THE ORANGE COLLECTION

Mobile Machines

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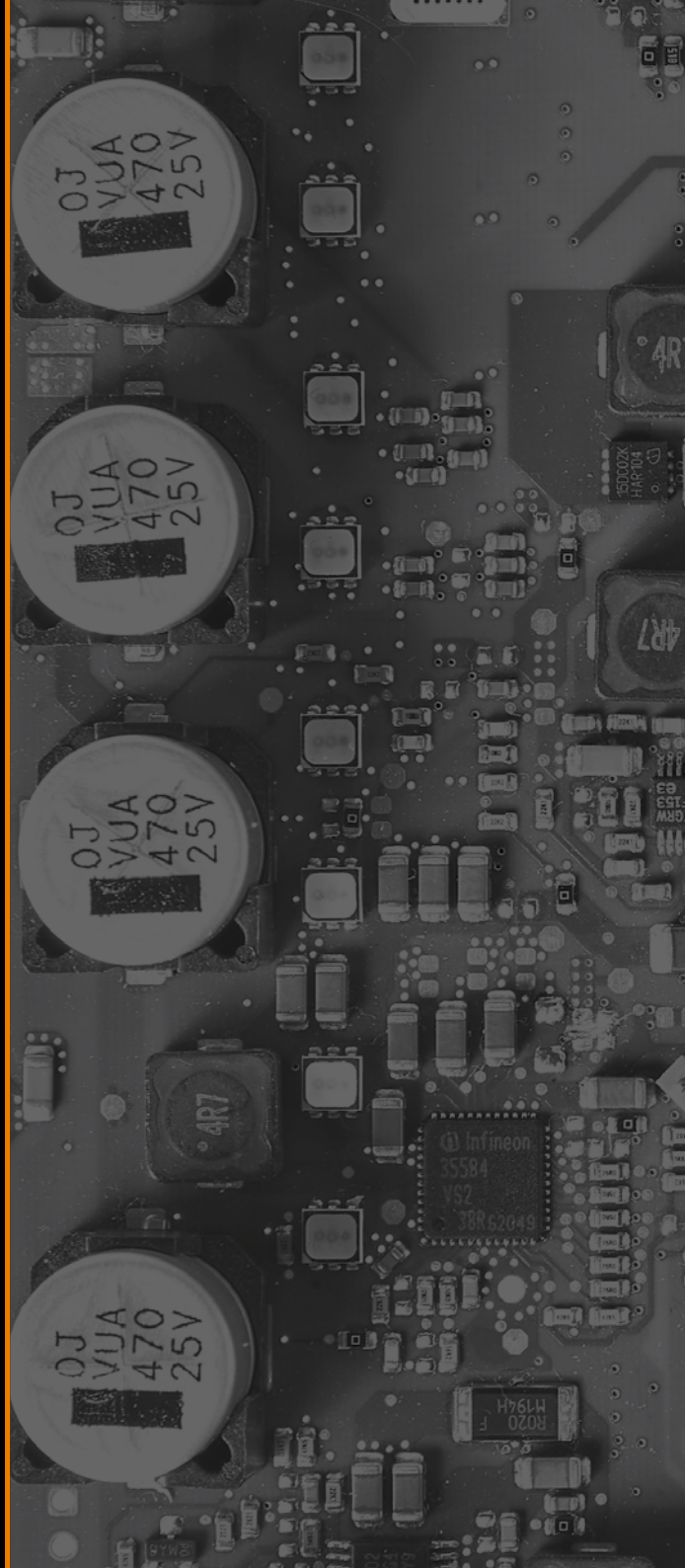


The orange way of automation

We believe that good automation is not just a means to an end. It must also be fun, so that something great and valuable grows out of it. Of course, sensors, connection cables, masters and software are primarily used to operate systems efficiently. And they can do that best if they are of outstanding quality. We have been committed to this aspiration for more than 50 years. But we do not define quality solely in terms of sensing ranges, repeatability, response times or protection classes. Quality means much more for us: Our colleagues' passion for automation. The ambition to develop the best possible solution every time. Setting benchmarks.

Inspiring customers. That means countless steps in development. Forwards and backwards. For every innovation, for every evolution. Until finally, all requirements which ifm places on its products are one hundred percent fulfilled: The best functional quality, maximum ease of use and a distinctive design.

Fascination and passion down to the smallest detail: The PCB shown here of the fail-safe sensor for mobile machines, CR720S, is 100 percent "made by ifm" - from development and production to placement.

Impulse: yes, you can believe your eyes

Experience automation as you have never experienced it before

Do you remember the intro of this brochure? When we said: "Automation must be fun"? When we talked about "our colleagues' passion" for this topic?

Should you have had any doubts as to whether we really meant that: What could be more passionate than dedicating an elaborately produced video format that will appear regularly from now on to a topic? With "Impulse – the ifm magazine" we will illuminate industrial automation from every conceivable perspective. We take a look at details, at the big picture, at new products and at success stories.

We let images and facts speak for themselves and experts have their say. In other words: We do everything to inspire, inform, entertain and infect you with our passion for hardware, software and finding solutions. To begin with, we took a look at four important topics.

We guarantee you: With Impulse, you will experience automation as you have never experienced it before. Have a look. You won't regret it!

A brain/heart for the future

CR7xxS mobile controller: more power, more reliability

Technical evolution. A friendly paraphrase of the fact that basically every consumer electronic computing device has an "Obsolete!" sign dangling from it the moment it is handed across the counter. "Come and see us again tomorrow and we'll present you with the next big thing!" One can often only marvel at the fast pace with which B2C colleagues try to lure the early birds from the trees with ever new random features, especially when it comes to glossy hardware for trouser pockets and wrists.

For technical progress

However, we do not want to demonise computational progress per se. Without the increasing minimisation of space and maximisation of performance, we (and you) would be faced with the challenge of accommodating wall-sized controllers in the format of Zuse's Z3 in (or rather: on) tractors, excavators and other mobile machines. The current generation of our ecomat controllers is a bit more handy and space-saving.

Freshness from the inside out

When your hardware has reached a certain level of sophistication, you can spend your time improving the software. At least that's what we think. Software and function updates keep our controllers up to date from the inside out. Better, newer, faster in the long run. So even late birds don't need to worry about catching only wrinkled worms and leftovers. Everything up to date. Today, tomorrow and also in the future. Promise!

Twice as good

More computing power, stability, comfort and reliability. That's what the current ecomatController offers you. And that in double measure. Because it is a superfast double brain (or heart? or both?), consisting of two 32-bit triple-core controllers, and comes in a weatherproof and vibration-resistant metallic housing. One controller deals with standard tasks, the other independently makes sure that the machine puts itself in a safe state in case of an emergency.

Ready for evolution

And as already mentioned, we are not only thinking about the hardware: Developers who also want to play it safe (or comfortable) on the software side can use TÜV-certified libraries when programming in Codesys. This makes it easy to collect all sensor data, keystrokes and display inputs, evaluate them and then feed actuators with the required commands. Countless freely configurable inputs and outputs and bus interfaces are available for this purpose. Whatever the technical evolution of mobile machines will bring: our powerful brain/heart is ready.

Fascinating!

The ecomatDisplays: hardware and software as if from another galaxy

Mobile work machine, aircraft, star cruiser?
Compared with the options and information equally available in the cockpit of the pilot, whether near-ground or sky-bound, the borders certainly seem more fluid today. Anyone with access to a central, universally ingenious interaction element can count themselves lucky. Elsewhere, prior to every take-off, check-list encyclopaedias had to be worked through or, in the case of engine problems, the pilot had to wait idly on Scotty's assessment.

Black belt in multicom

So it's good to have an ecomat display at your side in your on- or off-road machine. They really are true masters of their trade. Black belt in multicommunication. On 5 to 12 inches of die-cast aluminium, well-packaged in IP65/67, they show or tell the machine operator what is currently happening in, on or around the machine: Speed, temperature, up to eight camera images, warnings, maintenance videos, diagnostic documents. And many other things.

At the same time, the display is also the command centre from which the individual actions of the machine are initiated: Extend the supports, eject the seed, retract the ladder... Everything the machine operator's heart desires.

A heart for developers

If you get the impression we are raising your expectations too high, we offer our hand to the developer: Because we do not promise anything that can't be initially set up in the software environment with just a few clicks. Some might like hard coding, but you don't necessarily have to use it with such displays. Video embedding, camera integration, display layouts: Everything is readily available as a basic building block and can be added to the project with a few clicks. Really: everything a developer's heart desires.

Energy!

