

WHEEL WASHER TYPE WULKAN 360HP

USER MANUAL



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GENERAL INFORMATION

The washer can only be transported according to instructions specified in this manual.

Prior to connecting the washer, read this manual carefully.

The washer should be positioned, prepared for operation and installed according to guidelines given in this manual.

Only authorised persons may install the washer.

The washer can be used exclusively for the purposes described in this manual.

Only authorised persons may repair the washer.

Maintenance operations can only be performed according to recommendations given in this manual.

When operating the washer, use only original consumables. Similarly, only original manufacturer's spare parts should be used for repairs.

From the moment of purchase, the instruction manual must always be placed near the washer and easily accessible.

All modifications to the washer structure can only be made upon manufacturer's approval.

Observing the above recommendations will ensure safe, proper, effective and trouble-free operation of the washer, as confirmed by the CE mark. It is also the condition of manufacturer's warranty validity.

The manufacturer reserves the right to introduce changes in design, appearance and equipment of the washer.

PURPOSE AND APPLICATION

The washer is designed for washing complete car wheels, consisting of the wheel rim and tyre. All other use of the washer, e.g. washing the bare rim or tyre is not allowed and may cause damage to the washer.

As the washer is equipped with a pneumatic wheel stabilisation unit, it can be used for washing all types and sizes of passenger car, light commercial vehicle, off-road vehicle and SUV wheels up to 360 mm wide, consisting of all types of wheel rims and all types of tyres, including low-profile and Run-Flat ones. The washer is particularly recommended for washing wheels with rims made of aluminium alloys. Equipped with reinforced driving shaft, the washer can accommodate wheels with the weight as high as 60 kg.

The washing machine is a modern machine designed for operation in garages and car service stations, as well as tyre repair and vulcanising workshops and modern petrol stations.

ADVANTAGES AND BENEFITS

- after washing, allows to precisely evaluate the technical condition of the tyre and rim
- all further service operations, particularly balancing, can be performed on a clean wheel, thus ensuring driving safety and comfort
- improves the comfort of wheel maintenance and service operations - wheel disassembly and balancing
- keeps the workshop clean and neat
- extends lifetime of service equipment
- ensures effective use of operating personnel working time
- easy operation, practically without physical effort, by using five pushbuttons which control the operation of washer
- ensures effective and even more thorough washing of even very contaminated wheels by simultaneous use of the most effective washing method, proper washing material and water heating system
- does not require permanent water inlet and outlet - wheel washing is performed in a closed circuit water system
- ensures virtually trouble-free operation, confirmed by many-years of experience
- pneumatic wheel stabilisation unit reduces excessive noise and the risk of aluminium rim damage
- fully automated
- software in 6 languages

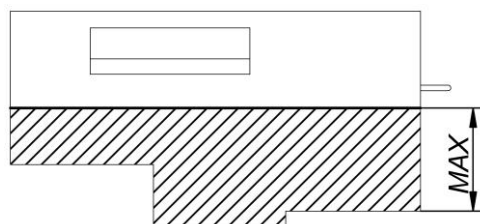
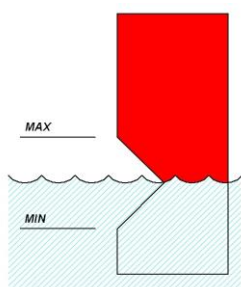
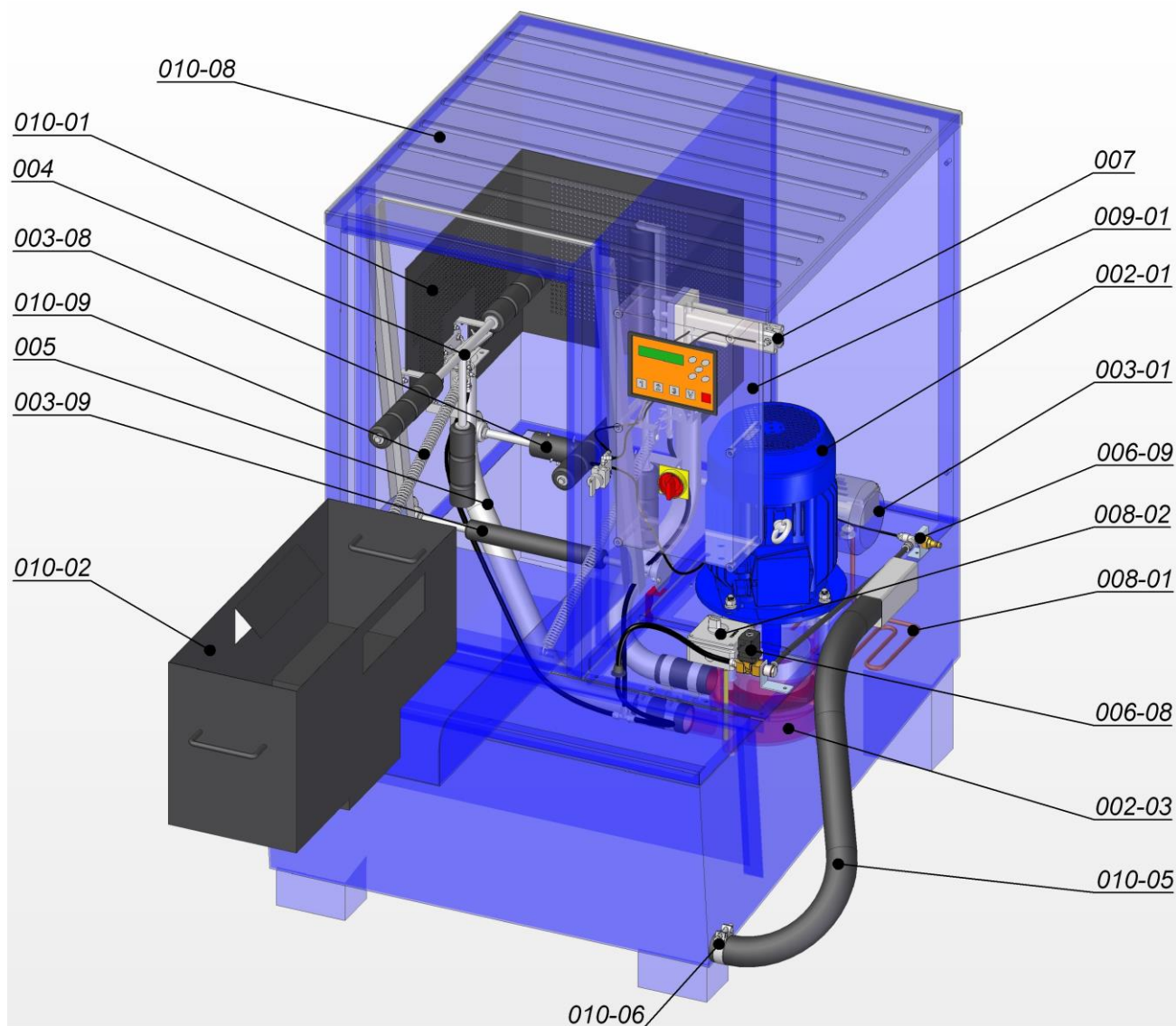
The washer meets all relevant European standards applicable to such type of equipment:

