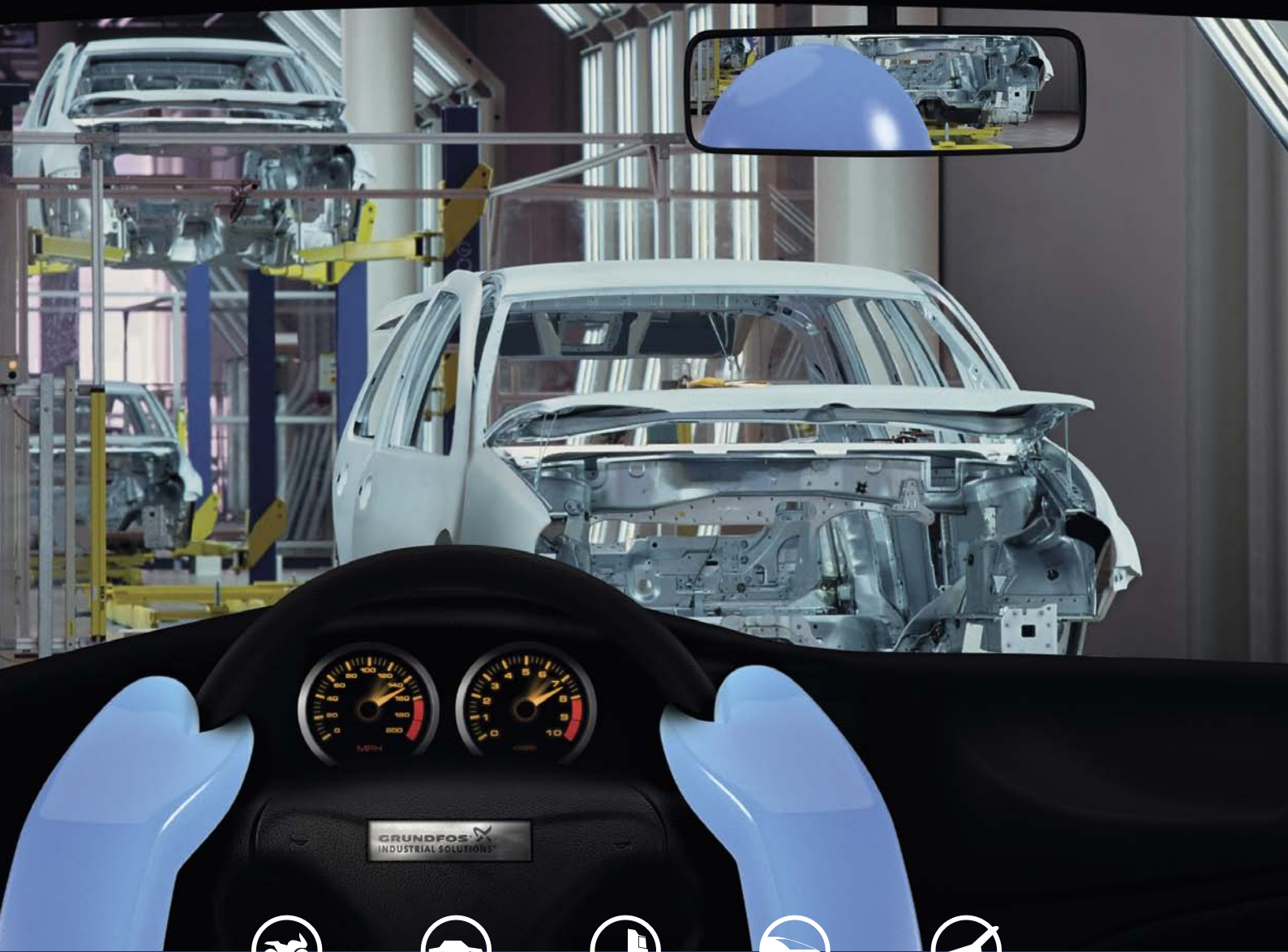


PUMP SOLUTIONS FOR AUTOMOTIVE INDUSTRY

MAKE YOUR PRODUCTION RUN SMOOTHER



MOVE INTO THE FAST LANE WITH THE GLOBAL NO 1 IN PUMPS



Are you looking for a pump supplier who understands the importance of accuracy and reliability – and who is able to provide you with expert solutions for all your automotive applications? The Grundfos range of thoroughly-tested industrial pumps is built on more than 60 years of experience and designed with specific attention to ensuring flawless operation in even the

