Smart Pumps for a Sustainable Future

Presention by: Kieran Killoran; Stefan Guenthner

Wilo at a Glance.

For 150 years in Dortmund and around the world

… to Global Player, Visible and Connected Champion

From the home-based "Kupfer- und Messingwarenfabrik Louis Opländer" in Dortmund …

Our consolidated net sales 2021.
New sales record achieved with growth of 13.8 %.

Net sales

1,651.9

MIO. EURO

EBITDA

181.1

MIO. EURO

Cash

189.9

MIO. EURO

Capital expenditure

172.3

MIO. EURO

R&D Costs

71

MIO. EURO

Employees

8,200

Our megatrends.
We look 20 years ahead.

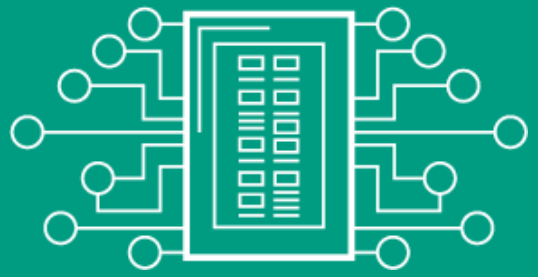
Urbanisation

Water shortage

Globalisation 2.0

Climate change

Energy shortage



Digital transformation

Our pumps and pump systems.
Broad portfolio in almost all performance classes.

Building Services

Water Management

Industry

Responsibility.

Environmental Responsibility

Extreme weather conditions: clean energy efficient solutions

Energy Supply Disruption to Market

Queensland to avoid further blackouts despite new 'lack of reserve ...

Power Outage Brisbane / A power outage affecting hundreds of thousan...

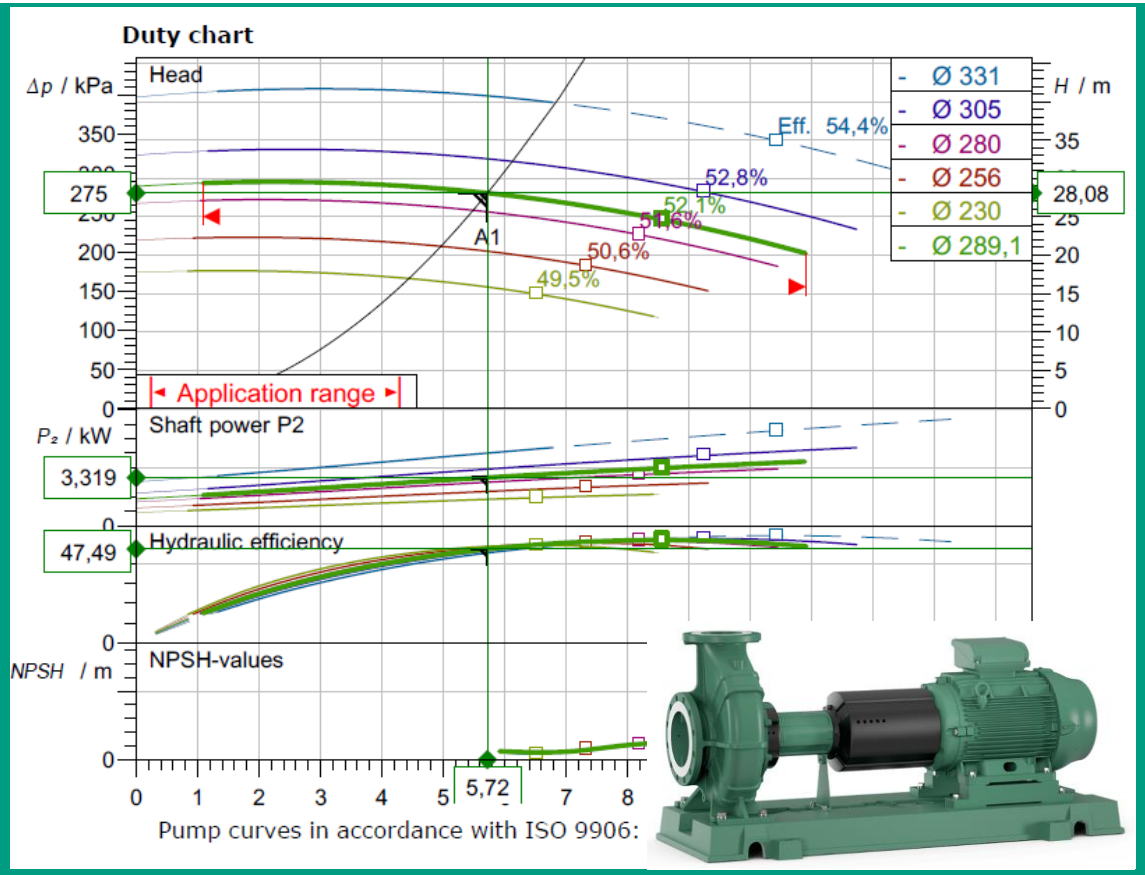
Anthony Albanese says AEMO decision to scrap spot market was the right move

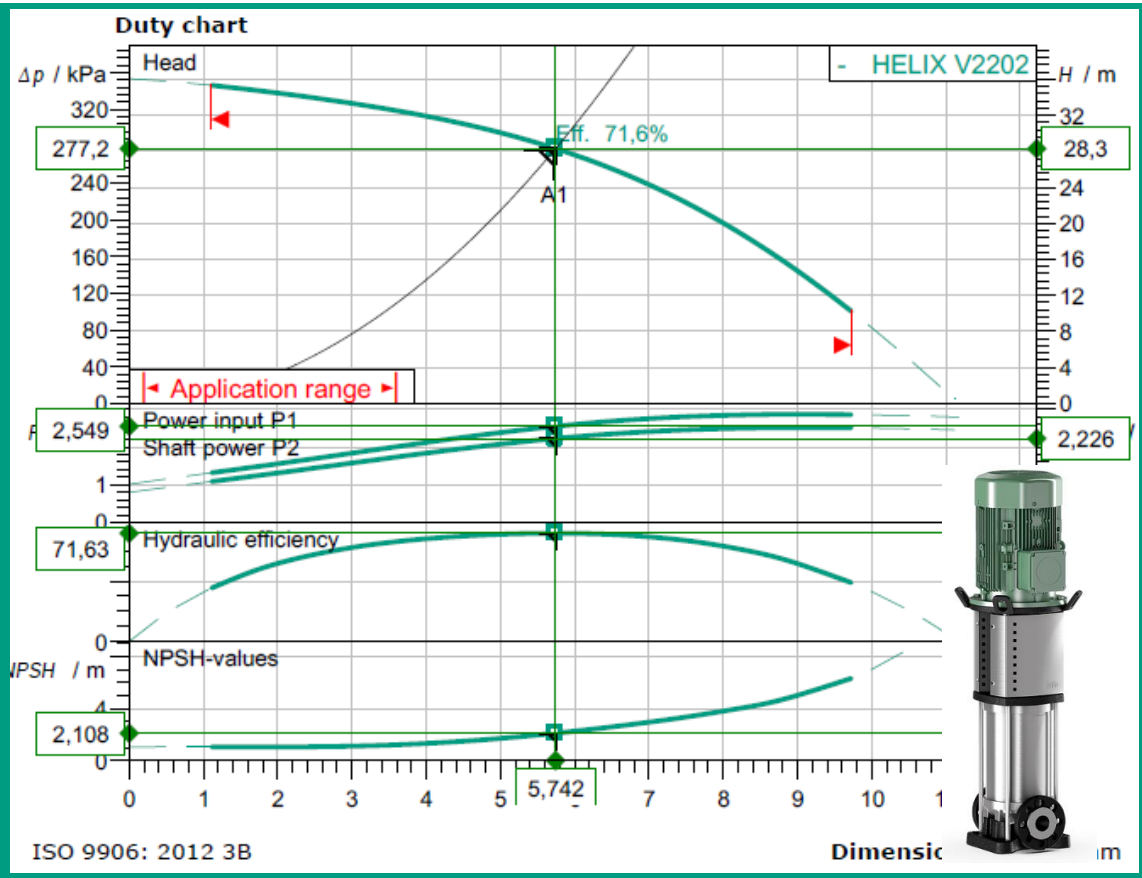
Australian Energy Market Operator suspends spot market for wholesale electricity to ensure reliability and avoid blackouts