- it is equipped with triple sound insulation (perforated PVC shield and rubber mat in the washing chamber, sound damping foam in the control box) and with special anti-vibration rubber pads under each foot, which reduce washer vibrations during operation
- it saves energy
- it is equipped with ergonomic housing
- it is environmentally friendly

WASHING METHOD

The washer uses a washing method consisting in striking the wheel with a pressurized mixture of water and plastic granulate WULKAN MIX, with addition of the WULKAN TURBO washing concentrate. After the washing cycle is complete the wheel is automatically dried. The complete cycle of washing and drying lasts as short as 35 seconds. The washing operation is absolutely harmless for natural environment.

DESIGN OF THE WASHER



Washing medium level indicator

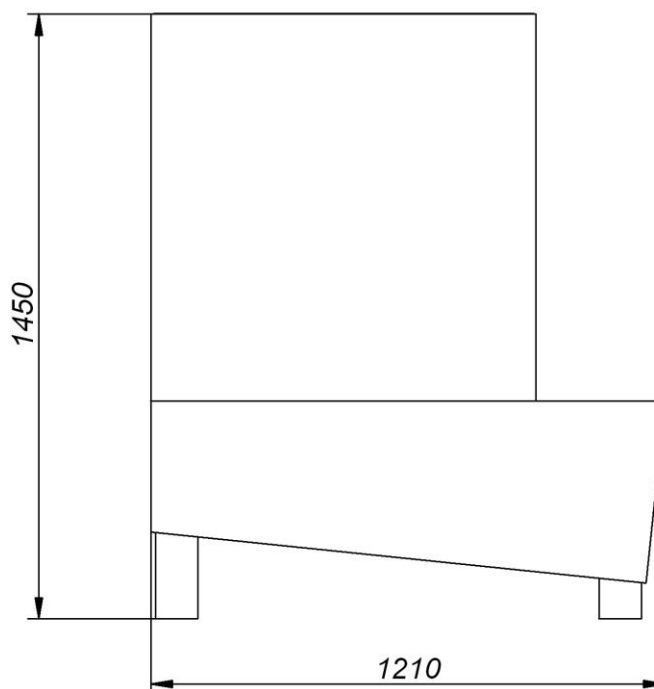
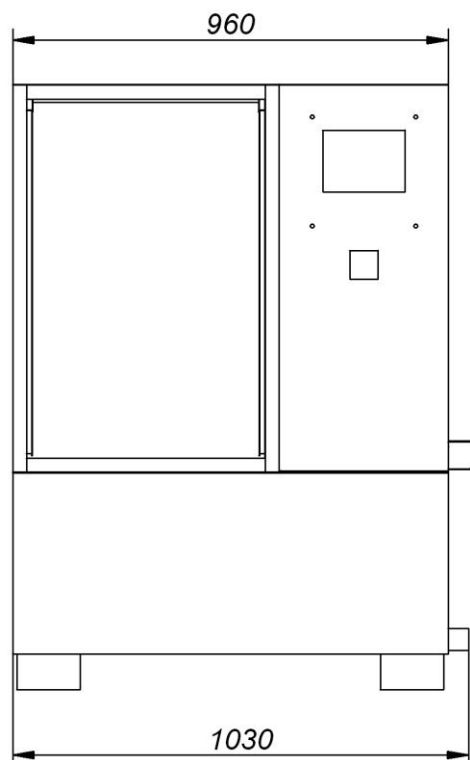
Indicator of the granulate level in the basket

