

# Control Unit TA-01

## Operating Instruction



Modification of indicated specifications and design reserved

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## 1 PURPOSE

This document serves as a user guide/catalogue for proper handling, storage, installation, commissioning, operation and maintenance of the product:

### 9 55 0940 Control Unit TA - 01

It is a product in standard design. Individual products are identified and provided with a nameplate, bearing the code number, year of manufacture and serial number.

## 2 APPLICATION

TA-01 control unit serves to an automatic control of the wheel flange lubrication of the trams. TA-01 is used in the trams that the wheel flange lubrication is not controlled directly from the tram control unit.

This device will make it easier for the rail car driver who cannot use put the wheel flange lubrication into the operation manually. Using the control unit, enables setting the optimal parameters of lubrication intensity.

## 3 DESCRIPTION

The control unit includes 1 - 4 working modes consist of:

The first putting into operation mode, standard lubrication mode in a normal operation, circuit cleaning mode for an eventual long-term putting out the vehicle of operation and mode of service button to verify the functionality of the equipment by the service worker. These modes are selected with the buttons. The requested time intervals are set by the appropriate switches.

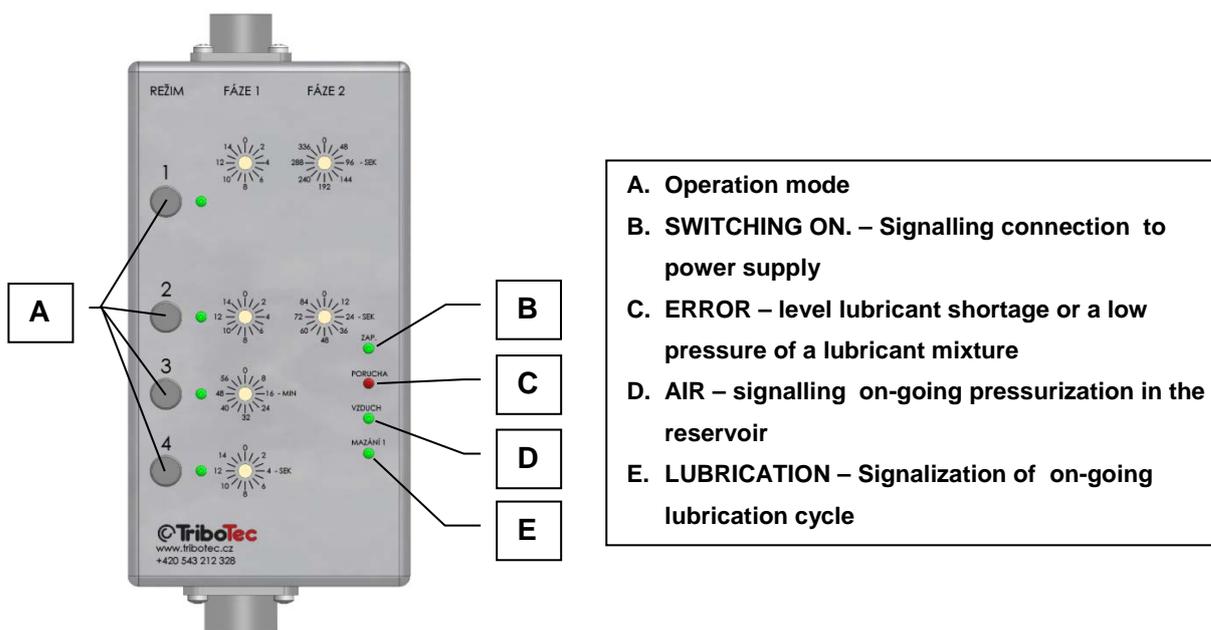


Fig.no. 1 Control unit TA-01

## 4 OPERATION

### 1.1 Mode description

#### Mode 1 – lubrication

##### Phase 1 – (spreading the mixture)

The lubrication time can be set by the switch in the range of 1 ÷ 15 sec. During the pause interval between the lubrication interval, the control unit receives information about putting the air vessel into operation to start-up the wheel flange lubrication process.

After ending the pause interval, the control timer is ordered to lubricate the system via the electromagnetic working valve, which releases of the inlet of a compressed air supply to the pneumatic piston pump and the mixer. The pneumatic piston pump supplies the lubricant dose into the mixer, where the air flow drags into the pipe-line, further into the divider, and as far as into the nozzles to ensure the lubricant is applied to the wheel flanges.

After passing the lubrication interval, the control unit cuts off the supply of the electric current to the electromagnetic working pressure, that shuts down the outlet of the pressure air to the mixture and the pneumatic piston pump. From this point on, the control unit will begin to measure the pause interval of lubrication.

