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For Automation Technology's Decision-makers in the Machinery Industry of Germany, Austria and Switzerland and the F&B and Automotive Industries

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Increasing use of robots until 2014 based on experienced users

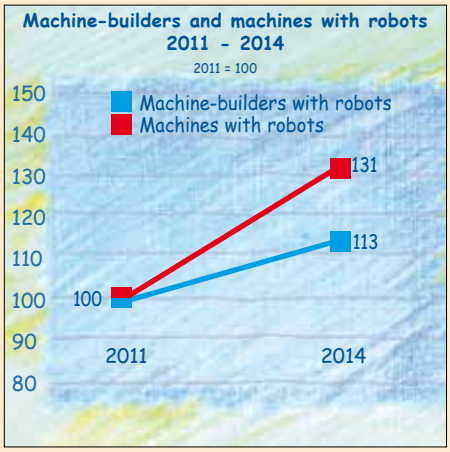
At the end of 2011 Quest TechnoMarketing interviewed more than 200 machine-builders in 11 sectors of the German machinery industry. Out of the many results we focus on the main direction of the development until 2014. This may be of interest for machine-builders as well as for suppliers of robots and automation technology.

Use of robots is intensifying

With 45% nearly each second of the investigated machine-builder is already applying for robots at the machines. So robots are not at all any longer an application for niches and no longer limited to machines and plants e.g. for the automobile industry.

None of the investigated machine-builders with robots in use stated in regard to 2014: „Robots? No, not any more, they did not work out successfully".
In fact, new first users will join during the next three years in such a way that by 2014 50% of the machine-builders are to be expected using robots at the machines. So the number of machine-builders with robots will increase until 2014 by 13%.

In this context robots are defined as programmable machines with several motion axes etc. according to the VDI-Guideline 2860.



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Experienced users will drive growth

Let us turn now to the machines, at which robots are implemented. Generally the machine-builders equip only a part of their machinery portfolio with robots. The number of these machines equipped with robots will increase by 31% until 2014.

Who will be the driving force of this growth? Will it be the new first users implementing robots at big scale?

No, on the contrary. The dynamic growth of robots at the machines will base to 99% on machine-builders already using robots.

The new first users will contribute only 1% to this growth.

Two results are derived from this:

❖ the machine-builders are satisfied with robot applications to such an extent that they will stick to them.

❖ growing experiences and extended applications will result in more and more differentiated requirements of the machine-builders.

The suppliers of robots and automation technology should adjust themselves in time to this ever more differencing use of robots.

Two thirds of the machine-builders make the engineering by their own

Even for the machine-builders the engineering of the robot application will become more and more challenging. Nearly two thirds (63%) of them make the engineering of the robot application completely in-house. One quarter (26%) of these machine-builders buy only some robot components or even build the robot in-house. One well third (37%) buys the complete robot and realizes the engineering by their own.

With ever more differentiated requirements not only the engineering is becoming more ambitious but there will open up new possibilities to create customer benefits and more competitive advantages.

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EDITORIAL

Dear readers,

Integrated total solutions, robotics, Ethernet and innovation - those are the topics of this issue, connected with the Hannover Messe, Drupa and Automatica as well.

The robots use until 2014 will become more differentiated, its engineering more demanding. This implies new challenges and chances for machine-builders, manufacturers of robot and automation technology.

In a guest article ABB shows that robotics and safety can be integrated with automation technology to total solutions.

In the development of Ethernet at printing and paper handling machines since 2005 real time Ethernet calls the tune.

In a guest article Balluff answers to the trend to Ethernet with an innovation: I/O modules with integrated displays are to simplify line-ups and to accelerate maintenance and troubleshooting with the end-users.

I wish you many useful suggestions.