And just as the spaceship jets smoothly through space and time towards its destination thanks to warp drive, the developer sprints at maximum speed through infinite expanses and possibilities towards project completion – thanks to ifm's ingenuity. Even the most unemotional space species raises an eyebrow in appreciation.

The ecomatDisplays: Fascinating!

ifm.com/de/ecomatdisplay

About Bucher:
Bucher Municipal is a manufacturer of special vehicles, such as refuse trucks, sweepers or winter service vehicles. The company demands that the vehicles are easy to operate even under adverse conditions.

A powerful controller for automated pipe cleaning

Automation technology for municipal vehicles

Sensors and control components used in municipal vehicles must meet the highest of demands: Their components are exposed to extreme temperatures, humidity, dust, dirt and vibrations. With the „ecomatmobile“ series, ifm offers automation components for these harsh environmental conditions. The company Bucher uses the ecomatmobile products for its sewer cleaning vehicles.

Bucher Municipal is a global supplier of special vehicles such as refuse collection vehicles, sweepers and winter maintenance equipment. In the Danish city of Silkeborg, the company manufactures sewer cleaning vehicles. Brian Munk Andersen, R&D Manager at Bucher in Denmark, explains the structure and function of this vehicle type: „Sewer cleaning units from Bucher feature two pump systems. The jetting pump cleans sewers and tanks. With the vacuum pump, we can suck sludge and industrial waste into the tank mounted on the vehicle.“

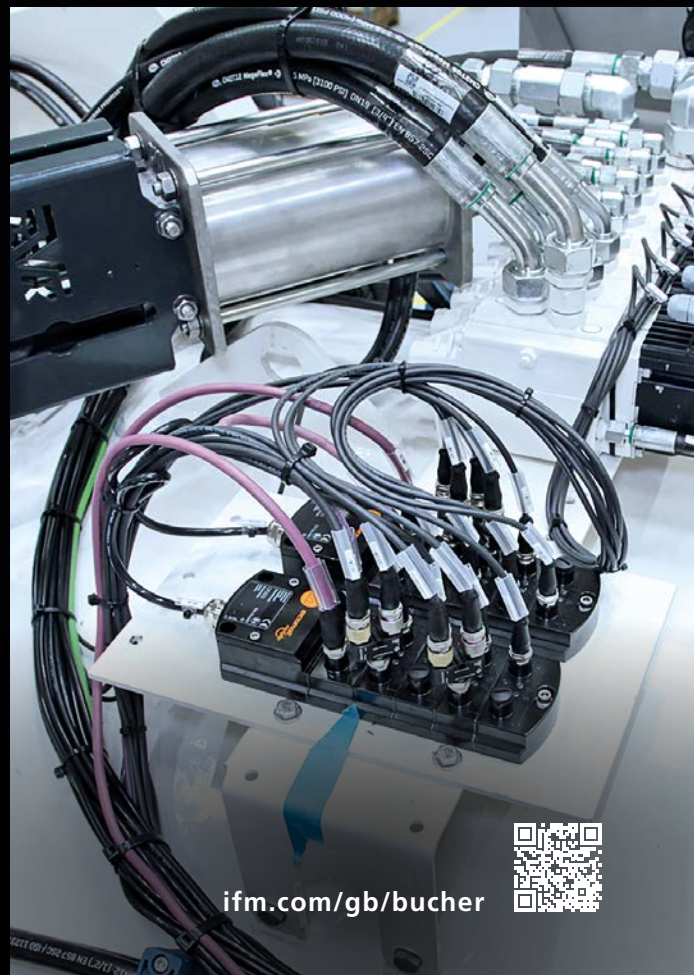
With two ifm control units for mobile applications installed outside the vehicle, the vehicle operator can perform a variety of work steps: rotate the boom, unwind and rewind the hose, switch the pumps or empty the sewage water tank. The displays of the dialogue modules show the relevant system parameters and process values and assist the user in performing the work steps.

A control unit inside the vehicle – also supplied by ifm – ensures that the individual processes run smoothly.

„The intelligent control of our sewer vehicles ensures efficient processes and enables maximum focus on the task, guaranteeing the highest possible added value for our end users,“ says Andersen.

ifm as a partner

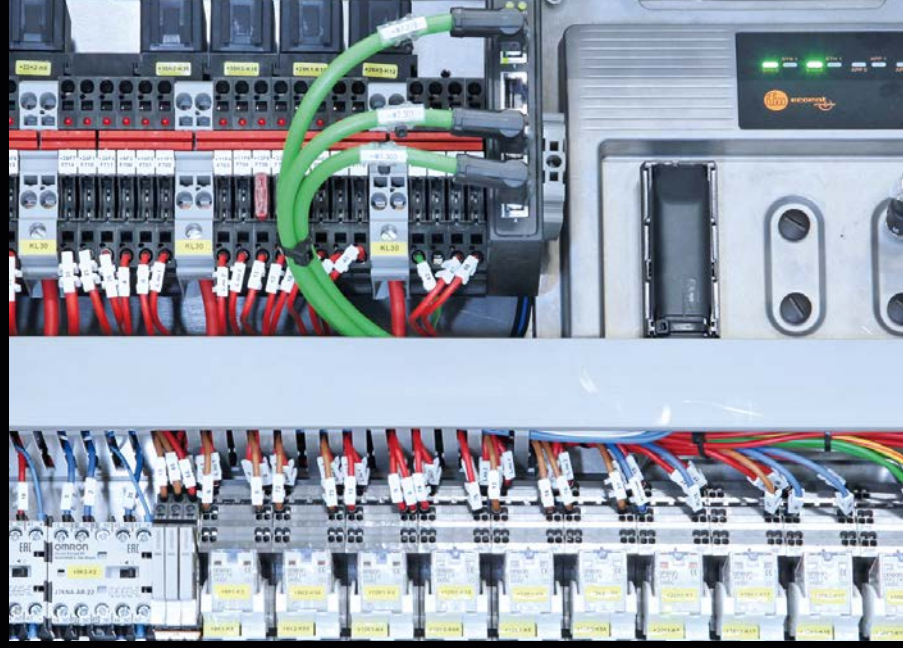
For several years now, the automation specialist ifm has been supporting Bucher Municipal as a partner for sensor components and control technology. Brian Munk Andersen: „At Bucher, we have a constant focus on innovation and development. That’s why we use automated and intelligent solutions. When we entered into a cooperation with ifm in 2016, we were looking for a reliable supplier of control solutions. ifm offers a wide range of components for our product – from sensors to displays and IO systems to controllers. Throughout the development phase, we worked closely with ifm to develop a solution and choose the ideal products. Our vehicles have to operate reliably in very varied conditions such as cold, heat, dust and dirt. This places particularly high demands on the components. Together with ifm, we have created a good and reliable solution with many automated features that offers the operator high quality and safety standards when our machines are on the road.“



The central components in detail

The core element of the system is the ecomatController CR711S, an extremely robust PLC for mobile applications. What makes it so special is that is has two independent internal PLCs – one of them a certified safety controller. Powerful integrated multi-core processors allow even complex control functions to be processed quickly. The application programs can be divided between the two internal PLCs if necessary. Consequently, the safe program part can be executed without interference from the general program execution. This ensures reliable operation even with complex control functions. The controller can be used in safety-related applications up to ISO 13849 PL d and IEC 62061 SIL CL 2.

In addition to its many multifunctional inputs and outputs with diagnostic capabilities, the ecomatController features two Ethernet ports and four CAN interfaces. The CAN interfaces support all important bus protocols (CANopen, CANopen Safety and J1939) as well as the transparent and preprocessed data exchange. The control functions are easily integrated into the application program thanks to CODESYS programming (version 3.5).



At Bucher, the controller is additionally connected to a GSM radio module. Andersen: „In many cases, our remote connection allows us to solve issues while the vehicle is still on the road. This saves our customers a lot of time. Only in cases where remote troubleshooting is not possible the municipal vehicle needs to be checked at one of our many service centres.“

IO modules

Various sensors and actuators are installed on the sewer cleaning vehicle to monitor and control the different work steps and process values. Using decentralised IO modules, they communicate with the controller via CAN bus. Brian Munk Andersen explains the benefit: „With CAN units installed at different positions on the truck, we reduce wiring and also achieve greater reliability and an easier operation of the equipment.“

The type CR2032 control modules each have 16 ports that can be configured multifunctionally, for example as digital inputs or outputs or as PWM outputs for controlling proportional valves. A controller integrated in the modules enables decentralised evaluation of the sensor signals in advance. This pre-filtering of the data not only reduces the data flow on the CAN bus to the controller, but also simplifies the application program on the PLC.
The robust metal housing is designed specifically for the harsh outdoor use of mobile machines and offers protection rating IP 67 for high ingress resistance of the connectors.

