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SZ-3,5H

SZ-16

The wheel jerking devices which allows for organoleptic detection of play in components of suspension and steering system in

USER MANUAL

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1. SAFETY

1.1. General

Considering your own and customers' safety, it is necessary to obey the following rules which determine hazardous situations and specify ways in which accidents should be avoided and potential damages of devices should be prevented.

1. Only trained and competent persons are allowed to use the devices.
2. Read the User Manual before first usage and apply all the safety and operational rules specified in the document.
3. All the devices and components included in the test lane should be operated according to the provided instructions and specifications.
4. Never use the devices if it is or seems to be damaged or out of order.
5. The personnel operating the devices must wear working clothes without loose parts, so as to avoid risk of getting caught by rollers and posing a serious hazard to life of the personnel.
6. All the outside bolt connections should be periodically inspected.
7. Never make adjustments (set-up) while the system is in operation.
8. In case of any danger switch off the "Main switch" located on the right side of the control cabinet.
9. Do not wet the devices, because rain, humidity and all kinds of liquid or moist can damage electronic circuits.
10. Use adequate clothing and have suitable behavior in order to prevent accidents.
11. Do not smoke and light flames when you work on the vehicle.
12. Keep hands and hair away from parts in motion.
13. Do not wear ties, wide clothes, wrist jewels and watches when you are working on a vehicle, in particular if the engine is on.
14. Do not touch the high voltage cables when the engine is on.
15. During the test at any device, no one except the operator should be near the devices.
16. Remove the power supply voltage before connecting or disconnecting cables.
17. Avoid contact with wet hands.
18. It is forbidden to stand on moving plates.
19. Drive slowly and gently on the device plates, at very low speed.
20. Periodically, in accordance with the intervals (point 6.3), check the tightness of the nuts of the foundation bolts to ensure that there is no play in operation; if play is detected, tighten the nuts with a torque of 79 Nm.

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REMARK: The start-up of the device, troubleshooting and all repairs of the device must be performed only by the authorized service of the Manufacturer or its authorized representative. Electrical works must only be carried out by electricians with the appropriate competence and permissions. Improper use or unintentional destruction of the device may void the warranty. Operation and use of the device is only permitted by trained personnel. If you experience any issues with the device, please inform the UNIMETAL SERVICES.

REMARK: In the case of user's interference in the construction, design, software, security systems or operating principle, it is considered as a significant modification. Such actions exclude the manufacturer from liability for incorrect operation of the device, damage or accidents. As a result of the described actions, the device warranty is discontinued.

REMARK: The UNIMETAL company placing the device on the market has exclusive copyrights and manages them with every right. In the case of the violation of any of the provisions of this document, it results in criminal and civil liability within the limits set by law. In the case of changes in the construction of the device, a natural or corporate person is obliged to inform the manufacturer about relevant changes, to which the Manufacturer must give one's asset.



ATTENTION: In case of any dangerous, stop the test and stop the device using the "EMERGENCY STOP" button on the control cabinet, or switch off "MAIN SWITCH" or tap on the middle of the screen of the android device.



ATTENTION! Special care must be taken. The oil in the hydraulic hoses is under high pressure. Special care is required when the operator uses tools that could damage the hydraulic hoses.



ATTENTION! The oil in the hydraulic hoses is high pressure. Be especially careful when carrying out repairs in the pit using tools that could damage the hydraulic hose braid

1.2. Electrical

1. Only trained persons are allowed to have access to the electrical system. Before opening the terminal cabinet, e.g. to carry out a minor repair, use the main switch to shut off the electric energy supply to the Test Lane.
2. Protect the electrical wiring of the system from moisture.
3. When devices are at standstill, use the main switch to shut off the electric energy supply to the device. The main switch should be prevented from being used by unauthorized persons.

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2. TECHNICAL DESCRIPTION

2.1. Hydraulic play detector

The wheel jerking device type SZ-3,5H (Fig. 1) allows for organoleptic detection of play in components of suspension and steering system in light vehicles with GVW up to 3,5t.

The universal wheel jerking device type SZ-16 (Fig. 2) allows for organoleptic detection of play in components of suspension and steering system in light vehicles with GVW up to 3,5t. and in heavy goods vehicles with GVW above 3,5t.

The device is composed of two modules mounted on the left and right side of the inspection pit. The play detector consists of two moving plates assemblies (left and right platform), control box, control torch and a device for locking the pressed-down brake pedal. The platform is a welded metal structure. The body is bolted to the base plate installed in the station's foundation. The moving plates are the basic assembly of the machine. They are slidably mounted on bearing guides and made of corrugated steel. Plates are connected by a hydraulic cylinders system so as to achieve lateral and torsional movements. The movements of the play detector are controlled using the control torch with buttons and a flashlight.

The test is done by moving both work plates simultaneously while having the vehicle stopped on top of the device, watching and manually checking for axle play while illuminating undercarriage for better visibility. The SZ-3,5H device allows for inspecting play in the joints, pins, bearings and tie rod ends. During use the SZ-3,5H device Operator could create the list of noticed defects and damages in the Play detector list application on Android devices.

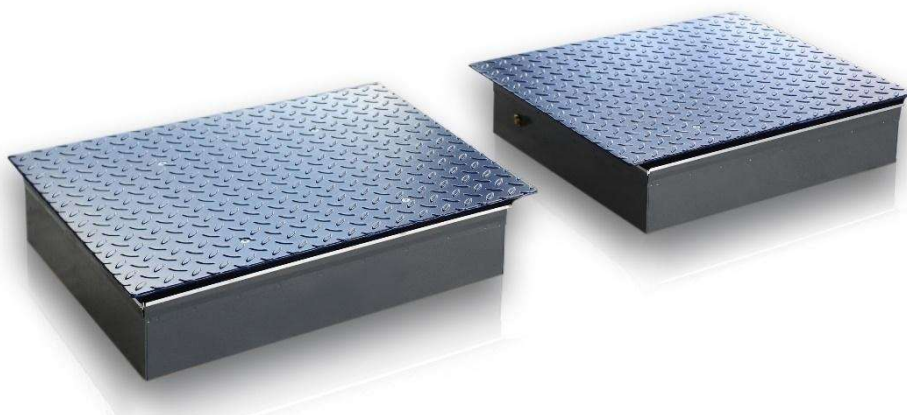


Fig. 1 – Left and right module of SZ-3,5H device

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Dimensions and weight of SZ-3,5H device	
Length of moving plate	650 mm
Width of moving plate	735 mm
Height of moving plate	6 mm
Height of device	167 mm
Weight	2 x 99 kg

