
GENERAL

XPU, XPower and Electroherb™

- The XPU is a tractor-based urban weeding solution adapted by Zasso to address the specific weeding needs of special areas such as industrial zones and pathways.
- The XPU is part of the pioneering family of electric weeding solutions under the XPower brand launched by AGXTEND™ and Zasso.
- Electroherb™ represents the treatment of plants with electricity, as understood and operated by Zasso. It's this technology which is used by the XPU system.

How does the system work?

- The Electroherb™ is a non-selective, systemic herbicide.
- The basic principle of the solution is the application of a lethal dose of electrical energy to plants and roots via electrodes that are in contact with the plants.
- It works as a closed electrical circuit: the high-voltage electricity is generated locally from the mechanical energy of the tractor. The electric current passes via the electrode into the plants and then into the soil. The electric circuit is closed via a second electrode that either touches other plants or the soil.

What is the mode of action?

- The mode of action of the Electroherb™ is best compared with that of systemic chemical herbicides such as glyphosate, but with the added advantages of non-resistance, non-residues, non-drifting and, thus, no environmental or social impact.
- The applied energy causes cell walls and membranes to burst. Primarily, the electrical energy destroys the vascular bundles, the main arteries for water and nutrient supply of any plant right down into the roots, as well as the process of photosynthesis. Cell sap leaks and let the plants dry out from the inside.

What are the components of the XPU?

- The XPU consists of a back unit and a front applicator:
 - The back unit includes a generator, a gearbox, 12 power units of 3kW and an electrical control cabinet.
 - The front applicator consists of a movable front frame with three rows of static electrodes.
- Special attention was given to the movable front frame to access lateral weeding areas, in a safe and practical manner.



What is the overall weight of the XPU?

- Total weight: approximately 1.600 kg
- Key components:
 - Front frame: 300 kg
 - Rear frame: 1.300 kg including:
 - Generator and gearbox: 270 kg
 - High voltage units: 270 kg
 - Control cabinet: 100 kg

Of what materials are the electrodes made?

- The electrodes are made of stainless spring steel, flexible and conductive so that it can easily transmit the power into the targeted plants.
- Zasso is currently testing various thicknesses and lengths of electrodes to optimize the efficiency of the system.
- The expected lifetime of the electrodes is about one year, but this can vary depending on the working conditions.

What are the characteristics of XPU?

Application	Industrial Areas
Implement Dimensions	Front: Length 1680 mm; height 1205 mm; width 1900 mm (with flaps on low position) Rear: Length 1610 mm; height 1720 mm; width 983 mm (without grounding devices)
Movement	Front frame 500 mm to both sides
Width of electrical application	1200 mm with 500 mm movement to one of each side
Weight	Approx. 1600 kg
Energy	Tractor used to produce high voltage electricity
Speed	Up to 5 km/h
Power	36 kW
Voltage	8,000 V
Power requirements	105 HP
PTO Speed	540 rpm
Hydraulics	1 double acting is required

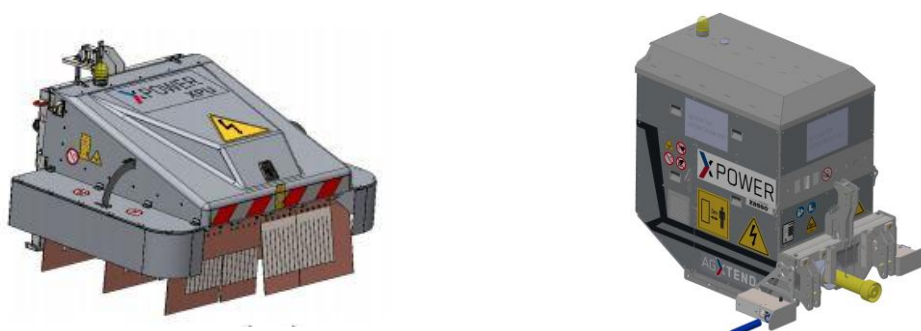


Figure 1: XPower XPU - Technical drawing



BENEFITS

What are the advantages compared to chemical weeding?