WULKAN TURBO / water proportion

NUMER OF ASSEMBLY NUMBER OF SUB-ASSEMBLY NUMBER OF PART	NAME OF ASSEMBLY NAME OF SUB-ASSEMBLY NAME OF PART
002-01	PUMP MOTOR
002-03	COMPLETE PUMP
003-01	WHEEL DRIVE MOTOR
003-08	DRIVING SHAFT
003-09	SUPPORTING SHAFT
004	SET OF STABILISING ROLLERS
005	WASHING UNIT
006-08	ELECTROMAGNETIC VALVE
006-09	COMPRESSED AIR SUPPLY SYSTEM
007	PNEUMATIC WHEEL STABILISATION UNIT
008-01	HEATER
008-02	THERMOSTAT
009-01	ELECTRIC BOX
010-01	SOUND ABSORBING PERFORATED PVC SHIELD
010-02	GRANULATE BASKET
010-05	OUTLET PIPE
010-06	OUTLET PIPE CLAMPING RING
010-08	PLASTIC UPPER PROTECTIVE COVER
010-09	WASHING CHAMBER FLAP SPRING

TECHNICAL DATA

Wheel diameter range	560 - 800 mm
Wheel width range	135 - 360 mm
Maximum weight of wheel	60 kg
Washing times, factory set (adjustable, 3 programmes)	20, 40, 60 sec
Drying time, factory set (adjustable, 1 programme)	15 sec
Water heating time to 50°C	60 - 120 min
Heater power	4 kW
Pump drive 3-phase 400 V, 50 Hz, 5.5 kW	2900 rpm
Pump efficiency	600 lpm
Wheel drive 3-phase 400 V, 50 Hz, 0.37 kW	930 rpm
Motors and drive power	6 kW
Water pressure	4 bar
Quantity of water	300 l
Quantity of WULKAN MIX granulate	20 kg
Quantity of WULKAN TURBO washing concentrate	3 l
Compressed air working pressure	8 - 12 bar
Acoustic power level	89.5 dB
Dimensions (width x depth x height)	960 x 1210 x 1450 mm
Net weight	330 kg
Maximum limiting number of washing process starts (service lock)	500 starts



STANDARD EQUIPMENT

As a standard, the washer is equipped with:

- perforated basket for adding the granulate to water and for recovering the granulate during exchange of water
- 25 kg of WULKAN MIX granulate (packed in a plastic bag and a cardboard box)
- 30 litres of WULKAN TURBO washing concentrate (3 plastic containers, 10 litres each)
- rubber anti-slip mat
- plastic upper protective cover

WULKAN MIX GRANULATE

This is a mixture of specially selected small round pieces made of biodegradable plastic, with various diameters, weight and hardness. Due to diverse weights and diameters, the pieces distribute uniformly in water in the form of a suspension. The mixture was developed by the KART Company based on many years of experience and tests and ensures the best washing effect without damaging the wheel rim. The quantity of granulate delivered with the washer as a standard equipment is enough to wash about 10000 wheels. During washing and cleaning of the washer almost all granulate is recovered. To start the washer it is enough to fill it with 20 kg of granulate. The remaining 5 kg is supplied for making-up losses during washer operation. To ensure correct operation of the washer and the best washing results it is important to keep the required level of the working medium. The WULKAN MIX granulate due to its properties practically does not wear out; it is only necessary to add some granulate in order to keep its required quantity in the washing mixture.

WULKAN TURBO WASHING CONCENTRATE

It is the non-foaming, biodegradable washing agent specially designed and manufactured for the KART Company and used for improving the quality of washing operation. Apart from the components that dissolve various types of dirt and grease deposited on the tyre and rim, the concentrate also contains the agent used for dishwashing machines; this preparation additionally makes the rim shiny. Using the washing concentrate also helps keep the washing machine clean, since it prevents dirt from sticking to the washing chamber walls, thus making the washer cleaning operation much easier. The concentrate is to be diluted in the proportion of 1:100. Therefore, for 300 litres of water it is enough to add 3 litres of concentrate. The quantity of the washing concentrate delivered with the washer as standard equipment (30 litres) is enough to wash about 10000 wheels. When topping up the water during washer operation, it is important not to forget adding the respective quantity of concentrate. The washing concentrate is the optional washing agent recommended by the KART Company. When a proper proportion is maintained, the WULKAN TURBO concentrate dissolves in water and then can be safely drained to the sewerage system.

TRANSPORTATION / RECEIPT / UNPACKING OF THE WASHER

The washer should be transported with particular care due to the dimensions and weight of the machine. It is recommended to use a forklift and protective belts. To lift the washer, the fork of forklift should be inserted under the washer from the front side; otherwise the tank bottom may be damaged. When the washer is delivered and unpacked, first check it for possible damages during transportation and all report all irregularities to the carrier and the manufacturer. Then remove the granulate basket and WULKAN TURBO washing concentrate from the washer.

POSITIONING THE WASHER

The washer should be positioned in such place where the operator has easy access to all its components. The room where the washer is installed should be properly ventilated and illuminated sufficiently enough to ensure good visibility. Moreover, the room should be heated in compliance with requirements and regulations applicable to service stations and repair workshops. When the temperature inside the room is too low during winter season and there is a risk of freezing of the water inside washer, drain all water from the washer. Otherwise both the pump and the tank bottom can be damaged by ice.

