



UX eSprit

Concept study:

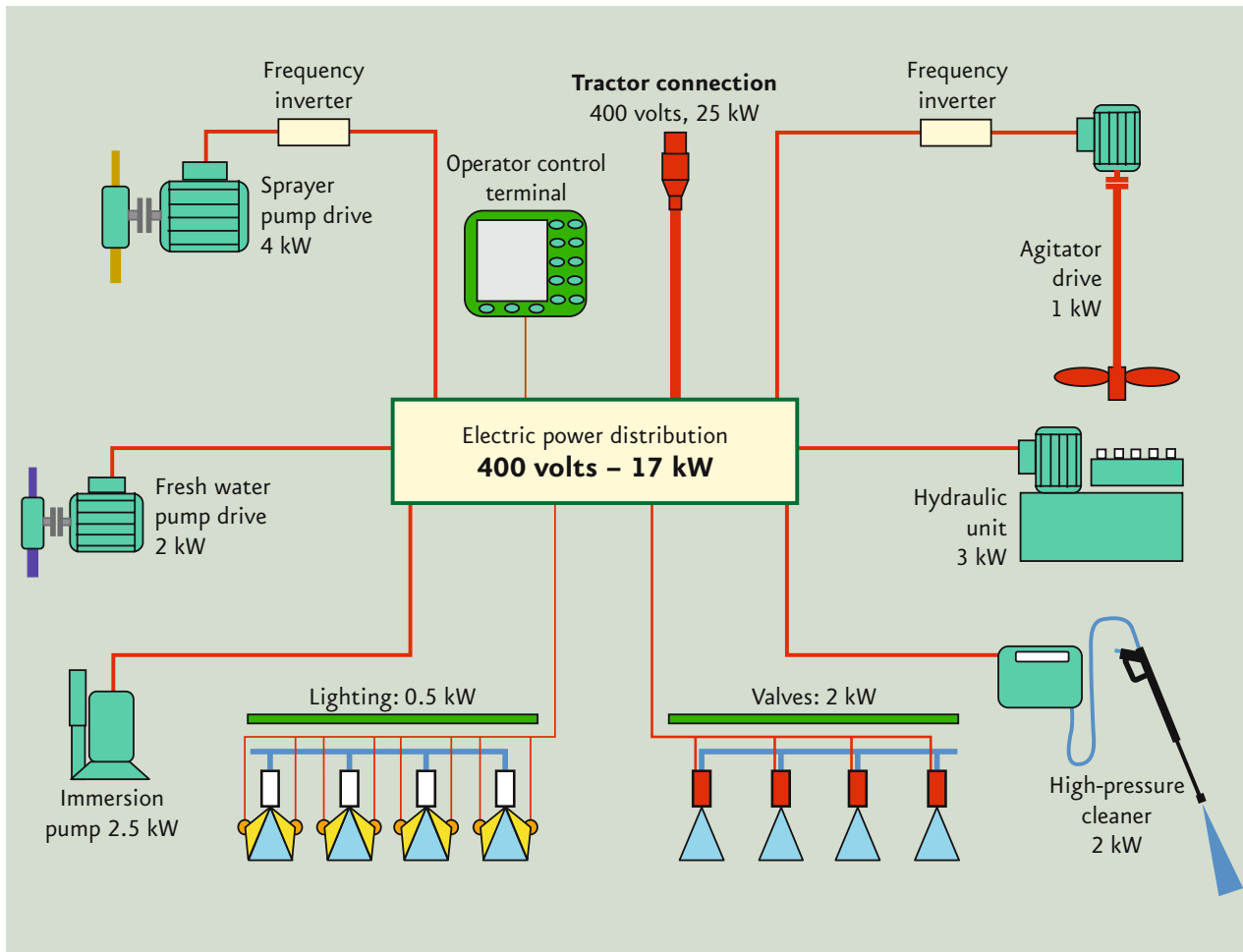
UX eSprit trailed sprayer

Crop protection sprayer with electrically driven metering, agitation and regulating equipment that offers a user-friendly, fully-automatic machine control.



Electric pump drive

The new options for a mobile power supply in the range of 400 volts that are to be available on tractors in the future open up entirely new possibilities in crop protection technology for controlling sprayer flow circuits. This new drive technology leads to increased road safety, greater environmental protection (residues) and a higher level of cleanliness, with increased operator comfort. Nowadays, conventional crop protection implements have different control circuits (application rate, agitator, circulation systems). Pump control, which is based on demand, also leads to greater overall efficiency levels, in particular in comparison to hydraulic pump drive.



UX eSpray components

In contrast to conventional crop protection sprayers, in which the pump is usually driven by the PTO shaft or hydraulically, with the UX eSpray a 400V three-phase power system is used as the drive energy for the pump, agitator, etc.

