Intelligent performance:
Components for advanced intralogistics

PULSE ROLLER

Intelligent performance:
Components for advanced intralogistics

PULSE ROLLER

Senergy Ai

The ingenious motor roller When it comes to throughput and reliability of drives for roller conveyors, solid mechanical design and versatility of controls are of equal importance. Exactly here Pulse Roller defines a new standard with its Senergy Ai – proven in practice ready for future applications.

Senergy Ai is a motorized driven conveyor roller with integrated 24 V DC brushless motor and a planetary gear box. Representing the optimal way to drive any type of intralogistics conveyor installation. With its self-contained design Senergy Ai is a maintenance free drive unit which operates very quiet and energy conservative.

Based on a long stack high torque motor, Senergy Ai has a significant high startup torque. Especially in roller curves and every other critical application this additional torque is an excellent benefit to let conveyors operate very reliable. To handle high torque, the planetary gear box is designed with specific emphasis on longevity incorporating a cage design for the individual stages.

Senergy Ai is the first external commutated motor roller which is connected to its controller by a reliable and proven M8 standard connector. This technology is patent pending. Hall-Effect signals are coded inside the motor by a µ-controller, which makes it possible to communicate them through only one pin to the external motor controller. Additionally to that motor temperature is measured inside the motor and transmitted to the external controller for analyze. This ensures that the motor temperature does not reach critical limits. Real temperature measurement has significant benefit to heat models because it takes environmental conditions into consideration.

Serial number, article number and manufacturing date is also stored on the internal memory for later retrieval by the external controller.

BENEFITS

- Reliable conveyor operation
- Increased throughput
- Precise positioning
- Excellent longevity
- Remote visitility and diagnostics

FEATURES

- Brushless 24VDC motor
- External motor controller
- High overload capacity
- High starting torque
- 4-pin M8 standard connector
- Internal Data memory
- ETL listed C/US | CE
- IP54/66/69K

Senergy JST-B

Reliable transport – safe stop As far as safety-relevant holding brake function on ascending or descending conveyors is concerned, the Senergy JST-B is the optimal motor roller. A mechanical holding brake, which is automatically closed when no power is applied, holds any conveyed good securely in position.

Senergy JST-B is a motorized roller with an integrated brushless 24VDC motor with spring-loaded brake. When the engine is switched off, the brake is automatically activated and reliably prevents the roller from turning further.

This function is particularly necessary on inclines and descents where the material to be conveyed should remain safely even when the supply voltage is switched off. This motorized roller is also used on vehicles in which the containers could move due to transverse forces.

Controlled by ConveyLinx JST-B, all control functions are available, comparable to the ConveyLinx Ai2. The control automatically releases the brake with the drive command and operates it again after the material is braked dynamically. The entire brake control is therefore fully automatic.

BENEFITS

- Drive for incline and decline conveyors
- AGV conveyor drive to prevent motion of totes
- No external brake mechanism required on conveyor
- Excellent longevity
- Increased conveyor throughput
- Precise positioning
- Control characteristic like servo motor
- Compatible to all common idler rollers

FEATURES

- Brushless 24 VDC motor
- Internal mechanical brake
- External motor controller
- High overload capacity
- High starting torque
- 9-pin JST connector
- ETL listed C/US | CE
- IP54

	Speed Code	Speed m/sec		Continuous torque Nm		Acceleration torque Nm		Holding torque (JST-B) Nm	
Senergy Eco-Mode	15	0,34	0,24	2,70	4,86	4,46	8,02	9,00	9,00
Senergy Boost-Mode	20	0,46	0,33	1,98	3,56	3,27	5,88	6,60	6,60
	25	0,56	0,41	1,62	2,92	2,67	4,81	5,40	5,40
	35	0,83	0,60	1,20	2,16	1,98	3,56	3,60	3,60
	45	1,00	0,73	1,00	1,80	1,65	2,97	3,00	3,00
	60	1,38	1,00	0,73	1,32	1,21	2,18	2,20	2,20
	75	1,69	1,22	0,60	1,08	0,99	1,78	1,80	1,80
	95	2,23	1,61	0,52	0,93	0,86	1,54	1,40	1,40

