



JNW CleaningSolutions GmbH

Fully-Automatic Cleaning Systems

ACC User Group Virtual Meeting, Oct. 14th, 2021

presented by: Arndt Krebs CEO / Managing Director



JNW – Company Overview

Experience Pays – fully automated even more

Founded: 1932

Headquater: Bochum, Germany

Business Divisions:

- **Machinery Building:** Since 1991 we delivered worldwide 300 complete cleaning systems including more than 3.000 chassis for the cleaning of air-cooled heat exchangers.
- **Cleaning Service:** With our patented mobile cleaning system we are cleaning air cooled heat exchangers in Germany, Europe and South Africa since 1995 and in USA with our partner Conco since 2001.



The JNW-Group

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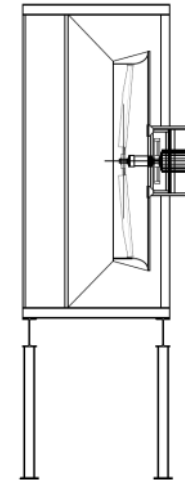
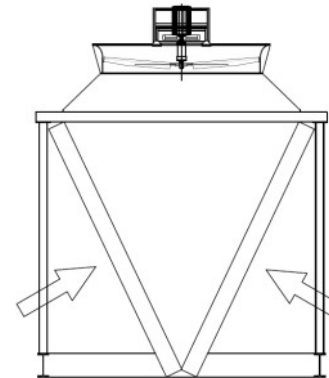
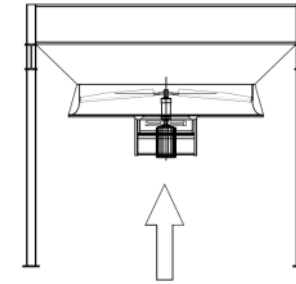
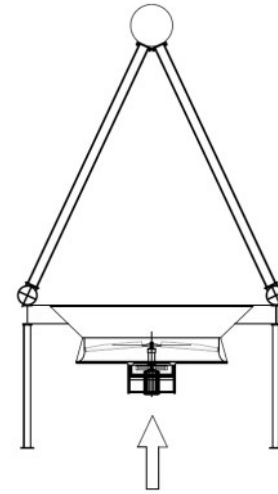
Cleaning Equipment Design

Our heart beats for engineering and clean air cooled heat exchanger!

That's why we design cleaning equipment that fits perfectly to each kind of air cooled heat exchanger:

- Air Cooled Condenser / ACC
- Flat Bed Cooler
- V-Design
- Hybrids

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Cleaning Equipment Range

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Complete range from manual to fully automated

- Manual Cleaning Chassis since 1991
- Semi-Automatic Cleaning Systems since 1991
- Fully-Automatic Cleaning Systems since 2012
- Special cleaning equipment designed to customer requirements since 1991