Dialogue modules

A range of displays for mobile applications are mounted outside the vehicle as human-machine interfaces. Brian Munk Andersen: „On the large display in the main cabinet, the operator can control the entire system and make the basic settings. After this, the system can be operated via the remote control or the operating panels."

Dialogue modules are programmable graphic displays for controlling, parameter setting and operation of mobile machines and installations. They can be used in conjunction with a mobile controller or as a stand-alone solution. Data and device functions are safely transferred via CAN interfaces. The displays feature many freely programmable backlit function keys. The units offer increased EMC levels and an e1 type approval for operation on public roads. Thanks to the high protection rating of the housing, the modules are suited for outside panel and surface mounting as well as for cabin installation. Just like the other ifm components for mobile applications, the displays are vibration resistant and have protection rating IP 67.

Bottom line

ifm offers a comprehensive portfolio of products for efficient and reliable automation of functional units on municipal vehicles. Brian Munk Andersen concludes: „With ifm's solution, we can create a highly automated system that offers us superior reliability and makes the lives of those operating our equipment a lot easier." ifm – close to you!

Bauhaus-style automation

ioControl: I/O module with integrated controller

Often, they say, it is the little things that make us happy. The details that make the total picture appear perfect. ioControl can be such a detail – in very different ways.

Aesthetics of optimised cable paths

From the outside, this masterpiece looks like an ordinary I/O module – and that is exactly what makes it so fascinating. Decentrally located, it is the point of contact for the connected sensors and actuators. Information headed for the controller (information from the sensors) and coming from the controller (commands to the actuators) is transferred via one cable. Gone are the days when endless cables snaked along the machine, like wild ivy, when at best it could impair the machine's appearance and at worst prolong trouble-shooting. Connections between cables and controllers are reduced to the essentials. Goodbye superfluous cable clutter, here comes efficient mobile automation in Bauhaus style. Walter Gropius would have been delighted.

The stylish I/O module with a mind of its own

On the inside, the ioControl is not quite so much about reduction: Where other modules are content with their purpose of existence as transmitters, ioControl takes the initiative, likes to think and steer for itself – or for others. In other words: The device, which outwardly presents itself as a simple module with gentlemanly understatement, is only too happy to act as a mini controller, which reduces the data flow to the higher-level controller or even makes this controller obsolete. A technical and stylistic masterpiece. Automation meets Bauhaus.

Smart meets simple.

Would you like for us to give you concrete examples? With pleasure. Let's illustrate the advantages with a fictitious conversation of a level-based valve control system.

Up to now:

Level sensor to I/O module: "The tank is full."
I/O module to controller: "Level sensor says tank is full."
Controller to I/O module:
"Tell the valve actuator to close the valve."
Controller to I/O module: "...and tell the valve sensor to check that everything is in order."
I/O module to valve actuator: "Close the valve."
I/O module to valve sensor: "Keep an eye on everything."
Valve sensor to I/O module: "Done."
I/O module to controller: "The valve is closed."

With ioControl:

Level sensor to I/O module: "The tank is full."
I/O module to valve actuator: "Close the valve."
I/O module to valve sensor: "Keep an eye on everything."
Valve sensor to I/O module: "Done."
I/O module to controller (if there is one): "Tank is full, valve is already closed."

That is efficient communication design.
Reduced to the essentials.
Could it get any more Bauhaus?

ifm.com/gb/ioControl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Yes, they talk to each other

ISOBUS Gateway: simple communication between tractor and trailer.

Here the tractor, there the trailer. Brought together, they form a team, a unit. The front pulls, the back follows. Simple as that. Really simple? At least, it used to be. In the days of oxen and wooden ploughs, the fields and meadows were largely ruled by silence. The only one who spoke (and, yes, could speak) was the farmer, here and there urging his animals to move faster, pondering inwardly over God and the world. Exchange between ox and plough? Not at all. How could they?

Talkative team with dialect problems

Today the tables have been turned. Intelligence has come to working vehicles. The tractor and the trailed machine communicate permanently with each other, probably talking more in one day than their farmer does the entire season. However: There are still certain communication barriers here and there. While everything in the front of the tractor is trimmed to ISOBUS, the normal CAN bus is still used in the rear. Both are basically related dialects. Nevertheless, they do not easily find their way to each other. Or rather: did not so easily.

CAN, ISOBUS – ISOBUS, CAN.

Thanks to ifm, there is now a simple, ingenious, compact solution that transforms side-by-side communication into cooperative communication: The ISOBUS gateway simply clamps itself between the trailer and the tractor as a synchronous interpreter – soufflés the CAN data from the tank car, seed spreader, plough etc. to the tractor ISOBUS. And vice versa. Without any further intervention, development or licensing.

The future is ~~nearly~~ there

Gone are the days when communication with the trailer was realised via analogue push-click-toggle switch boxes at bunched cables laid on the fly. Instead: a single (!) interface between tractor and trailer. Neatly laid cabling included.

All relevant information and functions can be read and implemented from a central multifunction display. tractor, trailer and human can be a modern, efficient, communicative team on the way to Agriculture 4.0.
The future can be so simple.

About Argometer:
The Danish company Agrometer headquartered in Grindsted develops solutions that allow quick, cost-effective and soil-friendly spreading of natural fertilisers even on large fields.

Robust PLC for field applications

Mobile-compatible system solutions for efficient agriculture

The Danish company Agrometer produces pump vehi-cles used for spreading liquids and substances on agricultural land. The units are controlled by a powerful mobile controller from ifm.

Many farmers use the slurry produced by their animals as a fertiliser for crop production. However, the average slurry vehicle with slurry tank is at best suitable for small fields. The Danish company Agrometer headquartered in Grindsted develops solutions that allow quick, cost-effective and soil-friendly spreading of natural fertilisers even on large fields. A hose is used to transport the slurry from a central location to the fields. For this purpose, special vehicles are equipped with a huge hose reel. The electro-hydraulically powered reel unwinds and rewinds the hose as needed while driving across the field. When changing the direction, for example at the end of the field, a guide arm positions the hose in an even radius.

The performance is remarkable: Up to 200 tons of slurry can be spread per hour. The advantage: As no slurry tank is required on the vehicle, the vehicle weight is reduced. This reduces the soil pressure to a value lower than a foot-print. The low self-weight means the farmers can enter their fields early in the year when the soil is still soft. The fertiliser is pumped directly to the machine via pipes and hoses, remov-ing smell issues from the roads. Agrometer builds these slurry spreaders as independent vehicles with a spreading width of up to 30 metres or as trailers for tractors called umbilical injectors.

Central PLC for machine control

Both variants combined: The important functions, such as the coiling of the hose, are controlled automatically by a central PLC. A large number of sensors is used to monitor the movement of the hose guide arm and other positioning tasks, which are signalled to the controller via decentralised IO modules. Sensors also monitor the pressure in the slurry pipes or temperature values.

Oluf Kristensen, Technical Manager at Agrometer, explains: „For our machines, we use the new mobile controllers as well as decentralised IO modules from ifm. They simplify the wiring and maintenance of the machines, which can be set up faster.

When developing the machines, we primarily work with the system integrator Pagaard. They supplied us with the complete ifm system and developed the software. Pagaard is also our service partner for error-handling."
The system integrator Pagaard relies on ifm's „ecomat-Controller", which is specifically designed for use in mobile machines.

„For our machines, we use the new mobile controllers as well as decentralised IO modules from ifm."

ifm.com/gb/agrometer

„We used to have problems with the monitoring of our outputs, [...] but the ifm controllers have PWM outputs. This is an important feature in the mobile world“

Pagaard's Managing Director and co-owner Torben Lund explains the decision to use ifm: „Initially, we were using an industrial PLC at Agrometer. But we soon realised that the durability of industrial products used on mobile machines is a huge challenge, as they are not designed for such purposes. So we scoured the market for technologies that could withstand the harsh requirements of mobile applications. We came across ifm where we had already bought sensors. ifm offers a controller we believe is best suited for this task.“

Designed for extreme operating conditions

For many decades, ifm has been one of the leading suppliers of robust control systems for mobile use, offering extensive application know-how in this field. The „ecomat“ series comprises PLCs, IO modules and sensors that can withstand the harsh environmental influences of mobile applications.

Slurry, water, permanent condensation or dirt are no problem for the ifm systems for mobile applications. The special mechanical design of the housing and a reliable sealing concept prevent the penetration of moisture. Suitable connectors and connection cables ensure that protection rating IP 69K does not end at the housing connections.