Abb.:© fotolia.de

To drupa 2012

Ethernet at printing and paper handling machines 2005 – 2012

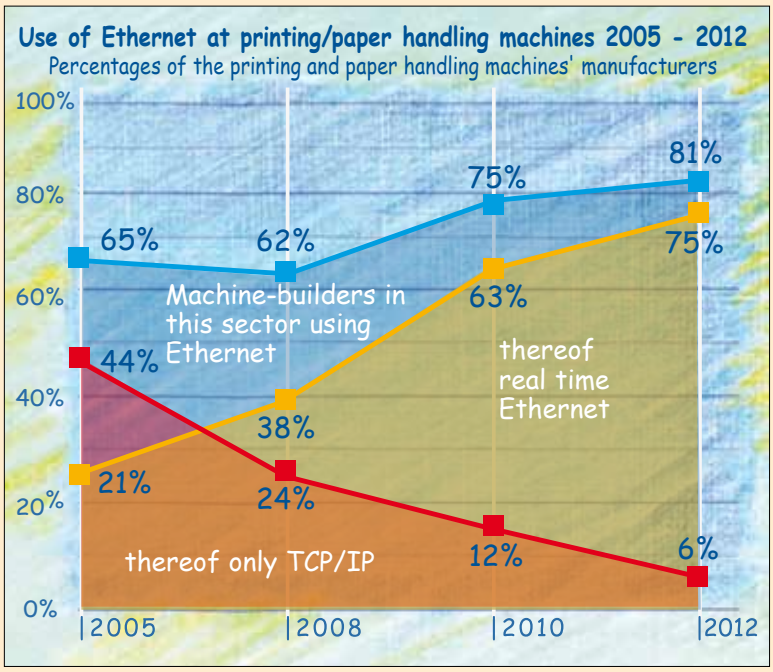
The use of Ethernet at printing and paper handling machines shows three characteristics compared with the total machinery industry.

❖ There it is a bit less distributed than on the average for the entire machinery industry. The diagram shows values that are for the machinery industry slightly higher with 50% (2005), 67% (2008), 80% (2010) and 89% (2012) apart from the year 2005.

❖ Real time Ethernet is above average frequently used at printing and paper handling machines. That applies for the whole period concerned. As the diagram shows, 75% of the printing and paper machines' manufacturers use RT-Ethernet while this figure for the total machinery industry stands with 67% noticeably lower.

❖ Finally only TCP/IP is below average frequently used at printing and paper handling machines. The reference values of the machinery industry to the values of printing and paper handling machines in the diagram are by 8 to 16 percentage points higher with the only exception in 2005.

So the sector of printing and paper handling machines is a real time Ethernet intensive sector.



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Reasons for slightly below average use of Ethernet or TCP/IP

CAN is partly regarded more favourably for application and cost structure than Ethernet.

❖ *„We have been already successfully using CAN BUS for many years in different structure levels. The decision was made at that time due to cost reasons and sufficient performance".*

Partly one uses classical field buses and limits the use of Ethernet to the monitoring via TCP/IP.

❖ *„The control is to take place still by means of field bus. One uses Ethernet only for interlinking to super ordinate machines, to permit data transfer to pre-stage printing machine as e.g. for the pressure preliminary stage and for server tying."*

❖ *„One already uses Ethernet, however, not for applications of RT-Ethernet yet. The main advantage in using Ethernet is the simple wiring and the very quick data transfer."*

RT- Ethernet for larger performance

❖ *„One will change to Ethernet in the future, because one will require higher data rates due to more bus participants and because a larger data volume will be required due to distributed intelligences. Thereby the topic safety for machine and the operator is important. So far one has two redundant systems. One will have the advantage of using only one system; therefore real time is important. Furthermore that should lead to lower costs at the end as well."*

❖ *„The main advantage one would like to benefit from RT-Ethernet is the lower variety of the devices and the larger performance. For the distributed entries one will have faster data transfers."*

Demanded improvements for the use of Ethernet

The machine-builders know best, where the shoe pinches with the use of Ethernet.

❖ *„One is less content with the IP address assignment. Here one is searching the web for simpler methods to assign the IP address. It is important to make it possible for every electrician at the machine to handle IP addresses via switches."*

❖ *„As a user one wishes one single system in order to not being constantly faced with the question, which protocol is to implement, EtherCat, ProfiNet or Sercos III."*

❖ *„By now one is content with the use, however, expecting further improvements in regard to the diagnostic ability and the simpler configuration. These expected improvements refer to all protocols in use.*

❖ *„Ethernet should become faster, 100 Mbit is too little, it should be at least 300 - 400 Mbit, and later, if the basics are fulfilled, also 1 Gbit."*

❖ *„Standardization of the different systems, definition of standards, simple gateways between TCP- Profibus- IO-Link etc., industrial suited version."*

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I/O modules with integrated display – world-wide for the first time on the market

Simpler addressing, manipulation protection, easier maintenance

As worldwide the first supplier Balluff integrates highlighted LCDs into field bus I/O modules. This simplifies engineering and start-up for the machine-builder. The user of machines and plants is benefiting from more safety in the plants, shortened downtimes and easier maintenance.

