# MINIMAX

# MiniMax offers:

- a unique modern design to capture the attention of Customers;
- versatility in installation and optimization in use, made possible by the self-supporting structure;
- the safety and look guaranteed by the protective devices and side coverings, as well as the newly developed drive system;
- total and precise washing and drying, with results that can easily be compared to those offered by top performing gantry but with almost double the productivity;
- the choice of accessories and optional washing groups for even better results;
- sophisticated software to control the brushes and patented drying system Air Plus combining advanced technology and unsurpassed simplicity.

# Machine characteristics

**Minimax can wash up to 30 cars per hour**

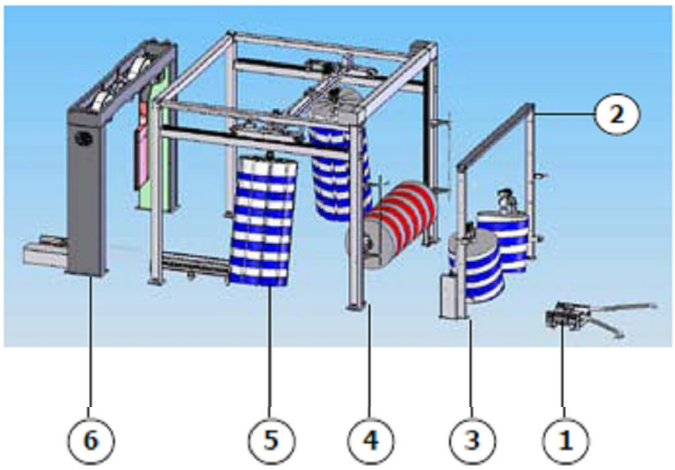
MINIMAX is a washing and drying centre for passenger cars. The washing cycle is carried out using rotating brushes while the vehicles are pulled, one after the other, though the different stations of the machine.

The vehicle to be washed is positioned in the entry section and is automatically pulled, by a motorised chain system, through the complete length of the tunnel.

Thanks to the modular design of the machine, it is possible to have many different machine configurations, including standard equipments, optional washing groups and different accessories.

The basic configuration of the system includes the five main sections listed below and shown in the figure:

1. Conveyor.
2. Entry section with water and shampoo distribution system.
3. Wash station with inclined short brushes.
4. Top brush wash station.
5. Translating side brushes.
6. Drying station.



# Washing cycle

**Tunnel entry section**

A photoelectric cell system is installed (1) at the beginning of the tunnel, in order to detect the presence of the vehicle. When the vehicle is correctly positioned, the automatic washing cycle can be started.

Starting of the cycle means that the conveyor chain begins to pull the vehicle into the tunnel and that the control system begins to monitor the position of the vehicle along the whole drive-though movement, from the beginning to the end of the tunnel. The continuous control of the vehicle's position allows the start in sequence of the washing groups.

A traffic light system is installed at the entry side of the tunnel to control the access of the vehicles.

**Conveyor system**

The conveyor system includes a motor driven chain, equipped with several rollers mounted at regular and suitable distance between them.

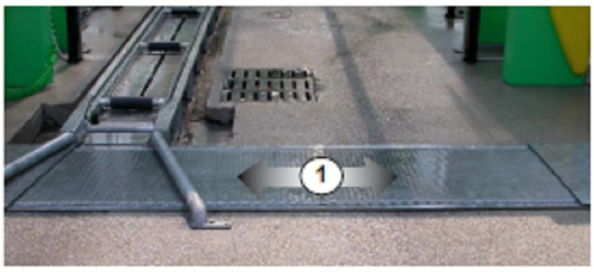
The conveyor chain is driven through a fix speed motorgear.

Once the vehicle is correctly positioned, with the gear in neutral, a chain roller comes out behind the left front wheel, pulling it ahead and moving forward the vehicle.

The conveyor system structure is embedded into a channel prepared on the pavement.

At the beginning of the chain, a wheel guide unit has the task to facilitate the introduction of the wheel.

Upon request, other types of wheel correlator units are available, with cross-sliding platform (1) or, alternatively, with cross-sliding rollers.



**Pre-wash section – Shampoo arch**

Before the activation of the brush groups, the surface of the vehicle will be pre-washed with shampoo, delivered through the nozzles of the side arches (1).