most critical productions. Every year, we devote 5% of the annual turnover to research and development for the benefit of our customers. Across the world, thousands of Grundfos pumps are already at work in automotive applications and we willingly use our know-how to optimise your production line, too.

Rely on us for full-line industrial solutions

Grundfos is the world's leading manufacturer of pumps* – a position we have earned through focus, dedication and an urge to constantly push the boundaries for innovative pump technology. One third of all Grundfos pumps is part of industrial solutions and for decades, industries all over the world have benefited from our extensive range of pumps for:

- > Machine tool
- > Filtration
- > Part washing
- > Chilling
- > Surface cleaning
- > Painting
- > Utilities

Advanced pump solutions have been developed specially for the automotive industry to meet the strict requirements of this business. Ensuring no intervention with the critical operation, Grundfos' solutions for the surface cleaning and painting processes are double sealed and have been reduced from all paint wetting impairment substances (PWIS).

Whatever you require we can deliver

Whether you are manufacturing cars, trucks, MCs or even trains and planes, Grundfos has the pump solution that will successfully meet your application requirements. Even when you are looking for a specialised solution. Our impressive range of standard pumps can be configured to serve specific needs – just like vehicles can be configured to include specific properties. Consequently, you can choose the exact components required to optimise different automotive applications.

Competent support is always nearby

In choosing Grundfos as your pump supplier, you choose a truly global partner. With more than 80 sales and service companies in more than 45 countries, you are guaranteed highly qualified service and support whenever you need it. In the local language, naturally. Also, we offer easy access to automotive application specialists who are able to work closely with you on development projects. This allows you the benefit of having a partner by your side who truly understands the challenges you face and go to great lengths to make a difference for you. Should the need for spare parts arise, we guarantee that these will be delivered to you in the shortest time possible, reducing costly downtime to an absolute minimum.



Grundfos' extensive service program includes:

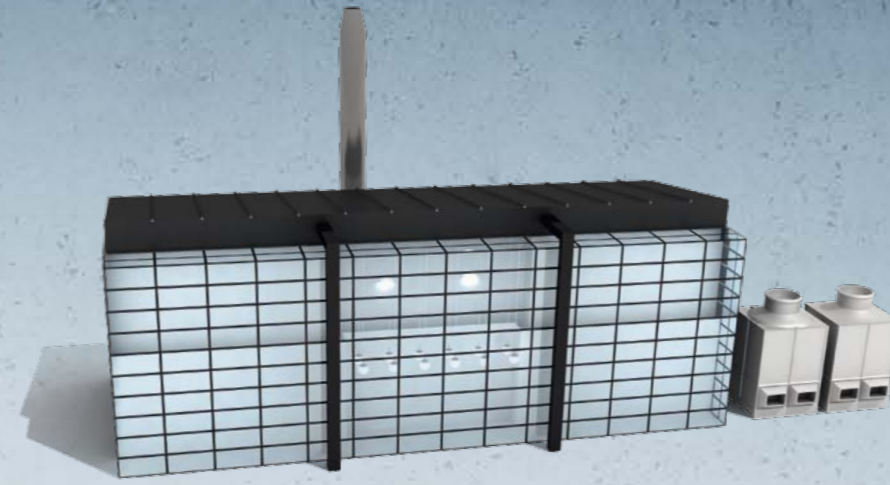
- > 580 certified Grundfos service partners worldwide
- > Quick delivery of spare parts – usually within 24 hours
- > Commissioning – ensure perfectly integrated pumps into your system
- > Life-cycle cost analysis – efficiency calculation of system performances via pump audit
- > Online support – via WebCAPS

* According to survey made by the VDMA Association.