Mech. cont. performance		Voltage range		Nominal voltage		Cont. current		Peak current	
40W	50W	18–30V	18–30V	24V	24V	2,5A	3,5A	3A	5A

01

02

03

04

05

06

07

The Senergy motor rollers are available in all commonly used torque transmissions. Additionally, there is a IP 66 Poly-V (washdown) and a full stainless steel Senergy Ai available. Special tube executions are possible on request.

01_**Stainless steel (304/1.4301), 50 x 1,5 mm**
02_**Tube 50 x 1,5 mm, electro galvanized**
03_**Tube 50 x1,5 mm, ZAM (zinc aluminium magnesium coating)**
04_**2 mm Polyurethan coating for 50 x 1,5 mm tube, 80 Shore (A)**
05_**2 mm PVC coating for 50 x 1,5 mm tube, 65 Shore (A)**
06_**Black taper segments with 1,8° conicity for roller curves with 800 mm inner radius**
07_**Grey taper segments with 1,8° conicity for roller curves with 800 mm inner radius**

08_**Double or single groove for o-belts**
09_**Protection rate IP66 or IP69k all stainless steel motor roller**
10_**Poly-V head for use with standard Poly-V belts, M8 female thread or spring loaded hex shaft**
11_**Motor roller without torque transmission with M8 female thread or spring loaded hex shaft**
12_**Double groove head with M8 female thread or spring loaded hex shaft**

08

09

10

11

12

01

02

01_**The design and the mechanical interfaces of the planetary gear box are crucial for the lifetime of the motor roller. Kyowas' over 60 years of experience in gearbox design and manufacturing contributes to this outstanding design.**

02_**In all Senergy Ai and Pulse Geared Drive Ai the last gear stage is specially reinforced to allow a high number of start-stops cycles and excellent durability.**

03_**Bearing housings are made with high precision for perfect functionality.**

04_**To protect motor and gear box from external shocks two absorbing devices are installed. They also contribute to low operational noise.**

03

04

Pulse Geared Drive Ai

The gear motor for through-going standardization Pulse Geared Drive Ai replaces pneumatic and AC drives in conveyor applications to standardize controls and bus systems – for higher efficiency and simplification of complex projects.

Basic idea behind Pulse Geared Drive Ai is the fact that there are many more motors in conveyors than only the ones which drive the rollers. Pulse Roller now can do all this with a super compact and strong gear motor which fits seamlessly into the controls architecture of the motor rollers. No pneumatic or any secondary communication bus required.

Due to that, the mechanical and electrical design of conveyors gets less expensive, easier to maintain and more straight forward. Virtually all functionality required in conveyors are now controlled and driven by Pulse Roller products. In most cases pneumatic actuators can be completely replaced. Compactness is the key for Pulse Geared Drive Ai to be applied in many different applications. Servo motor for pop up wheels, in transfers as belt drive or lift motor, together with positioning control of ConveyLinx, it is a perfect solution.

