

Innovative machine operation

# Controls for the next generation Build it in.



*Powering Business Worldwide*

# Meeting the needs of tomorrow, today.



With the industry moving increasingly towards digitalization, the control and communication elements used in machines are becoming more and more important by the day. It should come as no surprise then that today's new generations of young machine operators and company founders have a new set of standards when it comes to controls: high-resolution graphics, gesture-based controls, the ability to integrate mobile display devices, and an appealing design – these have all become decisive factors when it comes to whether a machine will be successful on the market.

This is just one of the reasons why we at Eaton attach enormous importance to being there for you every step of the way, whether it be preparing an initial draft of the controls you want or finally implementing them. Our innovative XV300 touch display not only has the same ease of use as a smartphone, but also complies with the OPC UA industrial standard so that it can be conveniently connected to the “Smart Factory of the future” or the cloud.

On top of this, we have a comprehensive range of pilot devices designed to meet your needs. With a sleek look and large dimensions, these indispensable devices are not only engineered to perfection, but are also designed to complement other input devices and give your machines a stylish image.



# Build it in.



40 %

of people between  
the ages of 32 and 45  
believe that they use  
better IT tools privately  
than at their company.



## Slimmer, sleeker, more striking than ever

With its unparalleled elegance, the new Eaton design behind our XV300 HMIs and our RMQ-Titan pilot devices is the perfect choice when it comes to bringing out the value and quality of your machines. It all starts with our XV300 HMIs, which feature a rear mounting configuration that makes it possible to seamlessly integrate them into machine enclosures. In addition, their stylish black bezel is guaranteed to make them an eye-catcher for even the most casual of observers.

Meanwhile, our RMQ-Titan pilot devices have also been designed with a number of factors in mind, not least of which is the fact that pilot devices are frequently used to control key functions and are accordingly placed in prominent positions on machinery. This means, among other things, that they need to stand out. In order to meet this requirement while delivering an innovative design, we at Eaton developed extremely slim front elements with a metallic surface and large dimensions. By using these pilot devices, you will not only be able to give your machine a new and cutting-edge look, but will also be able to take advantage of our tried-and-tested RMQ technology and its wide variety of options.

To learn more about the latest trends in  
machine controls, visit [Eaton.com/en/HMI](http://Eaton.com/en/HMI).

# The new face of machine interfaces for Industry 4.0



## Tomorrow's Operator Controls Today

Intuitive user guidance, precise gesture-based controls, multimedia integration – the ease of use we experience every day on our smartphones and tablets is now found in the latest generation of Eaton devices as well, ensuring that your work life can be just as convenient as your personal life.

And in order to make it possible for different roles and functions to get different user interfaces as required for their activities, all this and more has been incorporated into our new GALILEO 10 visualization software.



**77%**  
of all machine  
manufacturers are  
planning to integrate  
smartphones and tablets  
into their controls.



**OPC UA for the cloud  
communication**

**CANopen**



**EtherCAT**



## **Make sure that your machines are IoT-ready**

In order to be able to easily integrate machines into digital infrastructures, it is important for them to comply with the right communication standards so that they can be connected properly. This is where OPC UA, which is clearly becoming the protocol of choice for cloud communication and for machine-to-machine communication within smart factories, comes in. The OPC UA standard is not just supported by our XV300 HMI PLC devices, but, in combination with Eaton's GALILEO visualization software, can also be used to easily connect machines when the corresponding XV300 units are only being used as HMI devices. And to make things even better, these devices are available in a variety of designs and sizes of up to 15".

## **Intelligent communication system for data provision**

The type of data required not only includes device data such as motor currents, switching operations, and power consumption, but also production process data such as temperatures, pressures, and quantities. And while there are several possible solutions available, the best one for acquiring all this data without the need for more wiring is our intelligent SmartWire-DT communication system. This system not only connects all the components in a machine, but also establishes maximum transparency while minimizing the effort and time that goes into wiring when compared to typical point-to-point wiring solutions.