ONE PUMP SUPPLIER FOR ALL YOUR APPLICATION NEEDS

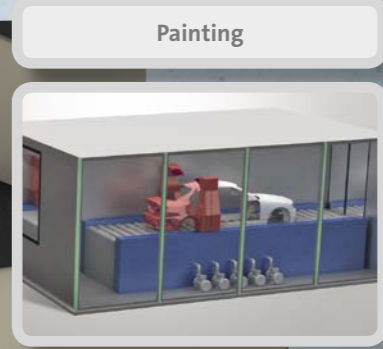
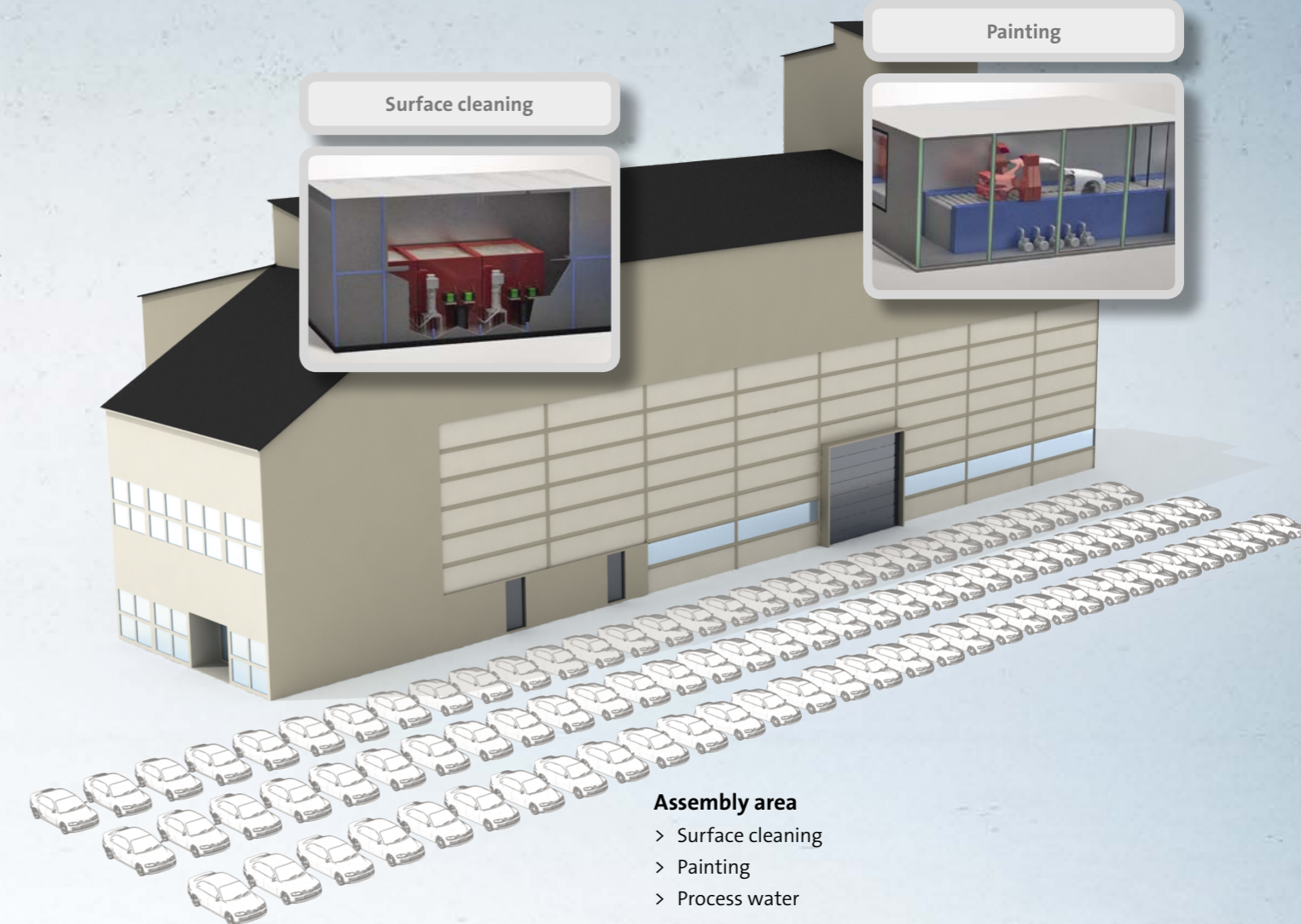
No matter what your requirements are, we are confident that we can provide the pump solution to meet them. Covering the entire production from the machining