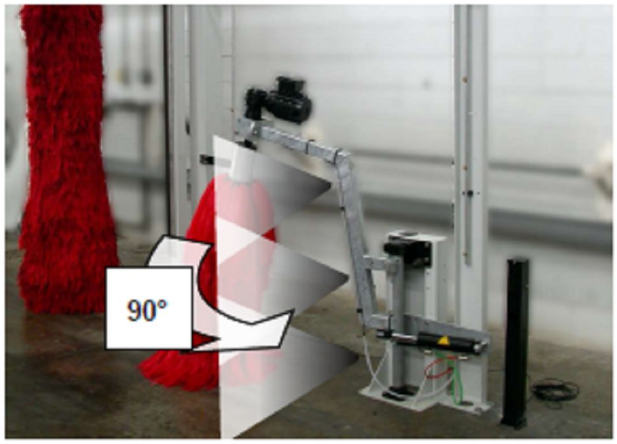
The nozzles of the shampoo arch are used for foam application as well.

**Short side brushes, inclined**

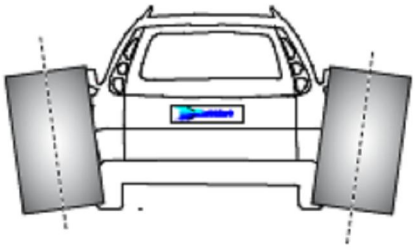
The first station that will be activated by the vehicle's forward movement, is the group with the two inclined short side brushes; each one of the two brushes is fitted on a structure that can rotate by 90° in order to reach the centre of the vehicle's front.

When in stand-by position, the brushes are closed towards the centre of the tunnel, they are opened gradually by the driving through of the vehicle an close again at the vehicle's rear side.

During the rotation, the brushes are kept wet by a series of spraying nozzles which are fitted to the machine frame, as shown in the figure. In this washing phase, the unit uses normally recycled water.




These brushes are designed for the washing of the corners and the lower sides of the vehicles.



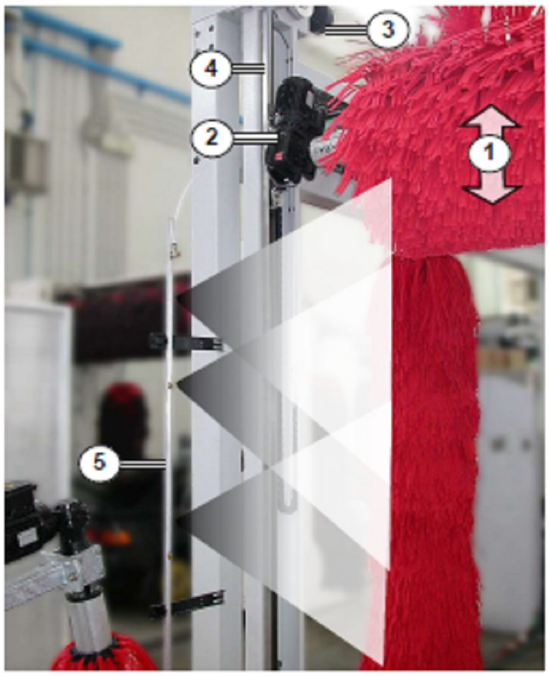
**Top brush**

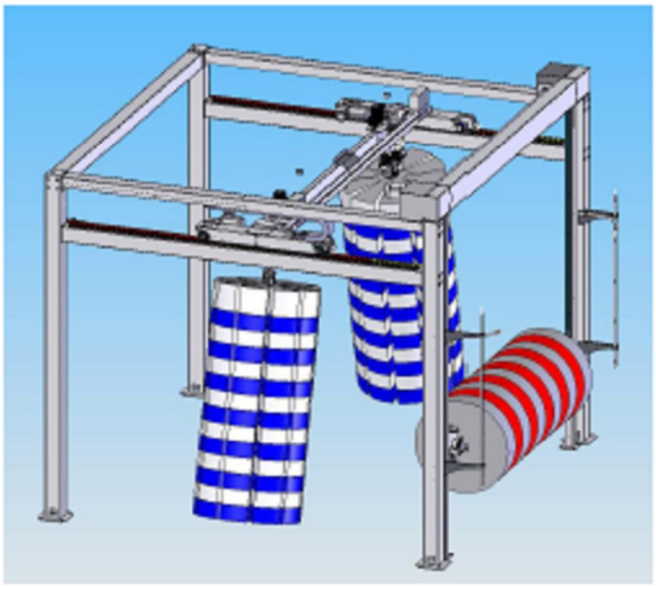
The top brush, with up and down movement, is the second station in the tunnel. The system includes following parts:

1. Brush
2. Brush rotation motorgear.
3. Motorgear for the raising of the top brush.
4. Flat raising belt.

During their rotation, the brushes are soaked with water that is delivered through the nozzles of the side arches (5).