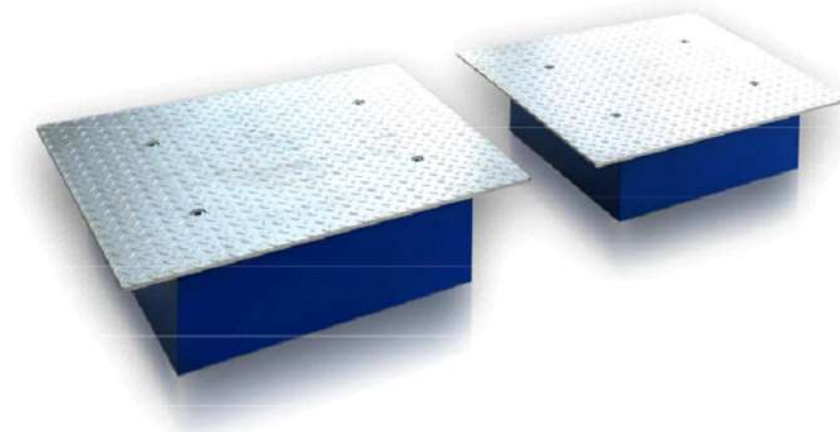


Fig. 2 – Left and right module of SZ-3,5H device

Dimensions and weight of SZ-16 device	
Length of moving plate	870 mm
Width of moving plate	1000 mm
Height of moving plate	8 mm
Height of device	220 mm
Weight	2 x 280 kg

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2.2. Hydraulic power supply

The SZ-3,5H and SZ-16 devices are powered by a hydraulic power supply (Fig. 3) which is connected to the control box. All the elements are placed on the top tank panel. Isolating valves are used to change the direction of movement and to stop the hydraulic recipient (platforms).

The hydraulic power supply is located in a recess in the wall of the inspection pit and connected by hydraulic hoses to the play detector cylinders



Fig. 3 – Hydraulic power supply

Dimensions and weight of SZ-3,5H hydraulic power supply	
Length	500 mm
Width	320 mm
Height	590 mm
Weight	66 kg

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2.3.Electrical box

The electrical box (Fig. 4) for SZ-3,5H and SZ-16 devices looks the same. In the electrical box are located control system components, which may be different depending on the version of the device. On the right side of the box there is a main power switch and a lamp indicating when the device is powered.

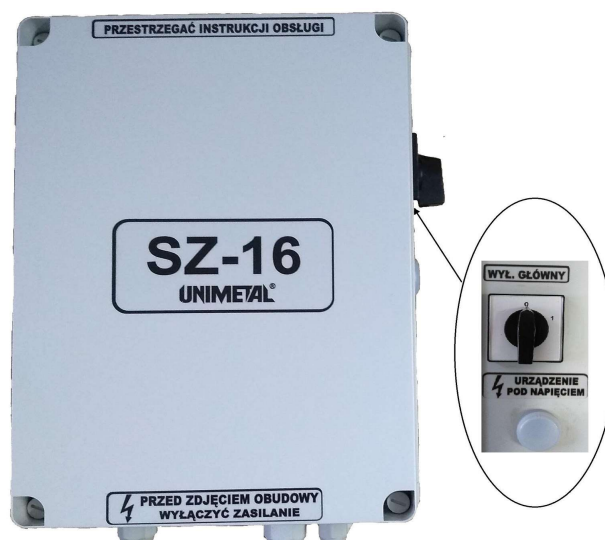


Fig. 4 Example of electrical box for SZ-16

Dimensions and weight of electrical box	Value
Hight	370 mm
Length	130 mm
Width	290 mm
Weight	5 kg

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2.4. Control devices

2.4.1. Wired control lamp

The wireless control torch (Fig. 5) is an integral part of the play detector, connected by wire with the control box. The polyamide body contains a LED bulb and buttons to control the movements of the moving plates. Functions of buttons controlling the movements of moving plates are described in chapter 5.5.1.



Fig. 5 - Wired control lamp

2.4.2. Wireless control lamp

The wireless control torch (Fig. 6) is an integral part of the play detector, connected by radio with the control box. The polyamide body contains a LED bulb and buttons to control the movements of the moving plates. Functions of buttons controlling the movements of moving plates are described in chapter 5.5.1.

Working time on a fully charged battery is 8h on average. Rechargeable batteries are charged with a special microprocessor charger attached to the lamp. Charging time is approximately 3h



Fig. 6 - Wireless control lamp

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2.4.3. Android device

The Android device (Fig. 7), depending on the selected range of equipment, is provided by the customer himself, or is supplied by the manufacturer of the play detector.

For control of the SZ-3,5H/SZ-16 device it is necessary to download to the Android device the application from the Google Play shop, given at the link below:

<https://play.google.com/store/apps/details?id=pl.unimetal.szx3>

The application allows to control the UNIMETAL play detector. Wi-Fi network is used for communication. The control is possible if the device is equipped with Wi-Fi.



Fig. 7 - Example Android device

2.5. Brake pedal locking tool

The brake lock (Fig. 8) is mounted on the pressed brake pedal and locked to the driver's seat to keep the vehicle stationary during detection of play in components of the suspension and steering system.