area to the assembly line, the Grundfos range offers pumps for every application in the automotive industry – including all the utilities.



Utilities

- > Wastewater
- > Water treatment
- > Water supply/Pressure boosting
- > Cooling & Heating
- > Boiler feeding
- > Fire fighting



Machining area

- > Machine tool
- > Chiller
- > Filtration
- > Part washer

Assembly area

- > Surface cleaning
- > Painting
- > Process water

FULL-LINE SUPPLIER FROM MACHINING TO ASSEMBLY

As a dedicated player in the automotive business, Grundfos is able to offer advanced pump solutions for your every requirement. Our extensive range of high-quality products is developed to optimise industrial

Machine tool

Grundfos' range of high-pressure pumps offers unsurpassed accuracy and stability to make sure that there are no interferences with the delicate machining processes. Equally important, the high efficiency of the pump ensures a remarkably low heat input into the cooling lubricant. Integrated frequency converters can be optionally supplied for increased system efficiency and flexibility. Pumps suitable for machine tool applications are the immersible MTH, MTS, MTR and SPK pump ranges, offering a tank mounted design. In addition, CR and CM are well-suited for machine tool applications.

Filtration

Reliable filtration is crucial in top quality machine tool applications, prolonging the life of the tool as well as preventing the chips from damaging surfaces or tolerances. MTA and MTB with open impellers are ideal for chips conveying into the filtration system while the single-stage NB/NK and MTRE ranges are the obvious choice for big central systems.

Part washer

The Grundfos range includes pumps suitable for the pumping of corrosive media and media with a high content of particles. Our frequency converted pumps with high-efficient motors ensure that the systems are operating under the best possible conditions with low energy consumption. Pumps suited for this application are MTB, NB and all immersible pumps.

processes, ensuring that your production line is as reliable as it is efficient. Please go to www.grundfos.com for the entire presentation of products, services and tools.

Chiller

The reliable and thoroughly-tested range of pumps for chiller offers a particularly diverse application spectrum. It covers cooling water circuits, washing plants, industrial circulation systems as well as general pressure increase applications. All pumps can be supplied with an e-motor to increase efficiency and perfectly control any process. Pumps ideal for this application are CM, CR and all immersible pumps.

Process water

Providing you with the optimum supply of process water is a Grundfos specialty. Our range of stainless steel products are designed for mechanical, chemical and organic treatment solutions. Fitted with frequency-converted motors the pumps can help you optimise your system, which may also benefit from Grundfos' top-of-the-line dosing program.

Surface cleaning

Offering a wide temperature range, the reliable, compact pumps are ideal for cleaning applications. The pumps can be supplied with an e-motor to increase efficiency and perfectly control the process. The CM, CR, NB and NK pumps are suitable for this application.

Painting

All Grundfos pumps for painting applications are developed with careful attention to efficiency and accuracy. On top of reliable operation, the range offers modularity, easy maintenance and low operating costs. The NB/NBK and NOVALobe pumps are well-suited for painting applications.



UTILITIES

Water supply/Pressure boosting

The Grundfos range covers both pressure tank systems and frequency-controlled systems. It includes submersible SP pumps for bore hole applications as well as in-line and end-suction pumps for backwash application and dosing pumps for water chlorination. The Hydro Booster is designed for this application.