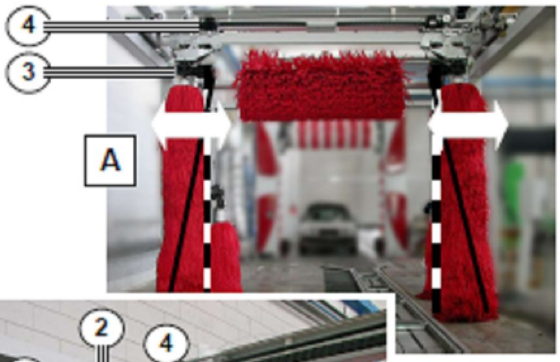
The power absorption of the motor is controlled during the rotation of the brush, in order to check for anomalies that could be caused by collisions or entanglements of the brushes with protruding parts of the vehicles.



**Translating side brushes**

It is the third washing station and includes two independent and rotating side brushes, mounted on a motorized frame with a linear movement to follow the vehicle. Each one of the brushes is fitted to a motor driven trolley and can also move crosswise for overlapping wash. The longitudinal travel of the station support frame is 2220 mm.

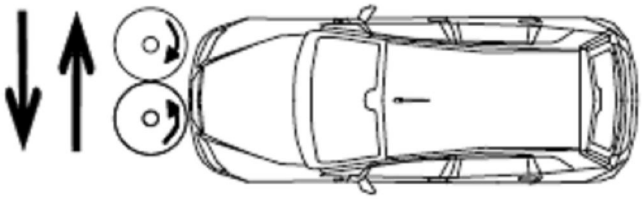



Composition

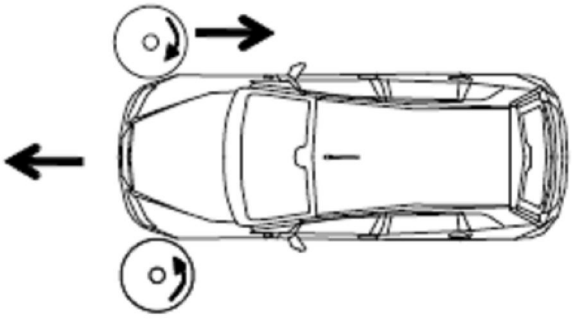
1. Side brushes
2. Linear translating frame
3. Motorgear for the rotation of the brushes
4. Motorgear for the movement of the brushes along the cross beam
5. Motorgear for the longitudinal movement of the support frame


Operation

At the beginning of the cycle, the brushes are positioned on the centre-line of the tunnel. The washing of the vehicle's front can begin with several alternated movements from the right to the left ("overlapping"). During this phase the wheel mounted main support frame moves forward following the vehicle and, close to the end travel limit switchers, the brushes open until they reach the corners of the vehicle's front.

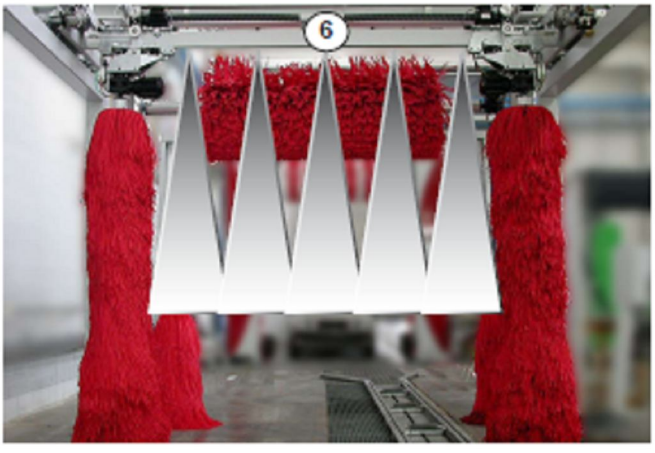


Now the brushes are tilted, as shown in figure (A), thanks to the action of pneumatic cylinders. The inclined position of the brushes improves the action of the brushes on the upper part of the vehicle, considering that the lower part has been already washed by the first group of short side brushes. During this phase the brushes support frame moves longitudinally backward in order to reach its starting position and be ready to follow and wash the vehicle's rear side.



The back side of the vehicle is washed the same way as the front side. At the end of the cycle the brushes will be again closed towards the centre of the tunnel and the brushes support frame will be in stand by position, waiting for the next vehicle.

During the rotation, the brushes are soaked with water delivered through the of nozzles (6) that are fitted to the trolley cross beam. The power absorption of the motors is controlled during the rotation of the brushes, in order to check for anomalies that could be caused by collisions or entanglements of the brushes with protruding parts of the vehicles.