Extreme weather conditions with iciness or blazing heat: The wide temperature range of the control components from ifm allows use in all climatic zones. All sensors and controllers must prove their resistance in cyclical temperature shock tests. Resistant housing materials ensure that salt deposits, as they may be caused by grit in winter, do not affect the products.

Where the going gets tough, the material is exposed to permanent vibrations or extreme impact. This is why the sensors for mobile applications are fully potted. Connectors are protected against unintended loosening by a special vibration protection. The mechanical design of controllers and modules is especially rated for permanent shock and vibration.

The complex electronics is protected against electromagnetic interference as detailed EMC tests have shown. Conducted interference is reliably filtered out and cannot affect the controllers. This ensures that the data exchange via the CAN interfaces functions reliably even under most adverse conditions such as in outdoor applications of transport and logistics. Pagaard Software Engineer Michael Lindbjerg explains: „The voltage of a mobile machine fluctuates strongly. An industrial PLC is not designed for this. A PLC for mobile applications is better suited as it operates with a wide voltage range between 8 and 32 volts.“

In addition, all ecomat components have an e1 type approval by the German Federal Motor Transport Authority. This allows installation of the units on vehicles without invalidating their operating permit. Beyond the required EMC limit value of the e1 type approval all units have an extended EMC resistance of 100 V/m and withstand pulses from the on-board vehicle supply system without problems.

Powerful controller

The ecomatController CR721S used at Agrometer consists of two internal PLC units, one of them certified for safety-related applications up to EN 13849 PL d and EN 62061 SIL cl2. The advantage of this double PLC: Two internal, independently programmable controllers allow for subdivision of the application software if required. Consequently, the safe program part can be executed without interference from the general program execution. Powerful 32-bit multi-core processors ensure fast program execution even with complex control tasks.

The ecomatController CR721S features 124 multifunctional inputs and outputs. Pagaard Software Engineer Michael Lindbjerg explains the benefits: „All inputs can be configured as digital, analogue or frequency inputs. We used to have problems with the monitoring of our outputs, which were purely digital in the industry, but the ifm controllers have PWM outputs. This is an important feature in the mobile world, for example for controlling hydraulic valves with pulse-width modulated outputs."

In mobile machines and equipment most functions are carried out by hydraulic systems. Electronic valve and pump control has become a standard in modern machines. ifm's ecomatmobile system provides current-controlled PWM outputs and optimised control functions for the power outputs. This leads to a manufacturer-independent interface between hydraulics and electronics.

Conclusion

The mobile controllers from ifm ensure ultimate reliability and a powerful performance even in challenging operating conditions. Thanks to their versatile connectivity and functions, they offer maximum flexibility. With this robust PLC, ifm guarantees the quality that is indispensable for harsh mobile applications. **ifm – close to you!**

ifm.com/gb/agrometer

Houston, we would have had a problem

mobile IoT: central view of all the machinery

Admittedly: We have not yet implemented interstellar predictive maintenance through our solution for digital, central machine management. And the Apollo mission (the thirteenth by the way!) that, due to an accident in space, failed to reach the moon but fortunately made it back down to earth safely and subsequently coined one of the best known phrases of all time, happened a few years too early for our mobile IoT.

Data via the cloud to the base

But for every terrestrial mission in which mobile machines equipped with appropriate sensors are used, our solution is able to turn the famous Houston phrase into a conditional tense one like above. This technology allows you to keep an eye on the well-being of your machines at all times, wherever they might be in the world. Using a wireless modem, all the collected data is sent to a secure cloud environment, which you can then access from the comfort of your base (in Houston, Havøysund, Gansbaai, Woolgoolga or anywhere else).

Friendly and appreciative calls

What you can do with this information might not be rocket science, but it is extremely practical in everyday working life. For instance, you can schedule maintenance windows according to demand and with foresight after the end of a project. If there is an imminent risk of a machine failing, you or your service team can be notified of this automatically. Thereby allowing you to launch a rescue mission immediately and supported by the most suitable equipment thanks to the transmitted data. The result: When the customer gets in touch, it is not to tell of their frustration of having had to wait so long and suffering unnecessary downtime but to express their joy at your foresighted service. Your proactiveness. Your ability to eliminate problems long before they arose. That’s what the conditional tense is all about.

Machine management 4.0

What else can you do with mobile IoT? Evaluate field test data in real time and update the software of your machines without having to bring them back to base or send out a technician. Optimise travel and transport expenses as well as idle time between projects. Get the most out of your machinery and avoid unwanted downtime. That’s machine management 4.0. Without the need for the conditional tense.

ifm.com/gb/mobile-iot

About Feldbinder:
Feldbinder has been manufacturing silo and tank trailers since 1975 and in 2018 they launched the Silo 4.0 project, which aims to systematically take them into the digital age.

Silo 4.0: unload more efficiently

Feldbinder brings bulk transportation into the digital age

The shortage of skilled workers continues to impact the transportation industry. Employers wanting to win over the much-in-demand truck drivers can definitely benefit from offering a comfortable workplace. This includes a well-equipped tractor unit but also extends to easy handling of the transported goods. This approach to innovations was also adopted by the German company Feldbinder, headquartered in Winsen an der Luhe. Feldbinder has been manufacturing silo and tank trailers since 1975 and in 2018 they launched the Silo 4.0 project, which aims to systematically take them into the digital age.

Facilitate the daily life of companies and drivers

"At that point in time, also after receiving corresponding feedback from the market, we concentrated on asking ourselves how we, with our vehicles, would be able to provide the transport companies with more comfort and support during the unloading process," remembers Michel Jörn, who, as a designer of new vehicles, is responsible for the silo semi-trailers and the Silo 4.0 project at Feldbinder. "Of course, this was also about supporting the drivers as best as possible in their everyday work and make things a little easier for them." The idea to digitalise the silo trucks and silo trailers was born – and it was implemented with the support of the automation expert ifm. "As we had already been in close contact with ifm due to other projects, we have made sure to also benefit from their expertise when implementing Silo 4.0," says Michel Jörn. "In addition to the hardware itself, we were convinced in particular by the extensive testing procedure applied by ifm to its components in order to ensure suitability for mobility applications and to obtain the required certifications."

Central control of the unloading process

So what exactly is the advantage that Silo 4.0 has over conventional semi-trailers and silo trailers? "Until now, the driver had to walk up and down along the vehicle during the unloading process, to open or close each shut-off device of the material conveyance or the air distribution system," says Michel Jörn. "Our digitalised vehicles can be centrally controlled from a single location.

„In addition to the hardware itself, we were convinced in particular by the extensive testing procedure applied by ifm to its components [...]"

ifm.com/gb/feldbinder

„We can connect up to four CAN circuits to the controller integrated into the display, which enables us to select each individual element of the silo trailer 4.0 in a structured way“

To do so, the driver can either use the touch display or the additional control panel mounted below it.”

The ecomatDisplay with a capacitive 12 inch touch screen and freely configurable keys is designed for mobile use both in the cab as well as in the outdoor environment. It integrates a powerful controller, which can be individually programmed through CODESYS. To the display, Feldbinder added the ecomatPanel. “By using the control knob, fine adjustments can be made quickly, for example when valves only need to be opened to a certain degree for mixed unloading operations,” explains Michel Jörn. “In addition, all the other operating actions that can be performed using the touch display can also be carried out by using the panel. This is advantageous especially when the user wears working gloves.”

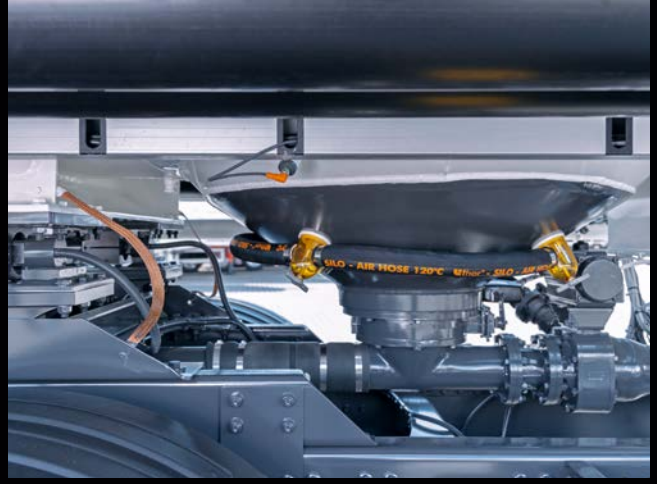
The future: transparent and efficient

Whether opening and closing the valves, starting or shutting off the main engine and the secondary drive, speed control – with a silo trailer 4.0, the driver can do all of this in a digital manner. And thus, in an extremely comfortable and efficient way.

