Reliability and Maintenance Best Practices for Aeration Blowers

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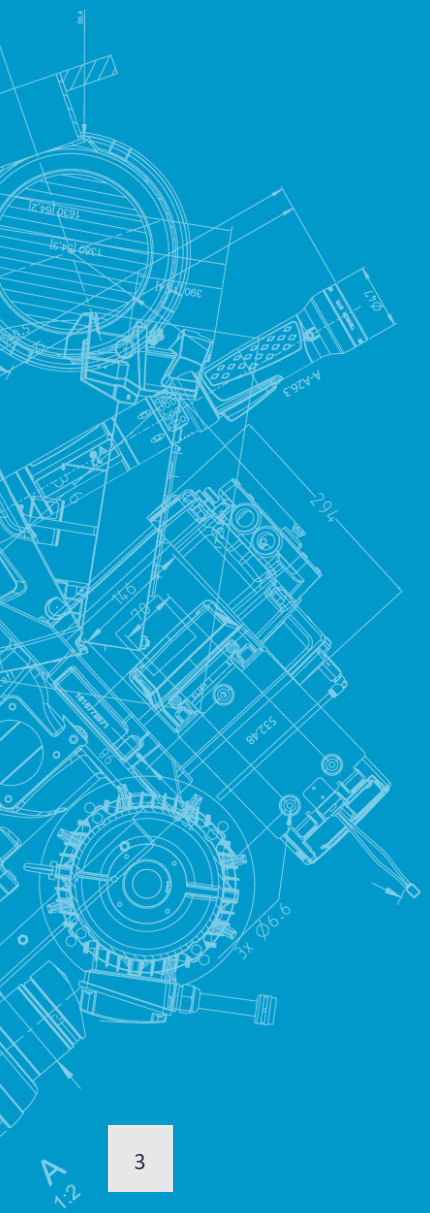
Introduction

- *A recent study by Atlas Copco revealed that 40% of wastewater treatment operators in the United States have concerns over the maintenance needs of their air blowers.*

- *This webinar guides you through what to look for pre-purchase, and what to focus on post-purchase, to ensure you get reliability and efficiency.*

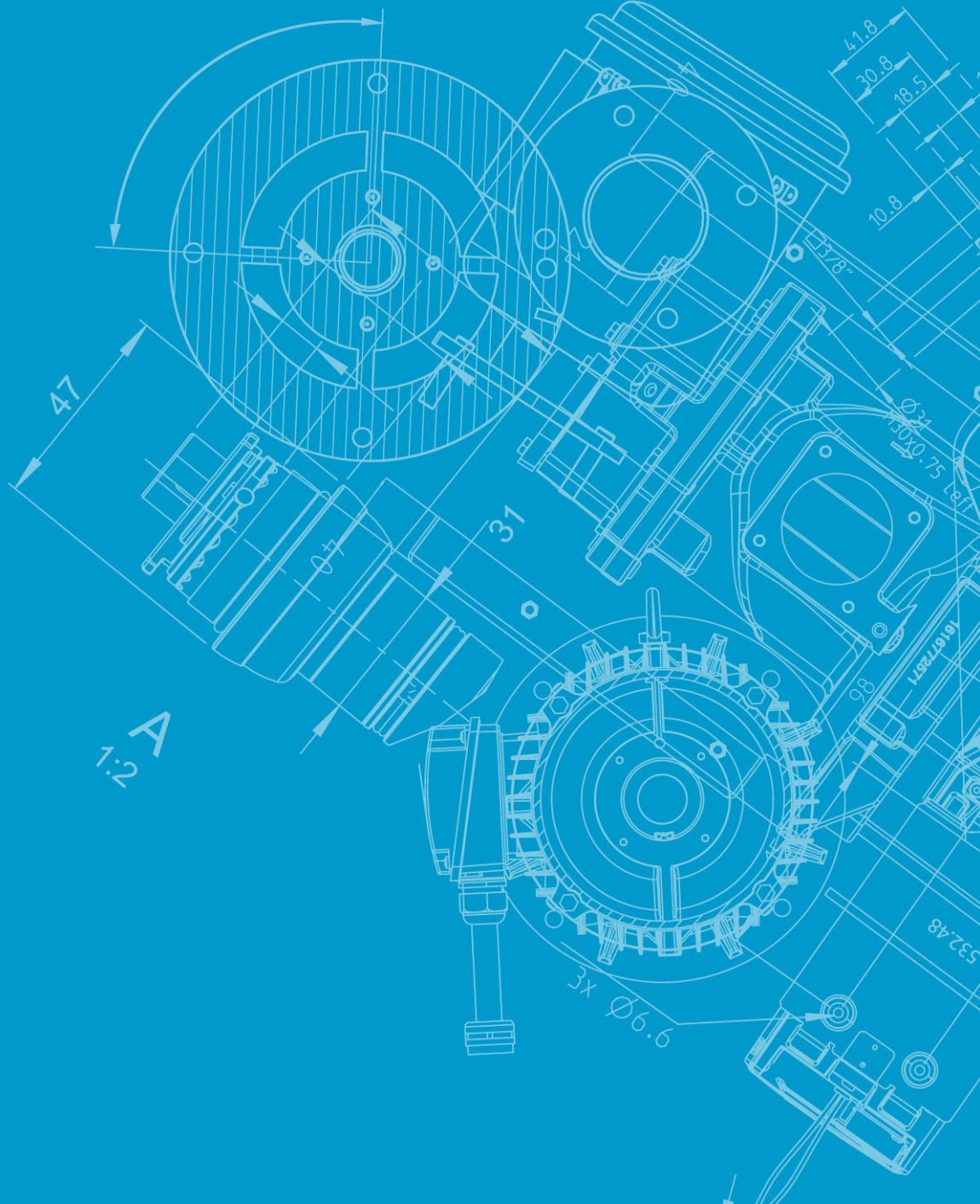
Category	Mentions
Maintenance	40%
Energy efficiency	16%
Sizing	10%
Reliability	7%
Heat	3%
Noise	3%



Agenda

1. Design Features That Add Longevity to Products?
    a. Cleanliness and filtration
    b. Reducing heat and cooling
    c. Bearing designs – contact and non-contact
    d. Unloading, blow-off, and relief valves
    e. Coated rotors and corrosion resistance
    f. Belt drives and gearbox drives
2. Maintenance Schedules per Product Type:
    a. Tri-lobe PD
    b. Multistage centrifugal
    c. Rotary screw
    d. High speed turbo
3. Importance of Service Plans and Scheduling
4. Remote Monitoring

Design Features That Add Longevity to Products?