## **Flexible communication**

The XV300 series features a comprehensive range of interfaces, making it possible to communicate via PROFIBUS DP/MPI/PPI, CANopen, Ethernet, or SmartWire-DT. In addition, OPC UA is available for connecting to the cloud.

## **Engineering Support: The way to a better solution**

Experienced Engineering Support staff familiar with the latest technologies can prove to be invaluable in your search for the best possible solution. Your local sales representative will be more than happy to assist you.

# Control and operate your machines flexibly

## Visualization and control

Our new HMI devices are designed to form a seamless part of Eaton's general vision for machine controls. Accordingly, our XV300 touch panel can be used either as an HMI or as an HMI PLC with CODESYS programming. Our new generation of devices also includes our ultra-fast and compact XC300 controllers, as well as our XN300 remote I/Os. All devices can be connected via a comprehensive range of field buses. Finally, the XP500 industrial PC rounds off the portfolio.

## Controlling and signaling – design is playing an increasingly central role

Our customers kept asking for a slim design with a sleek appearance, and we at Eaton were only too happy to oblige with our new RMQ Flat Design pilot devices. These new flat front elements in the RMQ-Titan range of products are not just sophisticated, but also rugged and functional. On top of this, the RMQ-AFX mounting module and its ease of installation ensure that pilot devices will have a secure fit and will be easy to mount.



## Elegant, sturdy, and efficient

Our convenient all-in-one RMQ *compact* solution integrates the required cable, connector, and housing and has them assembled in a non-detachable manner. The high degrees of protection in the front (up to IP69K) and at the back (IP65) of these devices make them the perfect choice for applications in which protection from dirt and liquids is required. In fact, they can even be installed directly in woodworking equipment and machining centers without the need for any additional enclosures. All in all, this makes the devices enormously cost-effective at every single step of the process, from planning, through ordering, all the way to warehousing and installation.