Thus, the UX eSpray makes it possible to provide a great number of specific quantities and pressures, largely independently of the engine speed, customised for each individual situation. With this type of control, the spray liquid circuit can be separated from the fresh water circuit to a large extent.

The agitator takes the form of a mechanical propeller agitator, and is completely separate from the liquid circuit. The spray liquid is then

agitated during transport without a continuous pump, and independently from the speed of the tractor.

For the operator, this makes handling much easier and safer. The connection to the tractor contains only an electrical connection, instead of the combination of 12V electrics and hydraulics that would otherwise be required. Being fully automatic, the machine is very safe and easy to use.

With the high level of electrical energy offered, further new systems will be possible, such as single nozzle connection and lighting, as well as filling via electrical immersion pumps. Up until now, the limited electrical power has frequently been a major obstacle.

The special features of the UX eSpray are demonstrated in a consistent realignment of the entire sprayer system:

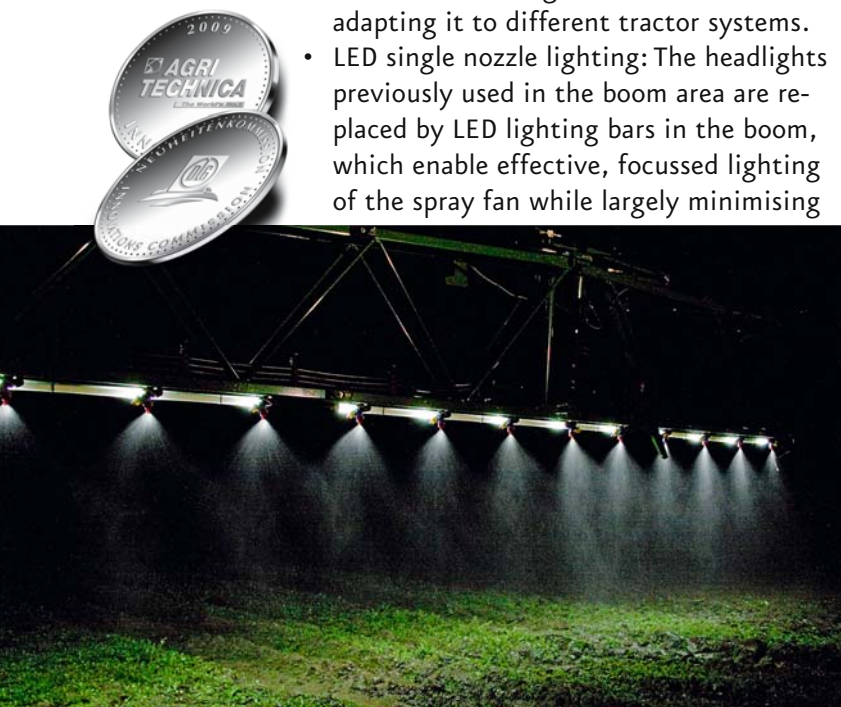
- Continuously-variable electric drive for the spraying pump: The volume is regulated at the boom according to requirement, by means of changes to the pump speed.
- Electrically-driven agitator propeller.
- Extensive use of electric valves: The available electrical energy allows actuating elements to be conveniently operated remotely from the cab. At the same time, system flows can be automated, and operating errors avoided by means of intelligent monitoring algorithms in order to protect the environment and the user.
- Use of a pure water pump for targeted, volume-controlled supply of fresh water for internal cleaning and the induction hopper.
- Self-sufficient hydraulic system for boom and steering control: Irrespective of the type of tractor and its hydraulic equipment, a closed hydraulic system can be constructed efficiently for the sprayer. The operational reliability of the system is considerably higher, since the system can be designed on a very specific basis, with difficulties no longer encountered when adapting it to different tractor systems.
- LED single nozzle lighting: The headlights previously used in the boom area are replaced by LED lighting bars in the boom, which enable effective, focussed lighting of the spray fan while largely minimising

reflections, for perfect monitoring of the work zone and crop population.