Remember

“An ounce of prevention is worth a pound of cure.”

Benjamin Franklin

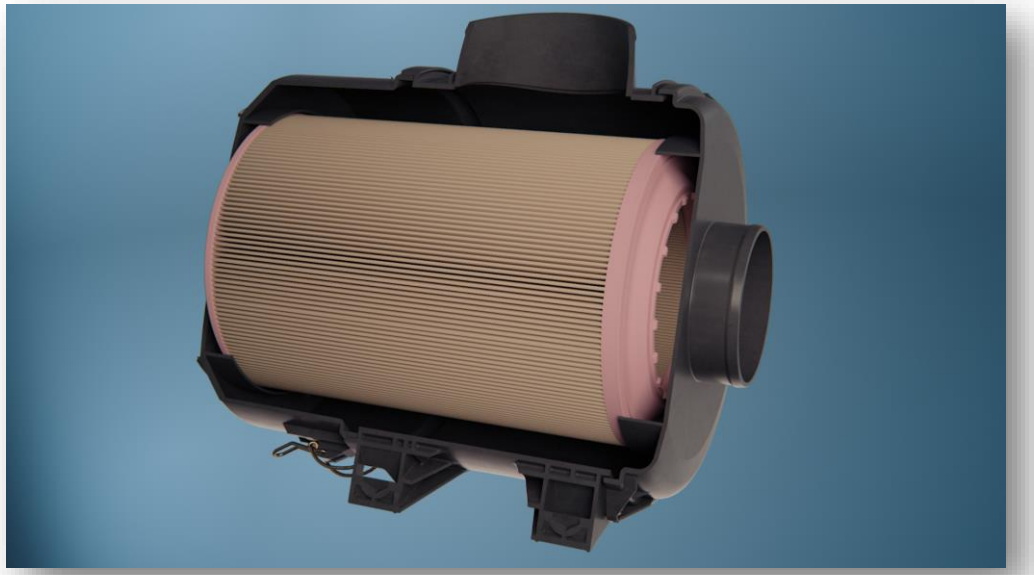
Cleanliness: The Importance of Filtration

What do we mean?

- Filters have different efficiency ratings
- Cartridge filters > Panel filters
- Material & surface area matter

How does it improve reliability?

- Increased longevity of rotors, impellers, bearings, seals, and electronics (VFDs, et al)
- Decreased chance of failure
- Longer time between maintenance services



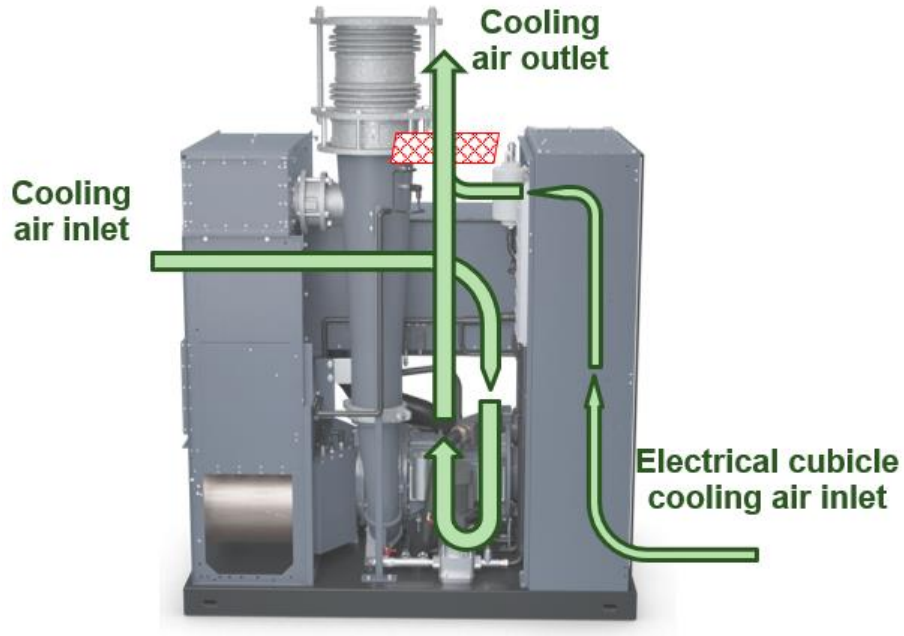
Reduce Heat

What do we mean?

- Inefficiency = heat
- Heat is the enemy of rotating equipment
- Ventilation is very important

How does it improve reliability?

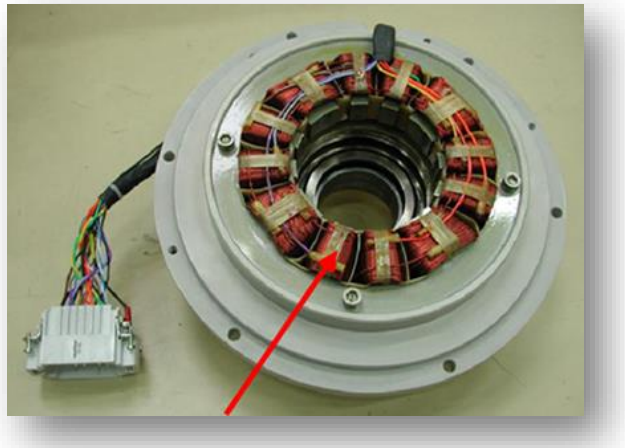
- Fewer oil changes required
- Longer bearing life
- Longer motor life
- Better efficiency = $ saved



Magnetic Bearings vs. Airfoil Bearings

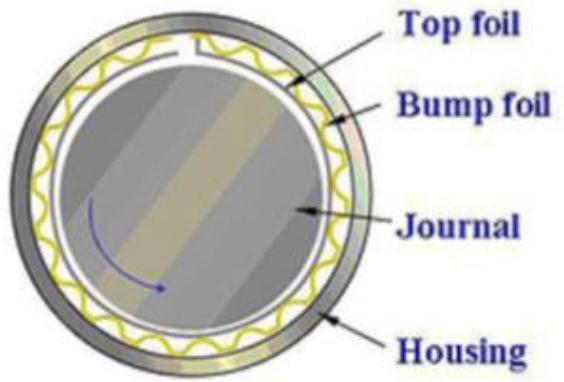
Magnetic Bearings

- Higher speed / load capacity
- Better aero efficiency
- Don’t require replacement