Place the washer on hard concrete floor or on other hard and smooth surface. The surface should be even and stable. If it is not possible, level the washer to avoid wobbling during operation. The washer is equipped with rubber anti-vibration pads attached to the bottom of every foot.

The rubber anti-slipping mat should be placed on the floor in front of the washer. The mat is included in the standard equipment of the washer. The mat protects persons against possible slipping on the scattered residuals of granulate.

INSTALLATION REQUIREMENTS AND RECOMMENDATIONS

COMPRESSED AIR

The washer should be connected to a compressed air supply by the person who is properly trained by the washer manufacturer in the area of washer design and operation and who knows occupational safety rules in force at the given workshop, with particular attention paid to the machines and devices fed with compressed air.

The washer is designed for being connected to source of compressed air with the pressure of 8-12 bar. Prior to connecting the washer to a compressed air supply, install the air preparation unit near the washer. The compressed air connecting installation should be exclusively made of special plastic tubing designed for compressed air. The hose that connects the washer to compressed air supply should be terminated with quick coupling which, upon disconnecting from the washer, plays a role of an insulating valve. The hose should be properly dimensioned to avoid unnecessary pressure drop.

WATER

The washer operates in a closed water circuit, i.e. it does not require permanent connection to the water supply and drain systems. Therefore, whenever possible, the washer should be installed close to the draining system well.

ELECTRICITY

The washer should be connected to electric power source by a qualified and appropriately licensed electrician. This person should be properly trained by the washer manufacturer in the area of washer design and operation and know occupational safety rules in force at the given workshop.

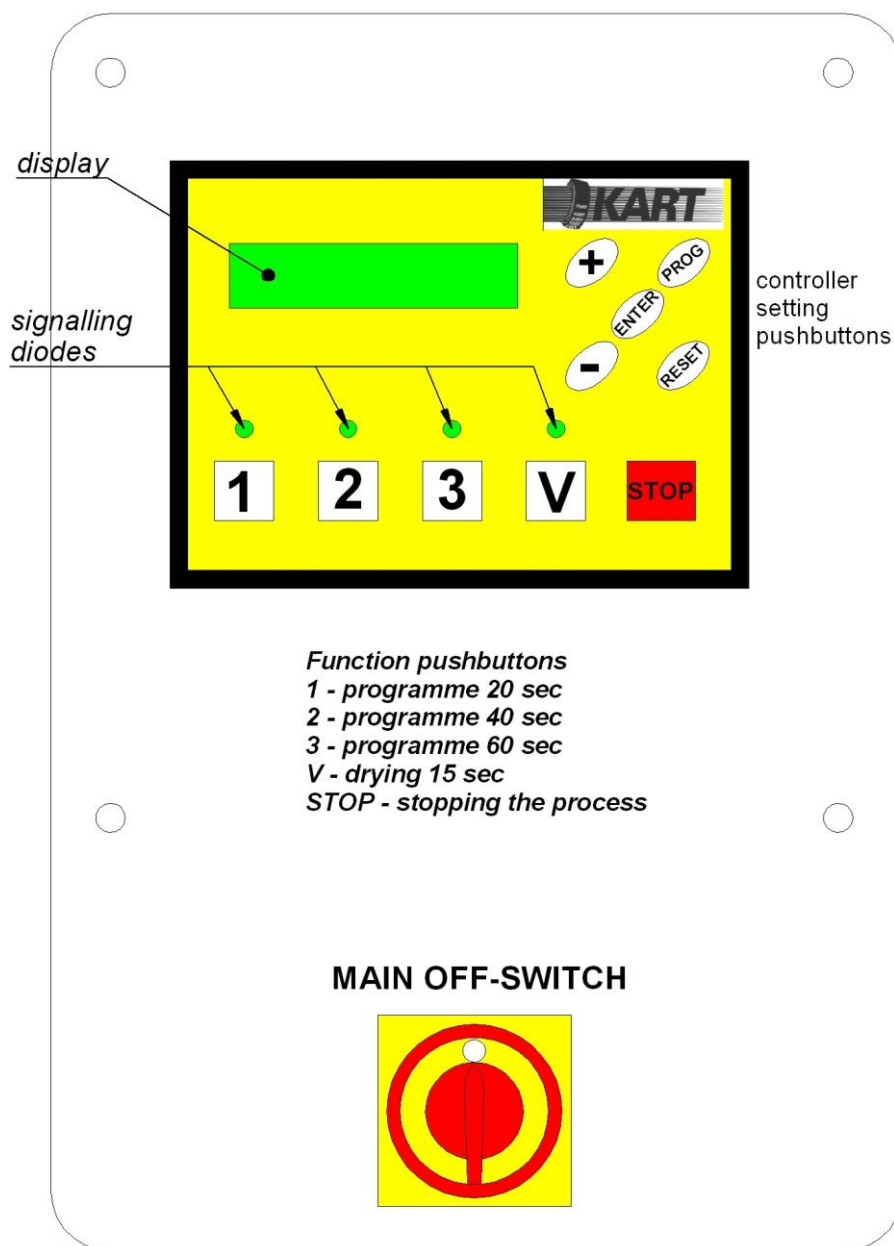
The washer is designed for being connected to three-phase, 400 V, 50 Hz, five-conductor (3L+N+PE) AC network. The washer motors are protected by own temperature and voltage protecting devices. Prior to connecting the washer to power supply, check the values of circuit breakers, fuses and possible other protective devices that protect this line. The power supply network should be equipped with 5-pole (L1, L2, L3, N, PE) connecting socket with current rating of 16 Amps, protected by overcurrent circuit breaker with current rating not less than 20 A and having the "C" class delay characteristics and additionally protected by 25 A, 30 mA, 4-pole earth fault circuit breaker (due to the motor starting current and the cross-section area of the line supplying the load that should not be less than 2.5 mm²). It is also necessary to check if all conductors of the socket are connected to the proper terminals, i.e. L1, L2, L3, N, and PE respectively. Such prepared power supply line should never be used for supplying other electric devices.