By political reporter Melissa Clarke and Nicholas McElroy
Posted 19h ago, updated 16h ago

Australian Energy Market Operator to get more power to prevent blackouts

Sustainability – Building Services - Rethink –





Total Pump Efficiency (η hydraulic + η motor)

Pump Specifications
Scenarios

Scenario: 1

- 80% of max impellor size e.g. **trimmed** Impeller
- Match Motor FLC to Trim OR **largest** design motor.
- Operating on VSD
- Selection based on initial anticipated duty.

--> Later years, client might need to change to full size impeller (maybe update of motor)

Scenario: 2

- **Full Size** Impeller;
- Selection based on a duty at 42Hz (84%)
- match FLC for **smaller** motor
- VSD to match
- Selection based on initial anticipated duty.

--> Later years, client needs 50Hz (100%) and must invest in larger motor and VSD

Our service partner was on site yesterday and able to identify the potential root cause of the hot bearings. See his report attached.

Basically the pump was selected with an undersized motor as the pump is be able to reach the given duty point (54m³/h @ 26m) at abt. 42 Hz only. The power demand (P2) of the pump in this duty point is 17kW and the selected 22kW Motor reasonably sized.

However, our Service partner checked the readings of the VSD and BMS and figured out that the motor runs up to 50Hz. So the flow/head demand of the system seems to be greater than what the pump was designed for. The power demand of the pump exceeds the motor power in this conditions and the motor gets overloaded.

As a short term action the max. frequency was set to 40Hz on site. This should prevent the motor from overloading.

If the full performance of the pump (50Hz operation) is needed, the motor should be replaced by a 30kW motor. Please consider that the pump was sized according to the given duty point and this operation was not required initially.

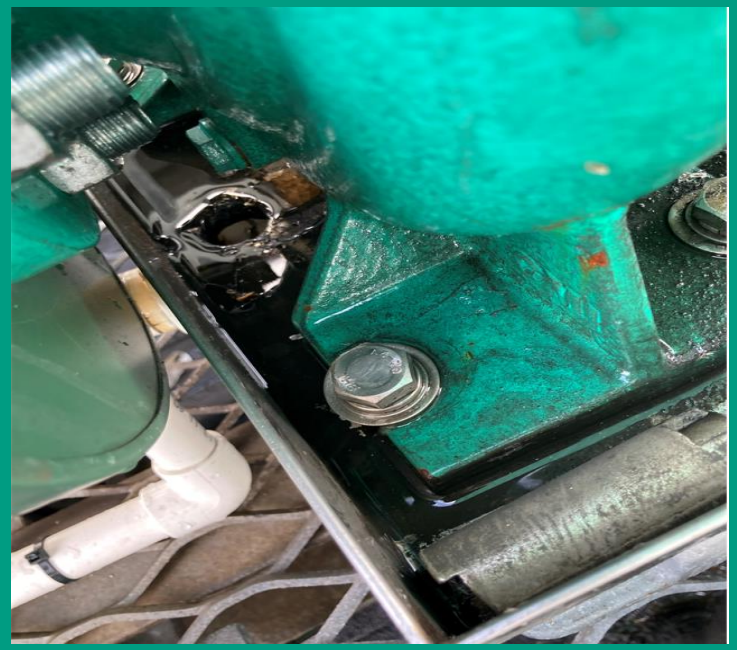
We would be more than happy to help you to replace the motor if required.

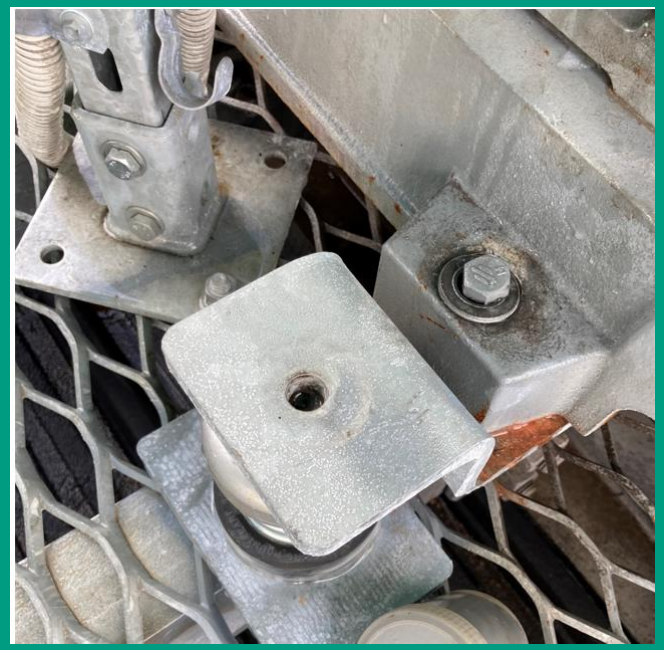
Let me know your thoughts.

Wilo Recommendation

- Stop trimming.
- Use suppliers design motor.

Installation





Installation – vibration, noise, maintenance

Installation Specifications
Issues

- **Issue:** Pump physical condition deteriorates quickly.