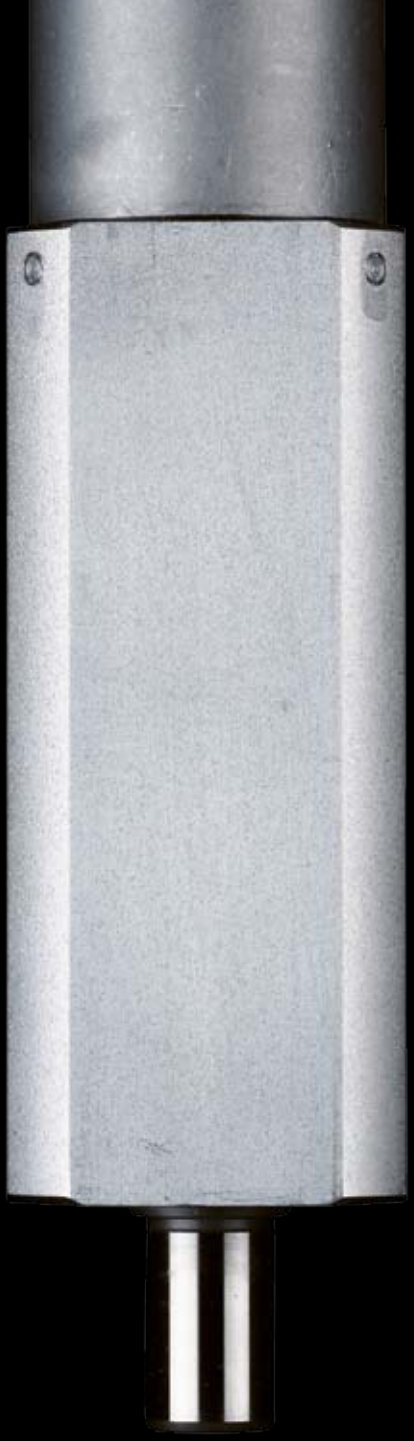
With Pulse Geard Drive Ai, Pulse Roller opens up a new world of cost effective, reliable servo drive applications.

BENEFITS

- Servomotor for conveyor applications
- Replaces pneumatic
- Versatile application
- Same control like Senergy Ai
- One control for all motion in conveyor
- Space saving design

FEATURES

- Brushless 24VDC motor
- Double bearing output shaft
- Full Ai-Technology
- External motor controller
- High overload capacity
- High starting torque
- 4-pin M8 standard connector
- Internal Data memory
- ETL listed C/US | CE



	Gear ratio	RPM min^{-1}	Continuous torque Nm	Acceleration torque Nm
PGD Eco-Mode	67:1	86	4,02	6,63
PGD Boost-Mode		62	7,24	11,94
	45:1	129	2,70	4,46
		93	4,86	8,02
	33:1	176	1,98	3,27
		127	3,56	5,88
	27:1	215	1,62	2,67
		156	2,92	4,81
	18:1	316	1,20	1,98
		229	2,16	3,56
	15:1	387	1,00	1,65
		280	1,80	2,97
	11:1	527	0,73	1,21
		382	1,32	2,18
	9:1	644	0,60	0,99
		467	1,08	1,78

Mech. cont. performance	Voltage range	Nominal voltage	Cont. current	Peak current
40W 50W	18–30 V	24 V	2,5A 3,5A	3A 5A

Pulse Motion Drive Ai

Perfectly simplified The Pulse Motion Drive Ai is the perfect replacement for small conventional servo motors. Consistently integrated by the Ai technology, the control technology is standardised and significantly simplified throughout the entire system: One motor for many applications.

The Pulse Motion Drive Ai (PMD Ai) is a special version of the PGD Ai that features a standard mounting flange. This makes it possible to replace conventional servo motors in the field of conveyor technology and to design the entire control technology completely consistently.

The PMD Ai can be controlled by EQube Ai, MotionLinx Ai and the ConveyLinx Ai family. This results in an excellent standardization of all movement axes.

BENEFITS

- Compact servo motor
- Ai technology
- Full compatible to all motor rollers

FEATURES

- Single-stage planetary gear i=3
- Mechanical fastening on the front
- Integrated Hall effect sensor system
- IP54 degree of protection
- 1400 rpm at 0.3 Nm
- ETL listed C/US | CE

	Gear ratio	RPM min^{-1}	Continuous torque Nm	Acceleration torque Nm
PMD Eco-Mode	3:1	1933 1400	0,27 0,48	0,44 0,79
PMD Boost-Mode				

Mech. cont. performance	Voltage range	Nominal voltage	Cont. current	Peak current
40W 50W	18–30 V	24 V	2,5A 3,5A	3A 5A

Pulse Divert Unit 90

Customized design based on standardized functionality The right angle transfer Pulse Divert Unit 90 is the ideal transfer for advanced Intralogistics. Based on 24V technology costly pneumatic actuators get completely obsolete.

