Industrial automation

EtherCAT.

PROFI NET®

IO-Link

CANopen

Modbus-RTU
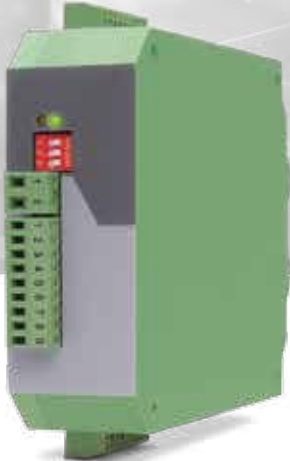
Contents

SAFETY RELAYS

Safety Speed Monitors

with **SIL3 PLe** Safety Function and **SIL2 PLd** Safety Function certification

The safety of man and machine in production processes is the top priority, we guarantee for that with our speed monitors!
Fullfilling the highest security standards, our devices offer maximum protection. These safety standards are verified by a double certificate
EN 61508 and ISO 13849 by TÜV Nord.

The focus of our safety relays is on monitoring movement sequences such as speed, standstill, direction of rotation and position.
In order to implement further control and regulation purposes, our safety devices offer signal feedback via analog output as a special function. A signal splitter is also
integrated in the devices, enabeling easy integration into existing sensor cables during retrofitting. The speed monitors of the DS series
are used both in new systems and in the cost-efficient modernization of old systems.

For large system projects, our plug-in operating module offers an efficient way of transfering already parameterized device data,
to other monitors quickly and easily using the copy-paste function.

In addition to our certified high-end devices, we also offer cost efficient monitoring modules as an alternative for applications without
a certificate requirement.

TÜV NORD
TÜV NORD CERT GmbH
Approved Safety Function

EN ISO 13849-1
EN 61508
EN 62061
PL 'e'
SIL 3
SIL_{CL} 3

- Monitoring of overspeed, underspeed, standstill or direction of rotation
- SIL3 / PLe or SIL2 / PLd certification
- Safety functions equivalent to EN 61800-5-2
  (SS1, SS2, SOS, SLS, SDI, SSM, SLI, SBC, STO, SMS)

Device Types

- Speed monitor for SinCos sensors

  1-channel for certified sensors
  Encoder systems: certified SinCos encoder

  2-channel for standard sensors
  Encoder systems: incremental encoder, proximity switch, SinCos encoder

- Speed monitor for incremental sensors

  1-channel for certified sensors
  Encoder systems: certified incremental encoder

  2-channel for standard sensors
  Encoder systems: incremental encoder, proximity switch

Technical Data

			Encoder systems	Encoder interface	Control inputs [HTL / PNP]	Input frequency up to	Forced-guided redundant relay contacts (NO)	Control outputs short-circuit-proof, [HTL / push-pull]	Analog output 4 ... 20 mA (safety related), 14 Bit	Signal distributor	Security level
⊓ ∿	DS230	Safety speed monitor 2-channel for SinCos encoders or 2-channel for SinCos and incremental encoders	2	HTL / TTL / SinCos	4	500 kHz	1	4	1	2 TTL AND SinCos	SIL3 PL e
⊓ ∿	DS236	Safety speed monitor 2-channel for SinCos encoders or 2-channel for SinCos and incremental encoders	2	HTL / TTL / SinCos	4	500 kHz	1	4	1	-	SIL3 PL e
∿	DS240	Safety speed monitor 1-channel for SinCos encoders	1	SinCos	4	500 kHz	1	4	1	2 TTL AND SinCos	SIL3 PL e
∿	DS246	Safety speed monitor 1-channel for SinCos encoders	1	SinCos	4	500 kHz	1	4	1	-	SIL3 PL e
⊓ ⊓	DS250	Safety speed monitor 2-channel for incremental encoders	2	HTL / TTL	8	500 kHz	2	4	1	1 HTL OR TTL	SIL3 PL e
⊓	DS260	Safety speed monitor 2-channel for incremental encoders	1	HTL / TTL	8	500 kHz	2	4	1	1 HTL OR TTL	SIL3 PL e