CHECKING THE MOTORS' DIRECTION OF ROTATION - TEST START

WHEN INSTALLING THE PLUG PAY ATTENTION TO PROPER DIRECTION OF MOTOR ROTATION, AS INDICATED BY YELLOW ARROWS ON THE MOTORS.

The purpose of the test start is to verify the direction of rotation of pump and wheel motors as indicated by yellow arrows placed on the motors. If the direction of rotation is incorrect, the washer will not operate properly. Motors are factory set for proper direction of rotation, but it is always possible that they will rotate in reverse direction. To check the direction of rotation, insert the washer plug into power supply socket, then turn the washer on by using main power switch on the front panel. Check the data displayed on the screen (washing chamber must be closed), then press one of washing time function buttons and check the direction of rotation for both motors. If motors rotate in the direction opposite to arrows, immediately turn the washer off by using main power switch, thus disconnecting the machine from power supply source. Then, to change the direction of motors' rotation, reverse the two PHASE conductors in machine supply cable plug or in the supply line socket. Upon reversing the conductors, turn the machine on again and check if motors rotate in the direction as indicated by arrows, and check all washing times one after the other.

NOTE: REVERSING THE WRONG CONDUCTORS MAY CAUSE DAMAGE TO THE PROGRAMMABLE CONTROLLER AND ACTUATORS IN THE SWITCHGEAR FROM WHICH THE MACHINE IS SUPPLIED AND CONSEQUENTLY, QUITE EXPENSIVE REPLACEMENT OF THE ELECTROMECHANICAL COMPONENTS!

CONTROL UNIT

NOTE: DO NOT USE DEVICES SUCH AS A MOBILE PHONE WHICH MAY DISTURB THE OPERATION OF THE CONTROLLER, IN THE VICINITY OF WASHER.

The above controller is designed for controlling the washing processes. The controller is equipped with an alphanumeric display and the following pushbuttons:

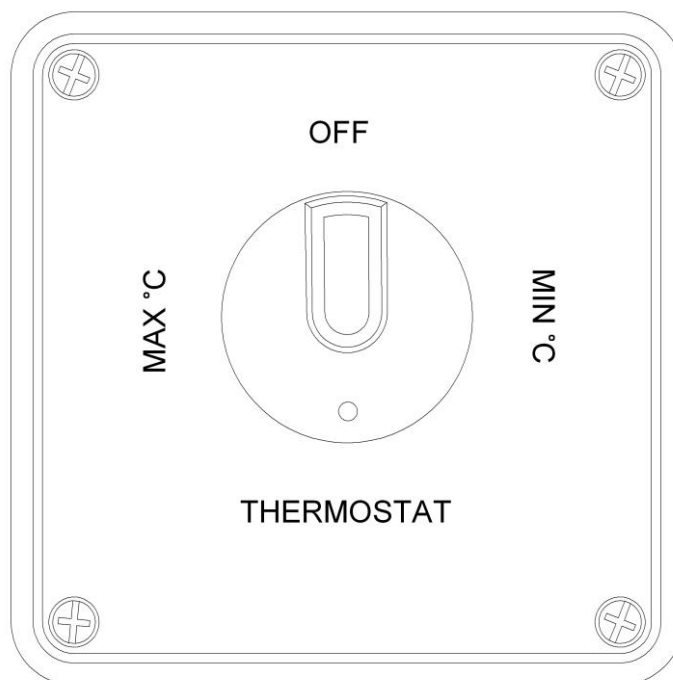
- a group of function pushbuttons located under the display and designed for activating the individual washing programmes, which is signalled by lighting the respective LED above the pushbutton;
- a group of pushbuttons designed for setting the programmer, located on the right side of the display – used for entering the controller settings (service use only).

The controller is equipped with a real time clock. This clock allows turning the heating on, on selected weekdays. It is possible to modify duration of every single washing programme, set the current time, program the timer which turns the heating on, set the counter of washing processes, manually switch the heating on and off, and to select the language of messages appearing on the display.

The display shows messages about current status of the machine - for instance: READY, BLOCKADE, EMERGENCY, PROGRAM 1 and so on. When setting the parameters, the respective values appear on the display. Also, the current date and time and the status of heating (ON or OFF) appears on the display.

The operation of the washer is controlled by the main switch, three washing buttons and the STOP button. Actuation of the main switch SG turns the washer on. Upon pushing of one of three washing time buttons (20, 40 or 60 seconds) the operating cycle starts (washing and blow-off). Pressing the STOP button interrupts the washing cycle, stops the pump and automatically starts the 15-second blow-off cycle, which is signalled by lighting the LED diode.