##### Phase 2 - pause interval (pause interval includes only the time when the vehicle is in the motion)

The pause interval can be set by the switch in the range of 24 ÷ 360 sec.

#### Mode 2 – the first putting (filling) circuit into operation

Multiple (40x), an immediate repetition of the lubrication cycle, triggered during put-out of the tram operation, is used at the first start of the circuit or after mode 3 or mode 5 in order to fill up the circuit with the lubricant and transport the lubricant to the nozzles as fast as possible. In case of necessity, mode 2 repeats itself.

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This mode has got two time-adjustable phases: phase 1- the lubrication (spraying mixture) and phase 2 – the pause interval. The lubrication time (phase 1) has got an adjustable range of 1 ÷ 15 sec. The pause interval (Phase 2) has got an adjustable range of 6 ÷ 90 sec. When the mode 2 is finished, the control unit is automatically switched over mode 1.

### Mode 3 – Cyclic blowing the circuit

Before a long term putting out the vehicle of the operation, it is necessary to clean out the circuit after the mixture from the lubricant by means of the cyclic blowing process. Lubricant residue particularly in the mixture and the nozzles could accumulate, stiffen up and during long periods of inactivity, the entire lubrication system would subsequently be unreliable. Before starting mode 3, it is necessary to shut down the hand-operated tap (16) at the air inlet to the pneumatic lubrication device. Mode 3 operates in a 5 second blowing cycle process with a 60 second pause interval. Total cycle blowing interval is adjustable in the range of 4 ÷ 60 min. When mode 3 is ended, the control unit of the timer is automatically turned off mode 1. After cleaning the pipe, it is necessary to re-open the hand-operated tap (16), otherwise the system will not lubricate after the put out vehicle of the operation.

### Mode 4 - Service button

Mode 4 is designed for the maintenance purposes and serves to verify the operation of the lubrication circuit, nozzle settings, and etc. When put on this mode into the operation, one lubrication cycle is performed even when the tram is put out of the operation; the lubrication interval can be set by the switch in the range of 1 ÷ 15 sec.

When the mode 4 is ended, the controller unit is automatically switched over mode 1.

## 1.2 Description of the warning lights of the control timer

### ON - Power supply indication

When connected to a power source, the warning light comes on and indicates that the device is in standby mode.

### FAULT - insufficient pressure in the lubricating mixture

It signals a failure that there is a pressure shortage in the system. This can be caused by the activation of the thermal fuse and then a temporary putting out the compressor of the operation due to overheating. However, it may also be a low pressure of the lubricant mixture caused by the pipeline damage in the lubrication aggregate.

### AIR - signalling of the on-going pressurization on the reservoir

The signalling indicates that the air reservoir is being pressurized by means of the compressor.

### LUBRICATION - signalling of the ongoing lubrication cycle

Signalling indicates that the lubrication phase is being performed.

## 5 TECHNICAL PARAMETERS

Supply voltage.....	24 V DC + 25 % - 30 %
Max current consumption .....	250 mA
Ambient temperature .....	- 10 to + 60 °C
Cabinet size d x w x h.....	260 x 85 x 61 mm
Weight of complete wheel flange system.....	0,5 kg
Degree of protection.....	IP 56
Installation position.....	horizontal or vertical (not depend)