Pulse Divert Unit 90 is a well proven right angle transfer design, which involves robust and reliable technology. Every Pulse Divert Unit 90 is specifically configured based on customer's individual conveyor design. With this Pulse Divert Unit 90 is always the best fit in any regards.

Controlling Pulse Divert Unit 90 by ConveyLinx Ai or MotionLinx Ai ensures a seamless and easy integration. There is no need for any additional control bus or pneumatic. Everything is driven and controlled by Pulse Roller components, creating a high degree of standardization and modularization. Design-, integration- and commissioning time is cut significantly freeing up valuable resources.

Pulse Divert Unit 90 is a further important part of Pulse Roller's ideal component range.

BENEFITS

- Seamless integration in Pulse Roller applications
- Transfer independent from conveyor
- Low profile design
- High troughput
- Simple maintenance

FEATURES

- Belt transfer featuring Ai-technology
- Lift- and belt drive by Senergy Ai
- Controlled by ConveyLinx
- Modular design
- Strong and oversized mechanical design

Smallest size: 360 x 360 mm
Maximal size: 800 x 800 mm
Minimale roller pitch: 75 mm
Maximum number of belts: 5
Maximal weight: 50 kg
Transfer height: 15 mm

Pulse Popup Unit 45

Typical Pulse Roller – highly adaptable and powerful. If diversion at high speed is required, the PPU 45 is exactly the right choice. Perfectly adapted to the conveyor system and controlled by ConveyLinx or MotionLinx, it provides a highly efficient and compact solution

The design of PPU 45 is based on PDU 90 and, like this one, it is perfectly adaptable for a wide variety of roller conveyors. The dynamic, uninterrupted conveying flow enables very high through put rates to be achieved. The angle of the wheels is selectable and can be adapted to the layout of the conveyor layout from the outset. In terms of design, it is also possible to divert to the left or right.

By using ConveyLinx or MotionLinx, the PPU 45 also fits perfectly into the control environment of the roller conveyor. Since the lifting movement is carried out by means of a motor roller, a system can operate completely without pneumatics. This creates a high degree of flexibility in use coupled with low operating costs.

In terms of control technology, ConveyLinx allows full standalone operation in which the function program is stored directly in the control system. Or the entire control is done centrally via the PLC.

This makes the PPU 45 another important component of the Pulse Roller product portfolio.

BENEFITS

- Seamless integration in Pulse Roller applications
- Machine independent from conveyor
- High through put
- Easy installation

FEATURES

- Belt transfer featuring Ai-technology
- Lift and wheel drive by Senergy Ai motor rollers
- ConveyLinx or MotionLinx as integral control
- 30° or 45° divert angle


CONVEYLINX
LOGIC
GND
DR

Pulse Roller Controls

Simplyfied complexity Pulse Roller controls are the perfect fit for any type of conveyor application. Installation, commissioning, configuration, programming and every day operation, Pulse Roller controls perform splendid.

ConveyLinx Ai 2

ConveyLinx Ai 2 opens up wide range of applications, from the simple zero-pressure accumulation conveyor to complex servo drive. This is achieved with one control on most compact design and unprecedented technical diversity. With just one type of control basically every motion in conveyor technology can be controlled.