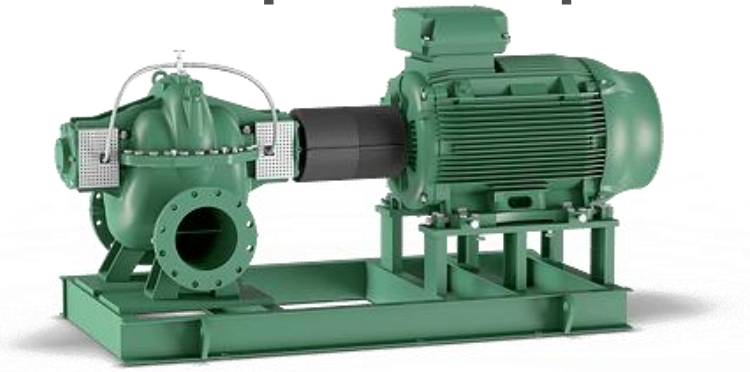
- Why: Variety of reasons such as:
- **- UV Intensity**
- **- Humidity**
- **- Monsoon Rain**
- **- Salinity from coastal locations**
- **- Ambient Temperature**

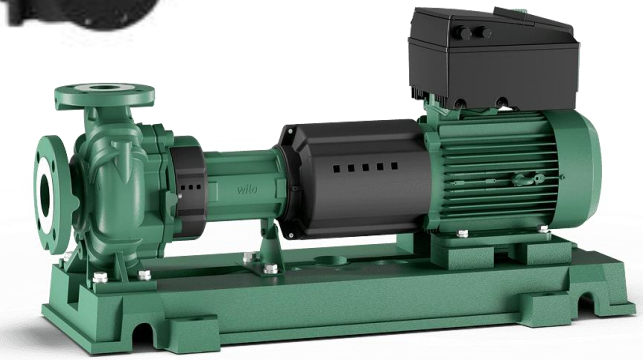
- **Comment:**
- Having IP56 or IP66 in specification doesn’t cover above.
- IP covers motor ingress protection for moisture & dust.

WILO BRINGS
THE FUTURE.

Wilo Brings the Future with Smart High Efficiency Pumps

Fixed Speed Pumps





Smart Pumps

Wilo-Stratos MAXO.

The world’s first smart-pump.*

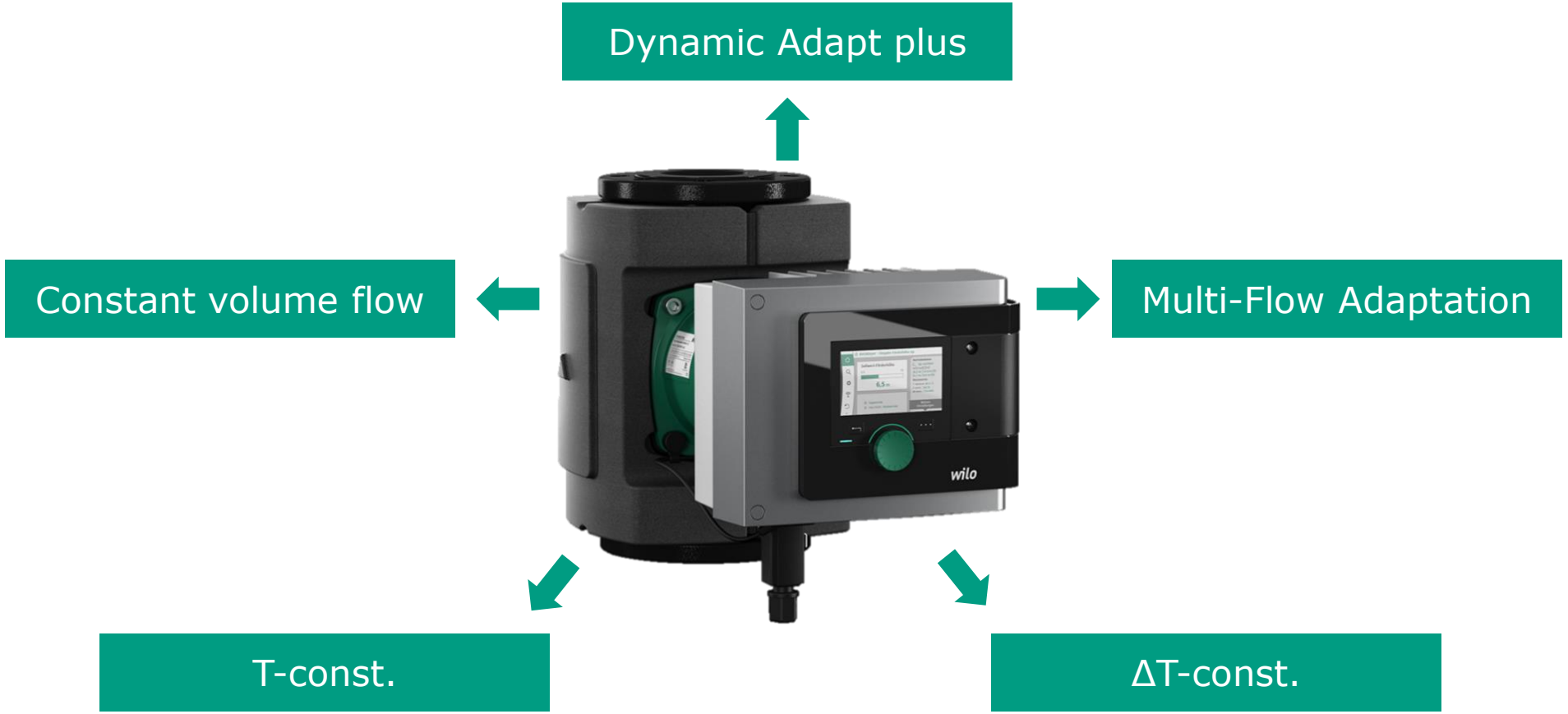
Intelligent technologies for more efficient systems