- Fast and durable action: it is residue-free and can be applied weather independently.
- It does not lose its effectiveness in case of rain after application, unlike chemical weed killers.
- The XPU user is not exposed to toxic substances.
- Neither the soil, water nor insects are affected during the application.
- Electroherb™ applications are not subject to legal restrictions and can be applied in all areas, e.g. along water ways.

What are the advantages compared to non-chemical weeding?

- Electroherb™ has a systemic action down into the roots: other non-chemical methods generally are not systemic, which provokes re-growth.
- Electroherb™ has no impact on the soil: prevention of erosion risks and no stimulation of the weed seed stock or nutrient turn-over.
- Soil intactness: the energy runs directly into the roots and does not heat up the surrounding soil or the environment.

AGRONOMIC CONSIDERATIONS

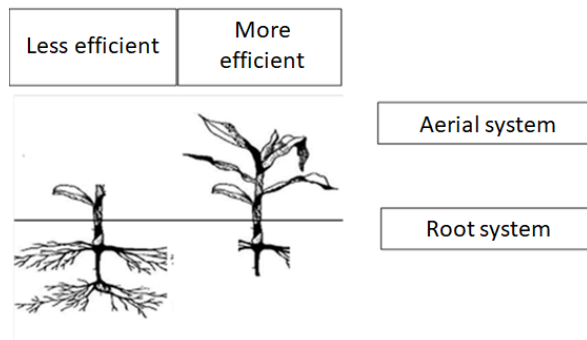
On which types of weeds is the XPU most effective?

- The efficiency of electro-physical plant treatment in the field depends, in specific, on the plant species, the morphology, the growth stage and the population density.
- Generally spoken, the treatment is relatively more effective on dicotyledons than on monocotyledons and on plants between 2 cm and 20 cm in height.
- The more complex the root system is, the more power would be required to achieve an efficient result to kill the below-ground root mass because the captured energy will be diluted.
- The higher and denser the targeted weed population is, the higher is the risk of the electrodes not being in contact with each plant, reducing the efficiency level.
- Zasso advises specific weeding strategies in terms of speed and power combinations to ensure good results, independent of the weed density.
- Zasso also advises the use of the XPU Power Boost to ensure further efficiency on monocotyledons, and a faster working speed.

What is the theory behind the XPU's electrical weeding solution?

- From an electrical perspective, the plant can be considered as a resisting system in two main parts, the aerial plant system and the subterrestrial root system.





- Plants with a low number of stems and low root volume relative to its aerial system (morphologically typical for dicotyledons) will require less energy and can be damaged more easily as the electrical energy, which passes through the plant interacts with less plant tissue and the critical lethal thresholds are reached faster. In the contrary, weeds which have a lot of stems, or which are densely populated and have large root volumes (morphologically typical for monocotyledons) will require more energy, to reach the critical threshold of a lethal damage.
- A satisfying treatment result occurs when the amount of power consumed by the roots of the targeted plant is sufficiently high enough (the lethal threshold was reached) to neutralize any re-growth.
- The below mentioned factors will also influence the power consumption:
 - The amount of power applied to the plant.
 - Plant characteristics: varying root structure, stem width, size of leaves and plant densities.
 - The speed of the tractor.
 - Distance between electrodes.
 - The soil impedance, influenced by general soil characteristics (clayey, sandy, silty) and the soil moisture.

What is the most ideal situation for effective Electroherb™ weed control?

- The Electroherb™ works best in populations with re-growth of young dicotyledon plants. Mixtures of monocotyledon and dicotyledon plants can also be treated effectively. However, the application must take place before monocotyledon plants overgrow the dicotyledons. If the growth is advanced, the application speed needs to be reduced to increase the energy consumption by single plants.



What are the limitations of Electroherb™ treatment?

- Energy consumption is related to weed density, which means that in places with higher weed density, the application will have to spend more energy per area or plant. This can be achieved by higher energy output or reduced driving speeds.
- Old, dense monocotyledon plant populations with highly developed root systems, especially if already mown in the past, are limiting treatment efficacy. In those cases, more than one treatment, with very high energy doses is required the first time throughout the area.

