

High-Pressure Water Mist for Turbo-Compressor and Oil System Protection

ORLEN Unipetrol RPA Litvinov | SO 1325

Protection of 1392-KO1 turbo-compressor and 1392-KO1 oil management

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IWMC 2026 · Prague · 7–8 September 2026



LPU4

20
heads

10_{min}
duration

Project at a glance

SO 1325

Turbo-compressor building in the ORLEN Unipetrol RPA Litvinov refinery area

1392-KO1

Turbo-compressor and oil management protected by the same local application system

May 2026

Implemented by KLIKA-BP gas systems s.r.o. as the HI-FOG system integrator

Main project specifications and challenges:

- no room for the engine room and water tank
- turbocompressor and oil management - one section
- 10 minutes firefighter response time
- non-standard power supply - 500V/IT

Protected scope in SO 1325

1392-KO1 turbo-compressor

10 open heads

Design intent: protect the turbo-compressor and the oil management together, not sequentially.

1392-KO1 oil management

10 open heads

20

open HI-FOG heads
in total

1

section serving two
levels

2

hazards discharged
simultaneously



Design basis and approval route



The selected route used the HI-FOG Local Application DIOM for flammable liquid hazards and an LPU pump-unit based system. The system architecture remains dry on the distribution side, with release controlled by detection and a solenoid machinery valve.

Local application criteria applied

Design item	Project choice	DIOM parameter	Purpose	Design check
Application type	Local application	Pool / spray / combined hazards	Protect oil fire scenarios	Hazard evaluated
Open spray head	4S1MC8MC1000Y	$K = 3.9 \text{ lpm/bar}^{1/2}$	Fine mist discharge	20 heads total
Operating pressure	Project hydraulic calculation	Minimum pressure per hazard class	Assure mist penetration	Most unfavorable head
Duration	At least 10 min	Largest section discharging	Bridge to site fire brigade	Water supply sized

Design takeaway

The DIOM gives the tested boundaries; the project design translates them into head placement, section definition, pump pressure and water supply volume.

Water supply and hydraulic sizing

$$Q = \Sigma (K \times \sqrt{P})$$

flow per open head, summed across the design section



$$V = Q \times 10 \text{ min} \times 1.10$$

duration plus design reserve



$$5 \text{ m}^3$$

project tank

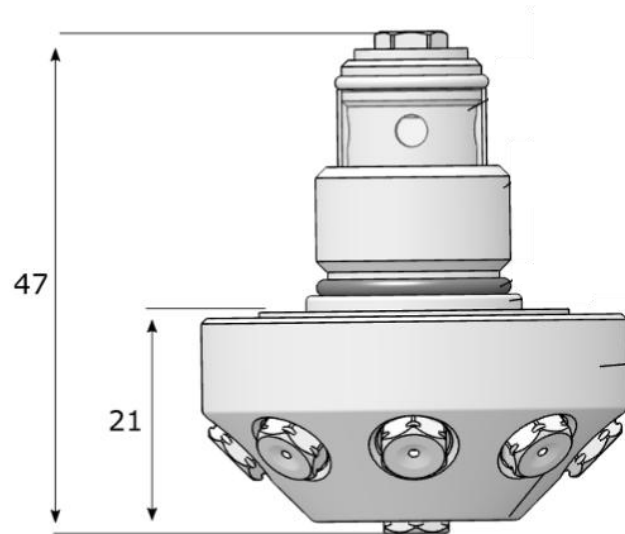
The project tank was selected from the hydraulic calculation for local application suppression and is continuously refillable from the plant water supply.

- Water quality equivalent to potable supply
- Fill line through <100 µm filter
- Tank level and water supply monitored

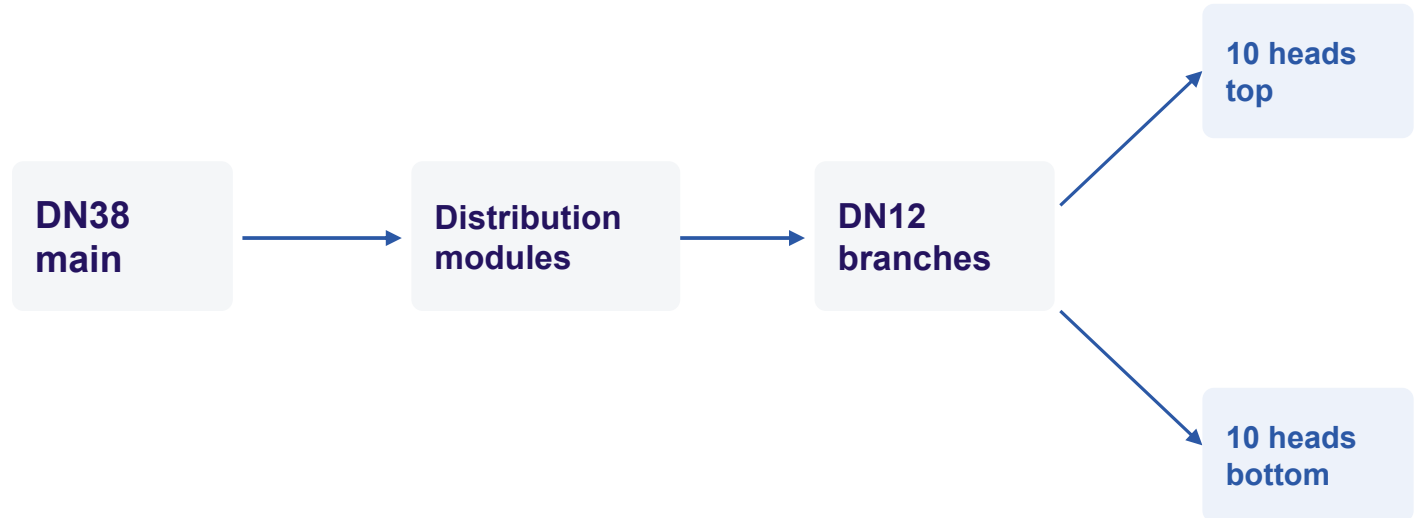
Piping and spray head installation concept