Maximum energy efficiency thanks to intelligent additional functions

Low energy consumption

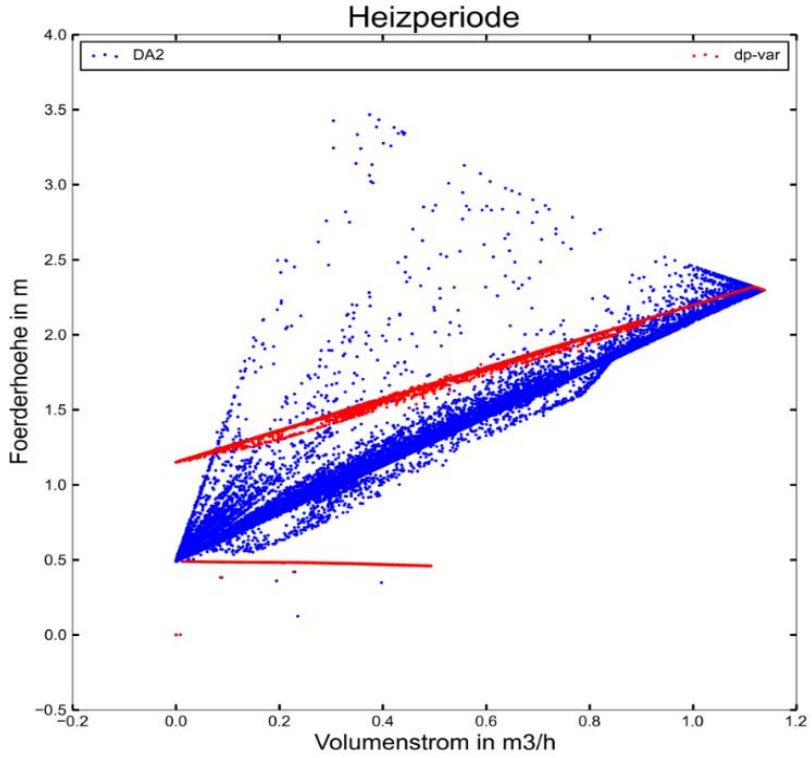
High energy consumption

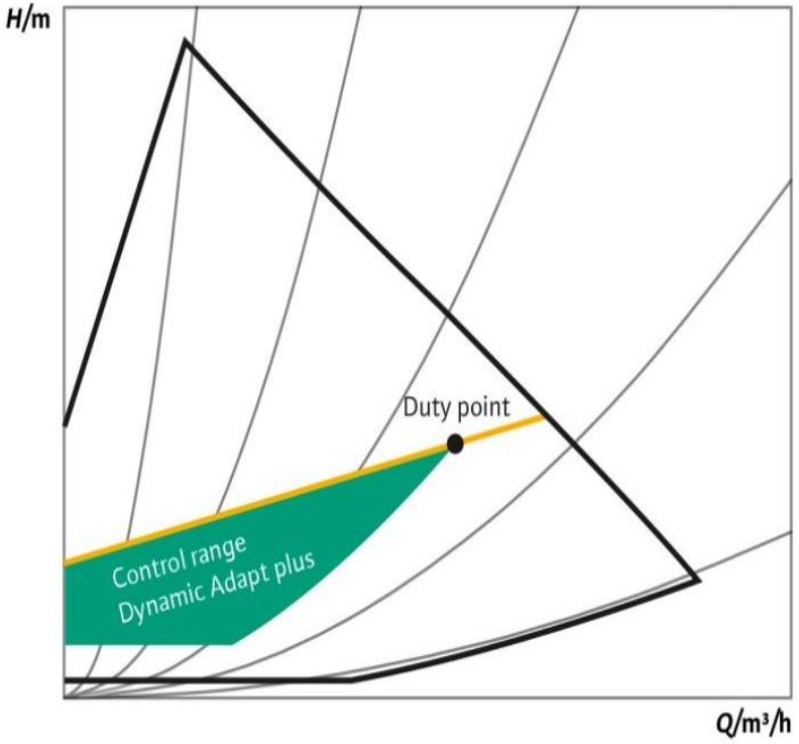
Wilo-Stratos MAXO – New control functions



Dynamic Adapt plus

Energy savings of up to 20% when compared to control mode Δp-v





- New Control mode automatically adjusts delivery head to the hydraulic demand without the need to specify a setpoint.
- After connections, the Wilo Smart pump will select, set it's own duty point based on the demand following a 24hr historical learning.
- Positive feedback Algorithm.