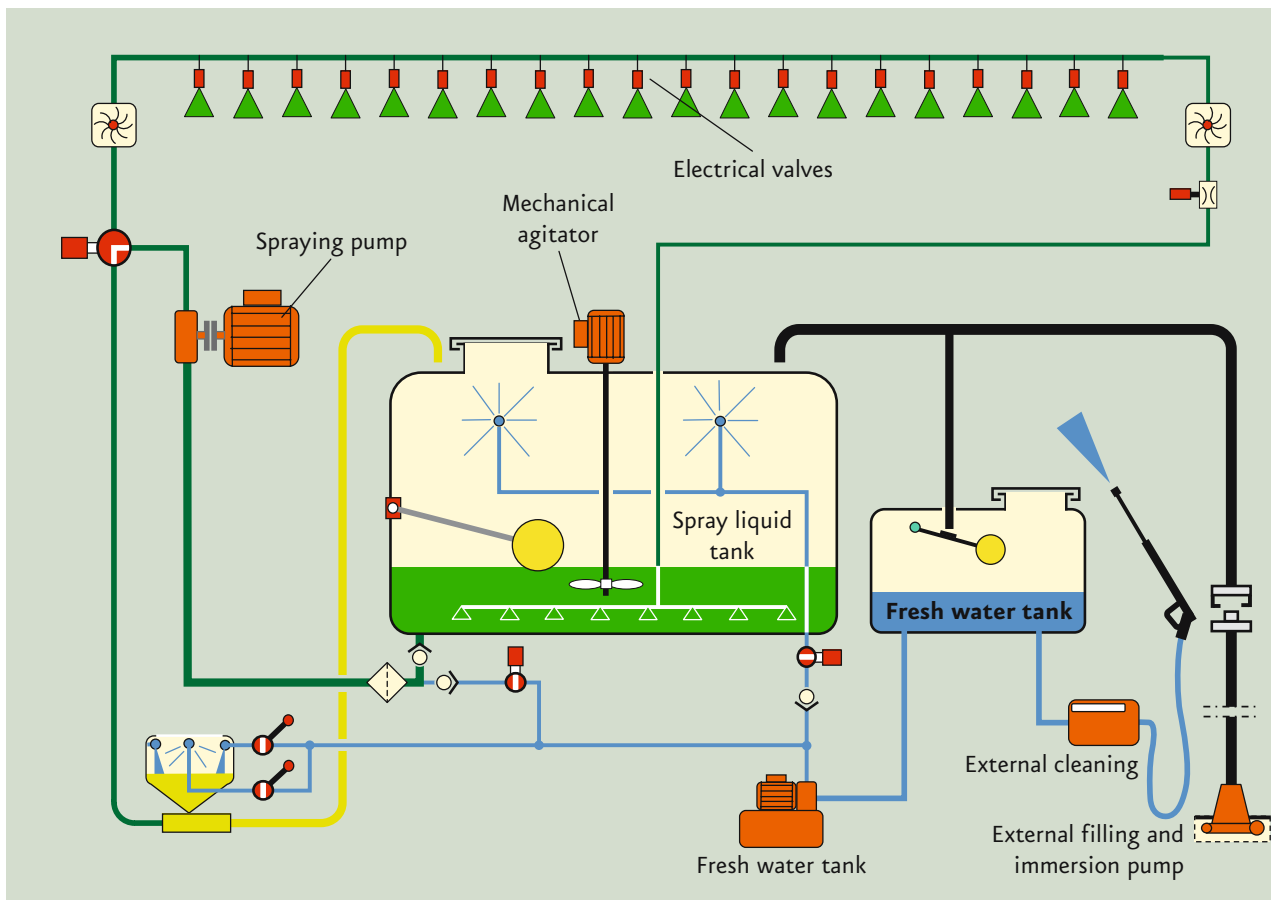
- Electrical single nozzle switching: The electrical energy available is used to dismantle the part width section system and replace it with an automatically-controlled, direct single nozzle control.
- The sprayer is filled with an electrical immersion pump and hydrant hose: Conventional suction hoses are expensive, cumbersome and also require a large diameter. With an immersion pump, the liquid is pushed into the sprayer and the pump can be controlled directly via the sprayer's fill level indicator.
- Electrically-controlled high-pressure washers: A conventional high-pressure washer can replace the cleaning option previously used in the system (a nozzle circuit).

The spraying pump is driven continuously by a 400V three-phase motor. The sensitive and highly-dynamic speed control thereby enables the required seed rate calibration value to be triggered directly, depending on the speed and current working width. There is no need for return flow into the tank, bypass valves or volumetric remote controls for pressure relief, and the sprayer residual volume is reduced. At the same time, the pump longevity is increased, since it is always operated at the optimum, low speed range.

Depending on the working situation, highly individual agitation programmes (strong agitation during induction, homogenisation on the road, agitator shutdown in order to reduce residues) can be created without any dependence on the actual spraying operation. The special geometry of the agitator blade gives the additional option of varying intensity and flow formation in the tank by reversing the direction of rotation. Today, essential, laboriously constructed double-pump machines are a thing of the past and the permanent risk of environmental damage caused by bursting hoses is ruled out. For road transport, the agitator is fully decoupled from the speed of the tractor vehicle.



LED single nozzle lighting



UX eSpray liquid circuit

When the system is cleaned, the separate clear water pump supplies the exact rinsing volume required for internal cleaning or cleaning of the spray line. Excess that currently reaches the tank by means of return flow without any particular cleaning effect is a thing of the past. New concepts for continuous internal cleaning can be implemented easily.

The consistent use of electrical energy leads to significant system benefits, increases occupational safety and reduces environmental hazards. At the same time, operating comfort is increased considerably.