Airfoil bearings

- Limited speed / load capacity
- Limited turndown and pressure range
- Must be proactively replaced based on starts/stops



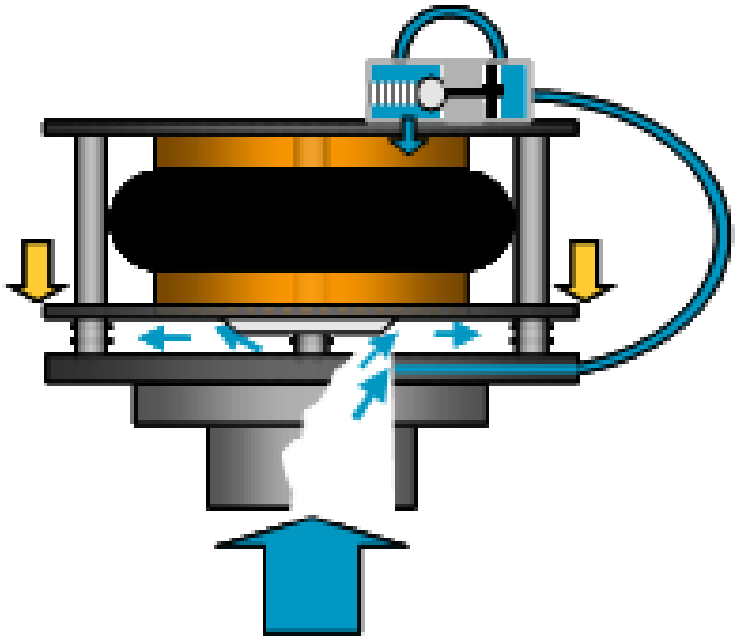
Start Unloading & Pressure Relief Valve

What do we mean?

- All blowers must be protected from over-pressure
- Centrifugals have BOVs; PDs have PRVs
- Unloaded starts/stops = lower power consumption; less stress on equipment

How does it improve reliability?

- Lower in-rush current = longer motor life
- Lower starting torque = longer bearing & belt life
- No short cycling = longer life



Coated Rotors

What do we mean?

- Blowers compress humid air
- Water corrodes iron and steel = rust
- H2S and other ambient pollutants can cause rotor lock-up

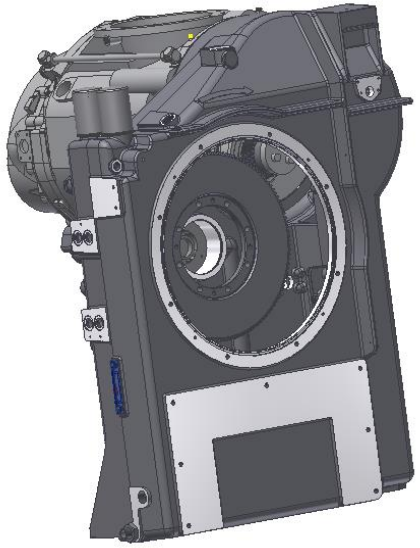
How does it improve reliability?

- Coatings increase efficiency and prevent corrosion
- No need to "unlock" rotors
- Less unplanned downtime; longer element life

Direct Drive or Belt Drive?

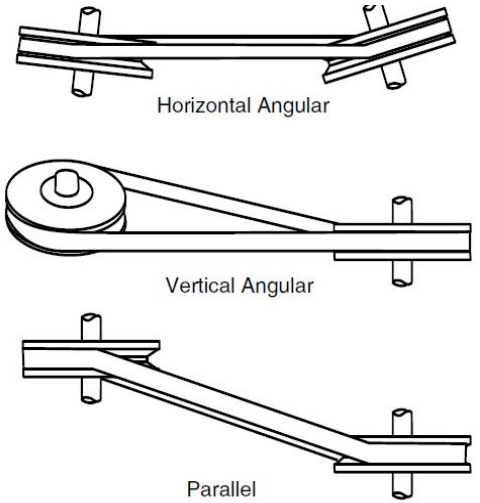
Gearbox drive

- High efficiency, no deterioration
- Oil required; same sump as blower = one change
- No other maintenenace