Addressing becomes simpler

While still two decimal rotary switches were sufficient to set up the address of the I/O module to the network (address range 0-99) with Profibus or DeviceNet, IP addresses with their four bytes can only be insufficiently set up with rotary switches.

With Ethernet/IP the module receives its own IP address in the network. This address, the subnet screen form and the gateway address are directly entered into the module via two pushbuttons with the help of an intuitively operated menu. Once adjusted, they are recallable at any time at the push of a button, with some models also the adjusted Baud rate can be read.

Protection against manipulation

So far only the new I/O modules from Balluff offer the possibility of directly using a digital display to protect machines or plants against deliberate or unconscious manipulation. After the input of the address in the editing mode, a so-called „lock bit“ can be set up by the control system (PLC) disallowing a further re-programming of the address.

Who turns now from the display mode to the editing mode of the equipment addressing, will look there at the settled lock symbol in form of a key. Thoughtless changing of the address is not possible at this point; deliberate manipulating at least not manageable without hurdles, inquiry call and documentation by the PLC.

Integrated equipment identification

By pressing the key can be gotten to know rapidly and at a glance, which hardware and which software version are locally in use. This is of advantage whenever for example the current status must be determined during maintenance or extension work.

Easier maintenance

Don’t search for a while gets quickly to the point is the motto. Two each bright red and green LEDs are integrated components of the display; the lights are independently of the module only controllable by the PLC. Via this function the user may specify reasonable states or circumstances, with whose entries the red, the green or both lamps (yellow) will light up. Now the operator can purposefully actuate a module that will quickly identify itself by green or red shining LEDs being fast detectable. In comparable way matching modules of a certain cluster can be actuated. If a LED of a module does not light up, it could be a sign of malfunction. The search & rescue function makes it also possible to visualize, which modules lie on the same subnet screen form. This is particularly helpful if duplicated lines are using same addresses but different screen forms or gates. A red shining LED can also indicate, provided accordingly specified by the PLC, that and where immediate actions are required in the process such as an exceeding the temperature. A comparable function is not available on the market by now.

Integrated web server

An integrated web server shows a close-to-reality picture of the I/O module as well as the current status of the signal LEDs. This applies not only to the process data but also to the bus signals (see picture).

In such a way the web server enables to

pass on process images, settings and faults (diagnosis) without large expenditure via the Standard Intranet to the central coordination. So diagnosis and maintenance can centrally be managed and faults rapidly located.

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Drives, Control Systems, Safety, Robotics – integrated from one single source

In factory automation integrated automation solutions are in the advance containing safety functions apart from automation function ensuring a high degree of safety, efficiency and cost effectiveness.

Harmonized components required

Nowadays automated production lines in factories are determined by the interaction of a multiplicity of complex components such as PLC, motors, frequency converters, robots, switch devices etc. In the context of rising cost pressure well harmonized components offer clear productivity benefits and potential savings.

ABB offers a complete and modern range of drive technologies, control systems and safety engineering as well as robotics for the manufacturers of machines and plants. Out of this a further singular benefit arises for the industrial customers because

❖ all products are matched on each others providing a standardized platform from one single source.

Safeball for safe one and two-manual controls

Safety becoming more important

In the final years the factor safety became in particular more important by the European Union Machine Guideline 2006/42/EG with mandatory safety requirements in regard to the development and construction of machines and systems. These high safety requirements are opposed by an increasing complexity of the systems and machines as well as a high degree of automation suggesting higher requirements on technical solutions and their integration ability. Due to improved designs of control and monitoring systems the two goals of high safety and productivity can both very well be matched.

Complete portfolio of automation

With the acquisition of the safety specialist Jokab Safety in 2010, ABB closed the gap in its product range regarding safety solutions for the manufacturers of machines and plants.

Since then ABB offers a complete portfolio of automation as well as turnkey solutions with integrated machine safety.

With the extension of the portfolio by the Safety Controller Pluto, ABB is better integrating Pluto with the engineering tool Control Builder for the automation platform AC500. So for example at a production line a safety controller can operate hand in hand with the AC500 as sequencing control providing safe disconnecting of the system if the protection device is triggered or an emergency stop switch is actuated.

Safety PLC AC500-S combines PLC and complex safety functions

In 2011 ABB extended its portfolio of safety solutions additionally by the Safety PLC AC500-S.

Safety PLC AC500-S from ABB

The new safety control is a simple extension of the automation platform AC500 by safety modules. Complex safety functions can be integrated into the AC500-S and be interlocked with the general functions.

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