How long does it take to see the effects?

- Electroherb™ interrupts the water supply of the targeted weeds within a few seconds after touching them. Depending on the weather and plant species, it can take from a few minutes to several days before the wilting and drying out of the plants is visible.

What is the expected regrowth period?

- A reduced re-growth can be expected. Electroherb™ method does not encourage germination because it does not stir or warm up the soil.
- Plants with larger old and developed root stocks or rhizomes are severely weakened but will likely recover from the first application.
- Depending on the season, plant species and size of the plant, a repetition of treatment once every 1 to 4 months during the growing season may be necessary.

ENVIRONMENT / SAFETY

What are the key safety principles to keep in mind?

- The machine may only be used for the specified application.
- The machine must not be used in rain.
- The machine must not be used by persons with active medical implants (e.g. pacemakers).
- Only trained and instructed persons may operate the machine.
- A safety distance of at least three meters should be maintained between the machine and third parties. must be observed.
- Please block-off the area of application by means of warning signs, so that third parties can see at an early stage that high voltage is currently being used in the field.
- Metal objects must not touch the electrodes.
- Please always use the insulated protective boots
- Please always make sure that the grounding chain touches the ground.
- Please ensure that there are no obstructions to visibility in the carrier vehicle when driving over (public road traffic) to the working area.



What is the impact of XPU on soil life?

- Tests performed on all our electric weeding equipment have consistently shown that, under realistic dosage and treatment conditions, no significant lasting effects can be found on earthworms, springtails, oribatid mites and microorganisms.
- We observe a short-term decline, as well as a capacity of the endemic population to come back, so that the long-term integrity of the ecosystem is not compromised.

Is the XPU safe to the operator?

- Maximum operational safety is ensured through insulating materials and optimized mechanical geometries.
- Before each handling of the electrodes, check that the machine is voltage-free (ten minutes after switching off the machine) by means of the high voltage lance.
- The machine may only be repaired by trained mechanics or certified high voltage technicians appointed by the manufacturer.
- The high voltage areas of the applicators are entirely isolated from the rest of the XPU equipment: all parts are fixed on an isolating base structure made from glass reinforced plastics, which additionally reduce the risks to the user.
- Risk and conductivity analysis is submitted to safety agencies
- The XPU is fully compliant with European safety norms in vigor.
- A detailed Safety Guideline is provided to the XPU operator with all necessary instructions to be followed.

Can the current from the XPU electrodes touch any metallic parts?

- For safety reasons, direct contact between electrodes and ungrounded metal parts must be avoided.

If XPU electrodes touch any metallic part, and someone touches a connected wire, could the person be injured fatally?

- It should be clear that it could be lethal to touch the metallic parts of the system during application.

Does the XPU generate electro-magnetic interferences?

- All devices and units are checked to ensure compliance with the electromagnetic compatibility (EMC) threshold values.
- The XPU is fully compliant with EMC norms in vigor.



BUSINESS MODEL

Who will be distributing the XPU system?

- The distribution of the XPower product range is exclusively reserved for AGXTEND™ certified dealers.

Who is Zasso?

- Zasso is a partner of CNH Industrial and AGXTEND™ since November 2018.
- Together, AGXTEND™ and Zasso have launched a pioneering family of electric weeding solution under the XPower brand.
- Zasso is a swiss based company specialized in non-chemical weed management solutions using advanced technology.
- The company has offices in Zug (Switzerland), Indaiatuba (Brazil), Aachen (Germany) and Paris (France).
- Zasso's mission is to provide safe, efficient and viable technologies necessary for a herbicide-free world.

For further information

Please visit our website or social media channels.

Website: <https://AGXTEND.com/products/XPower>

Facebook: www.facebook.com/AGXTEND

Instagram: www.instagram.com/AGXTEND

YouTube: www.youtube.com/channel/UCd-Zn-_oZAD7tZ-dnKuJI4Q