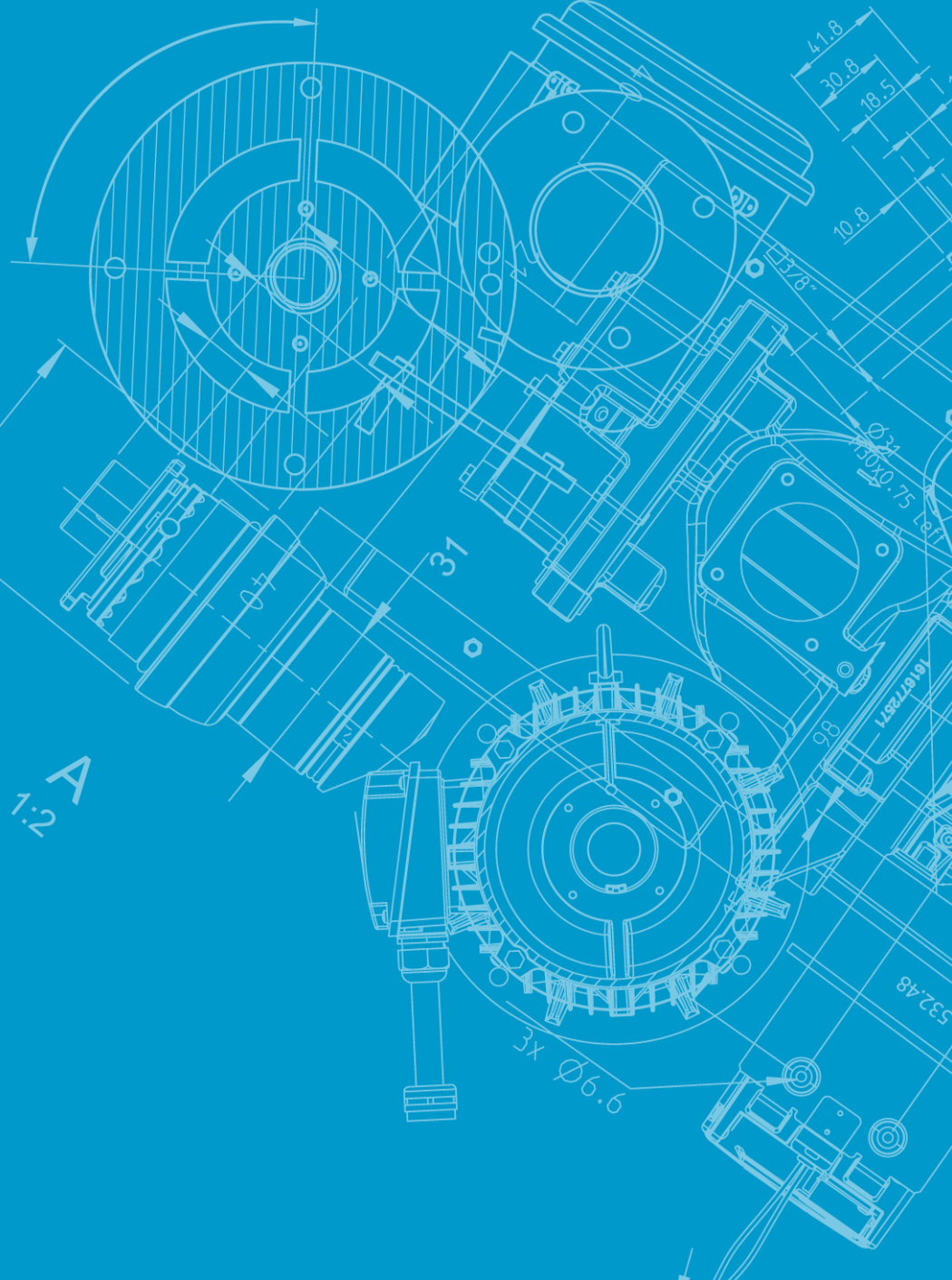


V-belt drive

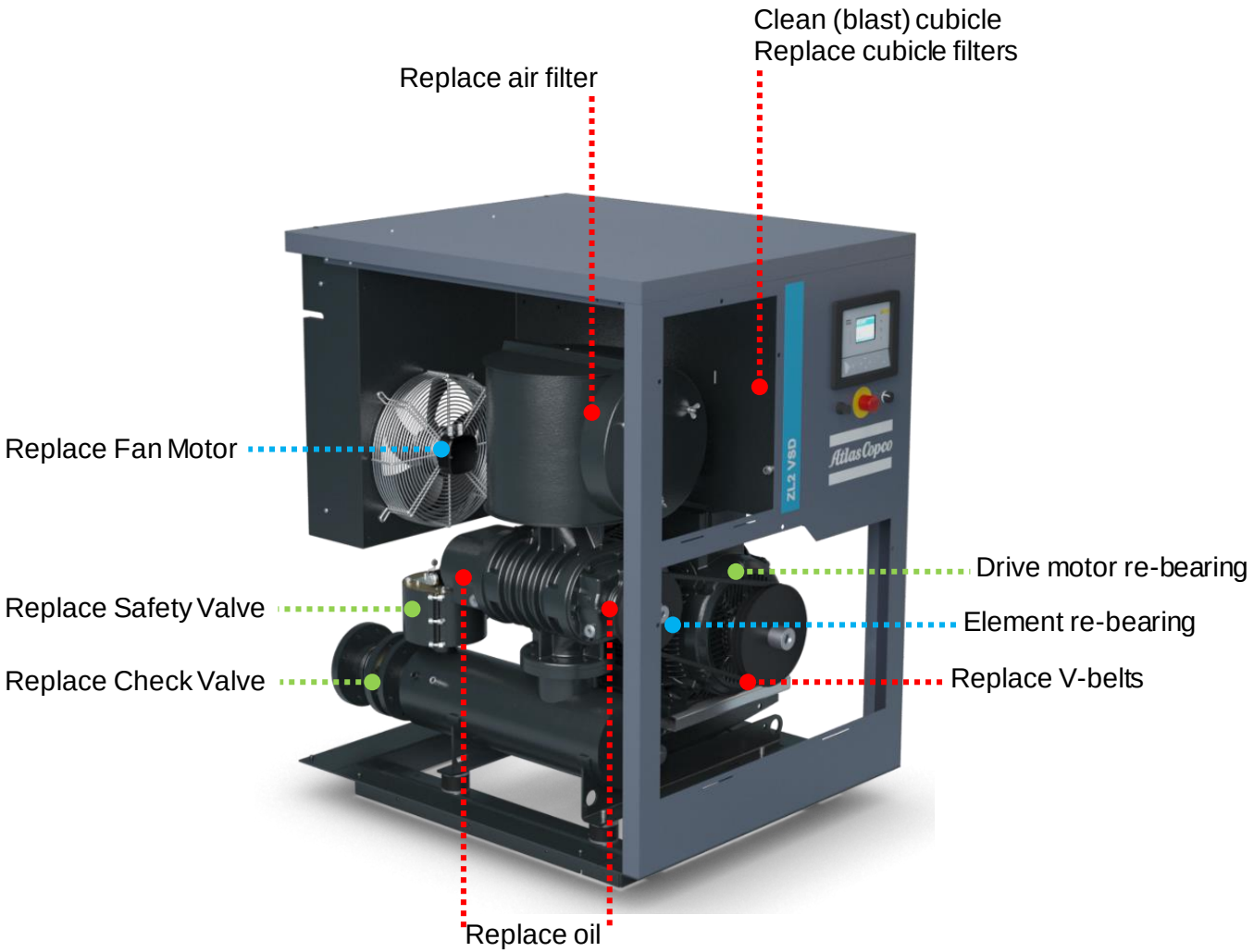
- Friction = higher losses & lower efficiency
- Heat & dust accelerate deterioration
- High bearing loads reduce lifetime and reliability



Maintenance Schedules Per Technology



Tri-lobe PD



I-visit ***& every 400 hrs***

Checks:

- general blower operation
- oil levels
- safety valve functioning
- PRV properly closing
- inlet filter condition
- V-belt tension
- motor operation
- cubicle filters