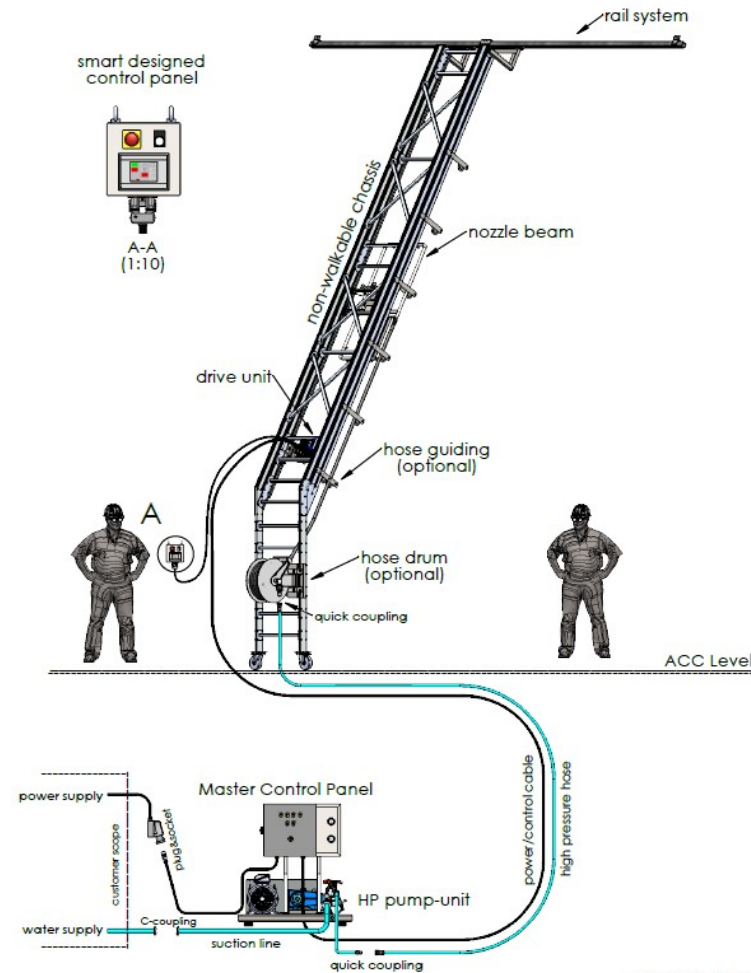


Fully-Automatic Cleaning

Fully-automatic vs. semi-automatic cleaning systems

- The cleaning process of a semi-automatic cleaning system requires intensive handling of min. two operators. The horizontal movement of the chassis is done manually, cables and hoses have to be repositioned and equipment has to be converted from one roof side to the next.
- The fully-automatic cleaning system is a robot that works completely independent.
- No operator is needed which saves personnel costs and increases work safety.

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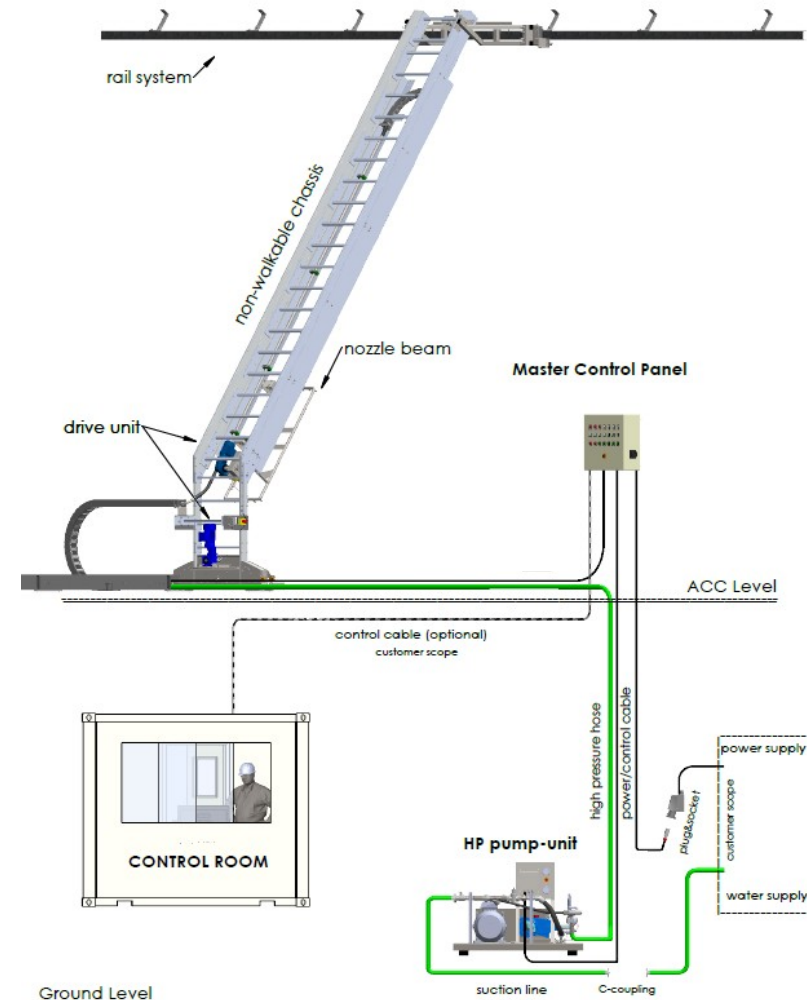
Ground Level