Our Classics

- Safety monitors for incremental encoders / sensors

  Monitor for speed, direction of rotation and standstill with start-up suppression
  Output configuration: control and analog outputs and relays

- Monitor for direction of rotation and standstill

  Variable setting options
  Output configuration: 2 control outputs, 2 relays

- Monitor for safe and redundant monitoring of two drive trains

  Logical linking of the target states by using a selection matrix
  Permanent actual value recording on both encoders
  (speed, direction of rotation, standstill, actual position, position difference)
  Output configuration: 4 control outputs, 4 relays

- Monitor for safe and redundant monitoring of one drive train

  Monitoring of misalignment, shaft fracture, torsion, slip
  Output configuration: 4 control outputs, 4 relays

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Applications

Load monitoring

The most important safety aspects in the area of crane monitoring are the monitoring of the winding and unwinding speed and the safe standstill monitoring of the hoist rope. Especially when it comes to great heights, e.g. with tower cranes, it is also possible to monitor the wind speed. Thereby a unintentional and dangerous swinging of the load is prevented.

In the operation of cable cars, the safety of passengers is of pramount importance. In order to guarantee safe transport, unintentional opening of the doors must be ruled out. So the door locking is monitored by safety relays while driving. In addition, if a predefined overspeed is exceeded, which indicates an uncontrolled movement of the cable car, an emergency stop of the cabine is triggered.

Monitoring cable car / chairlift

Turbine monitoring

In turbines, kinetic energy is generated by gas or fuel. To ensure that the turbine is not damaged by the resulting rotation, it is essential that the speed does not exceed a predefined range. In addition, standstill during maintenance is reliably monitored. This ensures the safety of people working on the turbine.

In modern production facilities and storage systems with AGVs (Automated Guided Vehicles) an autonomous monitoring of the movement sequences is required. Depending on the material to be conveyed, the predefined maximum speed is monitored and, if it is exceeded, an emergency stop of the conveyor unit is carried out. Within the parking position, the drive units are deactivated by the speed monitor and only activated again with an external release.

Monitoring AGV

Rotation monitoring

With safe speed monitors it is possible to monitor the rotor speed as well as the direction of rotation or standstill in wind turbines. Among others, an overload of the system can be detected and damage to the generator can be prevented. If the limit values are exceeded, the rotor blades are turned out of the wind and the standstill is ensured. This is the basis for a safe working environment for maintenance personnel.

Escalators transport large numbers of people around the world every day. Therefore safety relays ensure a constant speed of the escalators. In order to enable safe transport, the safety speed monitor prevents the drive from rotating too fast while the vehicle is in motion. In the case of revisions and an activated emergency stop, standstill is also guaranteed without exception.

Monitoring escalators

Monitoring of amusement ride

In amusement parks and at folk festivals, countless people rely on the safety of the rides they visit. Safety relays ensure smooth operation in a wide variety of drive units. The speeds of the attractions are reliably monitored and a safe and fun experience is guaranteed.

Most of today's production processes run quickly and fully automatically. Nevertheless, it cannot be completely ruled out that intervention by specialized staff is required. In order to enable safe intervention for maintenance and repairs, speed monitors prevent the system from starting up uncontrolled when the maintenance door is open.

Monitoring sawing / grinding plant

DIGITAL INDICATORS

Digital- and touchMATRIX® Indicators

Our unique touchMATRIX® indicators are widely used in industry as Smart HMI. Due to the different versions for analog, pulse, absolute value and strain gauge sensors, the areas of application are limitless. All important parameters of rotary and linear processes are measured, evaluated, monitored and displayed.

For integration into Industry 4.0, the devices are equipped with common interfaces such as Profinet, Ethernet, EtherCAT or IO-Link and thus guarantee a high level of data exchange with higher-level systems. With flexible expansion options, the devices can be adapted to a wide variety of requirements.