A zero pressure accumulation conveyor can be controlled by ConveyLinx Ai 2 fully autonomously without any PLC. At the same time, if there is the need of higher level control, a PLC can be connected by ProfiNet, Ethernet IP and Modbus TCP. However this PLC does not need to control every zone, it just can interfere with a limited number of decision points. If an application should be controlled fully from PLC, configuration and control of all ConveyLinx Ai 2 can be done by using Topology from TIA Portal or STEP 7. Nevertheless, the use of ConveyLinx Ai 2's internal logic is still possible and thus relieves the source code of the PLC.

ConveyLinx Ai 2 offers extensive diagnostic tools for the drives that enable a cost-effective preventive maintencance programm. Thus unplanned downtime is drastically reduced. Senergy Ai and Pulse Geared Drive Ai are simply connected via proven and robust standard M8 four pin connectors. For a plug-in safe and fast mechanical installation.

BENEFITS

- Small footprint for easy installation in side frame
- 3 Ethernet protocolls
- Control of all motion on conveyor
- High flexible application
- Significant reduction of PLC source code
- Fast module replacement

FEATURES

- Two zone controller
- Profinet and ODVA approved
- Connection for 2 motors and 4 sensors
- Fully integrated in topology
- Tracking data handling
- Internal ZPA logic
- Advanced diagnostic functions
- IP54
- ETL listed C/US | UL recognized | CE

PROFINET® CC-Link EtherNet/IP Modbus

ConveyLinx Ai 3 RC/FC

The power supply is and remains a decisive work and cost factor in motor roller technology. At the same time, the range of the cabling is important. It is therefore a matter of making the power connection to the control technology as simple and safe as possible.

ConveyLinx Ai3 is a solution that significantly simplifies and speeds up both the installation of the control and its replacement. The key to this is piercing technique. Connector-free contacting based on needles that penetrate the insulation of the cable and make contact with the current conductor.

ConveyLinx Ai3 is available in two versions. On the one hand the RC variant, RC means Round Cable and enables the use of 6mm² cables for the motor voltage supply and 2.5mm² cables for the logic voltage supply. With 6mm² in particular, a large cabling range is possible in the field.

On the other hand, the FC variant uses a ribbon cable from the ASI standard. The drive and logic can also be supplied separately with power. By using a 2.5mm² ASI cable, a high degree of standardization in the wiring is possible, while at the same time simplifying the overall construction. With ConveyLinx Ai3 a completely new way of cabling is taken.

BENEFITS

- Fast and easy wiring
- Tool-free connection
- Reverse polarity protected connection
- Easy interchangeability of the control

FEATURES

- Power supply using piercing technology
- Choice of ribbon cable or round cable
- Long range esp. with round cable through 6mm²
- Separate power supply for motors and logic
- IP54
- ETL listed C/US | UL recognized | CE

PROFINET CC-Link EtherNet/IP Modbus

ConveyLinx I/O

In many conveyor applications the need for I/O points exceeds by far their number on motorized roller controllers. Is this the case, it often gets difficult. Additional I/O blocks from other suppliers have to be integrated.

ConveyLinx-I/O offers the unique feature of having a system internal I/O block at your fingertips. It even is present right from the beginning in Pulse Roller's GSDML files. So integration in your project is very fast. ConveyLinx-I/O a further strong member of the Pulse Roller product portfolio.

BENEFITS

- Fast integration, all components from one supplier
- Fully compatible to all ConveyLinx controls
- Failsafe commissioning
- Low profile design for conveyor side frames
- Potential emergency stop of outputs

FEATURES

- 8 configurable I/O points
- PNP/NPN logic conversion
- Standard I/O pin out
- Configuration via PLC and GSDML file
- Separate power supply for outputs
- Outputs rated 300 mA continuous
- IP54
- ETL listed C/US | UL recognized | CE

PROFINET CC-Link EtherNet/IP Modbus


CONVEYLINX
+24V
GND


CONVEYLINX-IO

MotionLinx Ai

MotionLinx Ai is Pulse Roller's EtherCAT two zone high speed controller. Designed for a wide variety of applications in conveyor industry and general machine building, it can drive two Senergy Ai or two PGD Ai motors. A maximum of four sensors can be connected by two M8 connectors.