Wastewater

Solids and other particles in wastewater cause wear requiring robust pumps. Our range varies from small stainless steel drainage pumps to large wastewater pumps with up to 600 kW motor power. The SE pump is suited for wastewater applications.

Boiler feeding

The thoroughly tested CR pump has been customised with low NPSH to cater for systems with poor inlet conditions. This ensures cavitation-free operation even outside the pump's normal duty range. We recommend speed-regulated pumps for boiler feed to optimise the process. The obvious pump for this application is the CRE.

Cooling & Heating

The range includes numerous pump types for cooling and heating applications, water-borne as well as various other media. Solutions for high-temperature applications are also available. All pumps can be supplied with speed-regulated motors, offering major advantage in terms of dimensioning and energy savings. The TPE Magna is suitable for this application.

Water treatment

The easily installable Oxiperm DTS, particularly suitable for water treatment, is a highly efficient, compact chlorine dioxide preparations solution used for disinfection applications in cooling systems and warm water cycles.

Fire fighting

Grundfos' fire fighting pumps are designed to safeguard personnel and equipment and fulfil the internationally recognised VdS standards. Suitable for this application is the fire fighting system.

CONFIGURE THE OPTIMUM PUMP

Customisation is a Grundfos cornerstone. Just as efficiency is. Our product portfolio consists of an impressive number of pumps that can be individually configured with a wide variety of modules to form the solution that

perfectly matches your application requirements. The example below is the optimum solution for the painting process in the automotive industry.

- Machine tool
- Filtration
- Part washer
- Chiller
- Process water
- Surface cleaning
- Painting**
- Pretreatment
- Coating

MGE frequency converted motor

Steady the process, lower the energy consumption and reduce wear by fitting your pump with an MGE motor. Flow can be adjusted to meet individual application demands. Also, all parameters can be maintained at a constant level by using the on-board regulator.

PWIS reduced

The Grundfos pumps for painting applications have been reduced from all paint wetting impairment substances and efficiently optimise systems within the painting and pretreatment area.

Double shaft seal

The Grundfos double seal construction ensures that paint, aggressive media or explosive liquids stay safely inside the pump – rather than blocking the shaft seal area or polluting the surrounding environment.

Stainless steel

Grundfos' stainless steel program is corrosion resistant against aggressive media. This ensures smooth operation in painting and pre-treatment applications – and offers easy-to-clean products that are free from iron particles.



CONFIGURATION CHOICES

Motors

- > **MGE frequency converted motor**
- > Motor protection
- > CSA/UL approval
- > Industrial multiple plug connection
- > Single-phase motors
- > Four-pole motors
- > CEMEP Eff1 motors
- > ATEX approved
- > Special voltage
- > Enclosure class
- > Alternative terminal box position

Shaft seals

- > Cartridge solution
- > Alternative Seal faces
- > Alternative rubber parts
- > **Double shaft seal**
- > Tandem seal
- > Seal with pressure intensifier
- > Magnet drive
- > Dry running protection

Pump materials

- > Cast iron
- > **Stainless steel housing in 1.4408**
- > Stainless steel housing in 1.4517
- > Alternative bearing materials

Pump options

- > Different flange connection are available
- > **All paint wetting impairment substances have been reduced to a minimum**
- > Certificates
- > Customised paint finish
- > Spacer coupling
- > Low NPSH pumps
- > Flexible length for tank mounted pumps
- > A duty point specific is available for both bloc and norm pumps
- > Monitoring

EXPECT FEATURES THAT WILL OPTIMISE YOUR PRODUCTION

Improve efficiency with an E-solution

Grundfos' E-solutions are ideal in variable load operations and in applications where a high degree of process control is important. The "E" is synonymous with energy-savings, yet the advantages of innovative speed controlled pumps go much further. Specifically for the machining industry, E-solutions lead to:

- > Lower heat input into cooling lubricant
- > Increased cooling efficiency
- > Increased process safety
- > Flawless operation
- > Lower operating costs
- > Flexible interface dedicated to the machining industry

On top of this, the perfectly configured pump, motor and built-in frequency converter are easily installed thanks to a unique "plug and play" principle.