Fig. 8 - Brake pedal locking tool

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4. TECHNICAL DATA

4.1. Metrological data

SZ-3,5H	
Max axle load	2 t
Plate movement	Synchronous
Test shift of the moving plate in the transverse direction	45 mm
Test shift of the moving plate for torsional movement	16 °
Test force exciting a wheel jerk (for 0,8 MPa)	630 daN
SZ-16	
Max axle load	18 t
Plate movement	Synchronous
Test shift of the moving plate in the transverse direction	100 mm
Test shift of the moving plate in the longitudinal direction	100 mm
Test force exciting a wheel jerk	3000 daN
Hydraulic power supply for SZ-3,5H / SZ-16	
Oil type	Hydrol LHL - 68 (or equivalent with similar technical characteristics)
Oil volume	min. 20 dm ³
Working pressure	12 MPa

4.2. Power supply

Hydraulic power supply for SZ-3,5H / SZ-16	
Power supply	3x400 V
Power frequency	50 / 60 Hz
Power	1,5 kW
Electrical box	
Power supply	3x400 V
Power frequency	50 Hz
Power	0,2 kW
Current protection	C6, C10

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4.3. Environmental conditions

Temperature range	+5 ÷ +40 °C
Atmospheric pressure	860 - 1060 hPa
Relative humidity	Up to 95% in the temp. of 30 °C
Power voltage tolerance	±10%
Power frequency tolerance	±1%
Protection class	IP 22

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5. INSTALLATION / MOUNTING

5.1. Before installation

The jerking device SZ-3,5H and SZ-16 should be installed in a closed space, heated in winter and equipped with fume exhaust. It is necessary for the room to be equipped with an inspection pit, which makes it possible to install a hydraulic power supply with a control box inside. The location of the jerking mechanism in the inspection pit shall be such that the vehicle suspension can be easily watched by the inspector.

ATTENTION! The location of components of the device should be drained and free from groundwater influence. The control box should be protected against direct exposure to water. If the above recommendations are not followed, the warranty will be lost.

5.2. Preparing the foundations, and installing the device

The foundation work should be carried out by a specialist company. The foundation should be made in accordance with drawing 10 of this User Manual.

NOTE: The figures show the foundation of the SZ-16 unit, the installation of the SZ-3.5h is carried out in the same way.

- (1) The connection (supply) cable should be lead in the installation pipe with diameter $\varnothing 50$ mm to the recess in the diagnostic pit, where the control panel of the SZ-16 device will be mounted.