## Automation & visualization



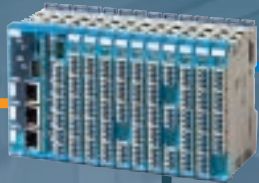
HMI XV300



HMI/PLC XV300



XP500 industrial PC



PLC XC300



XC152 Compact PLC



Remote I/O XN300



PLC XC300



Remote I/O XN300



## Controlling & signalling

Front with high degree of protection of up to IP69K



Flat Front



Flat Front



RMO-Titan



RMO-Titan

All-around protection: Up to IP69K in the front, IP65 at the back



RMO compact solution



RMO compact solution



signal tower



Surface mounting enclosure

SWD I/O modules



## Safety



Safety Technology



easySafety






Emergency-stop pushbutton

— Ethernet — CAN — SmartWire-DT — Wiring — Modbus TCP/IP

# Our products

## Visualization and control

| Product                                       | HMI<br>XV100/XV300   | HMI/PLC<br>XV100/XV300   | XP500  |
|---|--|--|--|
|   |   |    |   |
| <b>Product Description</b>                    | <p>Thanks to their outstanding graphics performance, XV100/300 control and visualization devices feature a highly responsive and modern user interface and make it possible to integrate multimedia elements (e.g., video, PDFs, web contents), much like the latest smartphones.</p>  | <p>XV100/300 units are control devices with an integrated PLC (HMI PLC) that have the same ease of use as smartphones. By combining high performance with powerful graphics processing units, these devices make it possible to display highly responsive, state-of-the-art user interfaces and integrate multimedia elements such as video, PDF, and web contents into visualizations.</p>  | <p>Our heavy-duty XP500 touch panel industrial PCs are characterized by high performance and powerful graphics processing units, as well as by the fact that they feature no rotating parts whatsoever. The open Windows Embedded 7 operating system makes them the ideal choice for playing multimedia content and running HMI and SCADA applications.</p>  |
| <b>Technical features and characteristics</b> | <ul style="list-style-type: none"><li>• XV100: Resistive TFT displays (3.5" - 10.4"), plastic or metal housing</li><li>• XV300: 7" - 15.6" capacitive multi-touch devices; displays with toughened, anti-glare glass panel</li><li>• Front and rear mounting versions with a degree of protection of up to IP69K</li><li>• A comprehensive range of interfaces: Ethernet, USB Host 2.0, USB Device, RS232, RS485, CAN, PROFIBUS</li><li>• Visualization with CODESYS/GALILEO</li></ul> | <ul style="list-style-type: none"><li>• XV100: Resistive TFT displays (3.5" - 10.4"), plastic or metal housing</li><li>• XV300: 7" - 15.6" capacitive multi-touch devices; displays with toughened, anti-glare glass panel</li><li>• Front and rear mounting versions with a degree of protection of up to IP69K</li><li>• A comprehensive range of interfaces: Ethernet, USB Host 2.0, USB Device, RS232, RS485, CAN, PROFIBUS, SmartWire-DT</li><li>• Programming and visualization with CODESYS/GALILEO</li></ul> | <ul style="list-style-type: none"><li>• 10.1" - 21.5" capacitive multi-touch devices featuring displays with a heavy-duty, anti-glare tempered glass panel</li><li>• Powerful dual-core CPU with high-performance Radeon HD graphics processing unit</li><li>• High resolutions all the way to full HD</li><li>• Small space requirement</li><li>• Fanless, no rotating parts</li><li>• Comprehensive range of interfaces: Two (2) Ethernet, two (2) USB 3.0, RS232, RS485, DVI-I</li><li>• WIN ES 7 operating system and runtime license for visualization software</li></ul> |
| <b>Applications</b>                           | <p>The devices in the HMI series are used in a broad variety of industries and are particularly well-suited to the following applications:</p> <ul style="list-style-type: none"><li>• Mechanical engineering</li><li>• System engineering</li><li>• Hazardous applications in the process industry</li><li>• Marine</li><li>• Renewable energies</li></ul>  | <p>The devices in the HMI PLC series are used in a broad variety of industries and are particularly well-suited to the following applications:</p> <ul style="list-style-type: none"><li>• Mechanical engineering</li><li>• System engineering</li><li>• Hazardous applications in the process industry</li><li>• Marine</li><li>• Renewable energies</li></ul>  | <p>These industrial PCs are used in a broad variety of industries and are particularly well-suited to the following applications:</p> <ul style="list-style-type: none"><li>• Mechanical engineering</li><li>• System engineering</li><li>• Hazardous applications in the process industry</li><li>• Marine</li></ul>  |



## Controlling and signaling

### Flat Front Design



RMQ flat front devices are not only characterized by an attractive and sleek design, but also feature the sophisticated mounting system known as RMQ-AFX. They are sized for 30-mm holes and allow for a smooth transition between control sections and machines.

- Elegant, slim design
- No projecting pushbutton or indicator light parts
- Enhanced vandal resistance
- Easy to clean
- Easy and one-of-a-kind installation
- Fully compatible with existing modular RMQ-Titan accessories
- Sophisticated mounting system (RMQ-AFX)
- For installation in 30-mm holes

The pilot devices in the RMQ-Titan M22 series are characterized by enormous versatility, making them the perfect solution for a wide variety of applications and processes. In fact, the range of potential applications for which they can be used is further broadened by their high degree of protection.

### RMQ-Titan M22



With their versatility, reliability, and functionality, RMQ-Titan devices with a 22-mm mounting hole diameter have proven to be an ideal choice for the machine and panel building industries for years now, and as a result have become synonymous with quality pilot devices.

- Ergonomic design with concave actuator elements
- Optimum illumination efficiency through specially designed lenses in the indicator lights
- Quick connection to the AS-i bus
- Installation in standard 22.3 mm drill hole
- Simple conversion to stay-put or spring-return function with all stay-put pushbutton actuators
- Protection type up to IP69K
- Complies with all international standards and regulations such as IEC/EN 60 947
- Test mark requirements and directives such as: UL/CSA, IEC, CCC.