From a technical point of view, the indicator series impresses with its very high dynamics, short response times and input frequencies of up to 1 MHz. Unique on market is the three-color touchscreen graphic display, which enables simple and intuitive parameterization. The colors can be switched depending on the event. This offers in combination with the bright and high-contrast display a maximum of clarity and readability for the user.

The indicators of the touchMATRIX® series are primarily used as decentralized evaluation systems or on-site displays.

Ready for Industry 4.0
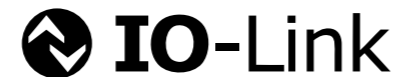
Device Types

- Process indicator with analog input

  Sensors: analog sensors ± 10 V or 0/4 ... 20 mA
  Measured variables: inclination (inclinometer), length, acceleration, pressure, flow rate

- Incremental indicator for frequencies up to 1 MHz

  Sensors: incremental encoders, light barriers, proximity switches, linear scale
  Measured variables: speed, frequency, length, quantity, time

- Position indicator for SSI absolute encoder

  Sensors: absolute encoders, absolute measuring systems, magnetoresistive sensors
  Measured variables: position, length, angle

- Position indicator for transonic distance measurement

  Sensors: magnetoresistive sensors, linear scale
  Measured variables: position, distance

- Process indicator with strain gauge input

  Sensors: pressure cells, force sensors, load cells
  Measured variables: compression, tensile and bending forces, weight

- Fieldbus indicator

  Interface: Profinet, EtherCat, Ethernet IP

- IO-Link indicator

  Interface: IO-Link Device V1.1

Technical Data

- Tricolor graphic display with 186 x 64 pixel
- Intuitive and easy parameterization through plain text and touchscreen
- Bright and high-contrast display with event-dependent color variations

- 4 preset / limit values
- Numerous functions: scaling, filter, start-up suppression
- Linearization with 24 control points
- Freely editable symbols and units

- Panel housing (w x h x d) 96 x 48 x 116 mm / 3.78 x 1.89 x 4.56 inch
- Protection class IP65

- Power supply 24 VDC

Options (combinable):

- AC: device supply with 115 - 230 VAC
- AO: 16 bit analog output, 4 control outputs, serial RS232 interface
- AR: 16 bit analog output, 4 control outputs, serial RS485 interface
- CO: 4 control outputs, serial RS232 interface
- CR: 4 control outputs, serial RS485 interface
- RL: 2 relay outputs

			Signal inputs	Signal formats	Optional interface
	AX350	Process indicator with analog input	2	Analog (V, mA)	Modbus-RTU
	DX350 DX355	Electronic counters / tachometer (input frequency up to 1 MHz)	1	Frequenz (HTL, TTL) OR Pulse (HTL, TTL)	Modbus-RTU
	MX350 MX355	Combi counter / tachometer (input frequency up to 1 MHz)	2	Frequenz (HTL, TTL) AND Pulse (HTL, TTL)	Modbus-RTU
SSI	IX350 IX355	Position indicator for SSI	1	SSI (DATA, CLOCK)	Modbus-RTU
Start-Stop	DP350	Position indicator for transonic distance measurement	1	Transonic (start-stop, init)	Modbus-RTU
DMS	DM350	Process indicator with strain gauge input	1	Strain gauge (mV / V)	Modbus-RTU
	PN350	Profinet indicator	1	-	PROFI NET
IO-Link	AX350/IO	IO-Link indicator	2	Analog (V, mA)	IO-Link

Our Classics

- **7 segment indicator**

  Incremental and SSI inputs
  up to 4 thumbwheel switches
  6 decades or 8 decades with
  15 mm and 10 mm digit height

- **7 segment miniature indicator**

  Analog and incremental input
  5 decades with 8 mm digit height
  Compact housing 48 x 24 mm / 1.889 x 0.945 inch

- **7 segment CAN Bus indicator**

  CANopen with SDO and PDO
  6 decades with 15 mm digit height

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Applications

Speed
Flow

The motrona tachometers record rotational speeds, of e.g. centrifuges, generators, wind turbines or grinding machines. Another application is monitoring the speed of axes, shafts and rollers.In addition to the rotary movements, the devices are also used for the line speed used on conveyor belts, extrusion lines and printing machines. This makes it easy to visualize production speed and operational throughput.