**Wax arch**

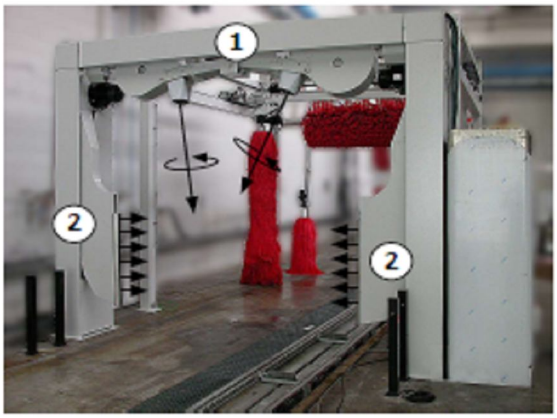
In this station the vehicle is sprayed with a mixture of fresh water and wax chemical in order to clean and rinse the surface of the vehicle, taking off the recycled water of the washing cycle. Due to the wax, the water drops are not sticking to the surface of the vehicle and are easily pushed away under the action of the air flow coming out from the next drying station.

This group is installed before the drying section.

**Drying system**

The system includes one vertical and one horizontal working section.

1. The horizontal group is equipped with two blowing nozzles. These are secured to special motor driven supports that keep the drying nozzles rotating and oscillating around their axis, at variable speed.
   - Each drying nozzle is equipped with a 3 kW blowing fan.
   - Diameter of the drying nozzle is 180 mm
2. The vertical working group includes two side drying nozzles which are mounted on the opposite gantry columns. Each nozzle is equipped with one 4 kW (5,5HP) air blower, fitted on top of the relevant gantry column.



# Technical features

.Double hydraulic circuit for recycled water

| Overall dimensions (mm) | |
|---|---|
| Conveyor chain length | modules, upon request |
| Unit width | 5900 |
| Unit height | 4010* / 5010** |
| Washing width | 2200 |
| Wheel runway width | 350 |
| Washing height | 2300 |

* without roof and gutters

** with roof and gutters

| Technical data | |
|---|---|
| Power supply (V) | 400 ± 10% |
| Installed power (kW) | variable, depending on machine configuration (power of basic configuration: 25) |
| Frequency (Hz) | 50 / 60 |
| Conveyor speed | 3 meters per minute |

## WATER QUALITY

The correct operation of the washing equipment is granted only if the water used for the washing process is in compliance with the following characteristics:

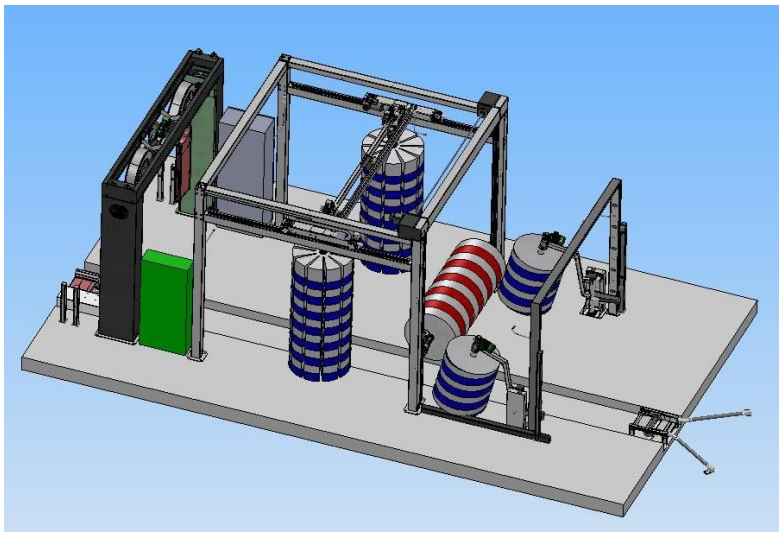
| | Tunnel or gantry units |
|---|---|
| PH | 6-8 |
| Hardness (°f) | < 30 |
| TDS (mg/l) | < 3.000 |
| Turbidity max (NTU) | 1 |
| SDI | - |
| Free chlorine (mg/l) | - |
| Iron (mg/l) | < 2 |
| Manganese (mg/l) | - |

