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UP-TO-DATE POLL ABOUT AN INNOVATIVE ISSUE

IO-Link in the machine-builder's spectrum of opinion

IO-Link is an innovation whose broad launch is taking place. How do the machine-builders evaluate this innovation, which spectrum of opinion shows up around IO-Link? On behalf of well-known sensor providers we talked about this issue to over 300 machine builders in the first half of this year. Some results we are going to present now.

EDITORIAL

Dear Readers,

From the range of trends regarding the automation technology followed and set by machine-builders, the trend magazine picks out current aspects.

Ethernet-based field buses are among these aspects. Machine-builders are struggling for intensified use as the trend survey „Changes in 2007 the machine-builder wants to" shows.

The continuing change of the control technologies belongs to these aspects as well that favours the PC technology.

In the electronic drive technology, intensified applications of torque motors and linear drives show up. This is in connexion with an above average positive development of the servo drives in the next years. This influences other components of the drive technology as well as the control and the distribution of the control intelligence. Here the trend magazine picks out some points of this change.

Finally the trend magazine presents the pros and cons to IO-Link as an innovation. This is to support constructively the opinion making to IO-Link among the users.

Yours

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What IO-Link is like and for which it is useful

The talks with the machine-builders were based on three substantial features of IO-Link.

❖ IO-Link is a field bus-neutral interface between I/O component and sensor. IO-Link makes the existing point-to-point connexion able to communicate.

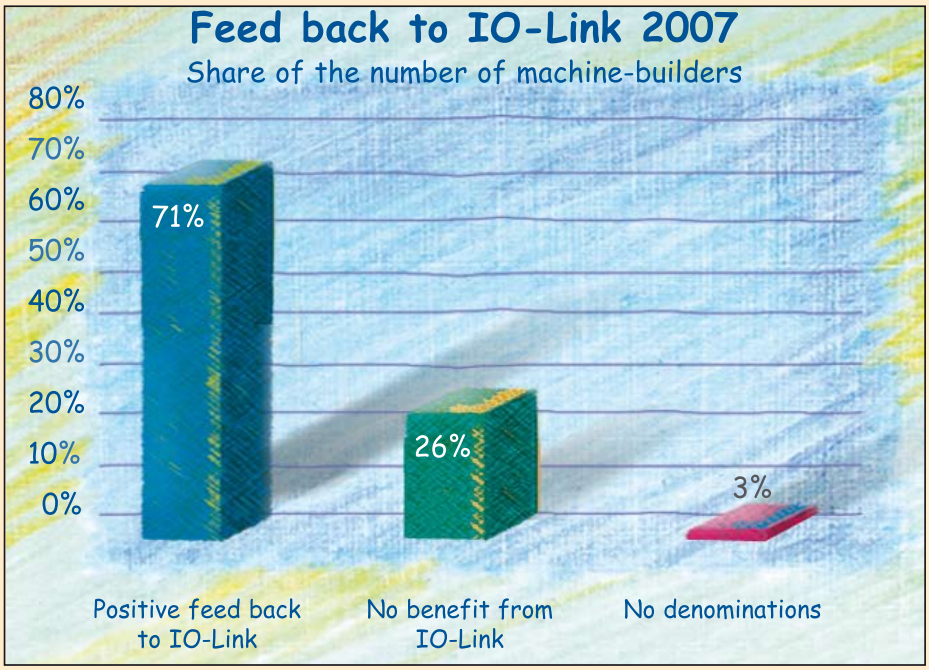
❖ IO-Link is mechanically and electrically compatible to the today's 2/3 wiring of sensors and actuators.

❖ By IO-Link you can transfer the signals for diagnostics and parameter settings of single- or multi-channel binary or analogue sensors via one and the same type of cable (=unscreened standard cable) saving additional effort.

These features lead to basically three benefit aspects for the machine builder:

1. For diagnostics and parameter setting of sensors the existing point-to-point connexion is adequate. All additional installations are omitted.
2. IO-Link saves the analogue boxes of analogue sensors.
3. No additional wiring effort, no screened cables because IO-Link uses the unscreened point-to-point connexion.

Positive feedback to IO-Link



71% of the machine-builders answered with positive feedback.

26% did not see any starting point.

We are going to present the spectrum of opinion of the machine-builders based on typical statements. First the positive statements.

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Diagnostics and parameter setting without additional wiring effort is important

Machine-builders take up this benefit aspect.