Spray head HI-FOG® 1000

Type 4S1MC8MC1000

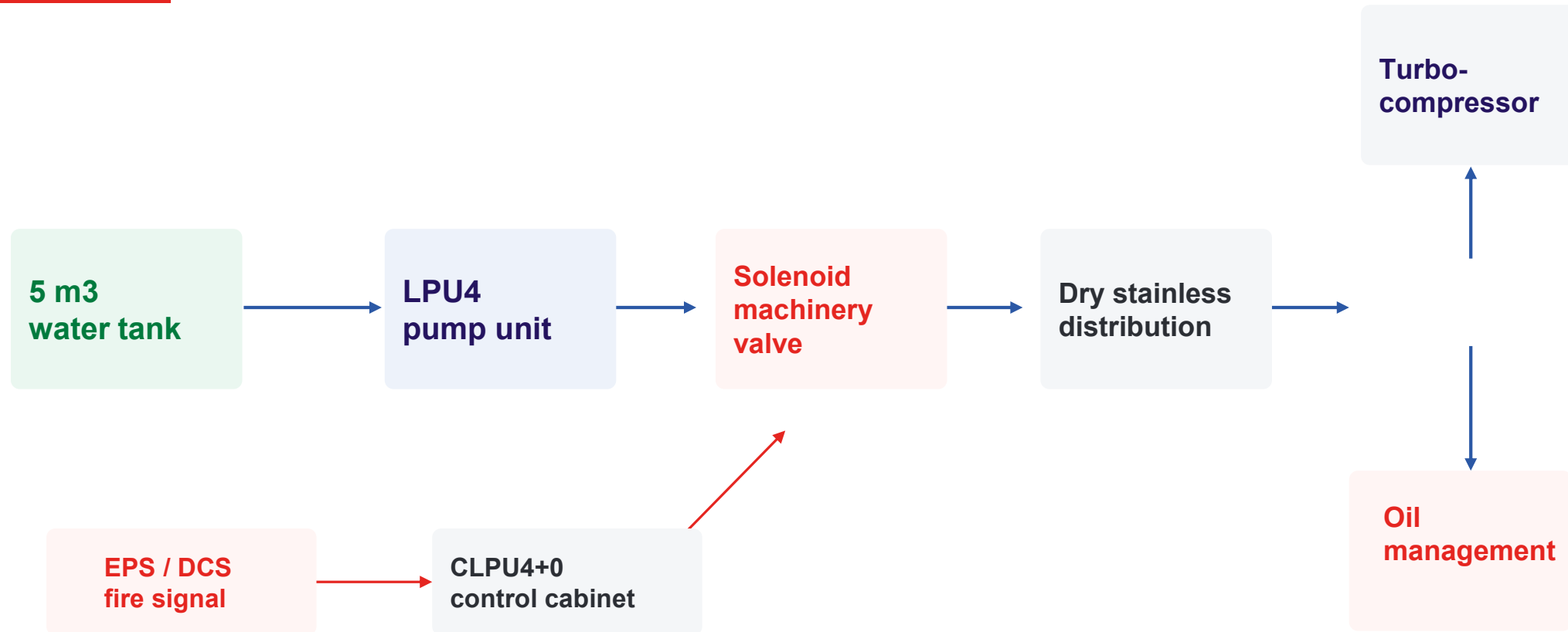


HI-FOG 1000 open spray head



- AISI 316 stainless steel distribution network
- Dry pipework to open heads
- Demountable sections where the overhead crane must remain usable
- Pressure test according to project procedure before commissioning

System architecture



Automatic release, with manual activation available at the CLPU4+0 cabinet.