For configuration, no proprietary software is required, all parameters can be configured via Service Data Objects (SDO) following fully EtherCAT standards. Specifically for zero pressure accumulation conveyors, there is a built-in logic to significantly reduce the need of programming inside the EtherCAT master. Preventive maintenance data can be retrieved from MotionLinx Ai with read Service Data Object transfer.

Due to its small footprint, MotionLinx Ai can be integrated in virtually all field environments very easily. Sharing the outer dimensions with ConveyLinx Ai2, MotionLinx Ai is perfect for design standardization and low height installation with protection rate of IP54.

MotionLinx Ai opens the word of deterministic high speed bus control to all Pulse Roller products – sharing their great benefits like Ai technology, durability and excellent design.

BENEFITS

- Super compact design
- High communication speed
- Real time applications
- Reduction of master source code

FEATURES

- Two zone controller
- Connection of 2 motors and up to 4 sensors
- Advanced diagnostic functions
- IP54
- ETL listed C/US | UL recognized | CE

EtherCAT

MotionLinx I/O

MotionLinx I/O is Pulse Roller's field I/O device for EtherCAT high speed bus systems. As the perfect addition for MotionLinx Ai, it collects up to eight inputs or eight outputs. Configuration is done based on Service Data Objects (SDO), no proprietary software is required. It integrates seamlessly into any EtherCAT installation offering great benefits and most versatile application.

Based on the same compact footprint like MotionLinx Ai, MotionLinx I/O is the ideal device for restricted space installations in conveyor and machine building applications.

BENEFITS

- Fast integration out of one hand
- Failsafe commissioning
- Low profile design for conveyor side frame
- Potential emergency stop of output

FEATURES

- 8 configurable I/O points
- Standard I/O pin out
- Configuration via SDO
- Data access via PDO
- Separate power supply for outputs
- Outputs rated 300 mA continuously
- IP54
- ETL listed C/US | UL recognized | CE

EtherCAT


IN
MOTION LINX
EtherCAT.
OUT


IN
MOTION LINX-IO
EtherCAT.
OUT

ConveyLinx JST-B

ConveyLinx JST-B is the controller for Senergy JST-B motor roller with an integrated holding brake. The brake is deactivated fully automatically and does not require any intervention from higher-level control. When stopped, the brake is always closed because it is spring-loaded and is opened by means of an electro-magnet.

Due to the full compatibility with other controls of the ConveyLinx family, it is possible to equip a conveyor zone with a mechanical brake motor roller if necessary. All logic functions of the ConveyLinx are available throughout.

Senergy JST-B is connected using a 9-pin JST connector, which includes the control of the mechanical holding brake.

ANWENDUNGSVORTEILE

- Automatic brake control
- Full compatibility with other controllers
- Robust casing design

PRODUKTEIGENSCHAFTEN

- JST-Motor connection
- M8 Sensor ports
- IP54
- ETL listed C/US | UL recognized | CE

EQube Ai

EQube Ai is the basic motor controller for Senergy Ai and Pulse Geared Drive Ai using robust and reliable M8 standard connection.

Using DIP-switches many parameters like acceleration, deceleration, direction of rotation and speed can be quickly selected or changed. The speed can also be set by digital inputs from an external control. With a motor error output you can continuously monitor your motor condition. All external signals are connected via simple in-line cage clamps.

Due to its small size E Qube Ai can be installed – even under very limited space – in basically all conveyor side frame.