Standard functions for pressure and flow rate

Constant speed n-const

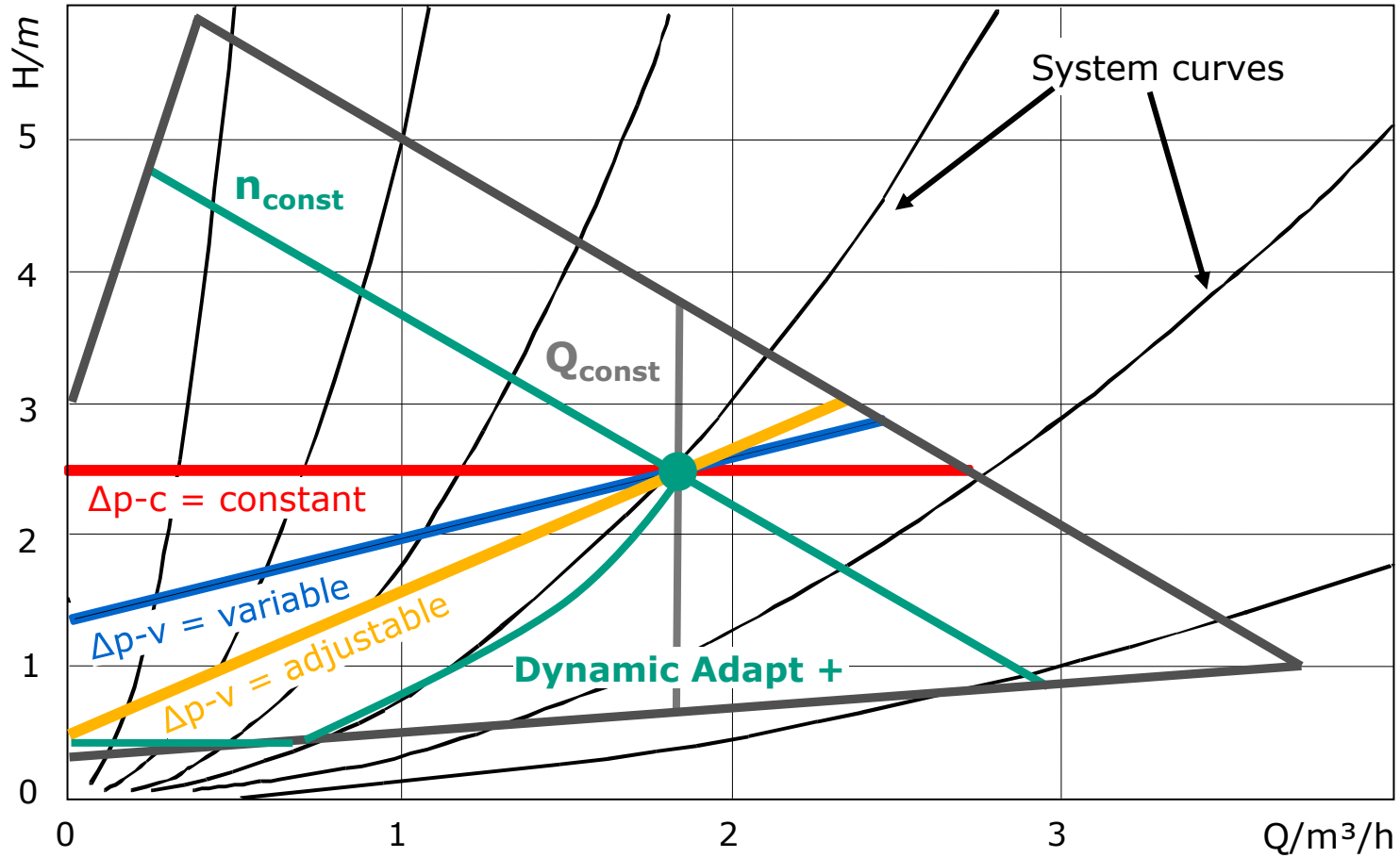
Constant volume Q_{const}

Constant pressure Δp-c

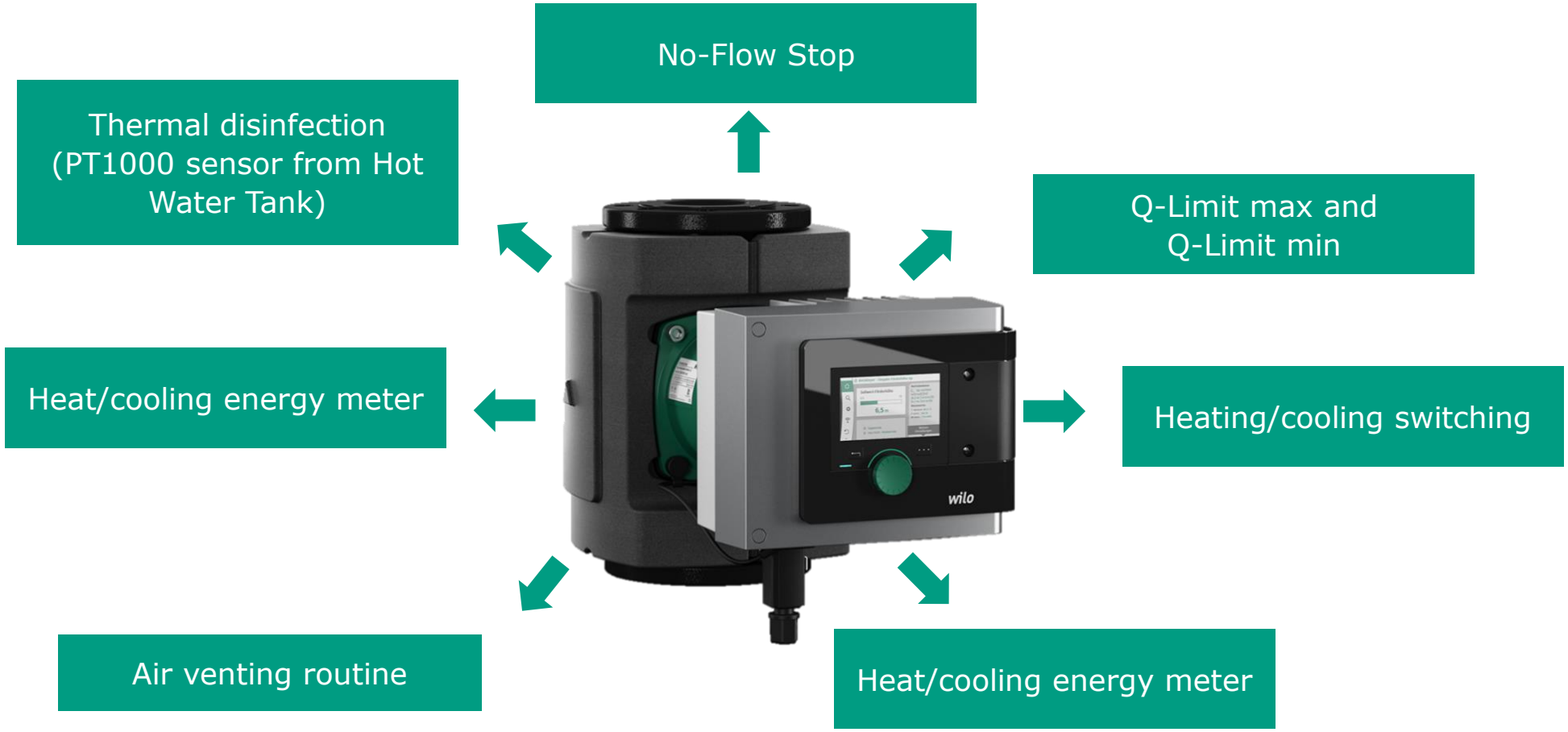
Variable pressure Δp-v

Variable pressure Δp-v
Adjustable gradient

***New* Dynamic Adapt +**



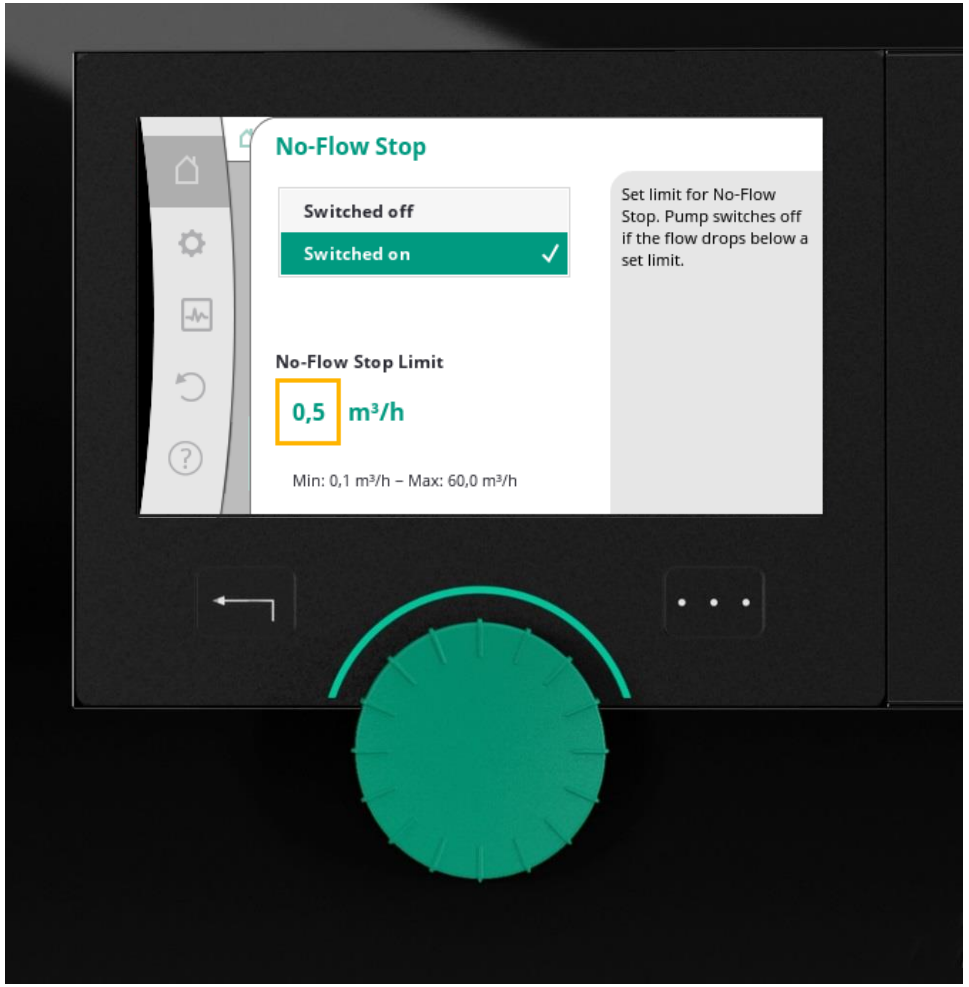
Wilo-Stratos MAXO – New functions/options