The same holds true for the integration of the hardware and software into the silo trailer. “We can connect up to four CAN circuits to the controller integrated into the display, which enables us to select each individual element of the silo trailer 4.0 in a structured way” says Michel Jörn. One CAN circuit is used for the linear drives and the remote control, the second circuit is the one for the type CR2042 ioControl modules. The ioControl modules decentrally collect data from the sensors – for monitoring the pressure and fill level, for example, and forward this data to the controller via a pre-fabricated CAN Bus cable. In the same way, the modules can forward commands of the controller to the connected actuators; with Feldbinder’s solution, the valves are controlled via the ioControl modules. In smaller applications, the modules can even be used as small controllers thanks to their programmability.

M12 connector reduces effort and sources of error

Depending on the type and design in question, Feldbinder equips its trailers with up to five ioControls, which are available as versions with either DEUTSCH or M12 connector.



"Currently, we are using modules with DEUTSCH connector, but we will switch over to the version with M12 connector in future," says Michel Jörn. "This makes cabling significantly easier as wiring errors are eliminated right from the start thanks to the standardised design. Thus, even employees without the relevant electrotechnical knowledge are able to wire the sensors, which allows our specialists to invest their time and expertise into more demanding tasks."

Integrator knows and values ifm's range of software

Regarding the development of the software, Feldbinder relied on the external expertise of system integrator Reinholz Software and Technology.
"We have been working closely with ifm for many years and know the hardware very well," says Pascal Kaufmann, head of Mobile Automation at Reinholz. His colleague, software developer Thorben Oltmann, adds: "The special requirement in the context of Feldbinder's Silo 4.0 project was to develop a modular software that would enable Feldbinder to define the specific equipment and configuration of each silo trailer by themselves by means of a CSV import.

When implementing the project, we also used the software libraries that ifm offers for its controllers. The software blocks help accelerate the overall programming of the software considerably. First, the need to invest resources into the programming of sometimes complex functionalities is eliminated, second, there is a certainty that these software elements have been tested comprehensively and that the communication between the hardware components works seamlessly."

The first step towards the future has been taken

Hassle-free comfort, efficient processes – has digitalisation arrived in the transportation industry? "The customers that use our modern vehicles will never want to do without the new options again. Drivers and companies equally value the easy handling and quicker unloading times."

So, the first step towards the future has been taken. But Michel Jörn does not yet want to leave it at that. "Feldbinder has recognised the potential of the new possibilities; we want to make things for our customers even easier and offer them support regarding qualitative optimisation."

For example, already today the CR3158 GPS module can be integrated, which helps determine the exact position of the vehicle. "This is useful to avoid costly and time-consuming faulty loading and unloading operations when customers have multiple unloading points, for example." In future, the process data from the silo trailer is intended to be used for the further support of quality assurance procedures.

"Recording the unloading pressure, centrally defining unloading quantities, the electronic closure of manlids and valves, all of which assigned with positional data and time stamp. A suitable combination of hardware and software enables unambiguous data recording – and via the cloud, the records can even be shared with all parties involved. All in all, this leads to transparent and more efficient transportation and unloading processes. And from this, all sides benefit in the end: transport companies, drivers and customers."

Like a waiter‘s wrist

JD series inclination sensors: active acceleration compensation for determining positions exactly

What is the best way to understand the definition and meaning of dynamic inclination sensors? With a well-filled tray balanced on your fingertips, that’s probably not the best idea – unless of course transporting liquids on that type of platform is the main aspect of your profession or passion. Because don’t forget: A good waiter remains calm and unruffled even when carrying more than 4 litres of liquid in unsealed containers. Speeding up and stopping abruptly, spontaneous changes in direction, largely unplanned and reactive – as guests always have right of way – and yet, despite all this, not a single drop is lost.

Combating the frustrations of everyday life

Instead, the ultimate professional brushes aside the worries and frustrations of everyday working life with a warm and friendly smile. Knowing full well that in such extreme situations they can rely fully on their sensitive, fast-reacting locomotory apparatus, i.e. their wrist. A top waiter is able to exude this air of calmness thanks to a variety of powerful humanoid inertial measurement units. These units work tirelessly when transporting items, thereby allowing the central computing unit to decouple the wrist and tray from external influences.

In other words: To keep them absolutely still.

IMUs cannot be shaken by anything

This fundamental skill that humans take for granted can be transferred to the locomotory apparatus of any machine by means of our JDs. They are in no way inferior to humanoid IMUs, reliably registering and compensating for any external acceleration or vibration in real time. This makes it easier for the controller, for example, to constantly align and keep the loading platform in position to ensure transported goods are ideally balanced against all centrifugal forces. No slipping, no tilting, no mess. Simply guaranteeing safe arrival at the destination. Mission accomplished. Cheers!

I spy with my little eye

O3M: the eye of mobile machines

Front, left, top, rear, right, all clear, pull up, watch load, watch out! A junction! Slowly brake, front, left, right, all clear, turn, watch out! Full braking!! Don't you have eyes in your head?!

Driving a forklift in intralogistics is probably as relaxing as an egg-and-spoon race at a heavy metal concert. Surrounded by potential hazards, the forklift driver must always be on his guard to avoid major accidents. Over the last 20 years, a lot has been done to reduce the stress level for drivers of such industrial trucks in internal goods handling.

Increased safety thanks to the 3-eyes principle

For example, the rear mounting of our O3M 3D sensor for mobile use on forklifts provides a better overview and more safety for all those directly and indirectly involved. Instead of constantly turning around in order not to miss any potential hazards, the driver can look forward and watch the monitor – because that's where the O3M, acting as a "third eye", transfers its view of the rear. But the O3M can do even more: In reverse gear, for example, it automatically warns of collisions with objects or people long before things get really dangerous.

But the O3M not only provides reliable support when it comes to hazard avoidance. It also helps to optimise work. For example, on vehicles on the airfield, where it avoids costly collisions of conveyor vehicles and aircraft tractors with airplanes. Or in agriculture, where it detects vines or hay windrows, for example, and enables harvesting or plant care by automated guided vehicles – even in complete darkness.

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Save time and effort

Quite a lot of high-tech, quite a lot of integration effort? Far from it! Thanks to the CAN interface, the O3M can be connected to the existing controller and configured in no time. And then navigating mobile machines on airfields and fields, in vineyards and warehouses, or wherever you want to move them with greater efficiency and safety, becomes child's play.

About Risse + Wilke:
The cold rolling mill Risse + Wilke in Iserlohn produces metal sheets of different thicknesses and qualities.

Bring it safe!

The 3D collision warning system reduces risks

Forklift drivers need a high level of concentration when manoeuvring in reverse. The camera-based anti-collision system from ifm, which automatically detects persons and obstacles in the rear area of the vehicle, warns the driver and stops the vehicle, if necessary, provides support. The innovation: Existing vehicles can be easily retrofitted with this plus in safety.

The cold rolling mill Risse + Wilke Kaltband GmbH in Iserlohn produces metal sheets of different thicknesses and qualities. The unmachined steel strips, wound into coils, are repeatedly rolled by means of cold rolls until they have the required material properties. Then saw blades, clutch plates and other metal parts are punched from them.

Heavy forklift trucks transport the coils from the storage location to the rolling stand and back. Enormous masses have to be moved: The forklift trucks and their freight can weigh up to 30 tons. One steel sheet roll alone can weigh more than 12 tons. This means that the trucks' braking distance is quite a bit longer than that of a regular car.

Caution when manoeuvring

Particularly when reversing, e.g. after the coil has been picked up from the storage location or the rolling stand, the drivers need to be very cautious to avoid collisions with other forklift trucks or persons when turning into the lane. They do not only have to keep an eye on the rear area of the vehicle, but must also ensure that the carrying ram, with its load swaying from side to side, does not collide with anything.

Florian Rolf, production manager at Risse + Wilke, explains the enormous challenges the drivers have to face: „The forklift trucks are equipped with aids such as mirrors and cameras. Nevertheless, the drivers must still be fully alert at any time, they must always have 360° vision and monitor their load and where they are going. At the same time they have to be aware of what is happening around them, e.g. colleagues and contractors crossing their path. Otherwise it can easily come to critical situations which we want to avoid."

Collision warning system

In order to avoid such critical situations, the sensor specialist ifm from Essen has developed an automatic collision detection system.By means of a 3D camera, the system permanently monitors the rear of the forklift truck and gives the driver visual and acoustic feedback. Depending on the configuration level, the assistance system can even stop the vehicle, if necessary.

