

# TURCK editorial

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## Fieldbus systems in machine engineering –

The Dutch company CSI has decided to opt for piconet<sup>®</sup>  
PROFIBUS-DP I/O modules

CSI is a middle-sized Netherlands-based company that offers palletting, transport and robotic packaging systems to manufacturers of consumer goods, such as foodstuff and luxury goods. Great importance is attached to flexibility, reliability, user-friendliness and fast trouble-shooting and diagnostics.



As a company that takes pride in innovation and in reacting quickly and flexibly to market needs while facing ever growing competition, CSI has decided to apply and standardise novel electric and electronic components which account for 45% of the costs involved in the field of product handling.

A good example of the company's innovative approach is that CSI's palleting systems work with industrial PCs as the controlling unit. Thus faster response times are achieved and many standardised interfaces, such as Ethernet, may be employed.

The required field devices are connected via PROFIBUS-DP. Simple components, such as binary and analogue sensors or actuators, which hardly justify the expenses of an own separate fieldbus interface, are connected via the piconet<sup>®</sup> I/O modules.

There were many reasons for the company's decision to opt for piconet<sup>®</sup>. Alongside the cost saving potentials of bus systems, e.g. in installation and construction, that are widely recognised in the meantime, the following criteria were decisive for CSI's choice:

- the internal construction of the system

- simple and fast mounting and disassembly
- reduction of wiring problems
- due to the simple construction of piconet<sup>®</sup>, installations can be carried out by a mechanic
- simple localisation and elimination of errors

Let's first have a look at the internal structure of the system.

The palletizer is always the core of the system. Different product lines can be handled by the palletizer, the system automatically adapts to new palleting goods. Product dimensions may vary, ranging from 100 x 90 x 40 mm to 600 x 450 x 600 mm.

Different types of pallets can be handled without lengthy alterations of the palleting scheme. On average, one pallet per minute can be packed and provided for further transport. The relevant product data are read and can, if required, be used for follow-up purposes to facilitate world-wide distribution.

The system's availability corresponds to 99.5 %. Peripheral components are integrated both in the product handling area and in pallet transport and stacking section. The structure of both sections is strongly influenced by customer-specific requirements and can thus not be standardised. They differ in size, construction and functionality. Conventional installation technology is demanding and laborious.

If, for example, the mechanical construction has to be altered, the electrical installations have to be adapted. New and longer cables are needed. Terminal boxes, which are an additional source of error, are frequently used for connections and have to be checked carefully during system setup.

If, for example, system functions have to be changed, this is automatically accompanied by

- installation of further field devices
- laying of new cables, which may mean that new cable ducts have to be installed
- extensions of the wiring cabinet or installation of new cabinets

Here, bus systems such as piconet<sup>®</sup> demonstrate their strengths. Extensions and function changes can be implemented easily. Additional cables are not needed, because field devices are connected either directly to the bus or via I/O modules, merely the bus and power cables have to be laid.

This is done quickly and easily, because, especially with a system such as piconet<sup>®</sup>, all connections are accomplished with standardised connectors and thus electric lines need not be split. Electrical installation work in the wiring cabinet is also reduced, because usually extra components are not needed.

Another important aspect is the system's production time. Today, mechanical engineers have ever-less time for construction of the machine. Sometimes there are no more than eight months or even less time between quotation and delivery.

In this period, customer specific requirements have to be integrated in the basic concept and the system has to be designed and constructed. The deadlines are unrelenting. Bus systems can remedy this situation. Individual components can be integrated more quickly during construction and circuit diagrams are less complicated and easier to read.

**The degree of protection:** All components feature protection degree IP67, so that a field housing or cabinet is not needed for installation. Mechanical construction of the system is simplified considerably, saving money, space and time.

**The size:** I/O modules, sized 3 x 17.5 cm only, can be placed anywhere without having to make cumbersome changes to the construction. There is always enough space for new modules if the system is to be extended or functions have to be altered.

**The I/O configuration:** The spectrum ranges from modules for connection of 4 or 8 binary 24 VDC sensors or actuators to 4-channel modules with analogue interfaces ( $\pm 0...10V$ ,  $0...20mA$ , PT100, thermo-elements) to modules with serial interfaces or types for connection of encoders. Thus, even the construction of complex system, is made child's play.

**Maximum system expansion:** The system can be extended internally by up to 120 I/O modules. Connections are established with fibre-optic cables. Thus, up to 1,000 I/O are available under a single bus address (depending on the kind of bus system used).

Problems, which are usually caused by the limited number of available addresses and occur frequently with some bus systems, are minimised significantly. When using PROFIBUS-DP more than 100,000 I/O points can be connected via a single master (provided the master has such a capacity).

**The connection technology:** All connections, ranging from the bus through the power supply to the inputs and outputs are plug-in connections featuring protection degree IP67. The bus is always connected via components prescribed by the respective user organisation or standard.

For PROFIBUS-DP, standard M12 connectors are specified by the PNO for IP65/67 installations. The power supply is connected via miniature M8 connectors and the inputs/outputs feature a choice of M8, S8 or M12 connections. TURCK offers a complete programme of premoulded connector systems in different cable qualities, ranging from simple PVC to irradiated PUR types.

The impact of this technology on electrical installations is considerable. Potential installation errors are reduced.

Moreover, installations may be carried out by a mechanic because terminal wiring of cables, that always leads to errors, is replaced by simple plug-in connection technology: **"Plug and Play"** is the motto.

All the exacting installation work, such as stripping the insulation, attaching wire sleeves, actual wiring, conductor identification, marking and testing, has become superfluous.

Diagnostic indications: All modules provide LED indications of the bus, the power and the I/O status. This simplifies diagnosis significantly and, quite often, errors can be detected directly in the field. With plug and play connection technology, faults can be repaired quickly and safely.

### **Bob Beerta, Marketing Manager, situated in Raamsdonksveer at the CSI**

#### **headquarters, comments on piconet®:**

"It combines the advantages of fieldbus systems with the benefits of simple connection technology based on connectors and premoulded cables.

On-site setup, testing and approval by the customer is facilitated enormously. After initial testing, the systems are dismantled, re-installed at their final destination and taken into operation. Formerly, experienced electricians had to be on-site because all the electrical installations had to be re-wired and field-tested.

Today, the entire construction is done by the mechanical staff; electricians are only needed for very few jobs, such as actual system setup. With piconet®, system set-up and disassembly times are a lot shorter. We do not yet have exact figures, but we expect cost savings corresponding to multidigit percentages."

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