The pilot devices in the RMQ-Titan M22 series are characterized by enormous versatility, making them the perfect solution for a wide variety of applications and processes. In fact, the range of potential applications for which they can be used is further broadened by their high degree of protection.

### RMQ compact solution



Our convenient all-in-one RMQ compact solution integrates the required cable, connector, and housing and has them assembled in a non-detachable manner. The high degrees of protection in the front (up to IP69K) and at the back (IP65) of these devices make them the perfect choice for applications in which protection from dirt and liquids is required.

- High degree of protection: up to IP69K in the front, IP65 at the back
- Plug & play installation
- A variety of connection options: pre-terminated cable connections with M8 or M12 plugs, cables with unterminated ends
- The pre-configured M8 and M12 plugs can be used to connect directly to field buses such as AS-i or to the SmartWire-DT connection system
- Various cable lengths
- Can be quickly and safely installed on machines

The new cable solution means that controls can be installed directly where machines are. These controls are particularly well-suited to machinery in which dirt, dust, or liquids accumulate, as is the case with woodworking equipment, for example.

### FAK



FAK foot and palm switches feature extra-large operators and are guaranteed to be tamper-proof according to international standards. They can be actuated with your palm, closed fist, elbows, or feet even if you are wearing work gloves. To allow a fast response.

- Extra-large operator
- Tamper-proof according to ISO 13 850/EN 418
- Strong shock resistance
- Extremely high IP67 and IP69K degrees of protection

A broad variety of operators ensures that FAK devices can be used anywhere where fast responses are needed. The high mechanical shock resistance and degree of protection of IP69K make the FAK the ideal device for use in adverse conditions.

## Signalling

## Security

### Product

### signal tower

### Controlled stop

### contact element Flat Rear



### Product Description

With their bright LED technology the signal towers SL7 and SL4 increase awareness of machine states. High-performance LEDs further boost perceptibility, specially at adverse light conditions. With their protection type IP66 the signal towers can be used also in adverse environments.

Our globally proven emergency-stop buttons ensure that people, machines, and systems are thoroughly protected. Needless to say, Eaton offers just the right components in this case as well, with the options extending from key-operated models to models with illuminated rings.

Our rear RMQ Flat Rear contact elements, which are designed to save space, perfectly complement Eaton's comprehensive and versatile range of pilot devices. In addition to this, their modular nature, coupled with their compatibility with existing RMQ-Titan M22 and Flat Design products, provides machine designers with enormous flexibility.

### Technical features and characteristics

- LED technology for all functions and common voltages
- Adjustable volume for various ambient conditions
- Up to eight different signal sounds
- Flexible mounting options
- IP66
- Communication via SmartWire-DT

- Contact elements for the front or base mounting of single-channel or dual-channel safety circuits
- Mushroom shape with a diameter of 38 mm and palm shape with a diameter of 45/60 mm
- With / without key
- Designed to comply with worldwide standards
- Turn-to-reset / pull-to-reset
- Non-illuminated / illuminated with standard LED or featuring a mechanical position indicator (green/red) at the center of the operator

- Flush electromechanical contact elements with a mounting depth of less than 30 mm
- Shorter installation times thanks to tool-less wiring, eliminating the need to retighten screws
- Fully compatible with the RMQ-Titan M22 and Flat Front portfolios

### Applications

- Mechanical and system engineering,
- Mechanical engineering with the highest expectations for attractive design
- Machines and systems for exterior use and raw ambient conditions
- Export-oriented mechanical engineering
- Panel building
- Cash register systems, deposit return devices, baking vending machines

Machines and systems are immediately stopped with the EMERGENCY-STOP button when pressed in hazardous situations. These EMERGENCY-STOP buttons can be used for most applications while simultaneously complying with worldwide requirements.