Fully-Automatic Cleaning

Layout and function

- Each cleaning chassis of a fully-automatic cleaning system is permanently and entirely equipped with all necessary equipment such as drive motors, sliding devices, nozzle beams and so on.
- Each cleaning chassis is permanently connected to the water and power supply.
- The cleaning system and process are completely computer controlled. Different cleaning programs can be selected for the most efficient cleaning of the ACC.
- Therefore the cleaning process can be started at any time without any setup or preparation just by pressing the start button.

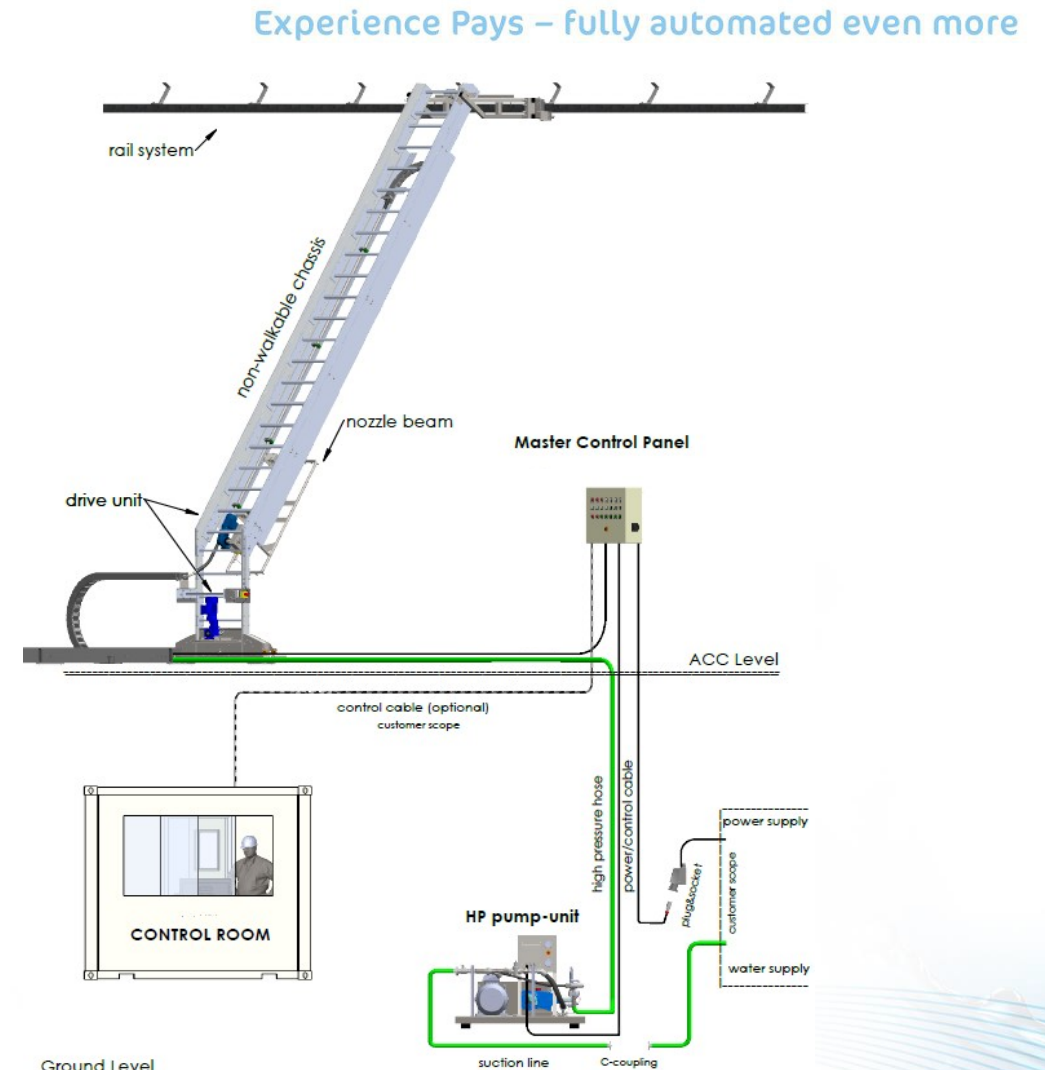
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Fully-Automatic Cleaning