❖*"That the simple point-to-point connexion is adequate for diagnostics and parameter setting, was the purchase-crucial point to IO-Link that became also part of our product specifications."* (Packaging machines)

❖*"Analogue sensors, cameras and colour recognition sensors are in use. That one can use diagnostics and parameter setting without additional wiring, is a reason to introduce IO-Link. Because one wants to use intensified remote maintenance. One wants to have first discussions about IO-Link on the Nuremberg SPS/ Drives fair getting informed more accurately."* (Packaging machines)

❖*"One is carefully intensifying those sensors that serve the preventative maintenance, the lowering of maintenance costs among other things… One will change to IO-Link with new machine types. The current series cannot be adapted because of the good order situation…There are no analogue boxes with analogue sensor because the AD-transducer is integrated but one uses screened cables. These cables could be substituted by unscreened cables with IO-Link."* (Machine tools)

Integration into the control world is important

The machine-builders evaluate the integration of IO-Link into the control world as an important point.

❖*"IO-Link has been intensively checking. Important is the integration into the control world. Because an IO interface is needed to connect this to Profibus and Profibus to the control system."* (Machine tools)

❖*"We completely agree with IO-Link and would like to introduce it, however, the control providers must go along with IO-Link. One would like to consider IO-Link already in the circuit diagram."* (Machine tools)

IO-Link requires customer acceptance

Machine-builders that have to consider specifications emphasise the need of customer acceptance.

❖*"One builds about 7 new plants per year particularly for the car industry. If this industry agrees with IO-Link, one will use it, if not then not."* (Conveyor)

❖*"One would like to inform about IO-Link and then speak to the customers checking their acceptance to IO-Link. Then further decisions can be made." (Packaging machines)*

Waiting for a complete product range to IO-Link

In order to achieve the benefit of IO-Link, machine-builders pay attention to an unified and market-broad supply.

❖*"That might suit us! One would like to inform more in detail and wait for the product development of the sensor providers in order to completely implement IO-Link on a project."* (Machine tools)

❖*"IO-Link is a quantum transition one will only dare, if there are a sufficient number of providers. "* (Machine tools)

❖*"One might only implement IO-Link, if the product range is completed for all types of sensors by the providers."* (Packaging machines)

Pros and Cons to IO-Link

So far a selection from the statements with positive feedback partly referring to further aspects. We are going to turn now to critical or sceptical voices.

Machines are too compact for IO-Link

For very compact machines the manufacturers do not see enough benefit of IO-Link.

❖*"One builds compact machines with short wirings which means that there is no starting point for IO-Link"*. (Printing/paper handling machines)

❖*"At the machines there are 8 pressure and temperature sensors, however, the machines are very compact, the wirings are short and therefore, because of price reasons, IO-Link is not of interest."* (Rubber plastics machines)

Only basic sensors in use

If only basic sensors are used and this also only sporadically, one does not see any benefit of IO-Link.

❖*"IO-Link was checked and refused based on today's point of view. One has a standard that does not include the use of programmable sensors…"* (Packaging machines)

❖*"One uses sensors only in limited cases and then binary sensors as reference switch. Therefore one does not see a useful starting point for IO-Link"*. (Wood processing machines)

In-house solution or field buses preferred

❖*"One adapted its own concept to the own needs. A serial interface for thousands of I/O was customised adapted. One has already been watching the market for 20 years, neither found anything useful nor payable. Via in-house solution one can change parameters up to software downloads and process analogue values."* (Textile machines)

❖*"One has decided against IO-Link because one prefers to combine the field level at central points. On the one hand a simple wiring might be important, on the other hand one can combine the distributed points more simply by the own system. That is why the ways are not so long and this reduces the benefit effect."* (Robotics and automation)

❖*"One will not follow the path of IO-Link but is waiting for integrating the multi-channel sensors into EtherCat. Therefore the benefit of IO-Link is basically positive, however, for the application concerned not important." (Robotics and automation)*

Outlook

We are going to complete the pros and cons to IO-Link with a statement of a machine-builder who is checking new ways with the application of sensor technology.