No-Flow Stop

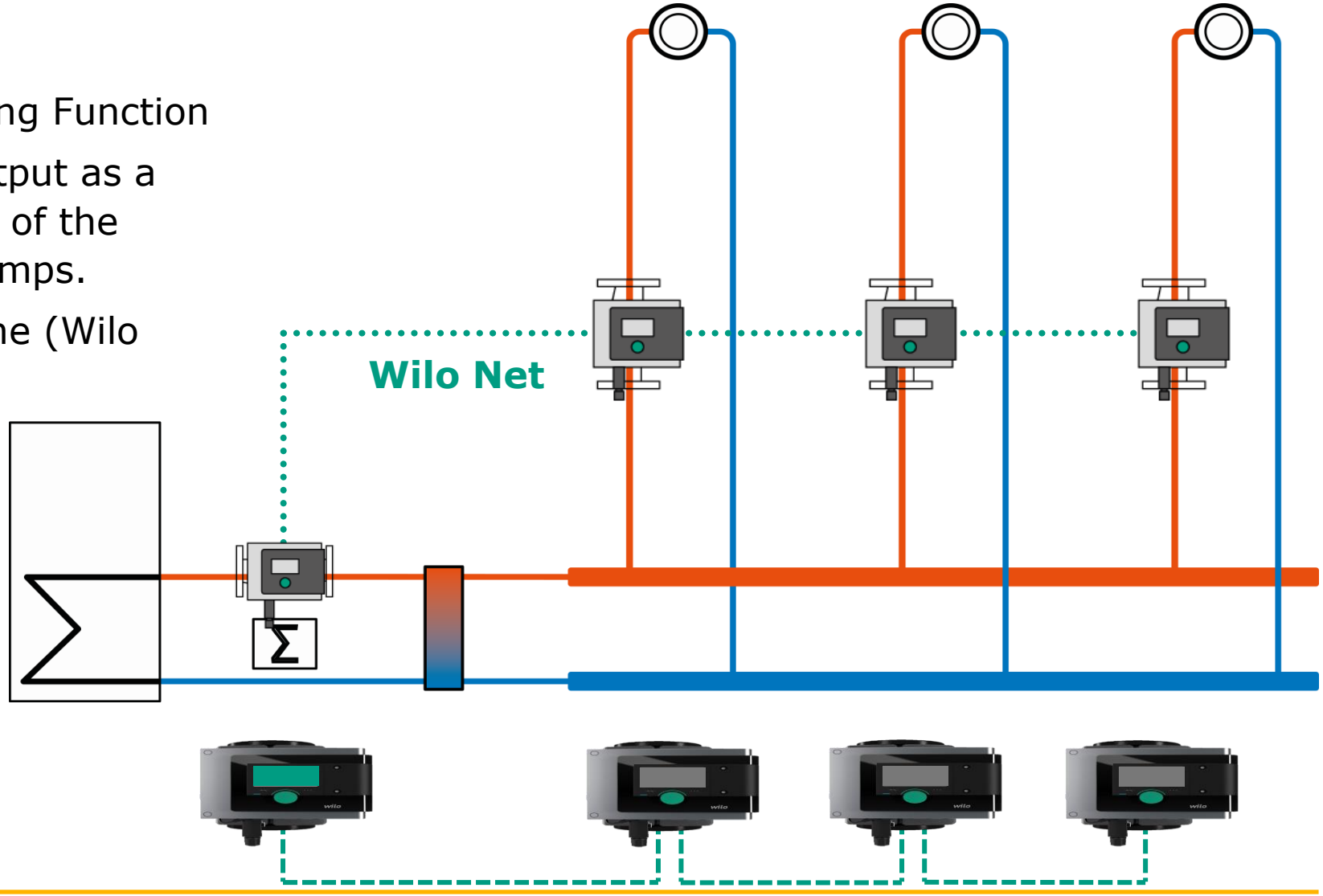
- **Pump automatically deactivates when no flow is detected**
- The pump stops the motor if an adjustable minimum flow rate is reached. Minimum volume flow is adjustable
- Every 5 min the pump attempts to restart and checks the flow for a few seconds. It starts again as soon as this minimum volume flow is reached again.
- The pump electronics detects when the pump delivers a very low flow rate when the valves in the system are closed.

Benefits: Electricity Saving; Bypass not essential;



Multi-Flow Adaptation

- New Innovation in Energy Saving Function
- Primary pump regulates it’s output as a function of the precise demand of the connected secondary circuit pumps.
- Simplest connection via BUS line (Wilo Net)
- Max. 200 m cable length
- Max. 11 pump partners



Display panel – Fault & Error messages

Example: **Electronic module too hot**

- Pump continues to run
- Warning in plain text
- Time the warning has been present
- Suggested solution