Lead time
Process time

By measuring the line speed and a given length our counters can continuously calculate the throughput time. In this way, e.g. drying or baking times can be easily set and monitored on feed or drying ovens, baking, painting or cooling lines.

Quantity
Production output

With the help of proximity switches, photocells or light barriers, quantities are measured and production output is determined by electronic counters. These apply especially on production lines, like filling and packaging systems. Here the number of products, required to fill a packaging unit, will be counted. Then the counter re-starts automatically and counts until the next unit is complete. A special area of application is also the recording of visitor numbers.

Position
Length

At automatic cutting machines, e.g. for cables, steel pipes and profiles, the absolute material length is displayed and measured up to a predefined value. When the target length is reached, a saw impulse is triggered to cut the material. After the cutting process, the length detection starts again. The detection of positions is another field of application for these devices, which is used in testing and measuring tables. This also applies to all types of processing machines such as saws, milling machines with feed, punching, cutting and grinding machines.

In production lines with endless material, depending on the adjustable material thickness the roll circumference and diameter can be calculated automatically with each full rotation. A precise visualization of the cutting length is also possible in following cutting processes. There is no difference whether it is thick sheet steel, cable, paper or very thin foil.

Circumference
Diameter

To determine measured values such as heights and angles, absolute measuring systems are used in combination with a position indicator. Position measurements are used to record the heights, e.g. for scissor lifts and lifting platforms, elevators, gate systems and mobile automation. Further application areas are the alignment monitoring of wind turbines, solar panels, crane systems as well as processing and rotary tables. In addition, the angles of inclination in testing systems, bending machines, setting angles, stops and locks can be monitored.

Height
Angle

In combination with suitable load cells, our strain gauge indicators record tensile, compressive or bending forces. In weighing, dosing and crane technology as well as in warehouse logistics, load monitoring is an important task to ensure correct and safe work processes. For processing machines such as presses or punches and in strength testing, force measurement is central in ensuring a smooth process.

Weight
Force

In the process industry, volume changes such as compression and expansion, e.g. in compressors, hydraulic units, gas turbines, biogas plants are determined. By using flow sensors, filling processes in filling / dosing systems can also be visualized, and the filling level of tanks and silos can be determined.

Pressure
Level

MOTION CONTROLLER

Universal Motion Controller

Our motion controllers are implemented in numerous applications in the field of modern drive technology.
The existing firmware library includes optimized routines for typical applications such as:

- Electronic drive synchronization
- Index and print mark control
- Rotating cross cutters
- Flying saws
- Eccentric shears
- Intermittent label printing machines
- Tubular bag packing machines
- Winding and laying machines

Each firmware can be parameterized easily and individually and thus quickly adapted to a wide variety of requirements.

The motion controllers impress with a very high frequency limit of up to 2 MHz, an extremely wide bus architecture as well as a variable input
configuration of encoders and sensors. This enables a high degree of flexibility and integration in various systems.
Unique feature of the MC800 drive controller is the integrated tandem drive controller which allows achieving the acceleration requirement of a slave axis by splitting the
power to two independent drives.