A-visit ***4 000 hrs***

- Check lubrication disks (oil level moving?)
- lip-seal blower shaft

B-visit ***8 000 hrs***

- A visit activities

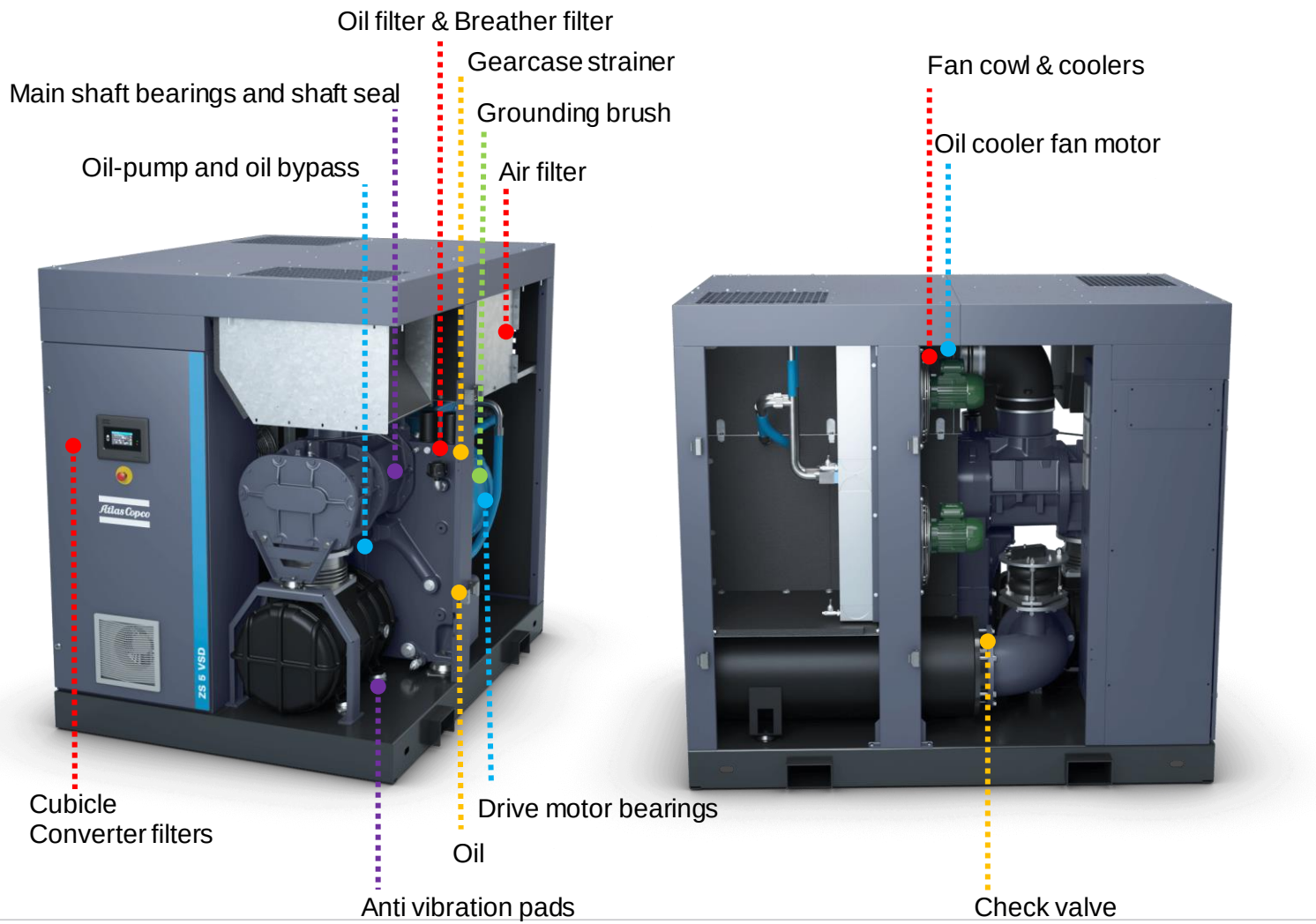
C-visit ***20 000 hrs***

- A visit activities
- BOV valve & check valve
- Vibration levels element

D-visit ***40 000 hrs***

- All visit activities

Rotary Screw



I-visit

Checks:

- air filter
- breather filter
- cooler & fan
- for air & oil leakage
- sensitive connections
- condition air intake
- oil quantity
- full set SPM readings

A-visit ***8 000 hrs***

- wiring & connections
- blow-off valve

B-visit ***16 000 hrs***

- A visit activities
- coupling elements

C-visit ***24 000 hrs***

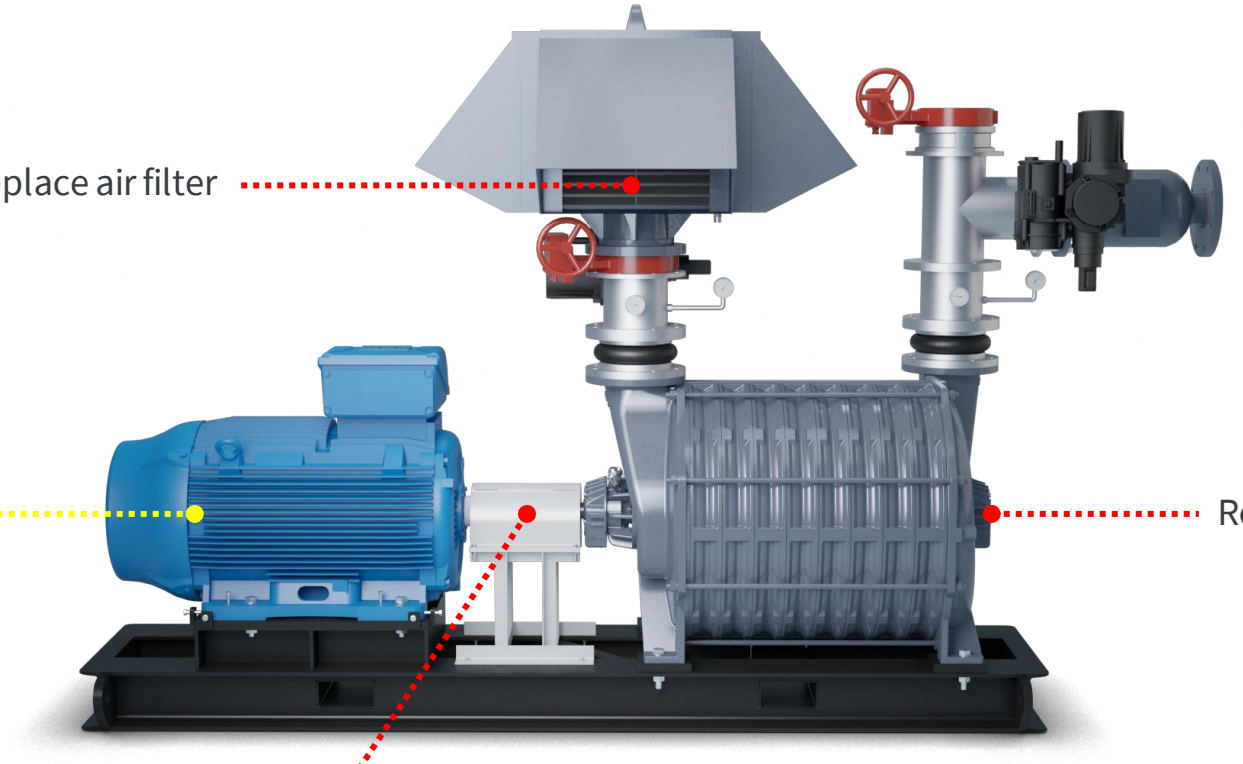
- A visit activities
- check condition of gears