HEATER THERMOSTAT - GENERAL VIEW AND PRINCIPLE OF OPERATION



OFF	– heating is turned off
MIN°C	– turning the heating on
MAX°C	– maximum heating level
MIN°C - MAX°C	– heating temperature range

The above operations can be performed only upon starting the programme in the controller.

NOTE! NEVER TURN THE HEATING SYSTEM ON
IF THE WASHING CHAMBER IS NOT FILLED WITH WATER TO THE REQUIRED LEVEL!
/OFF position/

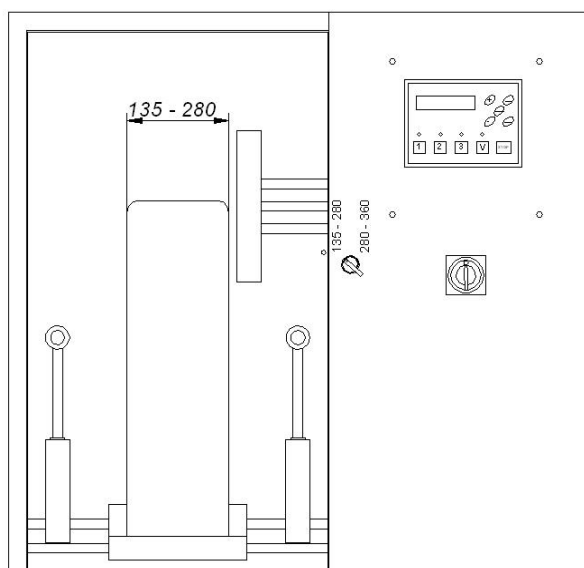
PNEUMATIC WHEEL STABILISATION SYSTEM - PRINCIPLE OF OPERATION

The pneumatic wheel stabilisation unit consists of the stabilising (thrust) roller mounted in rotary manner in the metal frame connected to the piston rod of the D32 cylinder.

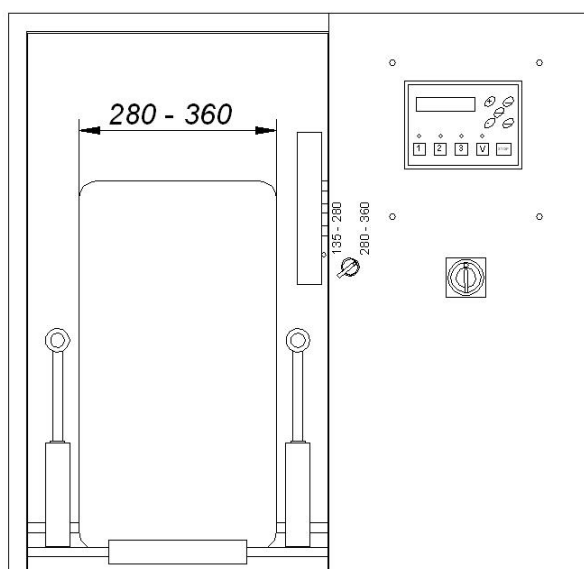
The actuator is controlled by two-position valve equipped with the knob on the housing.

Position **135-280** – the roller is in working position (pushed close to the wheel) - for wheels with the width of 135 - 280 mm;

– is designed for stabilisation the wheel and maintaining it in vertical position



Position **280-360** – the roller is in idle position (pushed away from the wheel) - for wheels with the width of 280 - 360 mm.



START-UP AND OPERATION

Before starting the washer check all electrical and compressed air connections. Prior to delivery to the customer, every new washer performs a trial washing cycle in the factory in order to check if the machine operates properly and clean it and its components from possible contaminations deposited during the production process. The delivered washer is ready for operation after connecting it to the electric power and compressed air supply.

The person responsible for start-up and further operation of the washer should be properly trained by the washer manufacturer in the area of washer design, operation and use, and should know occupational safety rules valid in the given workshop, with particular attention paid to the machines and devices powered by compressed air. Moreover, this person should be familiar with this instruction manual in detail.

To start the washer operation, proceed as follows:

1. Turn the main SG switch on.
2. Open the washing chamber flap and then fill the chamber with water up to the lowest level on the red level indicator located inside.
3. Pour about 20 kilograms of granulate to the basket (this amount corresponds to the level indicator on the basket), then pour the basket content to the washing chamber.
4. Add about 3 litres of WULKAN TURBO washing concentrate and top up the mixture with water to the upper line on level indicator. The level of such prepared washing medium should not exceed the line on the level indicator corresponding to the maximum allowable level and should not be lower than the minimum level.
5. Close the washing chamber flap and turn on the water heating system. It is recommended to set the thermostat indicator between MIN and MAX positions. It is not recommended to adjust the thermostat to maximum position. Our experience and tests show that best washing results are obtained when the washing medium temperature is set to 50 degrees Celsius. The water heating system installed in the washer is equipped with temperature limiting device which protects against overheating that can damage the washer.

NOTE: NEVER TURN THE HEATING SYSTEM ON IF THE WASHING CHAMBER IS NOT FILLED WITH WATER TO REQUIRED LEVEL, OTHERWISE THE HEATER CAN BE DAMAGED.