Device Types

- **Motion controller for up to 4 axes**

  Number of following axes cascadable

  Interface for CANopen, Modbus RTU

  Firmware options for various applications:
  Synchronization, flying operation, rotary material processing,
  eccentric material processing, tubular bag machine,
  winding and laying applications, printing and punching, position control

- **Motion controller for up to 2 axes**

  With integrated tandem drive controller

  Optional interface modules for CANopen, CC-Link, DeviceNet, EtherCAT, Modbus TCP,
  PROFIBUS, PROFINET, PROFIsafe, SERCOS-III, Ethernet / IP, Powerlink, Modbus RTU

  Firmware options for various applications:
  Synchronization, flying operation, rotary material processing,
  eccentric material processing, winding and laying applications,
  printing and punching, position control

Technical Data

			Control Inputs	Signal formats	Outputs	Interfaces
	BY340	Synchronization	2	Position / Frequency (HTL, TTL)	Analog (V, mA), 4 Transistors	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	BY641	Synchronization	2	Position / Frequency (HTL, TTL)	Analog (V, mA), 4 Transistors, 4 Relays	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	FS340	Flying operation	2	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	FS641	Flying operation	2	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors, 4 Relays	Modbus RTU, Printer CR/LF Drivecom DIN ISO 1745
	CT340	Rotary cross cutter	2	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	CT641	Rotary cross cutter	2	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors, 4 Relays	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	MC700	Synchronization Flying operation Rotary cross cutter	4	Position / Frequency (TTL) Analog (V, mA)	Analog (V, mA) 8 Transistors, Position / Frequency (TTL)	CANopen RS232 / RS485, Printer CR/LF Drivecom DIN ISO 1745
	MC800	Cut-to-length shears Tubular bag machine Winding and laying Printing Punching	3	Position / Frequency (HTL, TTL) Analog (V, mA) SinCos (1 Vss)	Analog (V, mA) 4 Transistors Position / Frequency (HTL / TTL)	EtherCAT, Ethernet / IP, Modbus TCP, Powerlink, PROFINET, SERCOS-III, CANopen, Modbus RTU, Profibus DPV1, CC-Link, DeviceNet, RS232 / RS485 , Printer CR / LF, Drivecom DIN ISO 1745
	PS340	Position control	1	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors	RS232 with Printer CR/LF Drivecom DIN ISO 1745
	PS641	Position control	1	Position / Frequency (HTL, TTL)	Analog (V, mA) 4 Transistors, 4 Relays	RS232 with Printer CR/LF Drivecom DIN ISO 1745

Our Classics

- Control for one following axis

  Analog output

  4 transistor outputs

  PROFIBUS-DP connection possible

  Firmware options for various applications:
  Synchronization, flying operation, rotary material processing, position control

- Control for one following axis with 4 relays

  Thumbwheel switches

  Analog output

  4 transistor outputs

  PROFIBUS-DP connection possible

  Firmware options for various applications:
  Synchronization, flying operation, rotary material processing, position control

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Applications

Rotary material processing

Motion controllers allow rotary cross cutters to be precisely synchronized with the material speed. A rotary encoder transmits the frequency to the controller, which regulates the drive of the cross cutter. By sensors at the cutting tool, the process is constantly monitored and controlled. Accurate cuts can thus be made in highly dynamic processes, such as cutting corrugated cardboard.

In tubular bag machines drives are placed at various points, e.g. at the conveyor belt of the products, at the feed of the foil and at the cutting tool. The motrona motion controllers synchronize the cutting tool and the conveying speed of the products and, depending on the product size, a precise cut is made at the sealing. In addition, the contents of the tubular bag can be monitored to ensure an accurate packaging process.

Tubular bag

Index multi-axis synchronization (print)

In industrial applications such as printing, punching and labelling, up to four axes can be synchronized. By means of print marks, the various axes are precisely synchronized, so that the printed images are superimposed without any offset. Precise control of all axes is therefore essential for a high-quality result.

In order to synchronize two conveyor belts the motion controllers work according to the master-follower principle. The movement sequences are passed on from the leading drive (master) to the controller, which controls the following drive. So the second drive follows the specified movement profile exactly and without phase loss. This electronic line shaft is primarily used in highly dynamic production processes.

Electronic drive synchronization

Flying operations

Motion controllers are used in on-the-fly processing, such as cutting steel tubes, profiles or aluminum plates. The saw blade moves synchronously with the material to be cut. The movement depends on the feeder roller or a measuring wheel, from which the motion profile is transmitted to the controller via a sensor. So a high-precision cut can be guaranteed, even with high dynamics.