D-visit ***40 000 hrs***

E-visit ***80 000 hrs***

- ALL visit activities

Multistage Centrifugal



Replace air filter

Grease motor bearings

Replace bearing lubrication (grease or oil)

Check alignment

A-visit ***4 000 hrs***

***Per nameplate**

High-Speed Turbo

Replace internal cooling water

Replace MBC cooling fans

Replace thermostatic valve

Replace Victaulic coupling

Replace pump seal

Replace motor cooling fans

Replace air filters

A-visit	***Not applicable***
B-&C-visit	***8 000 hrs & 24 000 hrs***
C+-visit	***32 000 hrs***
D-visit	***48 000 hrs***

Things We Commonly See

Panel filter in high-speed Turbo application

Down 1 month for belt replacement

Chipped Impeller improper filtration

Importance of Service Plans and Scheduling

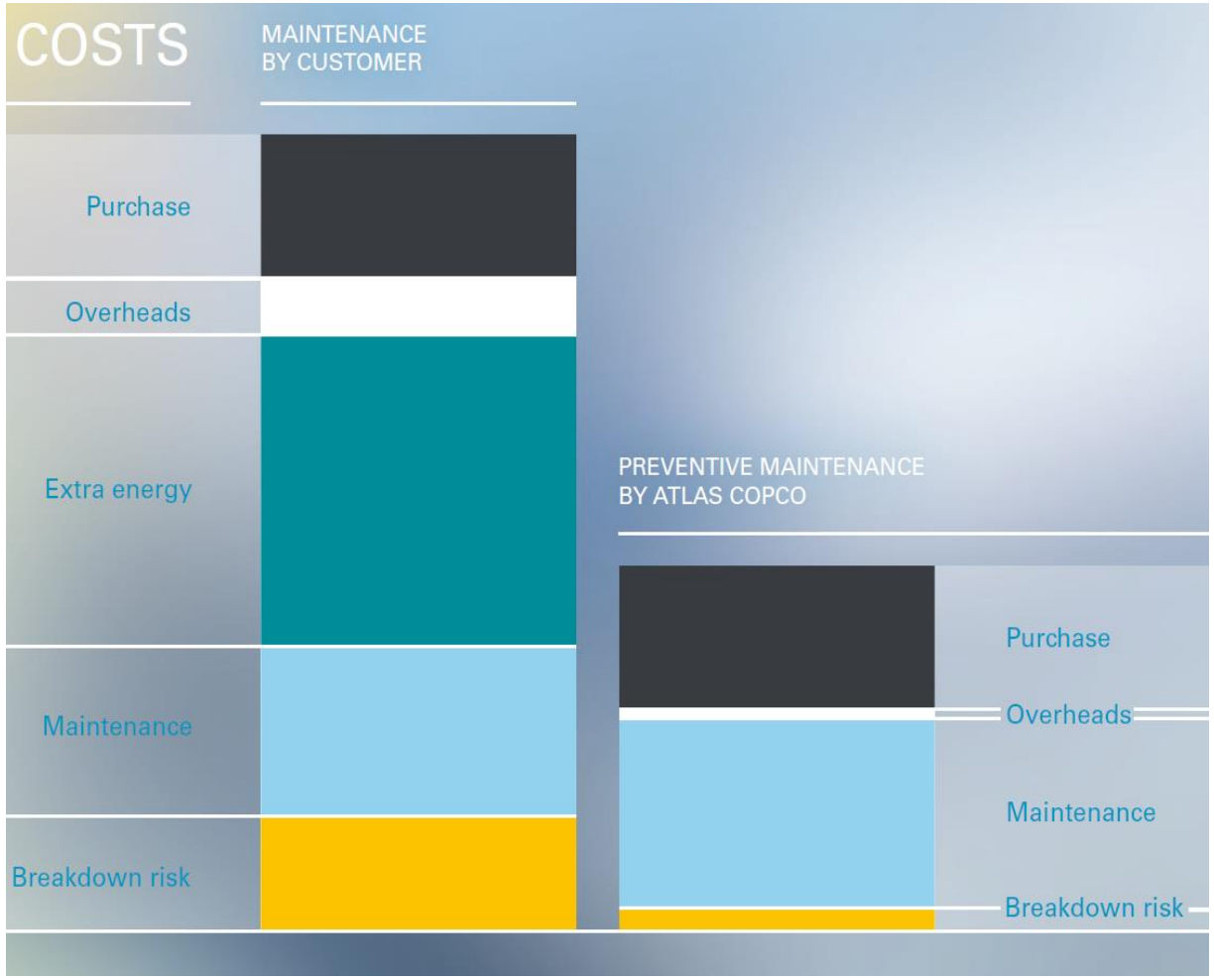
Service Plans

What do we mean?

- Having a plan to perform regularly scheduled maintenance and checks
- Keeping records of maintenance performed and conditions monitored at specific intervals
- Ensures equipment is running optimally and replaced if faulty

How does it improve reliability?