Fig. 9 - SZ-16 foundation and frame

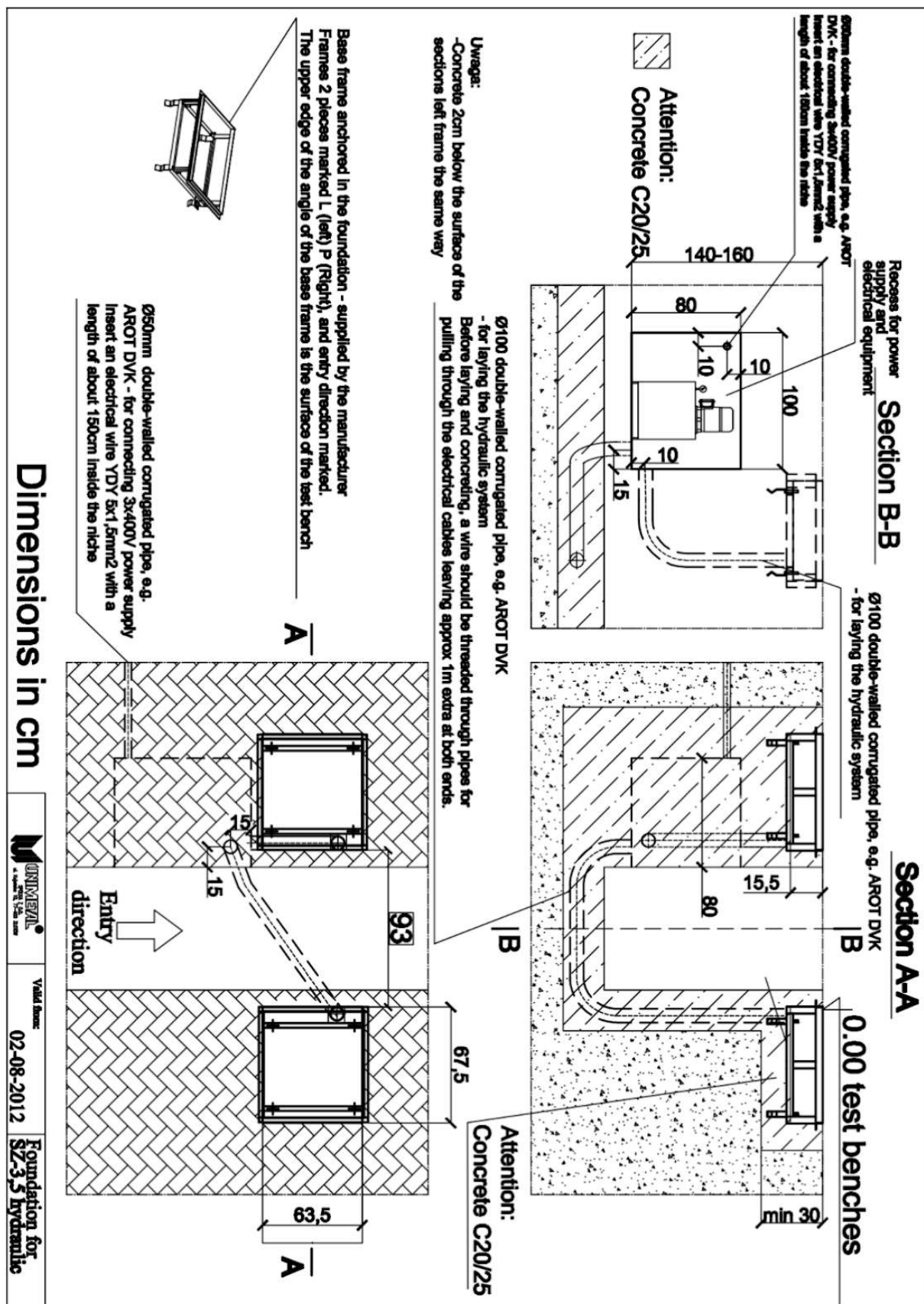


Fig. 10 - Drawing of the foundation for the SZ-3,5H device

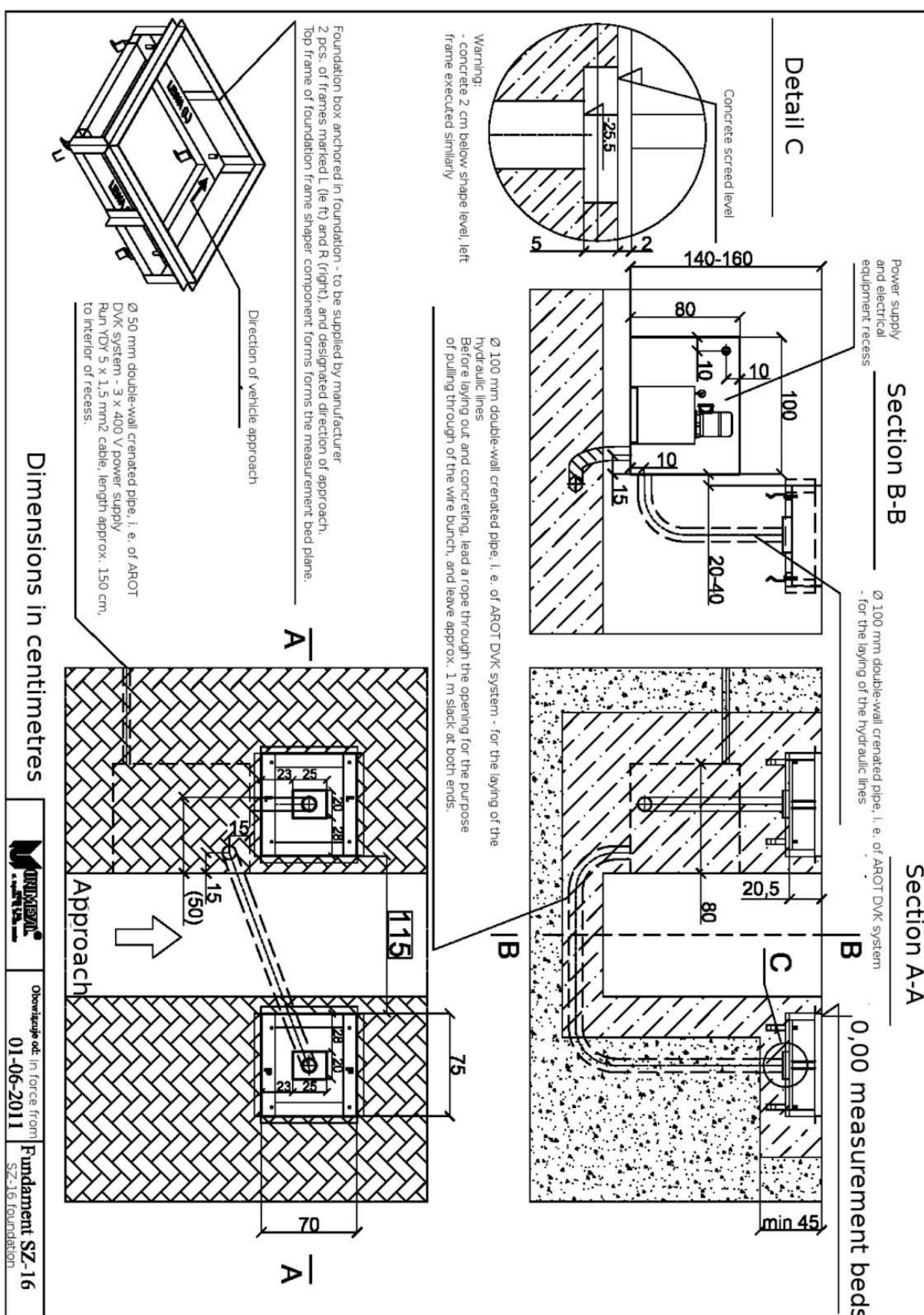


Fig. 11 - Drawing of the foundation for the SZ-16 device

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- (2) Then clean the foundation frames, cut the electrical conduit flush with the concrete, and remove the screw thread protectors. Measure the length of the hydraulic hose between the recess in the diagnostic pit prepared for the hydraulic power supply and the mechanical section, and cut 8 equal lengths of hose to be crimped. Pull the hydraulic hoses through the pipe, taking care to protect the ends from dirt.



Fig. 12 - View of foundation with hydraulic hoses



Fig. 13 - Hydraulic hoses in a recess in the diagnostic pit prepared for connection to the hydraulic power supply