Various positioning tasks are feasible with the motion controller. One example is the cyclic movement of endless material to a fixed predetermined position. The stopped material can then be cut to size. The controller regulates the feed drive and guarantees that the sheet size is always exactly the same.

Index and print mark control

Eccentric shear

Eccentric shear systems require the horizontal speed of the cutting tool to be synchronous to the material at any time of the penetration of the tool, whereas outside of the penetration zone, it is the cutting length and the active radius of the rotation that determine the speed profile. A quick computation is essential for precise handling and to prevent blocking. A sensor on the drive provides position feedback and ensures great accuracy.

Motion controllers are used to correctly wind or unwind cables, wires or other materials on reels. The task of the controller is to keep the web tension constant and to adjust the winder or feeder roll to the speed of the material. In the case of winding tasks, the controller also regulates the traverse carriage depending on the web speed and the current winding layer. Thus, the device moves transversal to the roll and places each layer of cable evenly over the previous.

Winding / Laying

SIGNAL CONVERTER

Signal Converters - Signal Distributors - Gateway
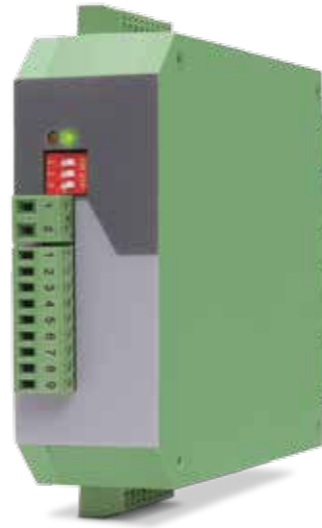
Our signal converters have already proven themselves in industrial automation technology for many years.
With different versions for analog, frequency, incremental, SSI, parallel, transonic, SinCos and strain gauge signals, the connection options are almost unlimited.
The most common signal types can be connected, processed and converted.

In addition to their high flexibility, the signal converters impress with their extremely short conversion times and high limit frequencies. Moreover, the devices offer many additional functions such as a programmable linearization, digital filter or window function. Besides the parameterization with our free user software, there is also the option of making settings and scaling using DIL switches.

For applications that require signal distribution, multiplication or processing, our signal converters, frequency multipliers, pulse dividers, level converters and measuring amplifiers are used.

Device Types

- Level converters (HTL, TTL, RS422)
- Encoder splitter, Impulse splitter
- Frequency divider / multiplier
- Fiber optic transmitter (HTL, TTL, SSI)
- Signal converter / Gateway with ...

  Frequency input (HTL, TTL)

  Analog input (V, mA)

  Strain gauge input (mV/V)

  SSI- or parallel input

  Start-stop input

  Impulse input (HTL, TTL)

  SinCos input (1 Vss)

  IO-Link interface

  Profinet interface

Technical Data

			Signal inputs	Signal format input	Signal outputs	Signal format output
SSI / Start-Stop	FU210 / FP210 IV210 / IP210 PV210 / PP210 ZU210 / ZP210		1	Frequency (HTL, TTL) SSI (DATA, CLOCK) Transonic (start-stop, init) Impuls (HTL, TTL)	1	Analog (V, mA) OR Parallel (BCD, Binary, Gray-Code)
DMS / SSI	IO220 IO221 IO222 IO223 IO224	Signal converters	1 1 1 1 4	Analog (V, mA) Analog (mV/V) Frequency (HTL, TTL) SSI (DATA, CLOCK) all formats mentioned	1	IO-Link
	UZ210		1	Analog (V, mA)	2	Frequency (HTL, TTL) Position (HTL, TTL) SSI (DATA, CLOCK)
	SV210		1	SinCos (1 Vss)	4	Pulse (HTL, TTL) SinCos (1 Vss)
	IT210 FM210 FM260	Frequency dividers / -multipliers	1	Frequency (HTL, TTL) Position (HTL, TTL)	1	Frequency (HTL, TTL) Position (HTL, TTL)
DMS	DM222 DM221	Measuring amplifiers	1	Analog (mV/V)	2 1	Analog (V, mA)
	GV / GT222 GV / GT224 GV / GT228	Signal splitters	1	Frequency (HTL, TTL) Position (HTL, TTL)	2 4 8	Frequency (HTL, TTL) Position (HTL, TTL)
	PU210	Level converters	1	Frequency (HTL, TTL) Position (HTL, TTL)	1	Frequency (HTL, TTL) Position (HTL, TTL)