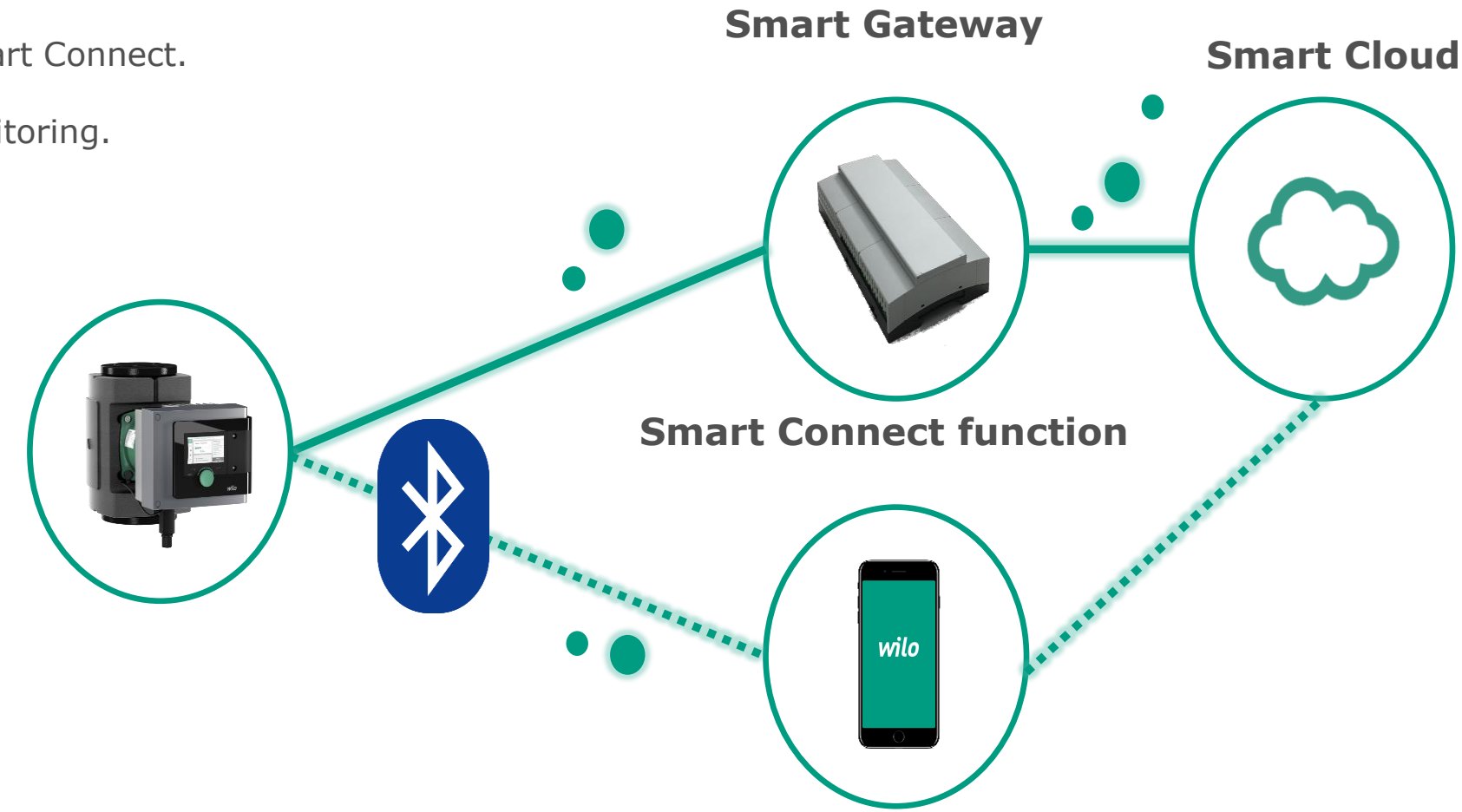
Example: **Pump blocked**

- The pump does not pump properly
- Fault in plain text
- Time the fault has been present
- Suggested solution

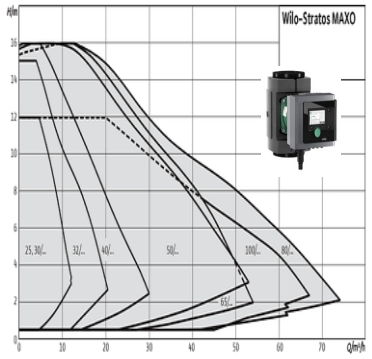
Intelligent Communication

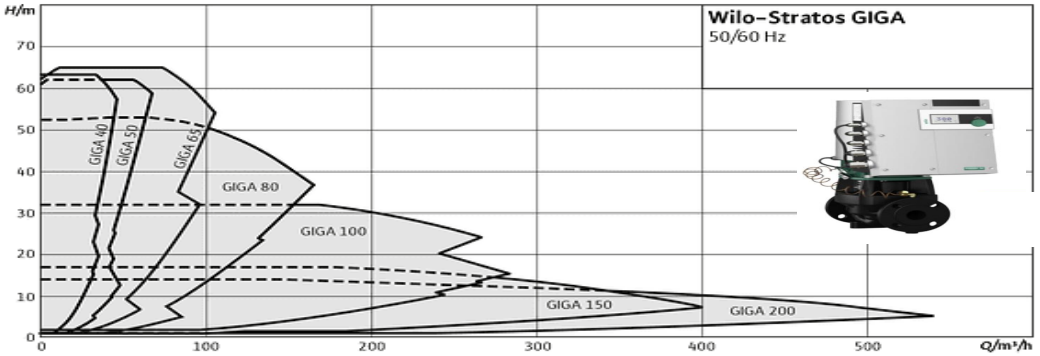
- Wilo Smart Gateway (Comm. Interface cards for BMS)
- Smart phone Wilo Assist App - Smart Connect.
- Wilo Cloud Service for remote monitoring.

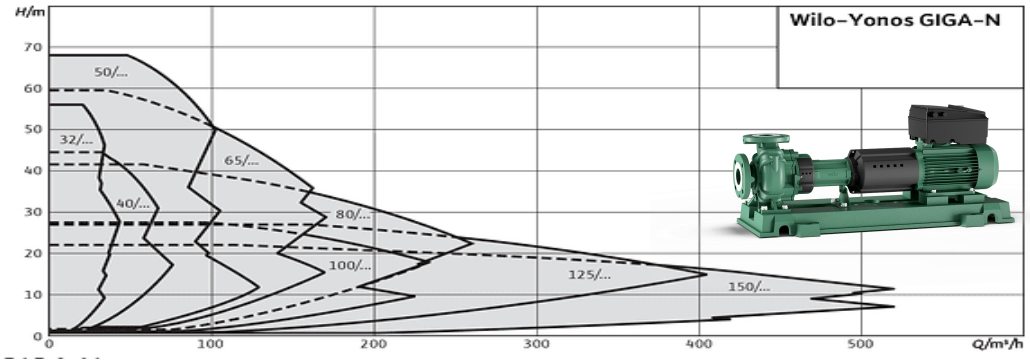
- BACnet MS/TP
- Modbus RTU
- LON TP/FT-10
- CANopen
- PLR