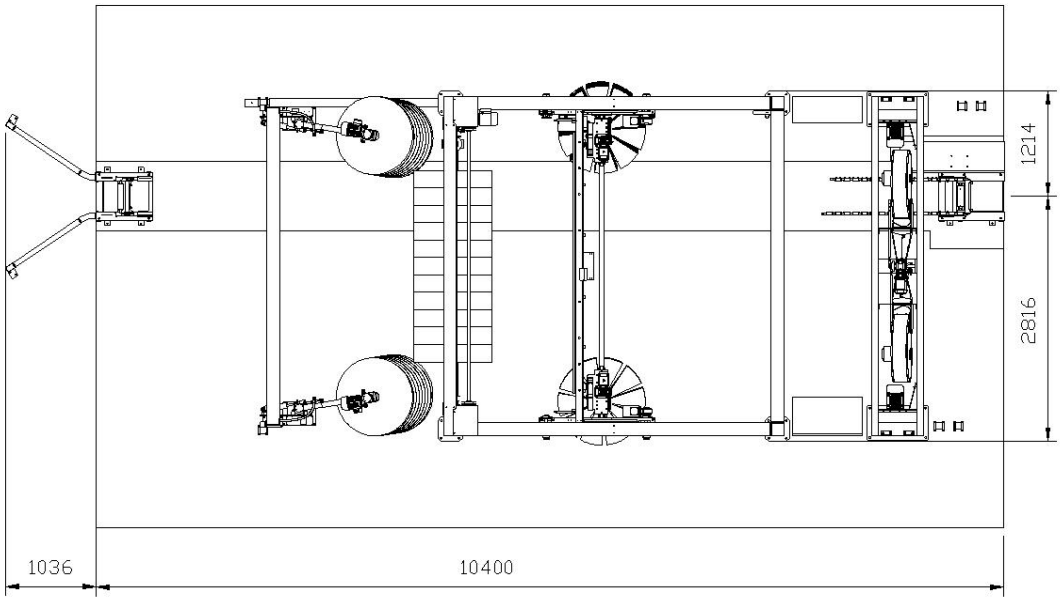
If above parameters are not met, Ceccato is at your disposal to study and propose the most suitable water treatment solution to obtain the required water quality.

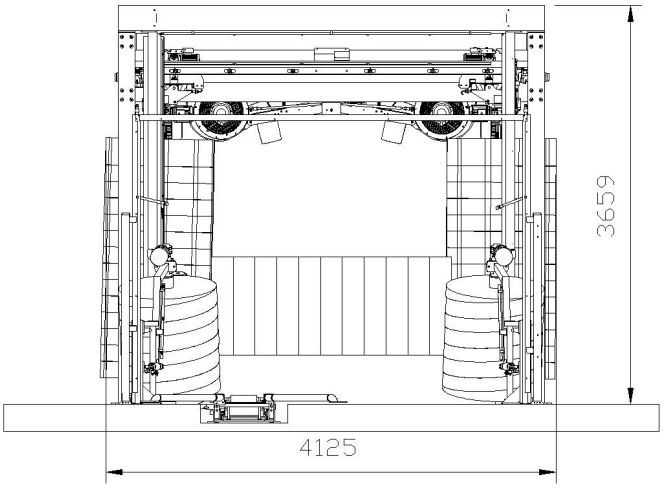
## CHEMICALS AND WATER CONSUMPTION (single cycle)

| | Water consumption | Chemical consumption |
|---|---|---|
| | lt | cc |
| Emollient | 8 | 25 |
| High Pressure | 500 | |
| Wheelwasher | 30 | 25 |
| Half brushes | 25 | |
| Shampoo | | 5 |
| Foam | | 25 |
| Horizontal brush | 25 | |
| Traslating brushes | 50 | |
| Wax | | 25 |