Detection and activation sequence



Double detection reduces false activations

Space constraint solved by a technological house

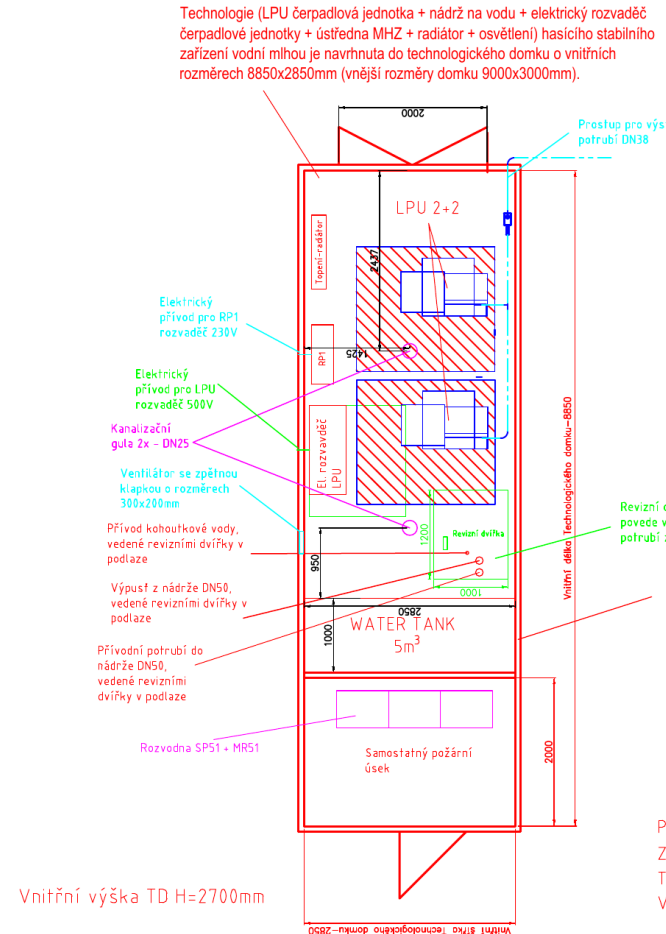
Constraint

No available room near SO 1325 for the MHZ machine room or fire-water tank.

Solution

A dedicated 9.0 × 3.0 m technological house with separate fire sections: machine room and power distribution.

- LPU4 pump unit and control cabinet
- 5 m³ extinguishing water tank
- Lighting, heating, sockets and drainage
- EI 60 / fire-resistance requirements



Pump room + tank + power section



External view of the technological house

Inside the MHZ machine room



Project photo: LPU modules, stainless pipework and the switchboard/frequency converter side of the technological house.

LPU4 with frequency converters

four electric motors; project pump pressure set to 95 bar

CLPU4+0 control cabinet

activation, signalling and power supply interface

5 m3 tank + refill line

water volume supervision, filter and refill for longer operation

Summary project interfaces

Plant / investor interfaces

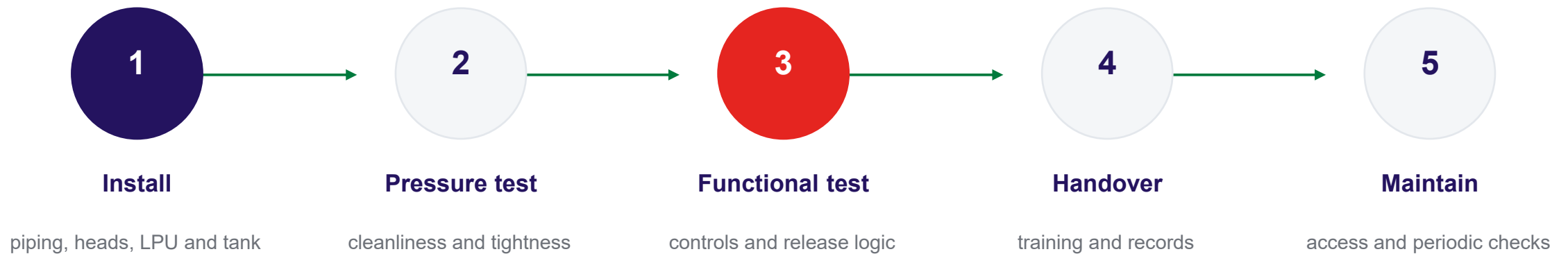
- 500V/IT power supply for LPU
- 230V AC supply for auxiliary cabinet RP1
- EPS/DCS fire and fault signals
- Water refill, filtration and drainage
- Operating access and maintenance clearances

KLIKA-BP water mist delivery

- LPU4 pump unit and CLPU4+0 cabinet
- 5 m3 tank and water-side equipment
- Solenoid machinery valve and drainage valves
- Stainless high-pressure pipework and open heads
- Technological house as part of the delivery

Successful retrofit = clear interfaces before installation

Commissioning, handover and operation



Operational rule after handover

Maintain access to the pump unit, valves and high-pressure heads; keep operating records and inspection evidence with the owner documentation.

Key takeaways

- 1 A tested local-application approach can be adapted to a complex industrial retrofit.
- 2 Dry open-head distribution and two-detector release reduce unwanted activation risk.
- 3 A dedicated technological house solved space, water storage and power-distribution constraints.

Thank you

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