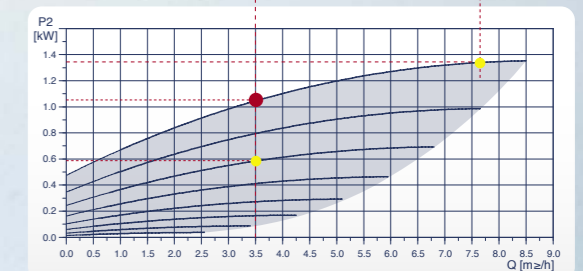
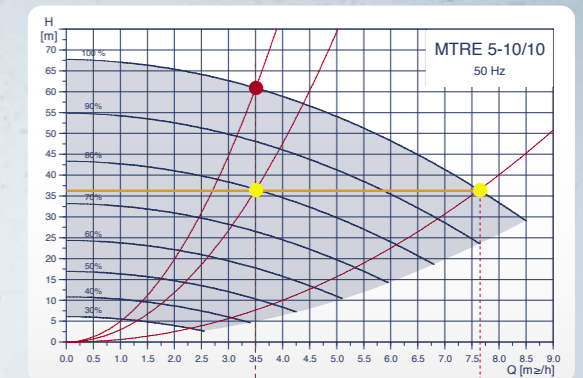
Guaranteed optimisation before you buy

Why waste energy and money, when a potential problem in your system can easily be diagnosed? Grundfos' pump audit determines in no time if and where energy losses are occurring, and suggests what you need to do to remedy the situation. In short, a pump audit is your guarantee that you will in fact benefit from replacing your existing pumps, offering:

- > Energy savings
- > Optimisation of pump set-up
- > Suggestions as how to remedy existing flaws
- > Reduced CO₂ emissions



Grundfos E-solutions efficiently reduce energy consumption while maintaining optimum performance.



CASE

75% REDUCTION IN OPERATING COSTS

Replacing existing high pressure pumps with a Grundfos E-Solution reduced Mayfran's operating costs by as much as 75%. Mayfran, a leading global manufacturer within swarf and cooling lubricants, is very satisfied with their 130 bar solution which combines a Mayfran controller with a Grundfos MTSE pump fitted with a frequency-converted motor.

Read more about industrial solutions at www.grundfos.com



“Especially grinding machines require a preferable constant cooling lubricant temperature for processing a workpiece within the specified narrow tolerances.”

Klaus Bock, Dipl.-Ing. at Mayfran

CONSTANT PRESSURE DELIVERS ENERGY-SAVINGS

Frequency-controlled immersible Grundfos pumps efficiently ensure constant pressure in a Mayfran filtration system designed for a joint venture between Lufthansa Technik AG and Rolls Royce plc.

Mayfran, a leading global manufacturer of conveyor and filtration systems, has planned and installed the central cooling lubricant filtration system that must supply each of eight machine tools with up to 500 l/min at a constant pressure of 3 bar. The solution is equipped with two Grundfos' MTRE pumps, designed to adjust the speed according to the number of active machine tools – while still delivering a steady pressure.

The Mayfran/Grundfos solution has resulted in significant energy-savings as well as the obvious advantage that a pump operating at reduced speed also generates less heat output to the cooling lubricant. This in turn means that no separate cooler need be switched on.

Read more about industrial solutions at www.grundfos.com



“Grundfos handled the changeover to the MTB pump in a very professional manner, clearly showing their high level of expertise in the machine tool area.”

Ralf Dörr, Process Planning, ZF Getriebe AG

EFFICIENT PUMP ENSURES ACCURACY AROUND THE CLOCK

ZF Getriebe AG, a world-leading supplier of parts to the automotive industry, benefits from Grundfos' extensive range of specialised pumps for cooling lubricant.