Options for GV series:

quickly and easily expandable via bus connector

GV228/EV
- with expansion modul EV224 up to 12 outputs
- with expansion modul EV228 up to 16 outputs

Options for GT series (electrical isolation):

quickly and easily expandable via bus connector

GT228/ET
- with expansion modul ET224 up to 12 outputs
- with expansion modul ET228 up to 16 outputs

Our Classics

- **Level converter**

  Max. input frequency 200 kHz
  Conversion from HTL to TTL/RS422
  Conversion from TTL/RS422 to HTL

- **Fibre optics**

  Max. input frequency 1 MHz
  Transmission of signals up to 3000 m
  Possible signal forms HTL, TTL, SSI

- **Impulse splitter**

  Max. input frequency 750 kHz
  2 cascadable pulse outputs
  For incremental signals

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Applications

Vision systems

In highly automated factories, all subsystems must be precisely coordinated. In production lines the inspection system must be synchronized with the line speed. A frequency multiplier provides the appropriate pulse width for the camera system. This triggers the camera at the right moment to record the product correctly. Overview pictures of large objects can be composed by using several individual images.

Hydraulic presses

Load cells or force sensors are generally used to monitor forces such as tension, pressure, bending and torsion. The sensors have a very small signal amplitude in the mV range. To be able to process these measured values, strain gauge measuring amplifiers are used, which amplify and convert the signals for subsequent devices.

Signal transmissions over long distances

Electrical signal transmission reaches its limits in large systems such as wind turbines or locks. Fiber optics enable interference-free and loss-free signal transmission. The arrangement consists of a transmitter, a receiver and a multimode fiber optic cable. The transmitter converts electrical signals into optical light pulses and transmits them over a distance of up to 3000 meters. These light waves are converted back into the original electrical signal form by the receiver.

Drive synchronization

Frequency to analog converters can be used for simple synchronization tasks. The converter calculates the frequency of an axis and and passes on this as a scaled analog value to a slave drive. As a result, this drive is adjusted to the speed of the primary axis and therefore the two axes are synchronized.

Robotics is a highly complex and high-tech field. It is possible that several drives require the same signal for their function. For this purpose, signal distributors can record a sensor signal, split it without loss and distribute it to the robotic drives. In addition, these signals can be passed on to subsequent devices such as displays, speed monitors and controls.

Signal distribution in robotics

During retrofit, old components of a system are replaced with new ones. Compared to a new system, the advantage of retrofit are the significantly lower costs. It is used for maintenance and modernization to increase efficiency. A common problem is that new and old machine units work with different input and output signals. Incompatible devices can be connected with signal converters.

Signal adjustment for retrofit

Many different devices work together in large plants. Different communication and signal forms are necessary to enable their complex functions. However, it happens that not all controls and regulators are able to communicate with each other. Signal converters form the link between the various participants. The converters connect the various signal forms so that the individual modules merge into one functional unit.

Signal conversion in production lines

A basic requirement for Industry 4.0 is a consistent communication system for all participants. Examples of such standardized communication systems are PROFINET or EtherCAT. Gateways enable the connection of devices and sensors of the lower process level. Process data is recorded via the inputs, calculated, evaluated and forwarded to the control level via the Ethernet interface.

Signal processing for Industry 4.0

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