*Tab. 1 Technical parameters of the Control unit TA-01*

## 6 CATALOGUE DESIGNATION

Control unit TA-01

ID No: 9 55 0940

## 7 DIMENSIONAL DRAWING

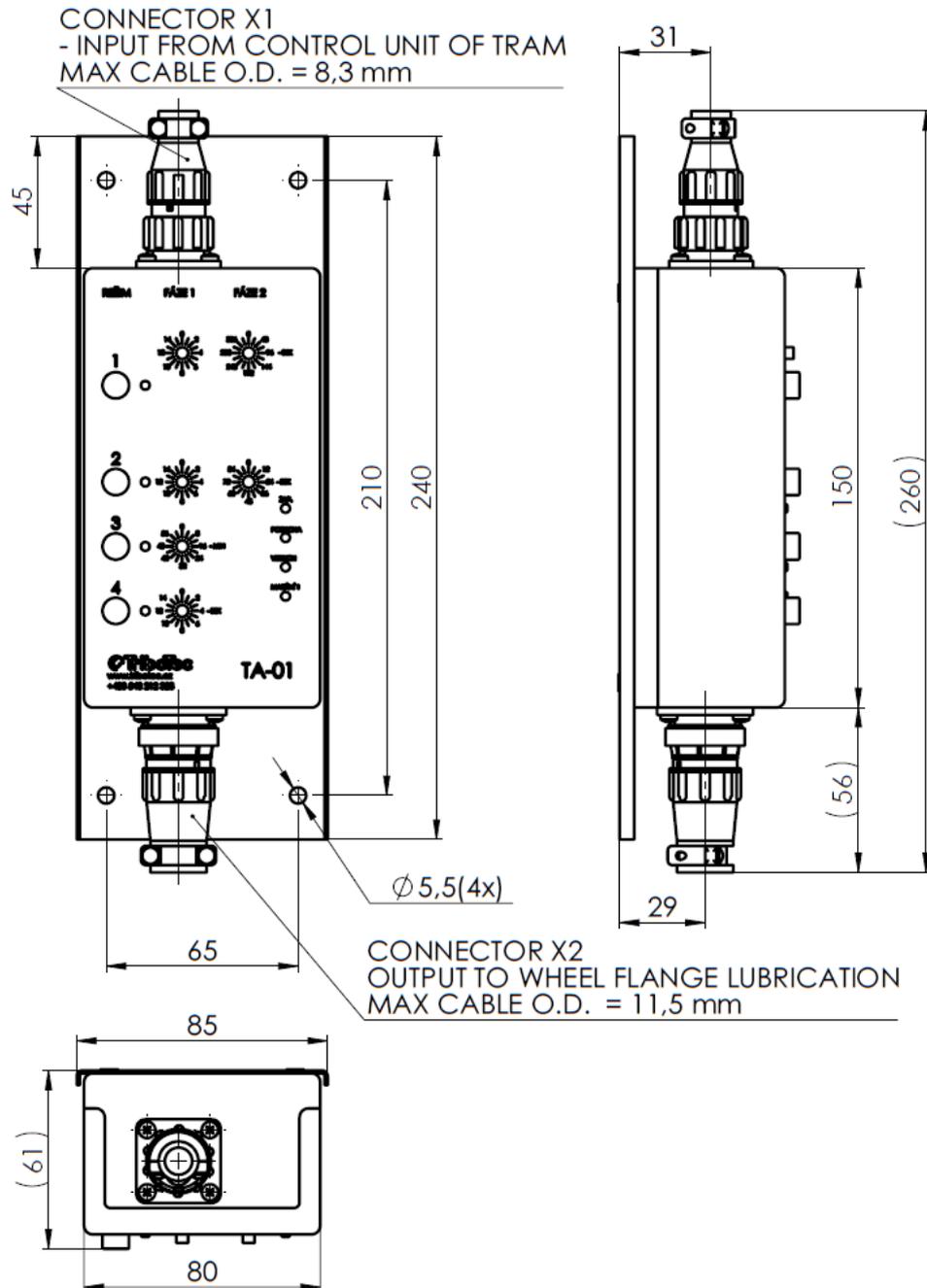


Fig. no. 2 Dimensional drawing of Control Unit TA-01

## 8 INSTALLATION AND PLACING INTO OPERATION

TA-01 control unit can be mounted in any position. It is fastened by means of four anchor holes with a diameter of 5.5 mm. When placing the control unit, it is necessary to exclude the possibility of mechanical damage and an access to moisture. The equipment must be performed in accordance with the valid standards and regulations for the installation of electrical equipment. The wiring is done according to the electrical diagram.

## 9 WIRING DIAGRAM, ELECTRICAL CONNECTION

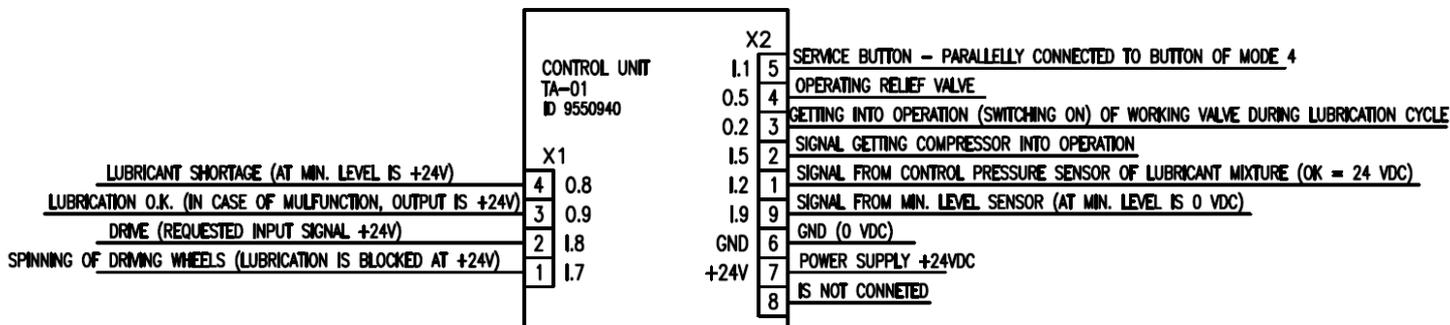


Fig. no. 3 Wiring diagram of Control Unit

## 10 ADJUSTMENT OF WORKING PARAMETERS – PROGRAMMING OF THE CONTROL UNIT

The switchers of individual working modes (are shown on Fig. 1) serves to the purpose of adjusting the control unit according to the customer's requirements. The range for the individual working mode is shown in the following table:

Mode No.	Phase No.	Operation	Range
Mode 1	Phase 1	lubrication (spraying mixture)	1 ÷ 15 sec (with increment 1 sec)
	Phase 2	pause interval	24 ÷ 360 sec (with increment 1 sec)
Mode 2	Phase 1	first filling circuit	1 ÷ 15 sec (with increment 1 sec)
	Phase 2	pause interval	6 ÷ 90 sec (with increment 6 sec)
Mode 3	Phase 1	cyclic blowing the circuit	4 ÷ 60 min (with increment 4 min)
Mode 4	Phase 1	service lubrication	1 ÷ 15 sec (with increment 1 sec)

Table 2 Adjustment of switches of the Control Unit TA-01

The control unit counts only the time when the vehicle is in the motion. In the event of stopping, the control unit stops reading the time and continuously continues until the vehicle moves again.

## 11 BASIC ADJUSTMENT

The following factory setting values are set on the switch:

Mode No.	Phase No.	Operation	Factory settings
Mode 1	Phase 1	lubrication (spraying mixture)	3 sec
	Phase 2	pause interval	180 sec
Mode 2	Phase 1	first filling circuit	1 sec
	Phase 2	pause interval	6 sec
Mode 3	Phase 1	cyclic blowing the circuit	4 min
Mode 4	Phase 1	service lubrication	3 sec

Tab. 3 Basic adjustment of Control Unit TA-01

## 12 SENSOR CONNECTION

Connector X1: Connection between the vehicle control system and the control unit

pin	signal	relevance
1	I.7	Spinning of driving wheels (input signal to the TA-01 control unit from the vehicle's control system, lubrication is blocked at +24 VDC)
2	I.8	Ride (input signal to the TA-01 control unit from the vehicle control system, required input signal +24 VDC)
3	O.9	Lubrication O.K. – a sufficient pressure of the lubricant mixture (output signal from the TA-01 control unit to the vehicle's control system, in case of fault output is +24 VDC)
4	O.8	Lack of lubricant (output signal from the TA-01 control unit to the vehicle control system, in case of minimum level is +24 VDC)

Tab. 4 Connector X1 description

Connector X2: Connection between the control unit and the wheel flange lubrication system

pin	signal	relevance
1	I.2	Control of sufficient pressure of the lubricant mixture (input signal to the TA-01 control unit from the pressure sensor in the lubrication system, switching signal, input at sufficient pressure during the lubrication cycle is +24 VDC)

2	I.5	Request for on-going pressurization (input signal to control unit TA-01 from the control pressure sensor in wheel flange lubrication system. Switching signal, input when request for ongoing pressurization is +24 VDC)
3	O.2	Operating (switching on) the working valve in order to start the lubrication cycle - (output signal from the TA-01 control unit to switching on the coil of the working valve (opening the valve) in the wheel flange lubrication system. Switching signal - the output is +24 VDC)
4	O.5	Control of the relief valve - (output signal from the TA-01 control unit for switching on the relief valve coil (valve shutting down) in the wheel flange lubrication system. Switching signal - output +24 VDC)
5	I.1	Service button - parallelly connected to the button of Mode 4 (input signal to the TA-01 control unit from the service button located in the wheel flange lubrication system. Switching signal, the input under switching on the service button is +24 VDC)
6	GND	GND (0 VDC)
7	+24 VDC	Power supply +24 VDC
8	-	Is not connected
9	I.9	MIN. lubricant level (input signal to the TA-01 control unit from the MIN. level sensor located in the wheel flange lubrication system, when reaching the MIN. level is 0 VDC)

*Tab. 5 Connector X2 description*

## 13 MAINTENANCE AND INSPECTION

It is recommended to regularly check the automatic control device and other elements of the system, including the electrical installation, together with the maintenance of the controlled lubrication system.