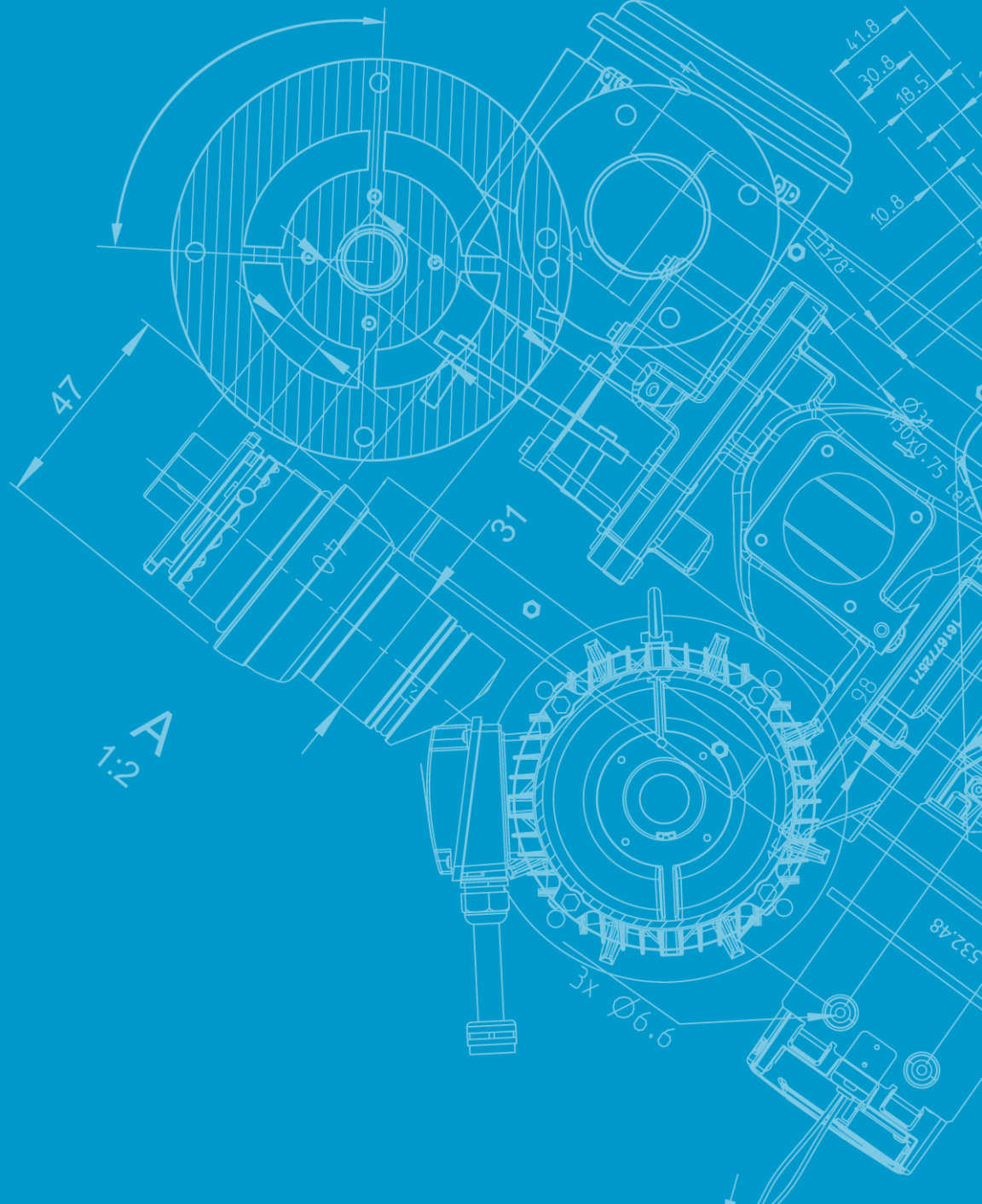
- Identifies areas of concern prior to component failure
- Allows scheduling of component to have on hand before end of life.



The Importance of a Plan

This Statement is Truer Now Than Ever

Remote Monitoring



Remote Monitoring

What do we mean?

- 24/7 monitoring and notifications to mobile devices
- Blowers also monitored by proactively by supplier
- Ensures a mirror (see the same data and notifications) between the customer and supplier

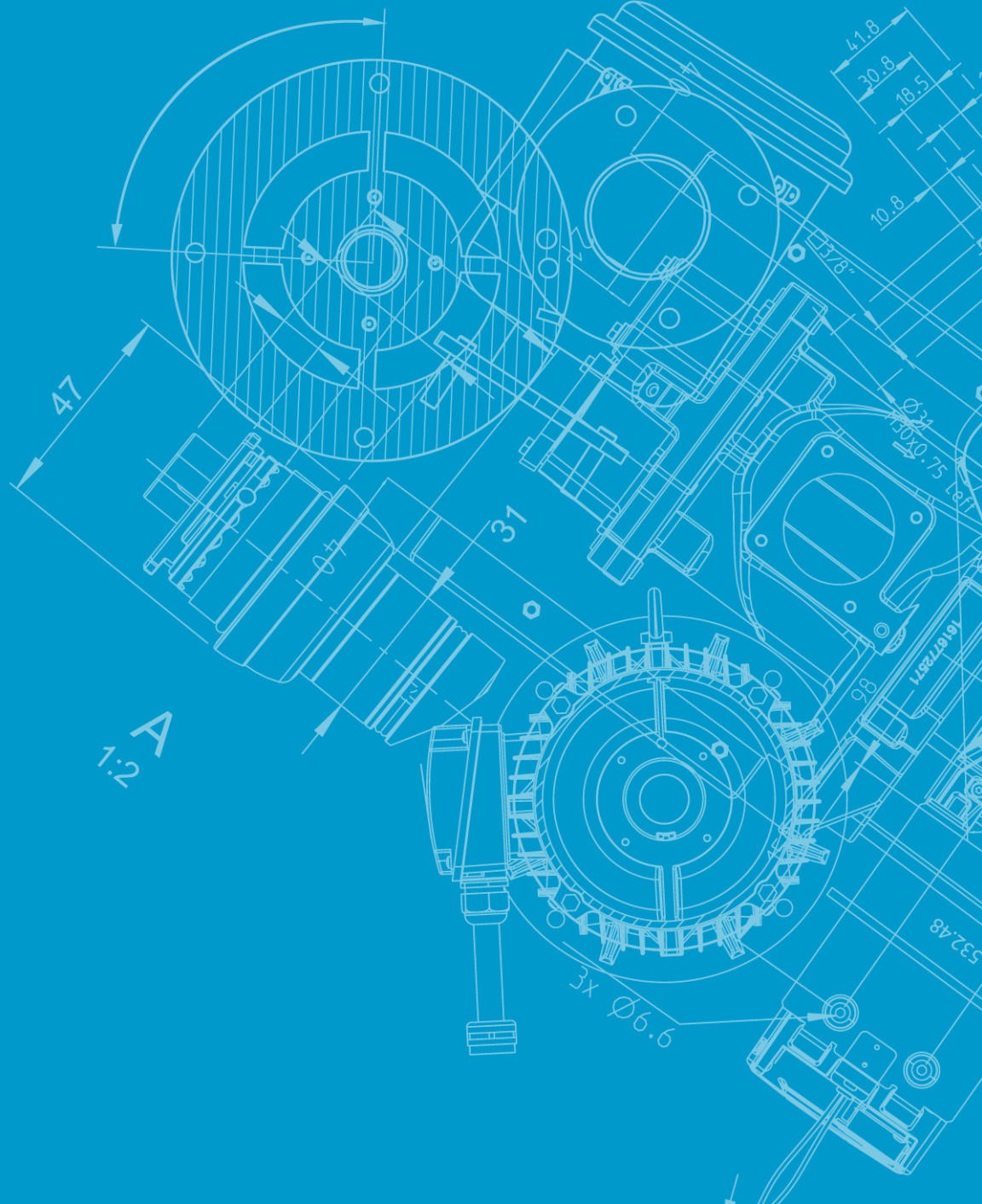
How does it improve reliability?