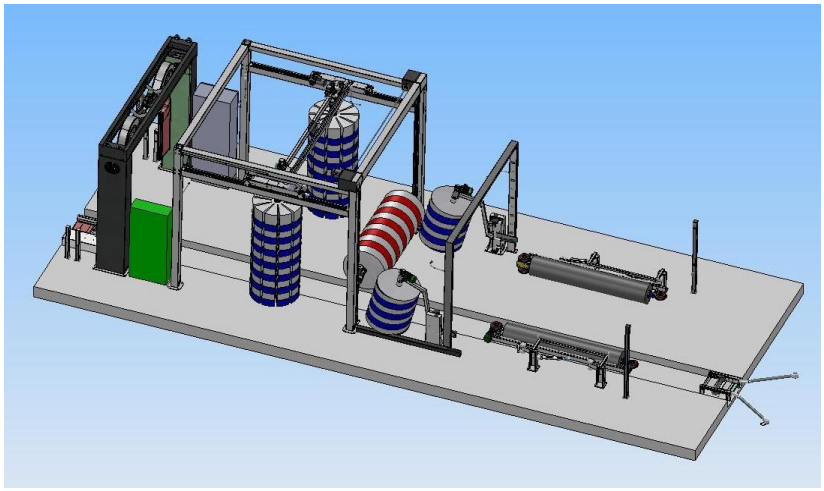
# MiniMax mod. Dynamic

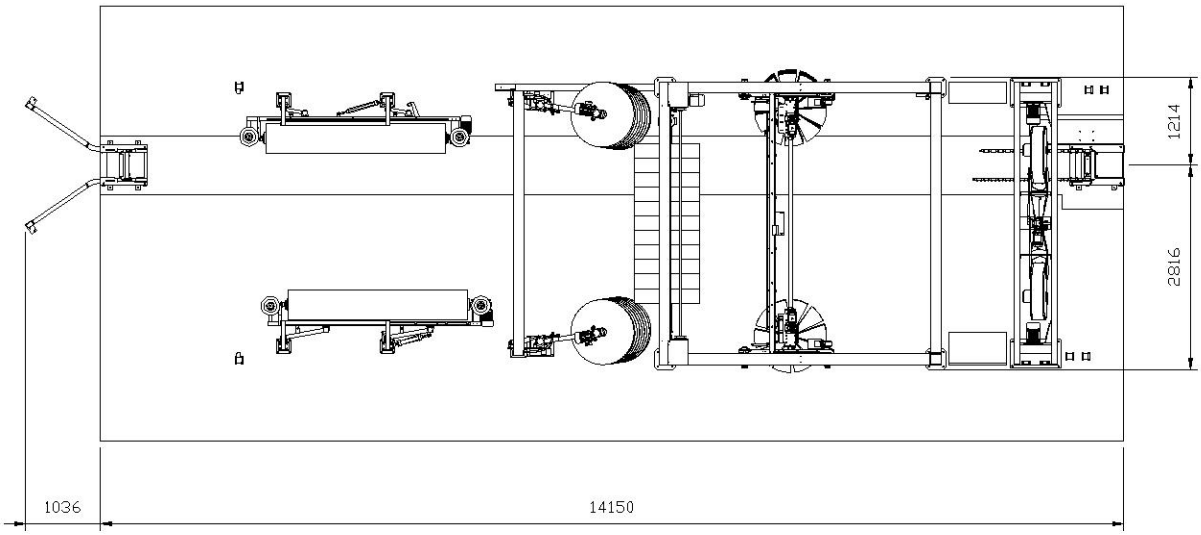


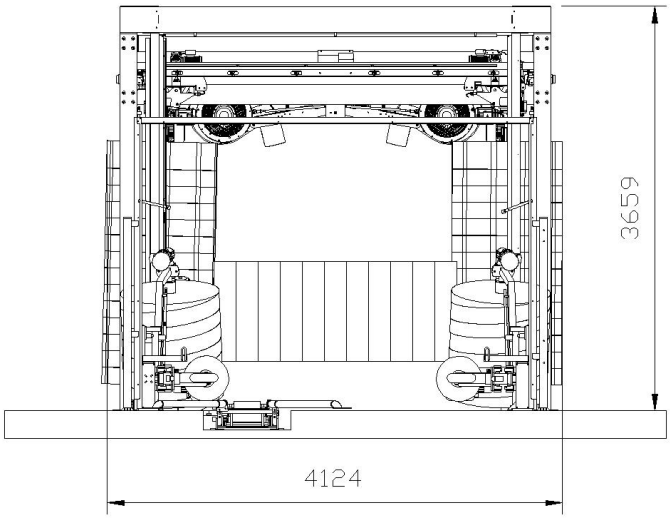


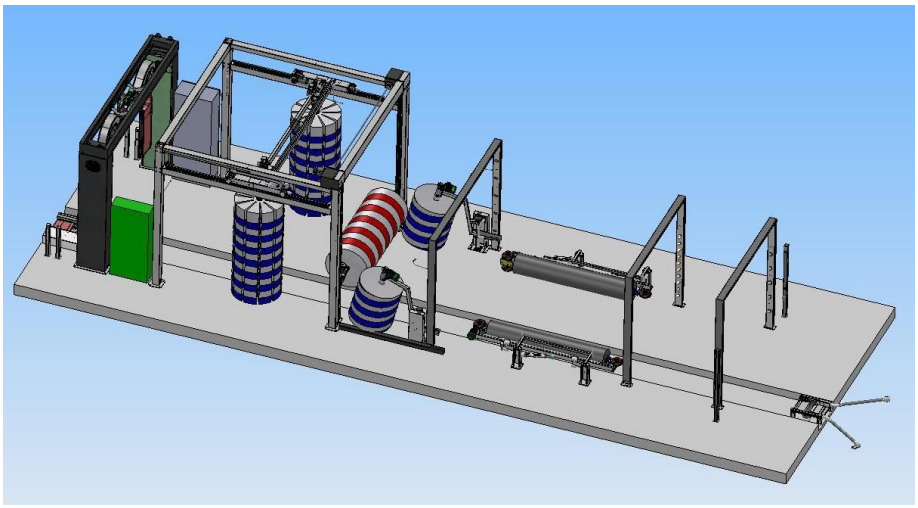
# MiniMax mod. Smart

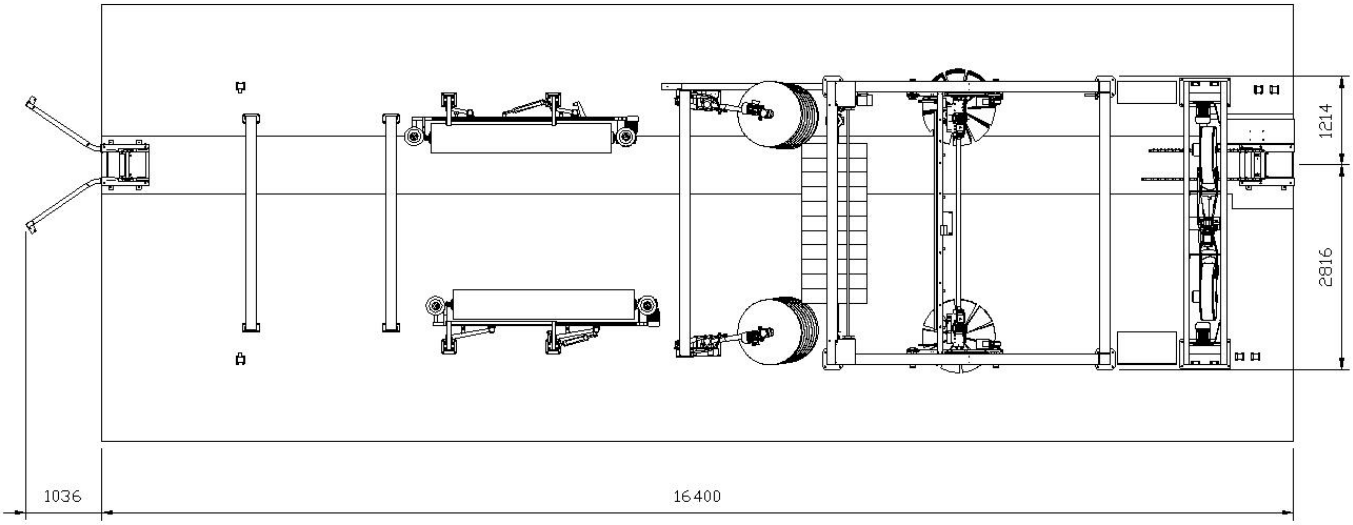


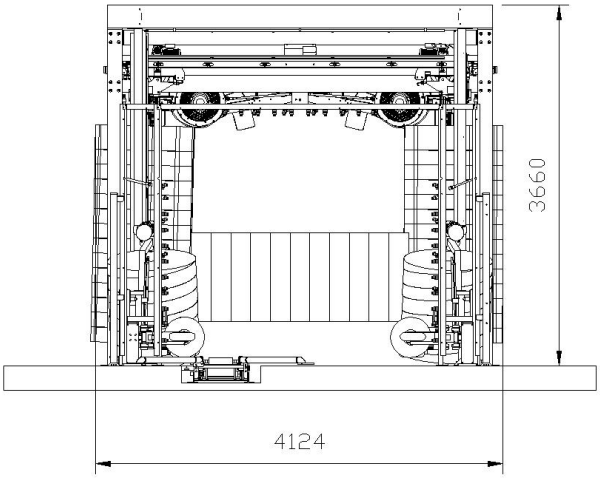


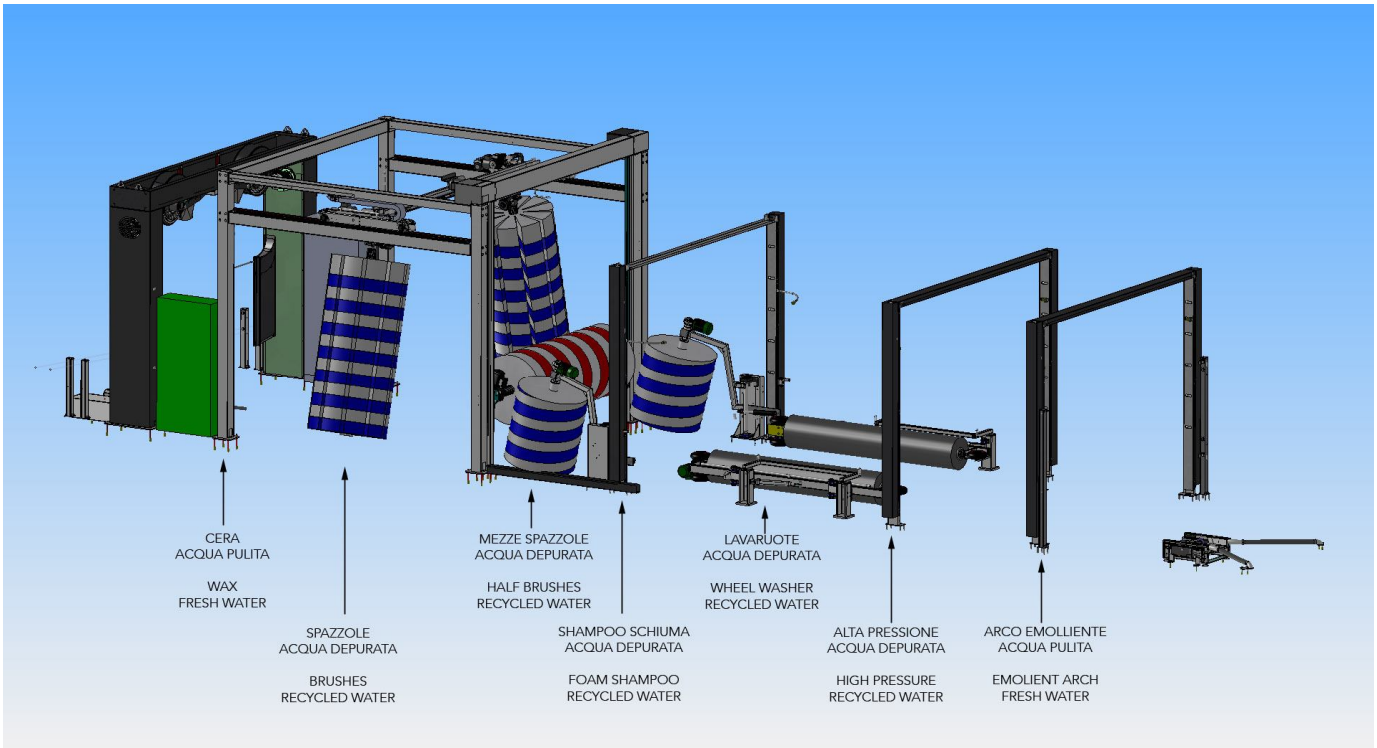
# MiniMax mod. Edition





## Process Water Quality




## Water Treatment

The diagram in picture 1 (next page) shows the following process:

- The water used during the various vehicle wash phases is collected in the underground tank ($V_S$), where heavy solids, sand and slurry settle by gravity.
- The water passes from $V_S$ into the second tank ($V_D$), where the free oils and hydrocarbons separate through gravity and gather on the surface.
- The water is then collected in the accumulation tank ($V_A$). <u>The minimum volume needed for each of the three underground tanks is established according to the volume of the water to be treated</u>.