6. Press the '1' pushbutton corresponding to the shortest washing time (20 seconds) and perform first trial washing cycle (without the wheel). Then it is possible to start the basic washing operations.
7. Evaluate the degree of wheel contamination. Before inserting the wheel to the washing chamber remove all movable items: plastic decorative hubcaps, balancing weights, valve protective caps and labels on the tyre, since they may clog the sprinkling nozzles or even damage the main pump. Never wash the wheel in the washer if the tyre is flat as a result of prolonged storage without inflation, since such wheel will not rotate and can damage the washer.
8. Carefully close the washing chamber flap. Do not let the flap go until it is fully open or closed.
9. Operating the knob on the front panel position the roller of pneumatic wheel stabilisation unit in proper position, depending on the wheel width:

Position 135 - 280

or

Position 280 - 360

10. Depending on the degree of wheel contamination, press the suitable washing time pushbutton. The washer is has three washing times pre-programmed in the factory, i.e.: 1 (20 seconds), 2 (40 seconds), and 3 (60 seconds), and the 15-second drying time. Years of experience gained by users show that such settings are optimum and most energy saving, while ensuring the highest efficiency. If wheels are extremely dirty and washing result is still unsatisfactory, the washing cycle can be repeated. To reduce washing time below 20, 40, and 60 seconds respectively, press the STOP button and then the V button. Due to electronic type of control, it is also possible to set any washing and drying time, thus adopting the washer settings to individual needs of a particular user.
11. Upon completion of the washing cycle, the drying cycle starts automatically and lasts for 15 seconds. Each of the washing and drying processes can be interrupted at any time by pressing the STOP pushbutton. During the drying cycle the granulate residuals are removed by compressed air.
12. When the wheel is already washed and dried, open the washing chamber flap and remove the clean wheel from the inside. Before fixing the wheel to the car remove residuals of granulate possibly left on the wheel after the drying process.
13. At the end of working shift, disconnect both the electric power and compressed air supply to the washer.

NOTE: DO NOT OPEN THE WASHING CHAMBER DURING WASHER OPERATION!

The washing chamber flap position sensor installed in the washer prevents starting the washer if the flap is fully or partially open. The open flap is signalled on the display by the CLOSE message. Upon closing the flap, the CLOSE message disappears from the display and the washing processes can be started again.

CLEANING THE WASHER

To ensure full availability of the washer and to extend its lifetime, it is necessary to keep it clean according to specifications.

Planned dates of washer's cleaning must be strictly observed. During the winter season, when roads are sprinkled with chemical anti-freezing substances, pay particular attention to the foam and remove it at once, if appears, since this foam lowers the quality of washing by creating the wrong level of washing medium and possibly by causing the granulate to clog the sprinkling nozzles.

When any washing cycle is started, this event is recorded by in-built counter programmed for 500 washing processes. When the counter reaches this number of counts, the washer is automatically blocked and requires cleaning from dirt and replacing water. The drying process is counted as a final stage of washing cycle. Starting the additional drying cycle is not recorded by the counter as a separate washing cycle. To achieve one-to-one correspondence between counter counts and the number of washed wheels, it is necessary to set washing times according to actual needs so that one washing cycle is performed for every single wheel. Repeating the washing cycle for the same wheel will be recorded as next, separate cycle. The service lock can be reset by simultaneous pressing and holding for ca. 10 sec. of RESET ENTER PROG pushbuttons, in this particular order, with the machine switched on.

It is recommended to clean the washer on regular basis; such cleaning should consist in daily inspection of washer and removing dirt from the sedimentation tank located in the front part of washer. Due to special design of the sedimentation tray bottom, which is inclined towards the front of washer, the natural sedimentation process causes dirt to accumulate on the bottom in the front part of tank. This part is easily accessible after lifting the service flap. This operation can be performed also when the washer is running. The sedimentation tank is separated by a barrier preventing granulate from entering the sedimentation tank area. Upon completion of 500 washing processes and resetting the service lock it is necessary to evaluate the degree of washer contamination. If wheels being washed were just slightly contaminated, then after resetting the lock the washer can continue work. Upon completion of another 500 washing processes and next activation of service lock it is obligatory to clean the washer thoroughly and replace both water and granulate with fresh ones. This will ensure further, proper operation of washer and effective washing of wheels.

If the washer has to be relocated to another place, remember that it can be lifted by a forklift and the fork has to be inserted from the front side of washer, otherwise the bottom of tank can be damaged.

To clean the washer, proceed as follows:

1. Open the washing chamber flap.
2. Ensure that there is enough water in the washer, otherwise top up water to the upper level on the level gauge.
3. Insert the basket (delivered with the washer) to the washing chamber, close flap and perform the longest washing cycle twice.
4. Upon completion, remove the basket with recovered granulate and top up the amount of granulate to the level indicated on the basket.
5. Lift up the service flap of sedimentation tank and remove the barrier.
6. It is recommended to leave water in the washer for some period of time (e.g. for a weekend) to allow dirt to collect on the tank bottom as much as possible, in order to prevent entering it into sewage system later on.
7. Drain contaminated water.
8. Remove dirt deposited on the tank bottom by using a small scoop and collect it in special container for hazardous waste material; then thoroughly rinse the barrier, tank and washing chamber with a stream of water from a hose.
9. Upon completion of cleaning re-insert the barrier, close the service flap of the sedimentation tank, fill the washing chamber with water, pour the granulate from basket, add about 3 litres of WULKAN TURBO concentrate and top up with water to the upper level on the level gauge.
10. When the washing medium is prepared, the washer can continue the work.