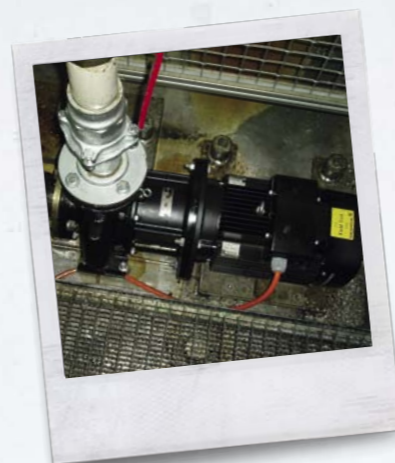
24 hours a day in a 3-shift operation, the unmachined gearboxes supplied by the foundry needs to be fine machined, washed and made ready for assembly. Despite separation of shavings straight after the machining process, 20% of the shavings remain in the cooling lubricant. As the shavings must also pass through the return pump on their way to the filter, a robust pump design is important.

The single-staged inline pumps in the Grundfos MTB range are designed for use on the “dirty” side of machine tools, transporting contaminated cooling lubricant up to 20 mm in size with a maximum flow rate of 1500 l/min. The high degree of efficiency offers the operator two immediate benefits: The pumps work

more efficiently and carry less heat energy into the cooling lubricant. In fact, 15-20% less than in conventional pumps. This is essential as grinding machines in particular are very temperature sensitive and require the cooling lubricant to be as constant as possible to be able to machine parts within the tight tolerances specified.

Because the return pumps at ZF Getriebe GmbH operate practically around the clock the MBT pumps can successfully be fitted with an EFF1 high efficiency motor as standard, significantly reducing the total cost of ownership.

Read more about industrial solutions at www.grundfos.com



WebCAPS – ALL THE INFORMATION YOU NEED IS ONLINE

Grundfos WebCAPS is an online product selection tool, yet it offers much more than that. The site includes all the product-related information you could ever need:

Catalogue

- > More than 140,000 product numbers. Includes all the products available in your region, complete with technical information, drawings, descriptions, performance curves, etc.

Literature

- > Find everything from data booklets through installation and operating instructions to product brochures. The newest version is always available.

Service

- > The place to find service instructions (including video tutorials), service parts lists, assembly drawings, etc.

Sizing

- > Enter your system requirements for instant recommendations. Includes Life Cycle Cost calculations.

Replacement

- > Enter the make and model of your old pump for an instant replacement recommendation.

CAD drawings

- > Download DXF and DWG files as required.



For offline use, WinCAPS is a CD-ROM version of WebCAPS. Contact Grundfos to order.

WebCAPS facts:

- > Catalogue – 36,000 monthly visits
- > Literature – 60,000 monthly document downloads
- > Service – 7,000 monthly visits
- > Sizing – 19,000 monthly visits
- > Replacement – 3,800 monthly visits
- > CAD drawings – 12,000 monthly downloads

GRUNDFOS AUTOMOTIVE SOLUTIONS

More than any the automotive industry requires highly accurate and reliable solutions. The global no 1 in pumps, Grundfos offers a wide range of thoroughly-tested pumps, covering the entire production floor from machining to assembly, including the critical surface cleaning and painting processes. All solutions can be configured to meet individual customer needs – and come with an unsurpassed worldwide service network:

- > Easy access to 80 sales and service companies in 45 countries
- > 580 certified Grundfos service partners worldwide
- > 18,236 Grundfos employees globally
- > Every year we produce more than 16 million pumps
- > 5% of annual turnover is dedicated research and development

Grundfos Management A/S

Poul Due Jensens Vej 7
DK-8850 Bjerringbro
Denmark
Phone: (+45) 8750 1400

www.grundfos.com/industry

The name Grundfos, the Grundfos logo, and the payoff Be–Think–Innovate are registered trademarks owned by Grundfos Management A/S or Grundfos A/S, Denmark. All rights reserved worldwide.