- After the pre-treatment of sedimentation and degreasing, the water still contains a small quantity of suspended particles, oils and residue detergents.
- The water is taken from the third tank ($V_A$) by the $P_Q$ pump to the filtering column **WS Q** and the activated carbon filter **WS C** and then collected in the underground tank ($V_R$)

- The filtering column **WS Q** contains differently grained inert material. Filtration withholds each tiny solid particle that remains in suspension after the primary sedimentation pre-treatment.
- The dirt held back by the filtering bed is removed periodically (once a day) by automatic backwash carried out using fresh water. The backwash water, which contains the particles removed by the quartzite, is taken back to the first underground tank.
- The carbon filter **WS C** is a column filled with highly adsorbent granular activated carbon that withholds the surface-active agents and the other organic pollutants that are still present in the wastewater.
- The carbon is periodically (once a day) back washed automatically to prevent packing caused by the continuous downward flow of the water, and to maintain maximum surface contact between the water and the carbon. The backwash water is taken back to the first underground tank.
- The water treated in this way is then gathered at discharge or, as an alternative, it can be re-used to supply the final rinsing phases of the car wash.
- A **WS A** oxidising line is used by the $V_A$ and $V_R$ accumulation tanks to ensure that no unpleasant odours arise, particularly during the hottest periods of the year, caused by the inevitable decomposition of the organic substances (e.g. surface-active agents) contained in solution in the wastewater.