All obstacles are reliably detected. Thanks to a special classification of reflective materials, e.g. reflective vests or clothing, the collision warning for persons can be given priority over other objects. This increases the safety of persons and leaves the driver enough time to slow the truck down and stop in time. This provides maximum safety when manoeuvring.

„The system is very good at minimising risk. I can use it on forklift trucks to prevent employees from entering the danger zone and to prevent a dangerous situation or risk situation from occurring in the first place.“

Easy retrofitting

ifm offers the anti-collision system as a ready-to-start application package (order no. ZZ1103). The package includes all components to set up a fully functioning collision warning system on a mobile machine, e.g. a forklift, wheel loader, excavator, reach stacker or transport vehicle within a few minutes.

In addition to the camera, the monitor and the controller, the package contains all necessary cables and mounting accessories. This means it can be easily retrofitted on all mobile machines with 24 V on-board system voltage.

Commissioning the system is very easy: After mechanical installation of the system and plug & play wiring, set-up is carried out within a few minutes via the pushbuttons and the colour display of the control unit. Only a few parameters (height and inclination angle of the camera, vehicle width) are required in the intuitive set-up process. Then the system is ready for operation. In contrast to other systems, no PC is required for parameter setting.

Different zones can be defined so that the driver is only warned when it is really necessary. This means that the O3M can be used to its full potential depending on the situation, which helps to reliably prevent accidents. At the same time, false alarms are virtually impossible due to the patented PMD time-of-flight technology.

For special requirements, expert settings are available during set-up. Pre-programmed inputs and outputs are available for an additional signal light, buzzers, standby operation or the ready status of the system.

The 3D sensors are suitable for robust applications in indoor and outdoor areas. A high protecting rating and shock and vibration resistance as well as a wide temperature range meet all requirements for use in mobile machines.

Conclusion

Florian Rolf's summary: „The system is very good at minimising risk. I can use it on forklift trucks to prevent employees from entering the danger zone and to prevent a dangerous situation or risk situation from occurring in the first place.“ This means that the anti-collision system, which can be integrated very easily into existing vehicles, provides maximum safety for all types of mobile machines and supports the daily work of the drivers.

ifm.com/gb/risse-wilke

Robots, unite your senses!

The new O3R camera and sensor platform

Spatial orientation, the ability to navigate from A to B without accidents: Thanks to the senses of sight and touch, this is usually an easy task for people. The eyes send visual information to the human computing centre while hands (or feet and shins) contribute haptic and tactile data. All this is evaluated in microseconds, deriving instructions for the locomotor system (“lift foot from plug-in module”, “pull shin back from metal support”, “clench teeth”). The main reason this works so well is that all the information flows to a central location. without time-consuming pre-processing, without dangerous latencies. Ideally, all sensory information is available to the brain at the same time. The result: quick response times.

Preventing over stimulation of the controller

For the AGV with the O3R platform, the situation is quite similar: As the central sensory system of the robot, the computing unit processes the incoming visual (cameras) and tactile (lidar, sonar, radar) data and passes it on in the form of bundled synchronised information to the executing control centre (controller). The control centre in turn – relieved of complex processing of the incoming flood of stimuli – can then issue quick instructions to the locomotor system without latency, similar to humans. In this way, accidents can be avoided by emergency stop while target objects or positions can be approached with precision. The AGV is thus able to navigate from A to B efficiently and without accidents.

In other words: The O3R platform takes navigation of mobile autonomous robots to a new level. Maybe not yet on a par with humans, but certainly extremely intelligent.


The road to digitalisation can
be a long and winding one!

Why not take the shortcut?

We support you with robust solutions - all from a single source

Digitalisation. A word that makes some people cringe like a non-swimmer at the sight of a 50-metre pool.
Or a flat-terrain cyclist at the thought of the 21 hairpin bends up to Alpe d'Huez. 'Mount Digitalisation'. An unconquerable monument? Perhaps, if you do it all by yourself. But with the right team, anything is possible.
You don't have to be a lone hero that sets out on a solo adventure along a steep and stony path across the summit to reach the land of the future. In certain cases, it has proved useful to seek the advice of an expert before embarking on an expedition. And, as chance may have it, this expert may even offer to safely guide you to your destination. Then you won't take the rough route. No, you will take the well-maintained route through the straight tunnel that has already been built by the expert. And yes, it really does exist. (The tunnel. And the expert.) You just have to know it's there.

Bye-bye bugs!

Don't waste your time struggling with unpredictable weather conditions that inevitably occur when different fieldbus fronts collide. Don't get on the wrong track while trying to escape these nasty bugs lurking at the side of the road. Don't lose your way or mind in the dense fog. Choose the effortless way to the digital future.
We'll add that extra level of ease to your journey, making it a smooth and seamless experience instead of a bumpy ride. Not only will you get to the light at the end of the tunnel faster than Michael Phelps swimming to the other side of the pool. Once you're through, the huge monument behind you will also appear to shrink more and more to the size of a molehill.

Become a tunnel builder yourself

Long story short: To master digitalisation, you don't have to be a lone hero. On the contrary, it is advisable to ask someone who knows. Someone who has already paved the paths and banished the bugs. Us, for example.
We accompany you on the path to digitalisation. Drawing from five decades of automation and digitalisation expertise, we are always there to provide you with assistance and advice. And we share our knowledge with you, providing you with the equipment and know-how required to build small or large bug-free tunnels yourself.

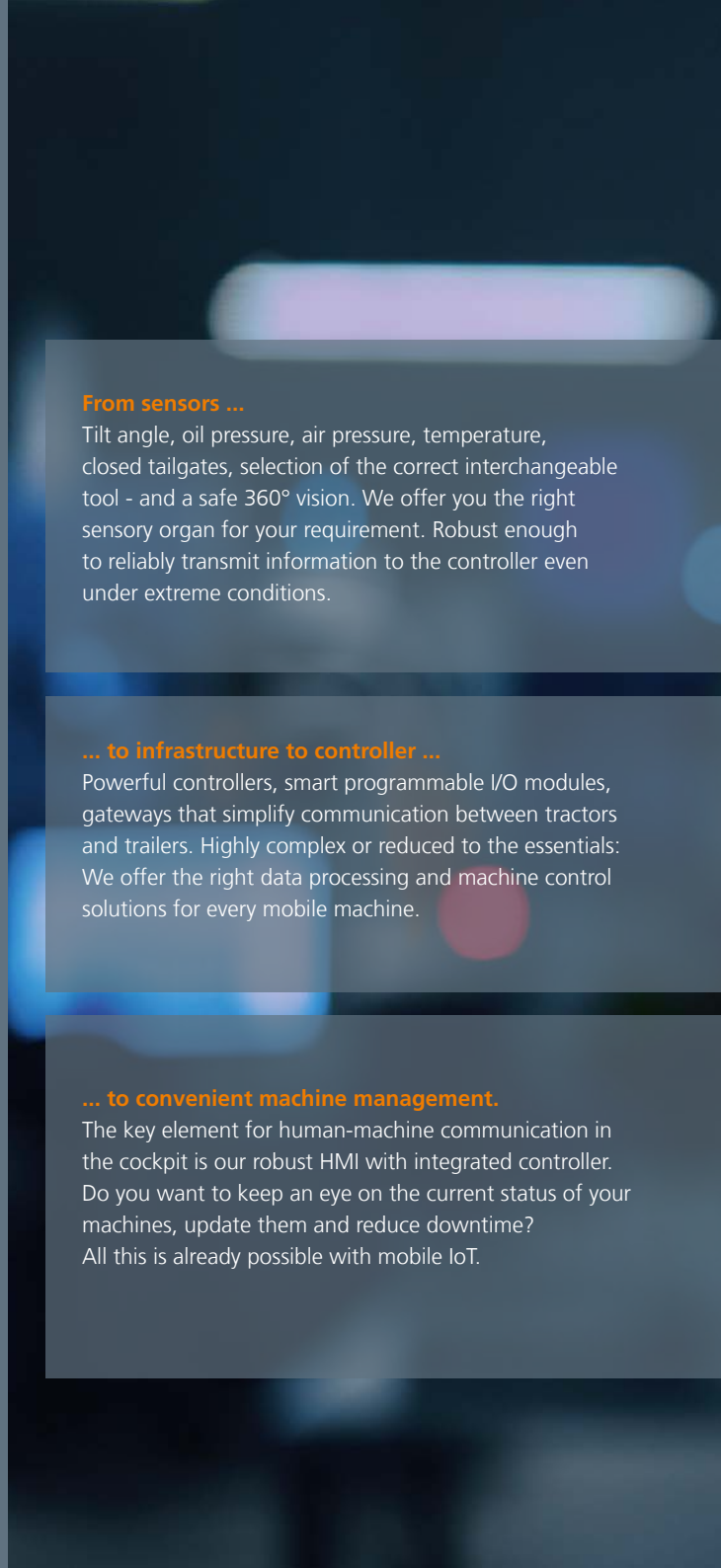
As a result, you have more time
to focus on the right challenges.