❖*"With sensors one is being in transition. The number of sensors might be increasing in the future in order to realise quality improvements…In this context a unified wiring concept such as IO-Link might be of interest."* (Robotics and automation)

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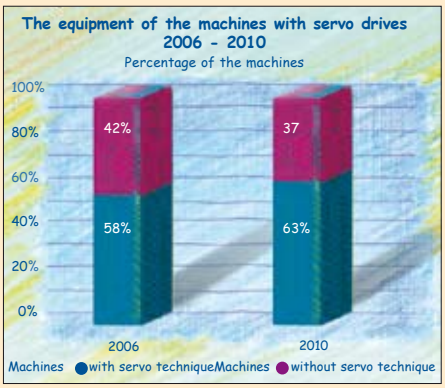
The Use of Servo Drives is growing to 2010

Comprehensive discussions with 20% larger machine-builders in the 11 automation-relevant sectors highlight the future of the use of servo drives to 2010. We briefly present how the servo drive will develop

More machines with servo drives and more servo drives per machine

The number of electronic drives at the machines will increase noticeably until 2010. The work horse of this development is the servo drive. Until 2010 the servo drive will be used with 63% of the machines, today this value is about 58%.



More machines with servo drives is at the same time connected with more servo drives per machine. To 2010 on the average 6 servo drives per machine will be used, at present these are 5,4.

Which reasons have the machine-builders for this development? The following typical statements inform about it.

"Trend in general to higher performance and dynamic"

❖ *"In the future one is going to partly substitute the FC by servo drives because the trend will generally go to higher performance and thus higher dynamics. The FC won't cope with."* (Building/glass/ceramic machines)

❖ *"The changes concern the increase of the proportion of the machines with servo drives because the customer requires more performance and higher speed."* (Building/glass/ceramic machines)

❖ *"In fact, the tasks are becoming ever more ambitious. Therefore the application of the servo drives will be intensified in the future substituting rather more FC at the conveyor belt drive… The use of servo-similar convertors is no topic because one needs the high performance of the servo drives. Therefore one would partly change the frequency convertors to servo drives."* (Printing/paper handling machines)

"Trend to higher process accuracy"

❖ *"Currently, one checks with the palletisers and packers whether frequency convertors should be substituted by servo-drives for a higher process accuracy. This aspect is not directly driven by price advantages."* (Packaging machines)

❖ *"The buffer zones between the processing stages are becoming ever smaller…This means that conveyor belts must be positioned as dynamically and accurately as the production process or synchronously to the production process. This requires a control performance, which cannot be provided any more by standard frequency convertors. Thus the servo drive substitutes the FC even at the conveyor belts."* (Packaging machines)

Servo drives substitute gearboxes

❖ *"The third change against this background is related to partial substitution of the FC by servo drives. Now the FC are often used with gearboxes. The substitution by servo drives with feed back means that one abandons the gearboxes. This saves space, the machine is working more precisely and its performance is increasing. Though this substitution is technically not mandatory, it will achieve the benefits mentioned."* (Packaging machines)

Trend to better uniformity

"The substitution of the FC by servo drives shall provide better uniformity with project engineering, thus cost saving." (Packaging machines)

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Servo drives and control intelligence

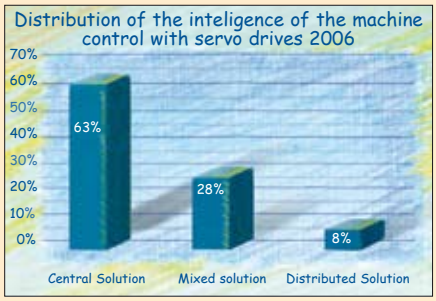
The control intelligence of the machines equipped with servo drives is subject to a noticeable change until 2010

Servo drives will be used intensified at the machines in the next years. As a consequence, the distribution of the intelligence of the superordinate machine control will not remain unaffected.

With the control systems of these machines, equipped with servo drives, we differentiate central and distributed control intelligence as well as mixed solutions. The central solution indicates a central CPU, the distributed interconnects several control systems at a machine by bus and finally the mixed solution combines central and distributed control intelligence at the machine.

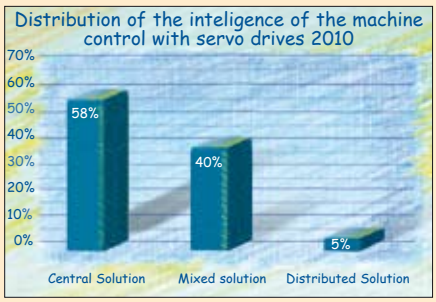
Central control intelligence dominates

Today the central control intelligence dominates. 63% of the servo potential is used at machines with central control intelligence.



Mixed solutions in the advance until 2010

Mixed solutions show the most dynamic development to 2010. 40% of the servo potential will be used at machines whose control intelligence is central and distributed.



Exclusively distributed control technology will lose ground in connexion with the servo application in the future.