- Alerts you before issues become problems
- Give you performance data at your fingertips

Advanced Controls

Feature	Advantage	Benefit
Pressure control	Reliable, precise process control	Stable header pressure
External speed control with 4-20 mA input (VSD only)	Process variable driven blower operation	Stable DO
Automatic Restart After Voltage Failure (ARAVF)	No need to go to the blower room to restart the units after electricity shutdowns	Minimized down time
SMARTLINK integration	Online monitoring of the unit, tracking of warnings/alarms, sensor trensing, maintenance scheduling; adopting to new Industry 4.0 connectivity requirement	High uptime, reduced service cost
Remote monitoring	Advanced warning of potential failures	Avoiding loss of air
Warning indication	Ensures early detection and rectification of potential problems	
Service plan function	Allows planning of service only when required Ensures correct service is performed at the time when it is needed	High uptime, reduced service cost
Elektronikon® balances running hours	Ensures all blowers operate maintaining lubrication and operational availability Evens out running hours extending service intervals and minimizing service visits	

In Summary



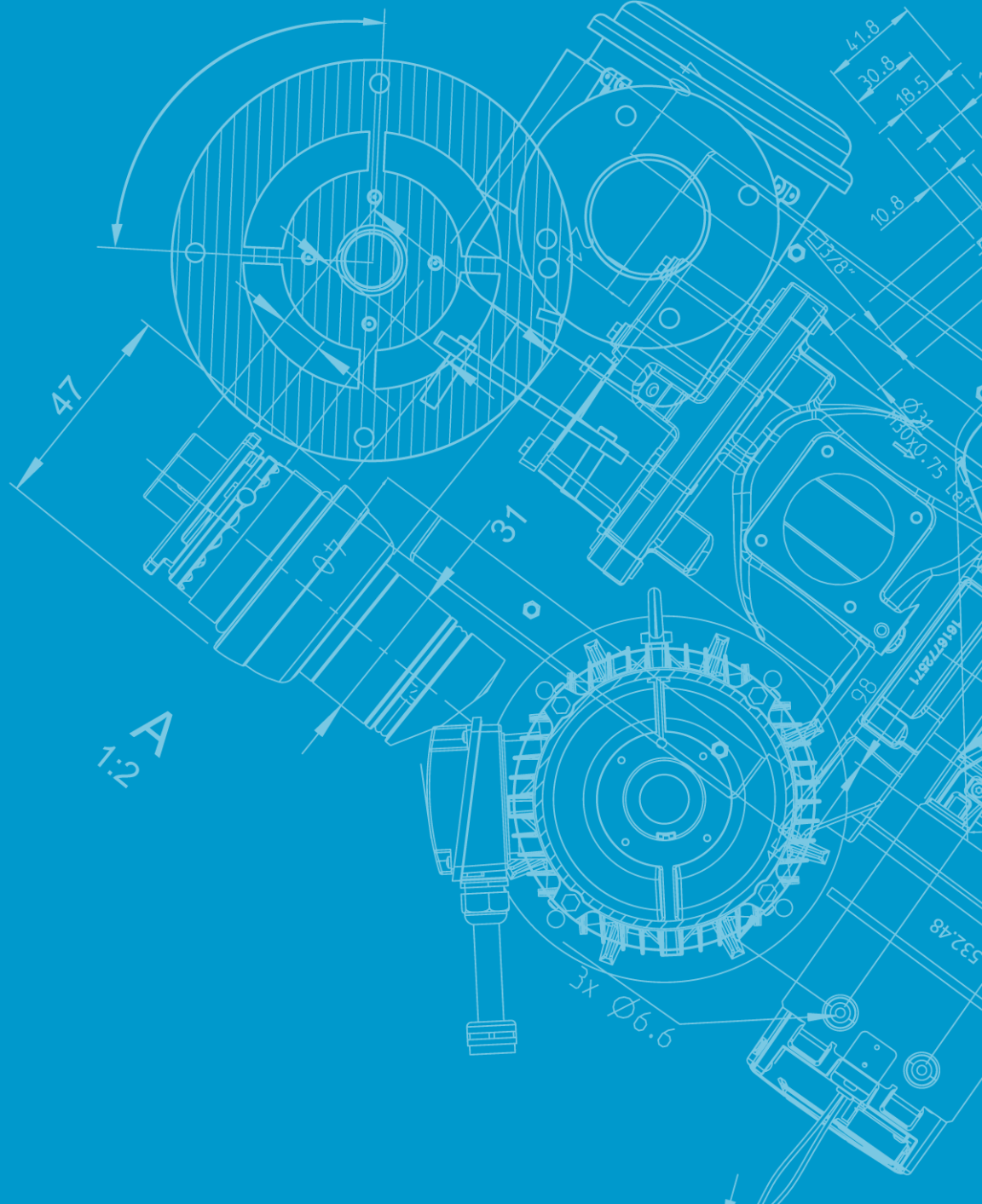
Conclusion

- Ultimately a big part of reliability is getting the best product for your application. Armed with your pressure and flow needs, these questions can go a long way to determining what's right for you

1. Is the application inside or outside?
2. How important is lower-noise levels?
3. Do the needs of the application change regularly?
4. Do you have your own maintenance team?
5. Is the site staffed 24/7?

Once your product is chosen, optimization and scheduled maintenance are key to maximizing your efficiency and reliability

Questions?



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