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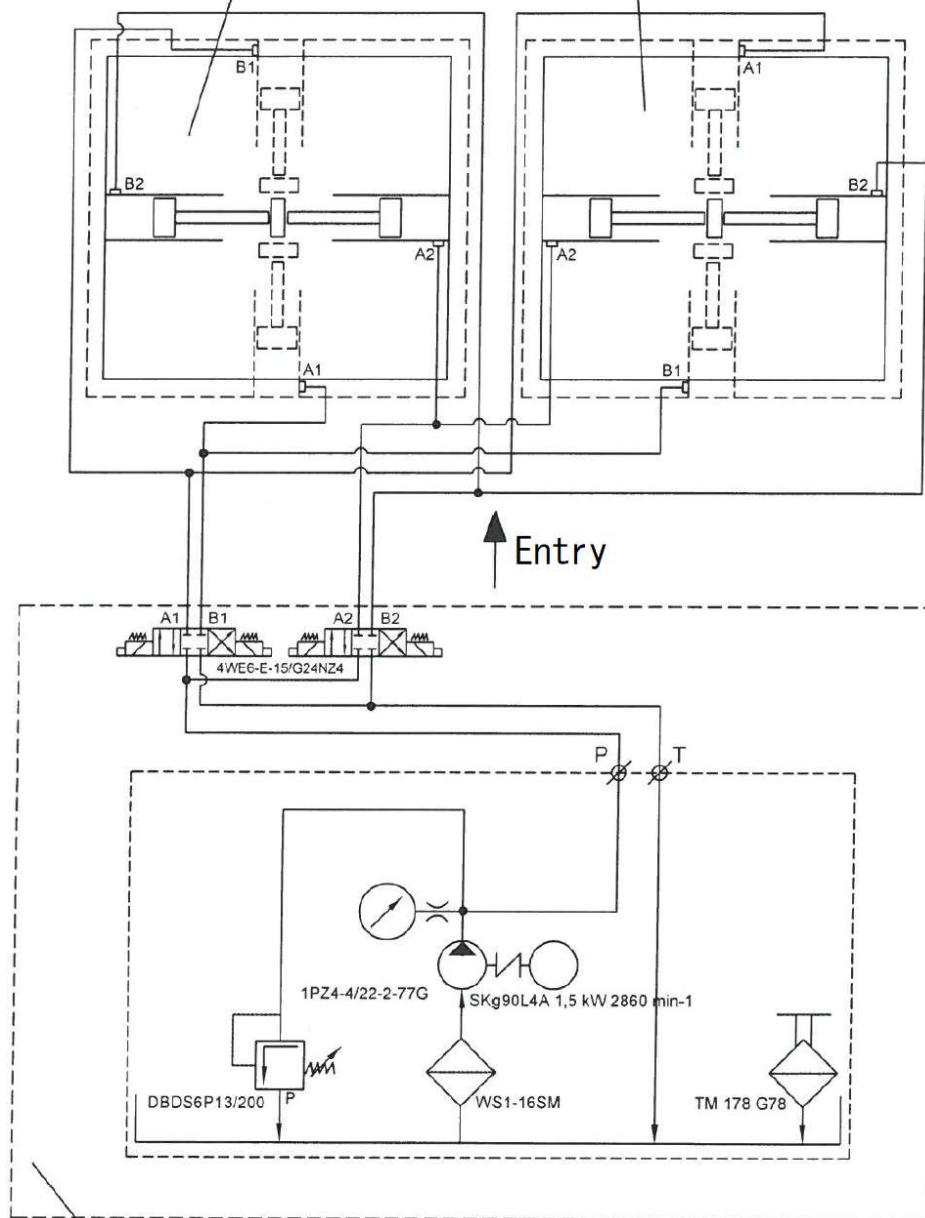
- (3) Then disassemble the device into 3 components: the base of the device, the middle plate and the top plate.
- (4) Place the base of the device into the prepared foundation as shown in Fig. 14. Check that the unit lies stable on the foundation frame (no swinging) and tighten the fixing screws and connect the cylinders according to the hydraulic diagram (Fig. 15).



Fig. 14 - SZ-16 unit base mounted in foundation

Left jerking module

Right jerking module



Hydraulic power supply

Fig. 15 - Hydraulic diagram of SZ-3,5H and SZ-16 device

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- (5) After checking the tightness of the screws and hoses to the cylinders, place the centre plate (Fig.15).



Fig. 16 - Middle plate mounted on the SZ-16 device base

- (6) Tighten the mounting screws and the hoses to the cylinders according to the hydraulic diagram (Fig. 15) and attach the top plate (Fig. 17).



Fig. 17 - SZ-16 device with moving plate mounted in foundation

- (7) Place the hydraulic power supply in a recess in the diagnostic pit so that the inspection window and oil filler are easily accessible.

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- (8) Prepare the hydraulic hoses with crimps: 2 pcs. 43 cm long and 2 pcs. 48 cm long, to be connected by T-pieces to the hydraulic power supply cube (Fig. 18) according to the diagram (Fig. 15).



Fig. 18 - Hydraulic power supply cube



Fig. 19 - Hydraulic power supply cube with connected hydraulic hoses

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5.3. Connection of electrical installation

- (1) On the wall of the recess in the diagnostic pit, install the control cabinet and the holder for the torch (Fig. 20) with the aid of expansion bolts.



Fig. 20 - Electrical box and torch holder with torch mounted in the diagnostic pit recess

- (2) Lead the 3x400 V, 50 Hz power supply to the terminals in the electrical box with a YDY 5x1.5 mm² cable. The power cable should be led to the place of connection in the installation pipe according to pt. 5.2.
- (3) The electrical connection should be made in accordance with the diagram shown in Fig. 21 / 22 / 23, depending on the variant of the selected control device .