Layout and function

- The cleaning process can get started from the master control panel (MCP) which is usually installed directly at the ACC close to the high-pressure pump or at fan level.
- Or the fully-automatic cleaning system is connected to the central control room which makes complete control of the cleaning process very convenient.
- After the cleaning of the ACC is completed the cleaning rig stop automatically in its parking position.
- At www.heat-exchanger-cleaning.com you will find a short film showing a fully-automatic cleaning system in action.
- Our scope of supply includes the complete cleaning system, our customer only has to provide water and power.



Fully-Automatic Cleaning

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Advantages

- **Significant decrease of costs:**
 - No costs for own or external staff to perform the cleaning service apply anymore
- **Strong increase of safety at work:**
 - Less staff in the plant will reduce the risk of accidents and increase the safety
- **Massive increase of efficiency, flexibility and output:**
 - Cleaning can be done at any optimal point without delay to organize own or external staff
 - Fully-automatic systems allows now cleaning during hot summer periods where the highest cooling capacity is needed but manual cleaning is due to high outside temperatures partially up to 90°C not possible. This is especially true in hot climate areas such as the Middle-East
 - Fully-automatic systems can be used to cool the cooler by spraying water continuously on the cooler in particular during the dayshift



Fully-Automatic Cleaning

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Cleaning philosophy changed by fully-automatic cleaning systems

- Traditionally ACCs got cleaned 1 – 2 times a year by use of a semi-automatic cleaning system or an external cleaning service
- Change of ACC cleaning cycle of a JNW customer (WtE plant) after installation of a fully automatic cleaning system:
 - Before fully-automatic cleaning on each day the outside temperature climbed above ACC design temperature the turbine must be slowed down and output of 4 MWh got lost.
 - With JNW fully-automatic cleaning system cleaning starts on each day with outside temperatures above ACC design temperature which allows the plant to run continuously at full capacity and regain 4 MWh.
 - Payback time of the investment 48 days (!!)



Fully-Automatic Cleaning

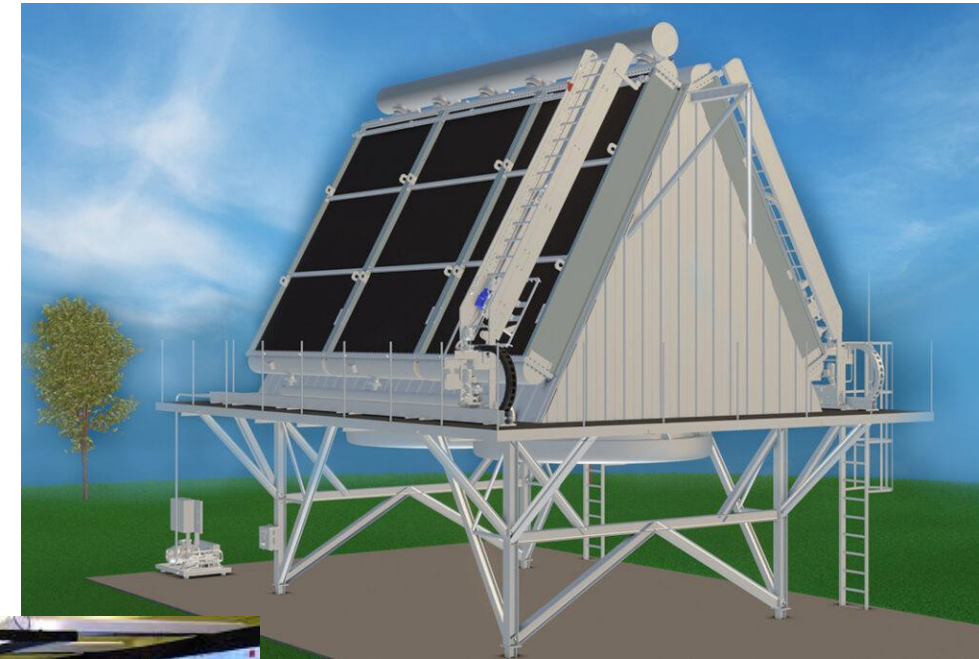
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The future is artificial intelligence and now