For example, to tackle the 21 bends of Alpe d'Huez.
Or to swim 50 metres freestyle against Michael Phelps.

We make digitalisation happen

Do you want to simplify the communication between people and mobile machines? Do you attach great value to performance, durability, comfort and safety? Are you interested in predictive, demand-oriented maintenance and an efficient use of your machines?
We make all this possible for you with our broad range of ecomatmobile products. You can also fully count on us to help you implement your digitalisation ideas. We know which sensors collect the desired information and where. We know all about Codesys and software integration of hardware components. And we know how to transfer our knowledge to you. To make sure you get off to a strong start and can take the next steps on your own. And if you have any questions or concerns, we are always here to help.

Sounds good? Your machines think so, too!



From sensors ...
Tilt angle, oil pressure, air pressure, temperature, closed tailgates, selection of the correct interchangeable tool - and a safe 360° vision. We offer you the right sensory organ for your requirement. Robust enough to reliably transmit information to the controller even under extreme conditions.

... to infrastructure to controller ...
Powerful controllers, smart programmable I/O modules, gateways that simplify communication between tractors and trailers. Highly complex or reduced to the essentials: We offer the right data processing and machine control solutions for every mobile machine.

... to convenient machine management.
The key element for human-machine communication in the cockpit is our robust HMI with integrated controller. Do you want to keep an eye on the current status of your machines, update them and reduce downtime?
All this is already possible with mobile IoT.

www.ifm.com

We love it when a plan comes together

And so do our customers

Actually, each of our products would have earned it: Having its quality, performance and added value confirmed by our customers. But our application reports don't just tell the story of a sensor. They tell the story of the joint success of the customer and ifm. Because one thing is clear: ifm is more than hardware, more than software, more than solutions. ifm is a solution provider, partner, pioneer and companion. This is also reflected in the small selection of stories we would like to offer you in the following.

Good automation solutions live from new insights, open minds, courageous approaches. This applies to our developers as well as to our colleagues in sales and, last but not least, to you – our customers. Take a moment to be inspired by the exciting stories from a wide range of industries. After all, who says that these success stories cannot be adapted to suit you?

And if you need someone to develop a plan together: You know where to find us.

ifm.com/gb/application-reports

You Tube

Sustainability & Motorsport? You can watch the video statement by Tim Zimmermann here.

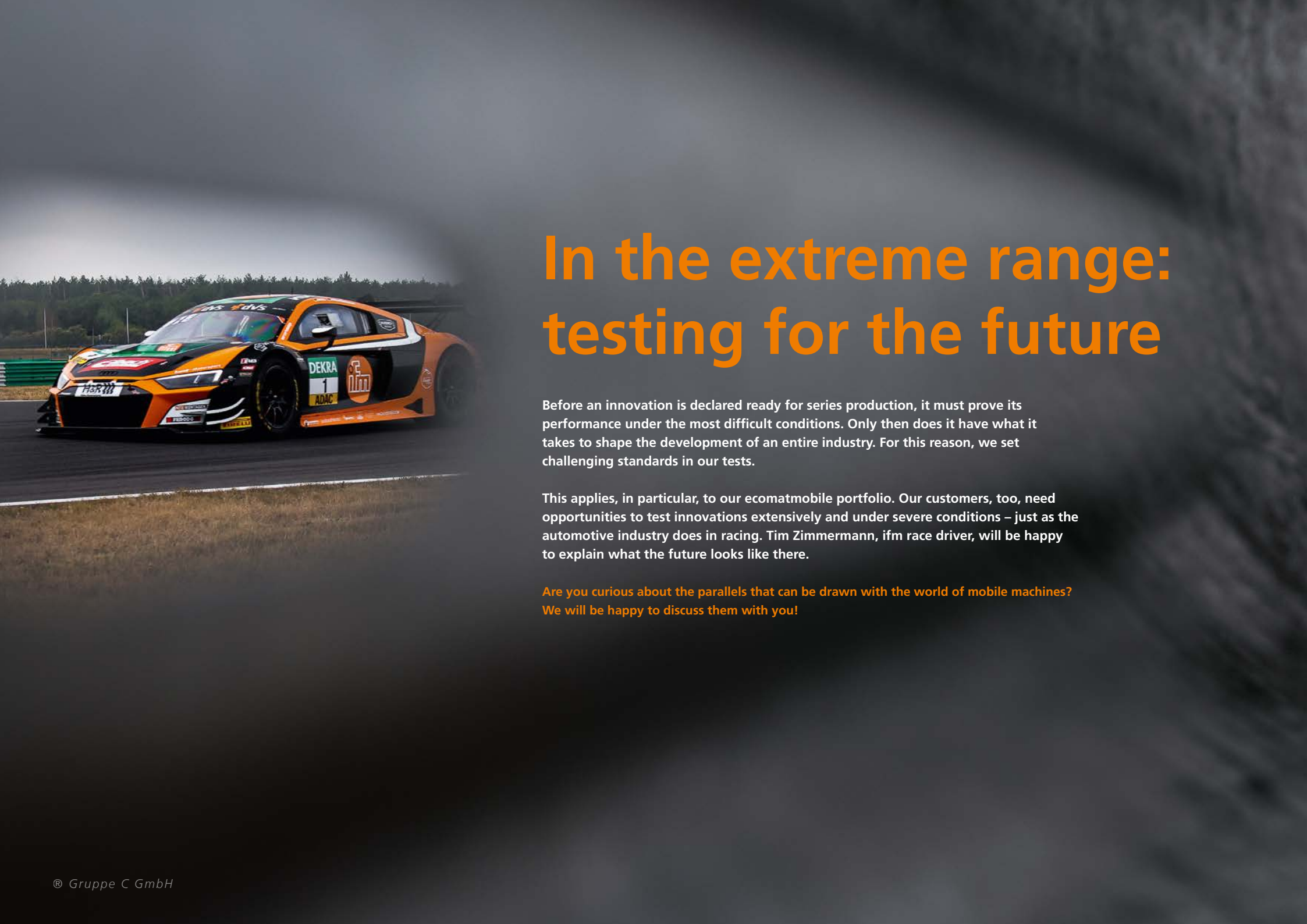
What connects us

The eternal drive: The desire to always get a little bit better. The goal: To achieve the perfect result. Permanently. Lap for lap, race for race, season for season. Tim Zimmermann has been pursuing his goal since childhood, steadily working his way up through the racing classes to now contest his third season in the ADAC GT Masters, the top class of the touring car championships.

That Tim Zimmermann's partnership with ifm came about in 2013 and has since developed to a close partnership is no coincidence. In both racing and automation, success is due to quality in equal regard. And in both cases, quality means constantly performing at the highest level. Striving for maximum precision at all times. To achieve this you need – besides talent and experience – one thing above all: Passion.

Tim Zimmermann and ifm – united in quality and passion.

www.ifm.com



In the extreme range: testing for the future

Before an innovation is declared ready for series production, it must prove its performance under the most difficult conditions. Only then does it have what it takes to shape the development of an entire industry. For this reason, we set challenging standards in our tests.