The removed dirt should be treated as hazardous waste and disposed of in compliance with valid regulations. The dirt should be neutralised by using commercially available substances designed for such purpose.

INSPECTION AND MAINTENANCE

To ensure full availability of the washer and to extend its lifetime, it is necessary to perform maintenance operations in regular intervals and immediately report and repair all malfunctions, defects and damages.

During replacement of water, washing and cleaning of washer, i.e. during the so-called maintenance shutdown, remove side cover of control chamber and check if all cable connections of electrical components are properly tightened. As the continuous vibrations occur during machine operation, the cable connections may get loose and contribute to improper functioning of the washer. If any loose terminals are found, tighten them by using appropriate tools. It is also necessary to check the condition of connections between the hoses connecting the pump with supply lines and delivering the washing medium from pump to sprinkling nozzles.

The main "SG" switch completely disconnects the machine and plays the role of an emergency switch. If necessary, this switch can be blocked by locking with a padlock for the time of maintenance and repair shutdown. If any warning or protecting device activates, the machine operation is automatically interrupted. The machine can be restarted only upon repairing the cause of malfunction and elapsing the approx. 5 seconds required for resetting the controller after failure.

The water level in the washer should be checked on a regular basis, since the amount of water inside the machine decreases during machine operation as a result of vaporising, particularly of warm water. It is also necessary to check the washer for foaming, which in most cases is caused by excessive amount of dirt and/or washing fluid. Foam must be removed immediately. If water level is too low and foam is present, the washer may function improperly, the washing may be ineffective and the risk of clogging the nozzles may occur.

Please remember that granulate should not be present in the sedimentation tank that is separated from washing chamber by the barrier. Otherwise, the granulate present in the tank will not be transported to the pump and the result of wheel washing will be worse. If any granulate is found in the tank, it should be removed and poured into washing chamber.

REPAIRS

The person who operates the washer should immediately report all malfunctions, defects and damages that are found during machine operation. The washer can be repaired only by manufacturer's personnel or by the authorised person trained by the manufacturer. Moreover, the person who repairs the washer must have all required qualifications and skills. In case of worn or damaged parts which are not classified as separate replacement parts and constitute an integral part of the unit in which they are working (e.g. driving shaft, supporting shaft and so on), the manufacturer will perform renovation of such part or will deliver a brand new unit.

The table below shows the possible causes of defects and malfunctions, along with repair recommendations.

Item	Symptoms of malfunction	Possible cause	Recommended action
1.	Noisy operation of washer.	Worn bearings.	Replace shaft.
2.	Overload protection of main motor triggers repeatedly.	Insufficient level of washing medium or too much granulate in water.	Increase the amount of washing medium to the indicated level, remove some amount of granulate from washer.
3.	Noisy operation of the contactor, possible sparking.	Worn contactor contacts.	Replace contactor.
4.	"Striking" the wheel with granulate is not heard.	Clogged nozzles.	Clean the nozzles.
5.	The wheel does not rotate, falls or blocks itself.	Worn spikes of the driving shaft.	Replace driving shaft.
6.	Even after the longest washing cycle, the wheel is not washed properly.	Insufficient amount of granulate and washing concentrate; water contaminated.	Add granulate and/or washing concentrate; replace water with fresh one.
7.	Improper settings of cycle times.	Errors in programming.	Reset the machine to factory settings.
8.	Message: EMERGENCY	Clogged nozzles or damaged shaft.	Clean nozzles and turn the motor switch FT1 or FT2 on; replace shaft.
9.	"Strange" marks or symbols appear on the display.	The battery is faulty or exhausted.	Replace the battery (type CR2032).
10.	The washer does not start - the message appears: BLOCKADE	The service locks actuated after performing 500 washing cycles.	Reset the service lock by simultaneous pressing and holding of RESET ENTER PROG pushbuttons, then perform washer cleaning and washing (recommended).

WARRANTY TERMS

The manufacturer warrants safe, proper, effective and trouble-free operation of the washer, provided all guidelines and instructions for machine use, included in this manual, are observed. The warranty period is 24 months from machine reception or delivery date. During the warranty period the manufacturer ensures free replacement parts and repairs, if it is not possible to perform the latter by the user itself or by the distributor's service personnel.

The above warranty covers only those defects and damages that are caused by reasons inextricably linked with the product itself, by use of improper materials, occurrence of manufacturing errors, defects in assembly and faulty functioning.

After the warranty period, the manufacturer ensures permanent availability of all replacement parts and making the repairs, if the latter are not possible to be performed by the user itself or by distributor's service personnel, according to the valid price list.

When reporting the failure or ordering spare parts, always specify the type of machine, serial number, year of manufacture and the part number. Within the warranty period it is also necessary to specify the date of purchase and invoice number and deliver the defective part and/or documentation confirming the defect (e.g. a photograph), along with a description of defects and circumstances of the defect occurrence.

The list of spare parts for individual units can be found at the end of this manual.

If it is found that a part must be replaced or a repair performed, please contact the manufacturer - KART, Bychowska 22; 04-523 Warsaw, Poland, Tel. no.: +48 22 812-55-05; Fax: +48 22 812-55-05; e-mail: info@kart.pl or with the distributor's service personnel.