- Today a fully-automatic cleaning process is also started manually even if the operator is located in the central control room and no longer has to go to the ACC anymore.
- In future artificial intelligence will start the cleaning automatically based on an algorithm that considers lots of different parameters such as:
 - production plan
 - maintenance plan
 - outside temperature and weather forecasts
 - degree of fouling

in order to calculate the optimum moment of ACC cleaning.

- With JNW ready to deliver such intelligent systems the future is now and has already started

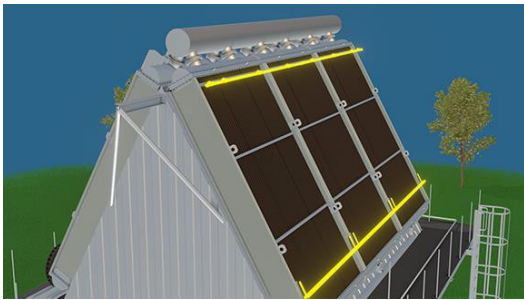


Fully-Automatic Cleaning

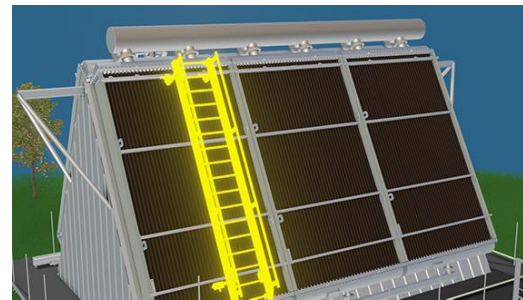
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Get fully-automatic and start now
if not at once than step by step

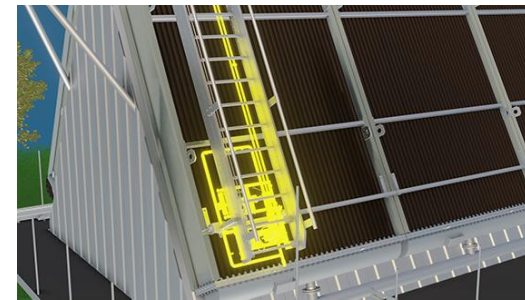
Your individual way of realizing a fully-automatic cleaning system step by step.



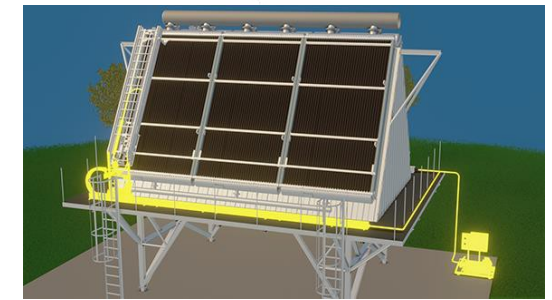
Step 1
Rail system



Step 2
Chassis



Step 3
Semi-Automatic



Step 4
Fully-Automatic

Our Strongest Argument

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Before



After!

JNW – Your Partner

We not only offer to our clients tailor made technical concepts, but also interesting and flexible commercial solutions like financing.

It will be our pleasure to develop together with you an optimized technical and commercial solution for your company.

We are looking forward to a successful cooperation.

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References

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for a BETTER PERFORMANCE