- Developed for modern machine designs and featuring a slim build
- Makes it possible to bring completely flat solutions to life when used together with RMQ Flat Front, especially when it comes to support arm systems used in combination with displays



## Function elements

### Multi-color



With their multi-color LED elements and compact design, RMQ Flat Rear units are the perfect choice for use in machines and systems with a streamlined design. On top of this, using the new multi-color LED elements in the series is a smart way to signal various machine statuses with a single indicator light.

- New modular dual-color and multi-color LED elements with a mounting depth of only 30 mm
- Up to seven colors can be shown with only one single button
- The color is selected by directly wiring the three color inputs
- Fully compatible with the RMQ-Titan M22 and Flat Front portfolios

- An indicator light can be used together with the new multi-color LED elements in order to efficiently signal machine statuses
- Makes it possible to bring completely flat solutions to life when used together with RMQ Flat Front, especially when it comes to support arm systems used in combination with displays

### Contact elements



The tried-and-tested contact elements in the RMQ-Titan family are known for both their versatility and reliability. Accordingly, they have become the product of choice in a broad variety of industries, which is no surprise given their quality and durability.

- For applications within a range of 5 V to 500 V
- Available with screw terminals and spring-cage terminals
- For front and base fixing
- Positive opening ensures that these elements can also be used for safety-relevant applications
- Up to 6 contact elements can be clipped on in 2 levels.
- Fully compatible with the RMQ-Titan M22 and Flat Front portfolios

- The pilot devices in the RMQ-Titan M22 series are characterized by enormous versatility, making them the perfect solution for a wide variety of applications and processes. In fact, the range of potential applications for which they can be used is further broadened by their high degree of protection.
- Can be used worldwide thanks to numerous approvals

### SmartWire-DT connections



SmartWire-DT communication modules round out our comprehensive range of pilot devices. By making it possible to establish a direct connection to SmartWire-DT, these modules eliminate the need for the control wiring traditionally required for devices.

- IP67 degree of protection
- Show the status of the corresponding button / switch
- Contact monitoring
- Driving indicator lights
- Fully compatible with the RMQ-Titan M22 and Flat Front portfolios

- When it comes to complex environments with a large variety of pilot devices, there is simply no better choice than SmartWire-DT.
- Convenient input, menu navigation, and confirmation (RMQ SmartWire-DT encoder)

### The Pushbutton Configurator – Select Your Products Quickly and Easily!



The Pushbutton Configurator is available online and is designed to help you select and combine a variety of pilot devices, such as those found in the RMQ-Titan series. The configurator is user-friendly and neatly laid out, provides a quick overview of the various ranges of products, and uses intuitive user guidance to show solutions that match your needs. In addition, once all individual components have been selected, the configurator will show the assembled final product. Moreover, the setup pane shows selected products directly, making it much easier for you to choose the right components for your application.

To use the Pushbutton Configurator, visit:  
[www.eaton.eu/config/rmq](http://www.eaton.eu/config/rmq)

# Unrivalled ease of use maximizes production efficiency



Perfect protection in dusty environments

“The illuminated pushbutton is exactly what we needed. Not only does it meet our need for greater efficiency and cost-effectiveness, but also saves space and has provided us with much greater flexibility,” confirms Rainer Kurz from Weinig AG.

**General information:** With its machine portfolio, Tauberbischofsheim-based Michael Weinig AG covers the entire process chain involved in solid wood processing. This ranges from planers and molders, window processing centers, and tool grinders to four-sided planers, optimizing cross-cut saws, and special-purpose machines. The company has production facilities in Germany, Austria, Luxembourg, the United States, and the People's Republic of China, and markets its products worldwide in its role as a global industry leader.

**Challenge:** The company's four-sided planer, which is used to longitudinally process wooden beams and moldings, uses fast spindle clamping systems to secure and clamp its tools. These clamping systems make it possible to quickly change tools, and users can operate, lock, and release the corresponding spindles with an illuminated pushbutton. This pushbutton needed to be installed directly in the machine area, and accordingly required a degree of protection of at least IP54 in the back as well in order to protect it from dust.