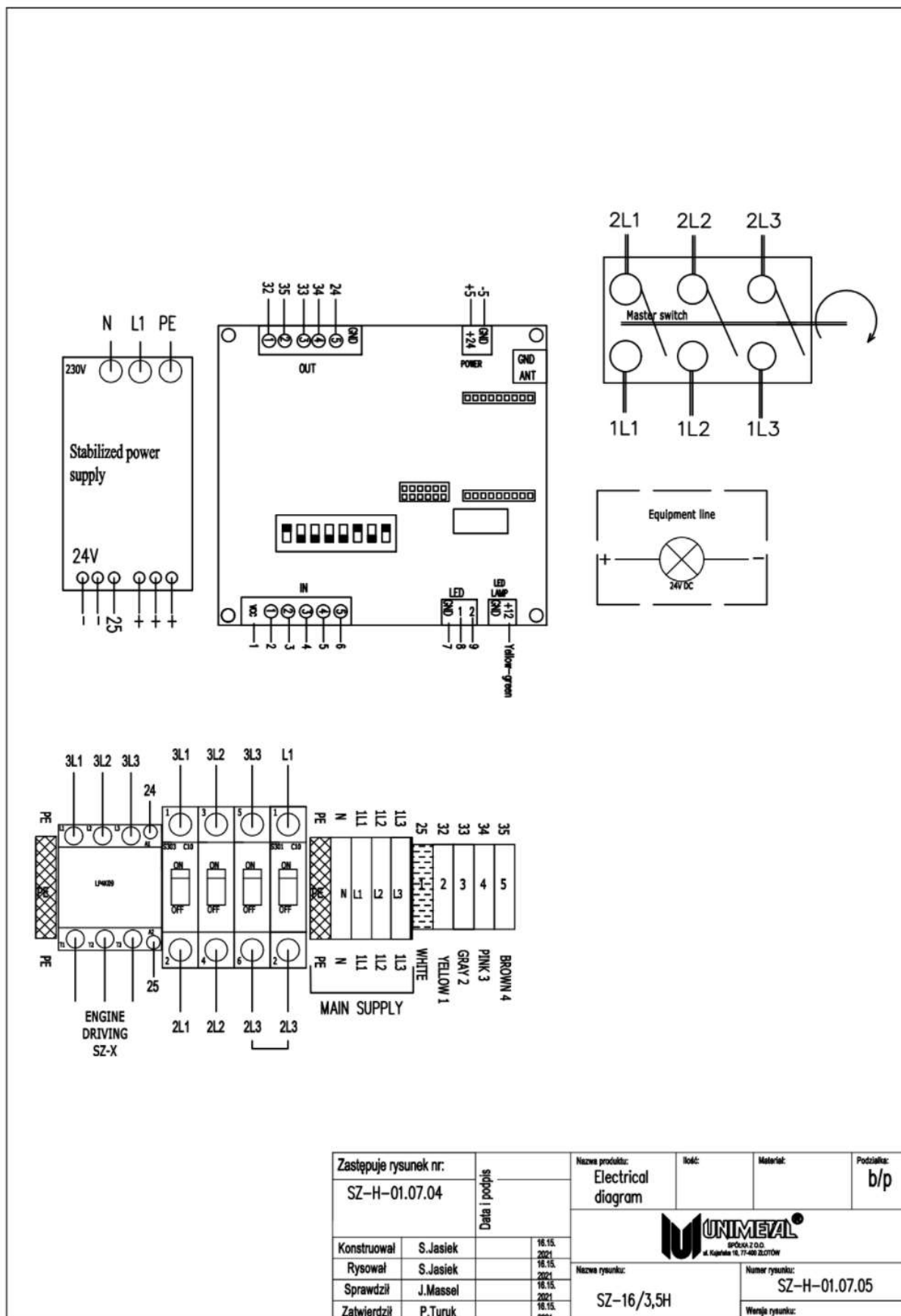


Fig. 21 - Electrical diagram for variant with wired torch

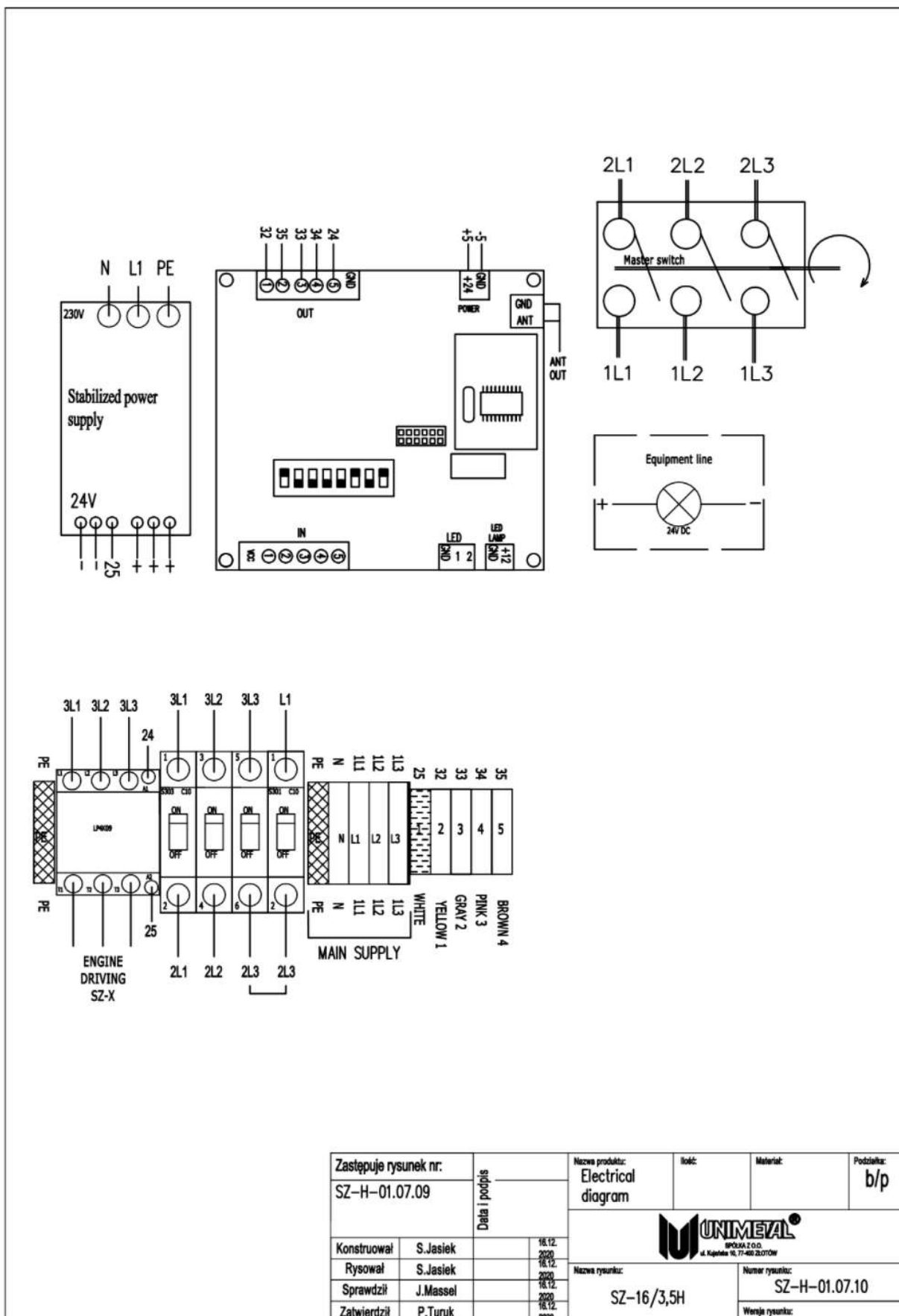


Fig. 22 - Electrical diagram for variant with wireless torch

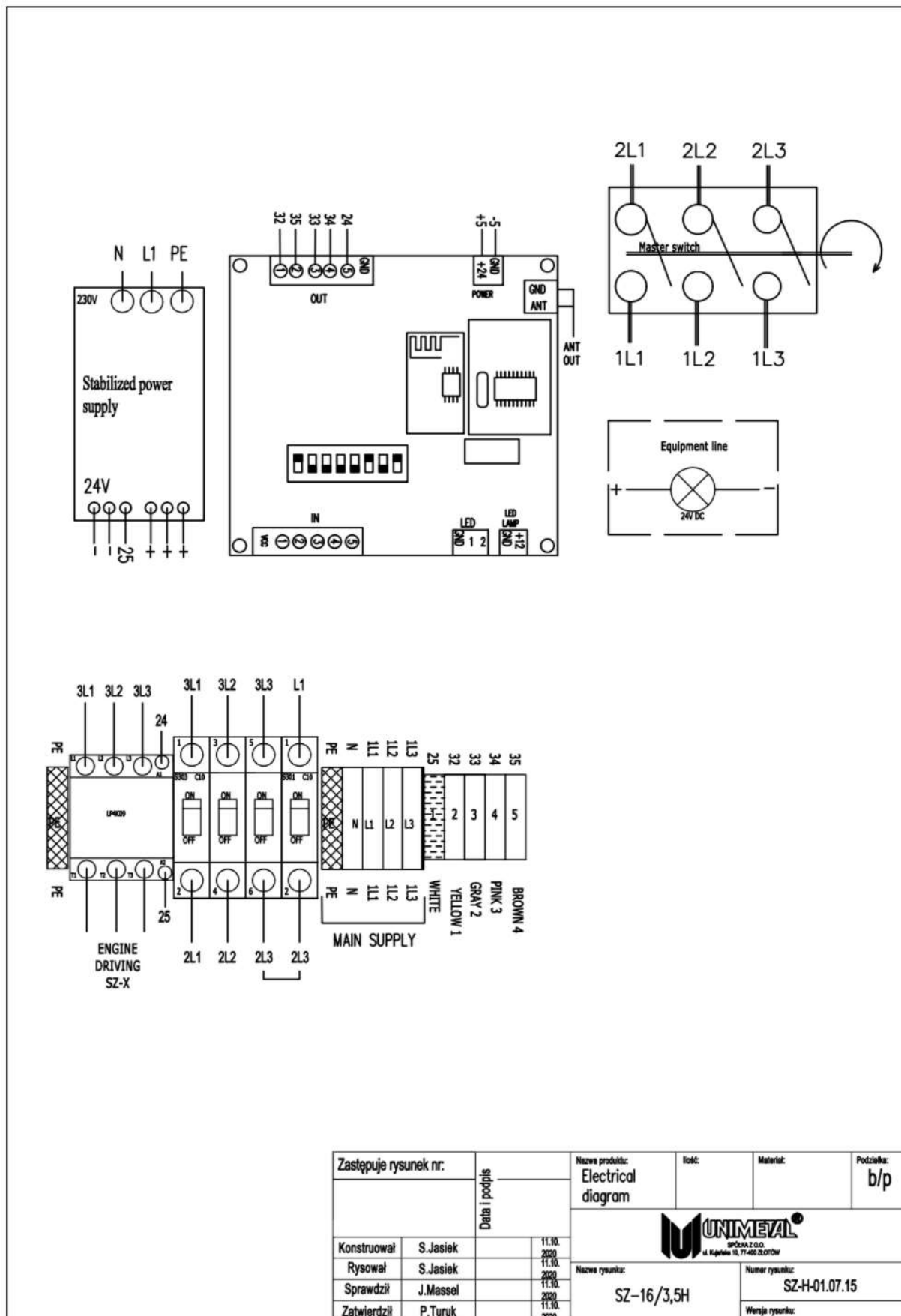


Fig. 23 - Electrical diagram for variant with control via Android device with app

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- (4) After connecting the wires, turn on the device. Check that the pump motor "turns" in the right direction, if it does not pump oil, change the phase order. Test the unit for a while and then add HL-68 hydraulic oil (or a similar type), check the oil level in the oil window (Fig. 24).



Fig. 24 - Window in the hydraulic power supply for checking the oil level.

- (5) After the tests, check that if there are no visible leaks, the unit is ready for operation. An example of the arrangement of the hydraulic power supply and electrical box is shown in Figure 25.



Fig. 25 - Example arrangement of the hydraulic power supply and electrical box in the recess of the diagnostic pit.

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6. PREPARING TO USE

Before switching on the power, make sure that there is no object in the area of movement of the plates that could block their movement.

To turn on the power of the wheel jerk device move the main switch on the electrical box to position 1 (Fig. 4). Power on is signalled by an indicator light located on the side wall of the control box. Power on is indicated by the control light located on the side wall of the electrical box.

Before starting work, periodically check according to the interval table:

- oil level in the hydraulic power supply tank (the level indicator window is located on the front of the hydraulic power supply),
- that the hydraulic system connections are leakproof
- the operation of the control lamp buttons, they must be as described in this manual.

NOTE: Be sure to charge the torch battery. The level of battery charge is indicated by the LEDs on the top of the torch. If the red LED lights up, connect the torch to the charger. Ensure that the charger is dedicated to the torch.

NOTE: In the case of an accident, damage or malfunction, when the unit stops/locks, to unlock it, the unit must be switched off and on using the main switch located on the wall of the control cabinet.