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UP-TO-DATE SURVEY TO CHANGES OF THE AUTOMATION TECHNOLOGY

Changes in 2007 the machine-builders want to

Change ratio: 56%, previous year 51% · Ethernet-based field buses in the focus of the changes · Torque or linear drives increasing · PC technology grows dynamically · Just few changes of the drive or control suppliers.

56% intending changes

56% of the 300 interviewed machine-builders will change the automation technology this year.

That will concern

❖the change of the control technology
❖the use of other field buses or
❖the implementation of torque motors or linear drives or
❖the implementation of multi-channel sensors.

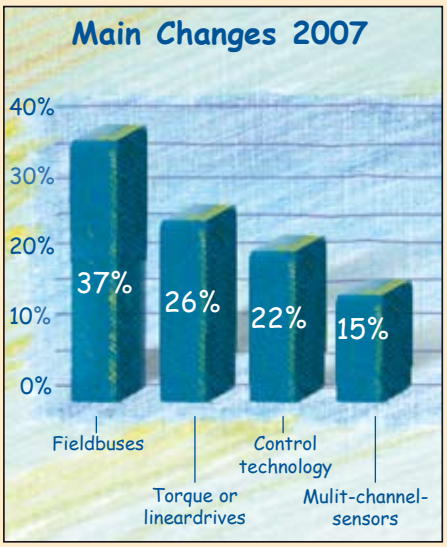
Which emphases the change-willing machine-builders are setting?

The ranking of the changes

Also this year changes of the field buses come to the fore. 37% of the change-willing machine-builders will use other field buses.

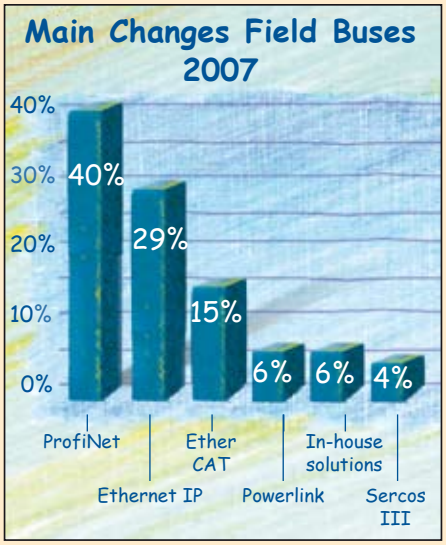
Ethernet-based field buses in the focus

75% of the machine-builders, that want to use other field buses, are going to intend to implement Ethernet-based field buses for the first time. ProfiNet takes the first position with 40% of these machine-builders, followed by Ethernet IP and EtherCAT.



ProfiNet and Ethernet IP grow particularly at the expense of Profibus and DeviceNet.

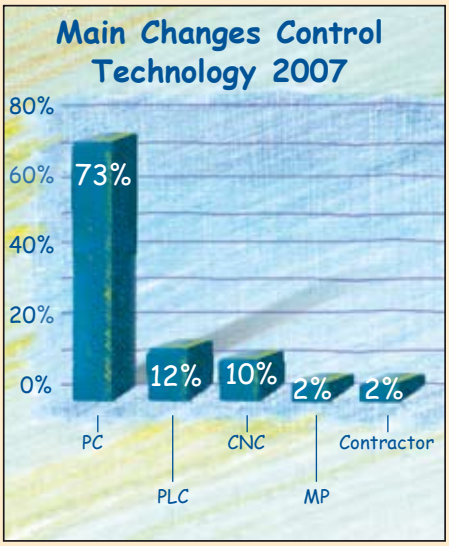
Torque and linear drives are up-to-date



26% of the change-willing machine-builders want to introduce torque motors or linear drives or to repeat a sporadic use this year. Partly high potentials are concerned. The emphasis is on torque motors. 67% of these companies will stay with their current supplier for these drives, 27% want to change the suppliers, 6% are still undecided.

PC is growing dynamically

Regarding the initial implementation of the control technologies the PC technology is ahead by a nose also this year. 73% of the machine-builders, that are willing to use other control technologies, decide for PC technology. The PLC is forced to bleed.



However, such changes concern relatively few machines this year because of the good situation concerning orders the time for replacement is limited. 52% of the machine-builders will buy changed control technologies from their current supplier, 43% want to change the supplier, 5% are still undecided.

Survey highly representative

Over 300 machine-builders, i.e. 46% of the companies with 100 and more employees in the 11 automation-relevant sectors, called their trends

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