**Solution:** The RMQ *compact* solution series of products with a degree of protection of IP65 makes it possible to install these products directly anywhere. To this end, Eaton equipped the pushbutton with a pre-wired cable and M12 or M8 connectors, which eliminated time-consuming wiring and made it possible to select the element's location freely. Moreover, the product has SmartWire-DT plug-and-play capabilities.



## Result

The illuminated pushbutton no longer requires any pre-wiring, which saves both time and effort. Moreover, its compact design means that it takes up much less space. In addition to this, the end customer is able to decide exactly where they want the pushbutton to be located, enabling Weinig to accommodate individual customer requests.





Gravel plant with load-dependent operation

Thanks to functionalities such as load-dependent operation, integrated diagnostics and monitoring, and intuitive controls, KBI was able to reduce unexpected downtimes and significantly increase its productivity.

**General information:** KBI Kieswerk und Baustoff-Industrie Kern GmbH & Co. KG's (KBI) gravel plant in Iffezheim, close to Rastatt, can produce about 200 metric tons of gravel per day. After being scalped, loose rock from a lake is crushed into sand and chippings. In a second step, the material goes through classification sizing and a screening and washing step. After this, the plant separates the prepared material by grade and size and distributes it into eight silos with a particle size between approx. 5 and 15 mm.

**Challenge:** The company wanted its facility to undergo a comprehensive upgrade, with the goal being to bring its automation and drive equipment up-to-date in order to increase the plant's productivity. In addition, the company wanted to improve transparency and implement state-of-the-art controls. Baden-Baden-based Weingärtner GmbH Elektromaschinenbau, an Eaton Solutions partner, won the contract and was tasked with retrofitting the facilities with a limited budget and during a vacation period of 4 weeks.

**Solution:** Weingärtner used the user-friendly XP500 touch panel with capacitive multi-touch technology for the control center. A 21.5" XP500 now displays the relevant higher-level processes, while three smaller units show the individual crushers' status. A network made up of Eaton XC controllers is used to control the processes. Thanks to the latest version of Eaton's Galileo software (version 10), the entire visualization interface was implemented easily and in record time. Moreover, the drive equipment was upgraded with DE1 variable speed starters, DA1 variable frequency drives, and approx. 70 PKE motor-protective circuit-breakers. Finally, the intelligent SmartWire-DT connection system made it possible to quickly and effectively wire all important components.

## Result

"Every motor in Iffezheim is monitored via SmartWire-DT, which together with the corresponding thermal motor models provides us with important information regarding the corresponding loads," says Fels (Weingärtner GmbH). This makes it possible for the company's staff to go easy on the plant by cold-starting with a small production volume and ramping up to full load only until after the operating temperature has been reached. "We don't know of any other technology that would enable us to implement this level of transparency and efficiency while keeping everything compact," the automation technology expert adds.

## Better solutions for mechanical engineering worldwide

At Eaton, we provide compact and complex machines and installation solutions for the world market.

These solutions are focused on helping end users to make tangible improvements in productivity and profitability with machines and installations that are:

- Simpler, more compact and lower cost
- More reliable
- More energy-efficient
- Enhanced safety

We serve the electrical engineering of all parts of a machine. Our circuit protection solutions help to better protect people and assets. Our SmartWire-DT intelligent wiring system enables users to connect electrical and hydraulic devices, from controllers to sensors, reducing costs and increasing uptime. We offer best-in-class solutions, ranging from simple pushbuttons to innovative multi-touch HMI PLCs, for ergonomically operating and controlling machines. Finally our modern motor starter and drive solution for safer, more reliable and energy-efficient operation.

For more information, visit [www.eaton.com](http://www.eaton.com)



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**Eaton Industries GmbH**  
Hein-Moeller-Str. 7-11  
D-53115 Bonn/Germany

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