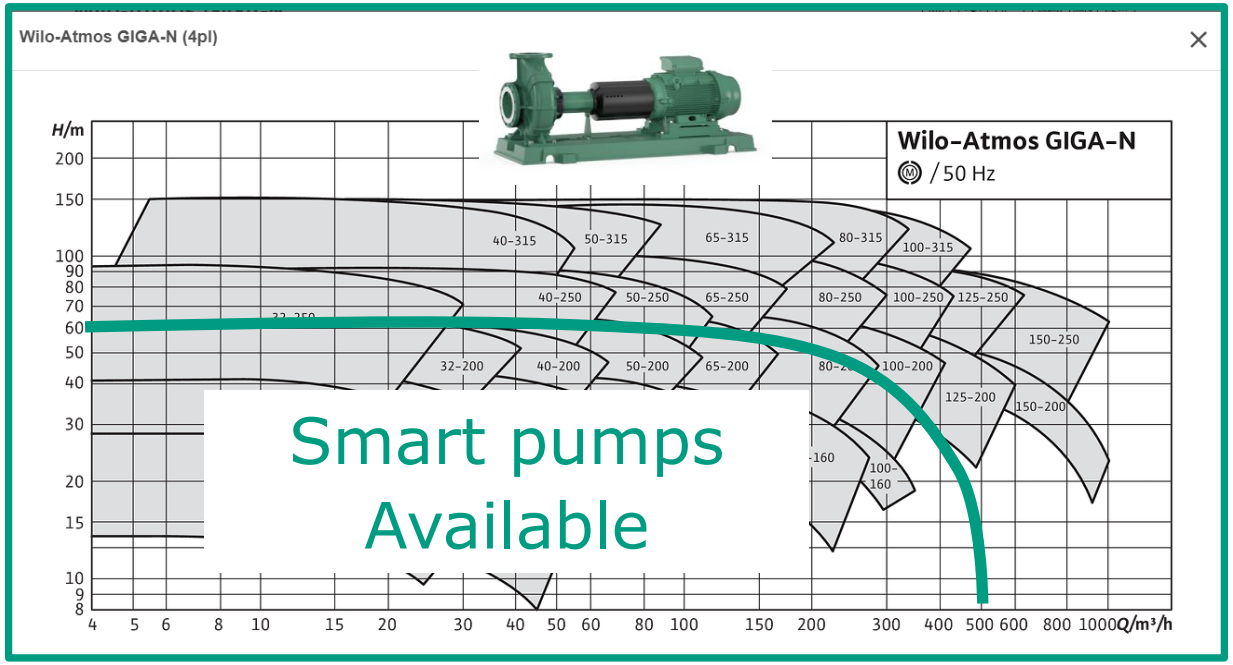


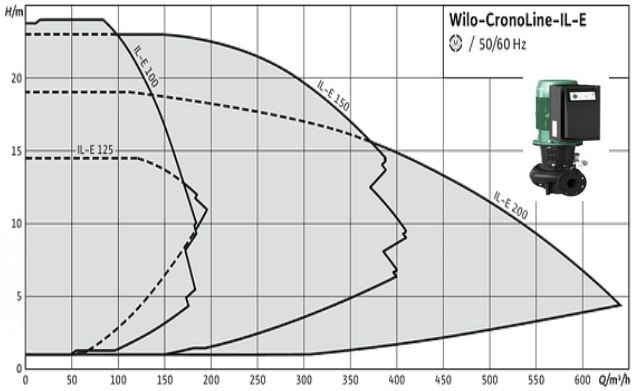
Performance Curve Comparison

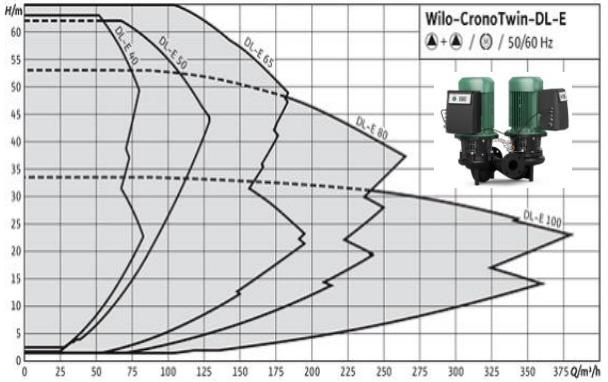












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> Start new selection | Choose language | Settings | Leaflet (0)

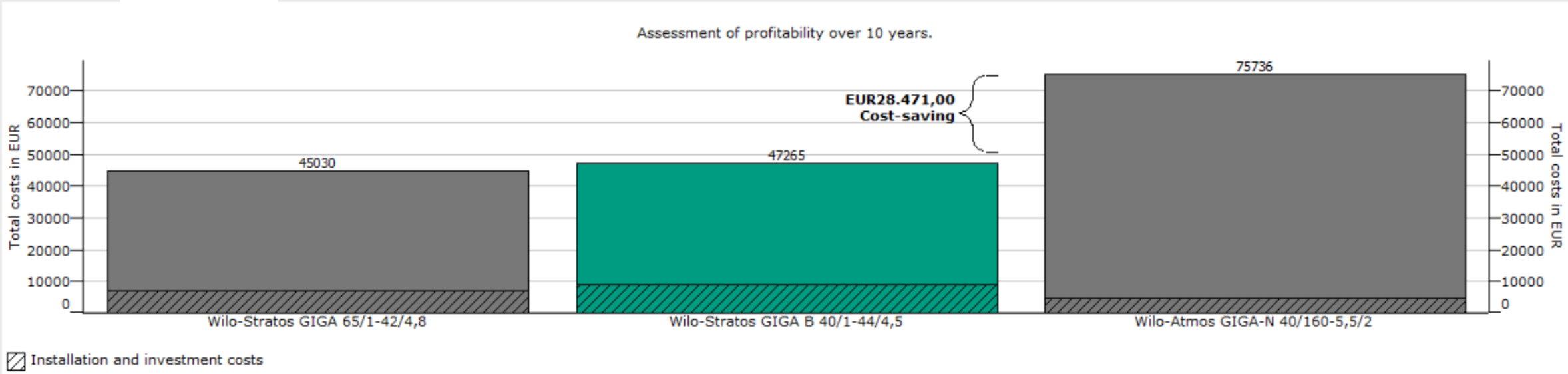
Running costs

Life cycle costs (LCC) | Life cycle costs (VDI 2067)

Settings

Description	Application range / l/s	t / h	Energy requirements / ...	Energy costs / EUR/a	Power input P1 / kW	Investment costs / EUR	Running costs / EUR/a	Total costs / EUR
Atmos GIGA-N 65/315-7,5/	12	6840	30470	6.094,81	4,455	7.903,00	6.094,81	94.917,87
Stratos GIGA 100/1-33/6,0	12	6840	18580	3.716,95	2,717	7.966,00	3.716,95	61.032,50
Atmos GIGA-N 80/315-7,5/	12	6840	36030	7.206,89	5,268	8.456,00	7.206,89	111.348,01
☑ Stratos GIGA B 40/1-44/4,5	12	6840	13330	2.666,65	1,949	9.193,00	2.666,65	47.264,52

Cost graph | Cost comparison | Power input | Energy requirements | CO2-emissions



> CLOSE

Best Practise case on Sustainable Energy Building Design; 'Kristall'.

- German Sustainable Building Council.
- Energy PLUS building.
- Platinum Certificate from the German Sustainable Building Council.
- Net Energy Surplus, 22 kWh/(m2a) (equiv. 284 Qld. Households)
- Every part of building is designed for maximum efficiency.
- From Thermal Insulation, Lighting Control, Photovoltaic Energy.
- Biogas-fired combined heat & power plant.
- A building this efficient, requires Smart Efficient pumps.
- 250 Wilo Smart Pumps.
- Total Gross Floor Area: 19,818m2
- 61m high, 21 floors.
- Tenant: LVM Insurance with 450 employees

Need for change in Tender Decision Making

Renewable energy

In addition to our ongoing major wind and solar farm contracts, we also continued implementing our own solar energy program to reduce our greenhouse gas emissions. This year, the Behind the Meter Program has added about 1,500 megawatt hours (MWh) of renewable energy generation at 14 sites across the state, including two solar/battery hybrid installations. This reduces emissions by approximately 1,000 t of CO_2 equivalent per annum.

Tender Criteria

- **LCC over 10years**
- **Lowest Opex**
- **14 sites**
- **10yr saving on Opex equiv. to original Capex**

Environmental Responsibility

Extreme weather conditions: clean energy efficient solutions

Our contribution to the Sustainable Development Goals.
WILO signed the UN Global Compact in 2018.

Our awards.
We are a climate protection pioneer.

Environmental decoupling.
Extreme weather, clean solutions. Committed to sustainability.

Pilot project: Hydrogen powerplant.
- 96 Electrolsyers.
- Produce 10tonnes of Green Energy/annum.

Climate-neutral headquarters

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