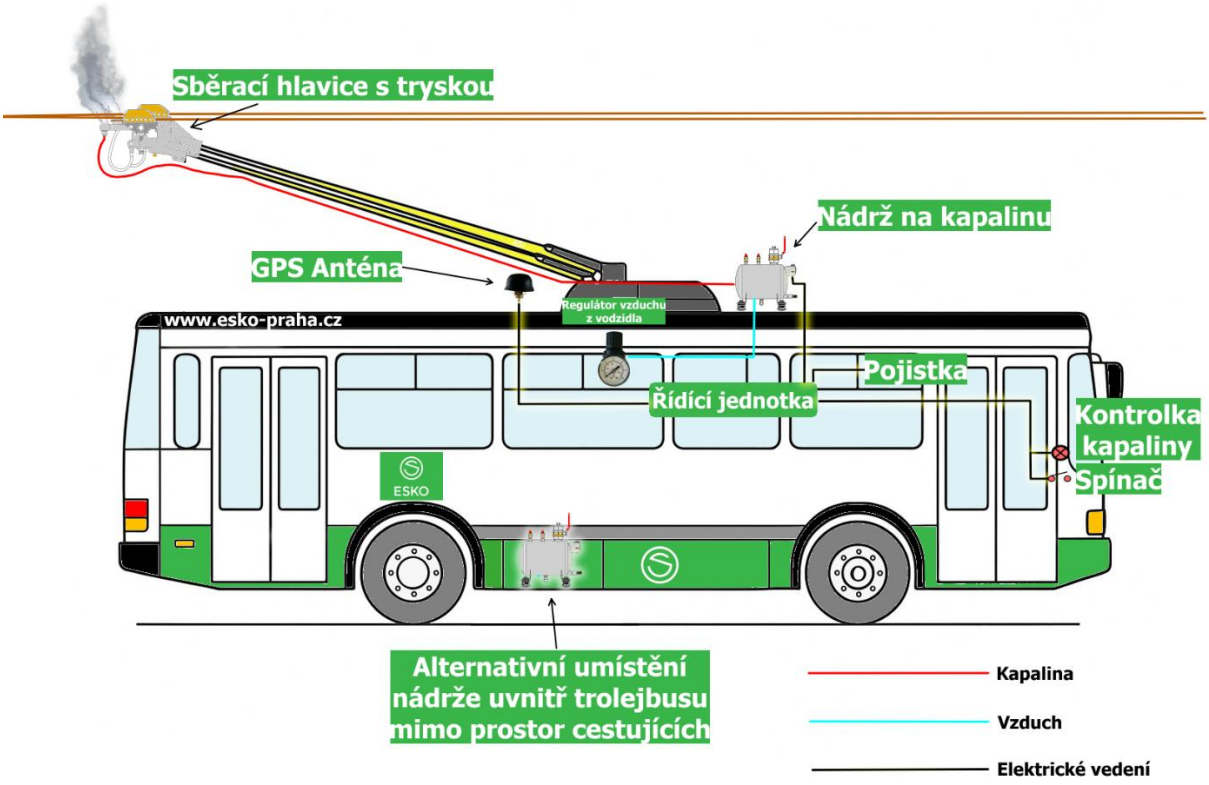
- When filling the tank, it is recommended to check for any air leaks or leaks of the liquid, check hose connections and fittings, and check if the hose is strapped to the trolley pole correctly.
- When changing carbon insert, check the nozzle and its holder. The nozzle must be in axis of the carbon insert (power lines respectively) and the nozzle must be clean.
- If the device is out of service for a long time, the nozzle may be dirty from carbon insert or other elements. It is recommended to clean the nozzle before using. When the nozzle is clogged, use compressed air.
- Collector head with a nozzle holder is maintained normally. This collector head is no different from any other collector head. Only difference is modification for a nozzle holder.

Diagrams

1 – Control unit



2 – Vehicle



Important !!!

The GPS antenna cable must be routed in a protective sleeve completely separate from other vehicle installations and structures!

The antenna must be mounted separately from the vehicle frame and in an insulated bracket!