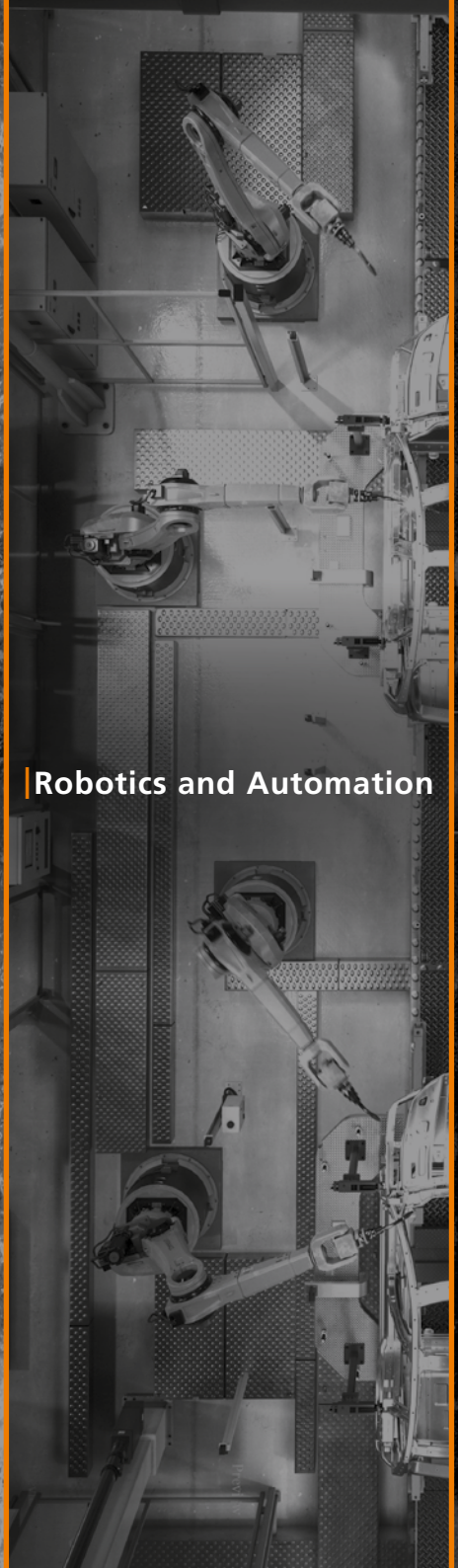
This applies, in particular, to our ecomatmobile portfolio. Our customers, too, need opportunities to test innovations extensively and under severe conditions – just as the automotive industry does in racing. Tim Zimmermann, ifm race driver, will be happy to explain what the future looks like there.

Are you curious about the parallels that can be drawn with the world of mobile machines? We will be happy to discuss them with you!

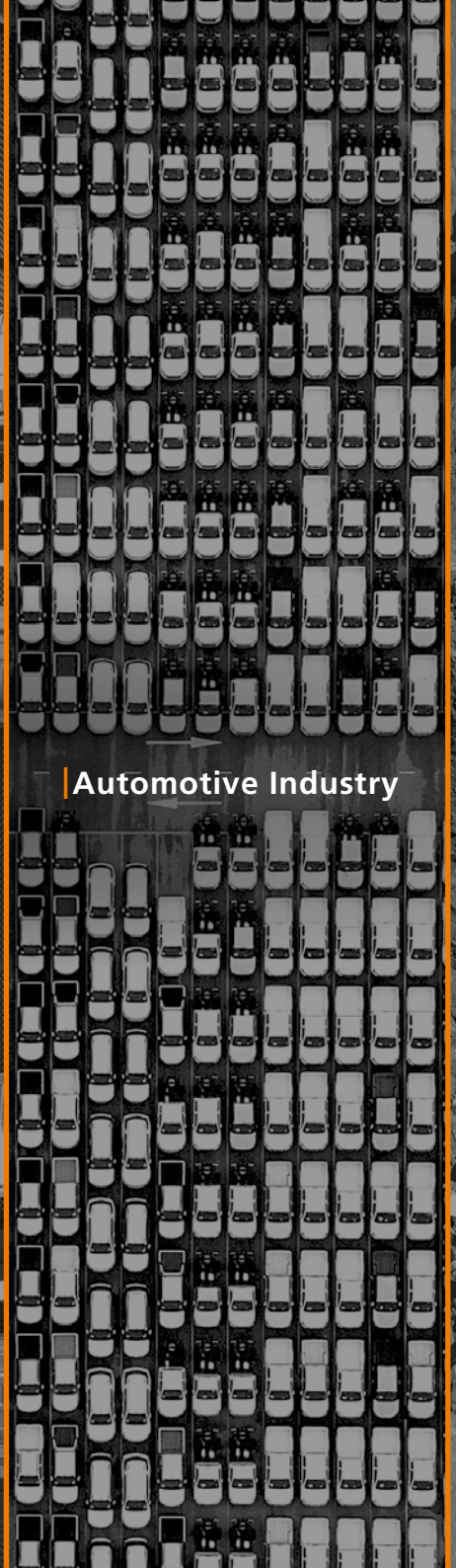
ifm.com/gb/ontrack

Food and Beverages

Water and Wastewater



Robotics and Automation



Automotive Industry

Mobile Machines

Why we don’t (or can’t) think like Einstein

“You don’t have to understand the world, you just have to find your way in it.”

A quote attributed to Albert Einstein. Would such a genius have said the same in today’s world? Probably not. The lack of resources due to the growing world population is becoming more and more noticeable. The inefficiency of our behaviour patterns is clearly affecting the planet. In the face of these challenges, it is no longer enough for us to make our way in the world. We must change it. We must contribute to preserving a planet that is worth living on in the future. Those who want to create solutions must understand the challenge.

In other words: We need to understand the world in order to improve it.

You don’t have to be a genius to understand this. Not a researcher. Not an innovator. Though innovation, research and genius should be driven by this insight. That, at least, is our goal. And with this goal in mind, we develop solutions for the most pressing challenges of the future, with an understanding of the challenges faced in each individual industry.

Everything the automation heart desires

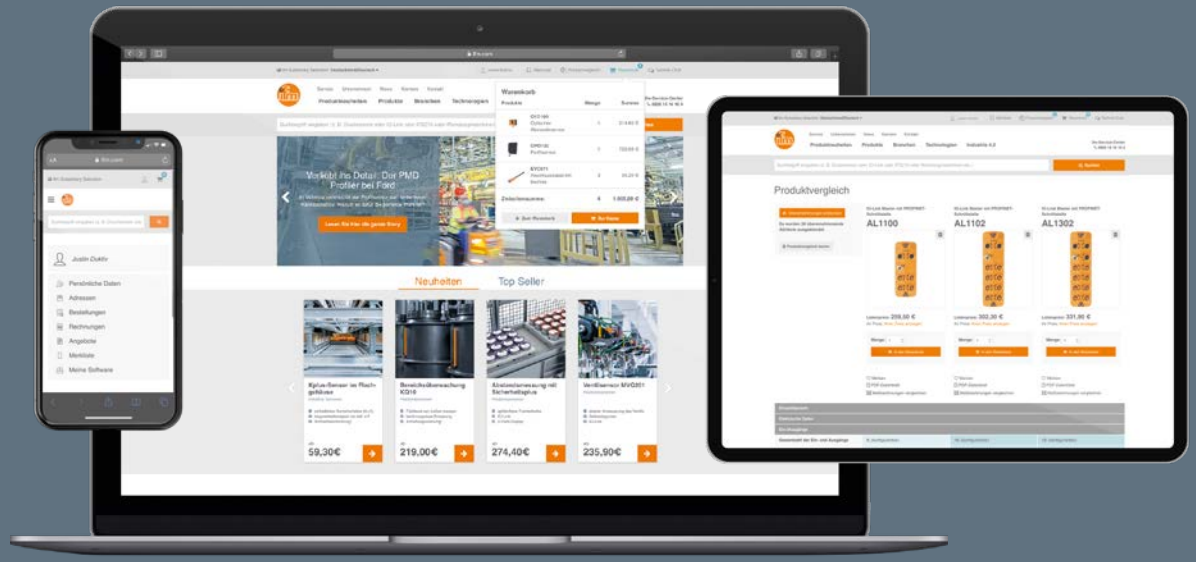
The online shop: find more, search less

Where does efficient plant automation start? We think: when shopping! And that's why our online shop is designed to guide you to your desired product as quickly as possible. At the same time, we also want to offer you maximum service when shopping online. For example, the selectors help you to narrow down the search to the suitable product versions. In your personal my ifm account you can easily import comprehensive order lists, create your own offers in no time and convert them into an order with just one click.

Products, accessories and interesting facts

Are you looking for the suitable accessories for your product? No problem! We have compiled everything you need to know about installation, parameter setting and set-up and added it to the respective product page.
Of course, in our online shop you will also find lots of interesting information about the technologies in our sensors, inspiration in the form of application reports, factory certificates for free download, and, and, and...

So if you are thinking about how to shop more efficiently, a visit to ifm.com is definitely worthwhile!



More transparency: Search for products, select, compare, get a support opinion, choose – and buy at your individual price.

More efficiency: Import order lists, create favourites, place previous orders again.

More flexibility: You decide how you pay and when we deliver. If you are in a hurry: use our express shipping.

More you: Create offers yourself, convert them into orders with one click, track shipments and status, save and retrieve invoices. my ifm – it's yours!

More future: Digitisation, Industry 4.0, finding solutions, downloading software, managing licences – all in one place.

More time: No closing times, no nasty surprises, shopping at any time, always up-to-date availability – and a reassuring 6 weeks' right of return.

That's it? Not by far!

Our entire product portfolio is available online!

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