Surface cleaning must be done only with a neutral detergent. Use of organic solvents, e.g. gasoline or alcohol-based cleaning agents, may damage the plastic. If you notice damage (cracking, the smell of burning plastic deformation, or loose wiring) immediate repair is required. Repairs may only be performed by a qualified electrician in compliance with all applicable safety standards. It is forbidden to tamper with the device (unscrewing the lid, changing the wiring, etc.) during the warranty period. Tampering with the device will void the warranty.

## 14 ACCESSORIES

There is no need to supply additional accessories to the control unit (counterparts of the connectors and the plug connectors with bushings are already included)

## 15 WORK SAFETY

Electrical connection of the lubrication pump must be executed professionally and applicable safety precautions must be adhered to. The customer is liable for correct and professional installation.

The curve sensor may be operated and its operating parameters adjusted solely by authorized persons who are duly informed and trained in such activities.

## 16 STORAGE AND TRANSPORT

When this product is stored, the customer must comply with the ambient conditions corresponding to the set of combinations of classes IE11 according to ČSN EN 60721-3-1 and in case of transportation, the ambient conditions corresponding to the set of combinations of classes IE21 according to ČSN EN 60721-3-2. The customer is responsible for storage of the product after delivery.

The products must be transported in protective containers. The products must be placed on a vehicle so that mechanical loading by stacking, damaging by shocks and weather effects during transportation can be avoided. Loading and unloading must be carried out carefully, avoiding fall and mechanical damage of the shipment.

## 17 QUALITY WARRANTY

TRIBOTEC guarantees that all products manufactured by TRIBOTEC will be free of material and workmanship defects on the date of sale from TRIBOTEC to the original buyer of these products.

With the exception of any special, extended or limited warranty published by TRIBOTEC, any product confirmed by TRIBOTEC as defective will be repaired or replaced by TRIBOTEC for a period of twelve (12) months from the date of sale.

This warranty is only valid in the event that the products are installed, operated and maintained in compliance with the written instructions and requirements contained in this document.

This warranty does not cover and TRIBOTEC will not be liable for product's normal wear and tear. The company will not be liable for defects on the product, its damage or wear and tear caused by the following:

1. faulty installation (unless realized directly by TRIBOTEC)
2. misapplication, i.e. use and operation under non-specified operating conditions
3. usage for other than recommended purpose
4. abrasion
5. pollutants or fragments
6. corrosion due to installation in a non-recommended work environment
7. Inadequate or improper maintenance
8. damage due to negligence, accident or intentional damage
9. using spare parts not supplied by TRIBOTEC
10. additional installation of parts and components not supplied or not approved by the TRIBOTEC
11. incompatibility of the TRIBOTEC products with the equipment, accessories or materials that TRIBOTEC has not supplied, or improper design, manufacture, installation or maintenance
12. unsuitable storage of the product before its installation and commissioning or storage in a contradiction with specified storage regulations.

TRIBOTEC covers the items sold by TRIBOTEC, whether as part of the product or separately, but not manufactured by TRIBOTEC with the guarantee period covering the complete product at its expense in full, except the cases TRIBOTEC advised the customer of in this document or in the purchase contract. In such cases, TRIBOTEC will provide the buyer with reasonable co-operation in submitting complaints regarding the components or parts in question to the manufacturer.

THIS WARRANTY IS THE EXCLUSIVE WARRANTY AND REPLACES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

TRIBOTEC will not be responsible for indirect, incidental damages and losses or consequential damages and losses caused by Force Majeure, resulting from the fact that TRIBOTEC has supplied the products.

## 18 POSSIBLE FAULTS AND THEIR ELIMINATION

### List of most common faults

The table below indicates possible failures, their causes and method of remedy. This table can be suitably used for troubleshooting via user interaction and as the assistance for fault identification in touch with the manufacturer.

FAULT	RELEVANCE	REPAIR POSSIBILITIES
<b>The control unit is connected to the electrical network but is not responding at all ("ON" warning lamp is out)</b>	An incorrect voltage at the power terminals	Verify if the power supply is correct
	Fall-out loss of electric energy of the earth-leakage trip or the circuit breaker	Switch on the earth-leakage trip or the circuit breaker
	An incorrect connection of the X1 or X2 connector	Verify a correct pin assignment according to Tab. 4 and Tab. 5
<b>The control unit is operating ("ON" and the "FAULT" warning lamps are lighting), but the lubrication is not being started</b>	The pressure of the lubricant-air mixture was by means of the control unit evaluated as an insufficient	Getting into operation (= Reset) by means of "Mode 1" button
<b>The control unit isn't working, but the lubrication intensity is too large</b>	Fault setting the pause interval	Re-setting intervals by means of the using the time switches on the control unit

Table 6 Possible Faults and Their Elimination

## 19 ANNEXES

Without annexes.