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7. OPERATING INSTRUCTIONS

7.1. Torch functions

The control lamp allows the user to control the device and at the same time to observe the chassis parts during the movements. The buttons of the wired and wireless control lamp are the same and have identical functions.

Torch control consists of two operations:

- selecting the type of plate movement (transverse or longitudinal),
- switching on the disc drive (left or right) .

Switch on the control lamp using the ON/OFF button (1 in Fig. 26). After selecting the direction of plate movement (lateral or longitudinal) with the arrows buttons (5 in Fig. 26), activate the plate drive with one of the buttons "A" and "B"(2 in Fig. 26).

To switch on the halogen bulb - press the torch button (3 in Fig. 26) and point the light at the suspension and undercarriage components to be checked.



Fig. 26 - Torch button description

The battery charge level for the wireless torch will be indicated by the LEDs (3 in Fig. 26)

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7.2. Application for Android devices functions

The control of the SZ-3,5H or SZ-16 device by an Android device with the application installed is analogous to the control by a wired or wireless control lamp.

On your Android device, run the app you have installed and downloaded from the Google Play shop. Once you have launched it, the fields whose functions correspond to the buttons on the control lamp appear.

After selecting the direction of plate movement (lateral or longitudinal) with the button 3 in Fig. 27, activate the plate drive (left or right) with the button 2 in Fig. 27.

Then switch on the halogen bulb - press the torch button (1 in Fig. 27) and point the light at the suspension and undercarriage components to be checked..

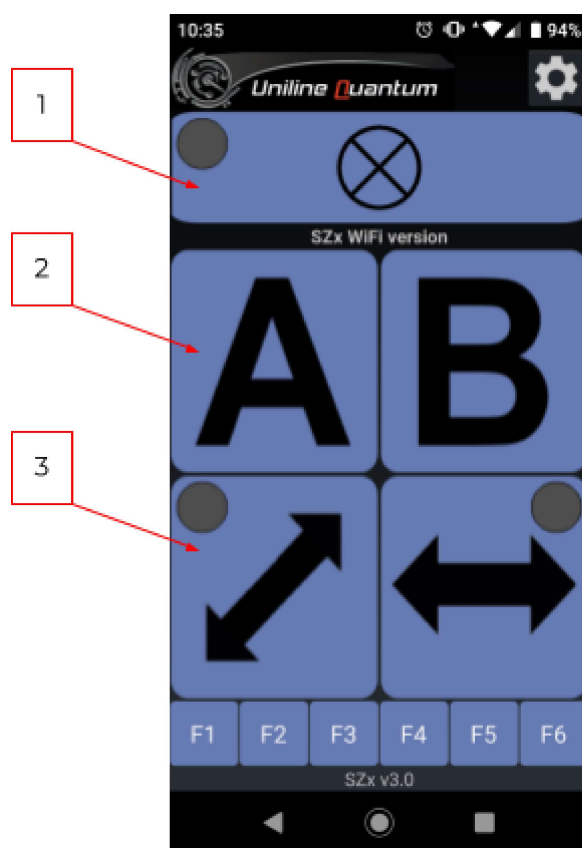


Fig. 27 - Screen of the application for controlling the SZ-3,5H and SZ-16 device

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7.3. Description of the test using the SZ-3,5H/SZ-16 device

User operation	Device operation
1. Switch on the power supply at the electrical box.	-
2. Drive the test axle slowly onto the device plates. The wheels of the vehicle should be braked (use the brake pedal lock).	-
3. Select the button switching on the bulb.	The torch bulb will light up
4. Select the direction of movement of the plates (longitudinal or transverse) by pressing one of the arrow buttons on the torch or Android device.	-
5. Select the "A" or "B" buttons on the Android device's screen, and the torch.	The left or right plate moves in the chosen in step 4 direction.
6. Using a torch to light up the undercarriage, check the condition of the joints in the suspension and steering systems while moving the plates.	The plates move in the chosen direction as long as the torch / Android device button is pressed
7. To check other components, choose the move type and plate like described above and repeat the test.	-

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8. MAINTENANCE

The correct operation of the device and keeping it in good condition depend on the correct operation and maintenance of the equipment.

Following the recommendations below will guarantee long life and trouble-free operation of the device:

1. Intermittent operation is recommended, i.e. max. 5 min. continuous operation (pause between cycles of at least 1 minute).
2. Keep the device clean.
3. Regularly perform maintenance in accordance with the table below.
4. Do not use a damaged device and report any faults in writing to the manufacturer's service department.

Description of maintenance operations SZ-3,5H / SZ-16	Number of tested vehicles*	25	750	2250	9125	36500
	Interval*	Once / week	Once / month	Once / 3 months	Once / year	Once / 4 years
*the validity of the service is determined by the parameter that occurs earlier						
Checking the hydraulic oil level in the pump tank (if necessary, filling up the oil via the filler plug)		x	-	-	-	-
Organoleptic check of the external connections of the hydraulic system, possible tightening of threaded connections		x	-	-	-	-
Checking the tightening torque of the screws fixing the moving plates; tightening torque 110 Nm		x	-	-	-	-
Checking the tightening torque of the nuts fixing the jerking device to the foundation frame; tightening torque 140 Nm		-	x	-	-	-
Lubrication of the guides with MOLYDAL 3790		-	x	-	-	-
Organoleptic check on leakage of hydraulic cylinders		-	-	x	-	-
Changing the oil in the hydraulic system		-	-	-	-	x

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9. WARRANTY

- (1) Services are provided by the manufacturer - "Unimetal" Sp. z o.o. in Złotów or authorized Manufacturer's Service.
- (2) The manufacturer provides the warranty on the principles described in the warranty book.
- (3) All warranty provisions are written in the warranty book of the device.
- (4) The construction and purpose of the device is very advanced, in order to ensure that the machine can be used for a long period of trouble-free operation, the manufacturer's service department reserves the right not to make any serious repairs themselves and to report any disturbing observations to the Office of the Service Coordinator.
- (5) If you find any irregularities in the operation of the machine, please send an email and contact the Office of the Service Coordinator:

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