BENEFITS

- Very small footprint
- Excellent integration
- Acclelleration and deceleration setting

FEATURES

- Motor controller for Senergy Ai and PGD Ai
- DIP switches for configuration
- Speed selection via two I/Osr
- Failure output
- Status LED
- UL recognized | CE
- IP 20


LOGIC
GND
MDR
CONVEYLINX


PWR
+24V
GND
MOTOR
EQUBE
MOTOR SPEED
ACCEL DECEL
Stop
Hold
Go
Error
Run A
Run B
Reverse
Common
Run
Over Temp
Power
IO TERMINAL

EZQube JST

EZQube JST is the simple motor control for all JST products. The possibility of connecting a potentiometer for speed adjustment allows the speed of the motor roller to be set very precisely.

Any further configuration is done via different DIP switches.

ANWENDUNGSVORTEILE

- Stepless speed adjustment
- Compact design
- Braking and acceleration setting

PRODUKTEIGENSCHAFTEN

- JST-motor connector
- IP20 protection rate
- Failure output
- Status LEDs
- UL recognized | CE
- IP 20

I/O X Interface

The I/O X interface is a simple but useful addition to the controls of the ConveyLinx family. It enables the conversion of the NPN output on the ConveyLinx into a usable PNP output. This enables a complete handshake to upstream and downstream conveyor technology. In addition, the I/O X serves as a splitter for the sensor connection so that two sensors can be connected there using M8.

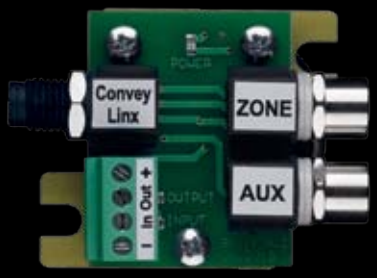
ANWENDUNGSVORTEILE

- Full handshake with external systems
- PNP standard for inputs and outputs
- Compact design

PRODUKTEIGENSCHAFTEN

- Conversion of the CovneyLinx Ai2 output to PNP
- Maximum output power 500 mAh
- Sensor connection using screw terminal or M8
- Leading out the Pin2 of the ConveyLinx to standard M8


EZQUBE
PNP [OUT]


Convey Linx
ZONE
AUX

Pulse Roller

Three specialists – one brand Pulse Roller is the brand name for most advanced 24 V drives and networked controls. Under this brand, three companies came together to offer products and provide services to the general conveyor market. All three partners focus clearly on components for conveyors.

Kyowa, Japan

As a Japanese Company Kyowa has been a premium manufacturer focusing on gears, shafts, gear boxes assembly and special machined parts. Founded 1950 as a private owned enterprise and today lead by second generation, Kyowa has large experience in gear box manufacturing and design for automotive industry. Kawasaki and Kubota are along with other long time customers.

In 1970 Kyowa started manufacturing AC drum motors for conveyor industry, later the first DC brushless motorized roller was developed. In later 1990th major projects where installed at US postal facilities nationwide. Also in Asia and specifically in Japan Kyowa is one of the leading manufacturers of AC and DC motor rollers and drum motors.

Industrial Software, Bulgaria

Industrial Software has been founded in 1991 as a branch off of University Sofia. Right from the beginning Industrial Software was dedicated to high end industrial controls. Soon first major projects in Bulgarian petrochemical industry took place, where in-house developed PLCs with distributed I/O were installed. This equipment is still in operation today. A break-through project in the field of conveyor controls technology was “Automated Induction Project” with US Postal Service in the late 1990th.

A further significant mile stone is the ”FSS (Flats Sequencing System)” project also with US Postal Service. Within this project Industrial Software manufactured and supplied over 60.000 CAN bus controllers for various motor roller applications. These FSS machines are today’s backbone of US Postal Service for flat mail sortation. Industrial Software’s designers understood very early, that the future – even for field bus use – will be Ethernet technology.

By straight forward development of first generation of ConveyLinx control modules applying Ethernet for motor rollers, Industrial Software accumulated lots of experience and knowhow and is far ahead of state of the art technology. Developing Ai (Advanced intelligence)-cabling technology for “Ai marked” Pulse Roller products is a significant leap forward again. Industrial Software is built around the philosophy of in-house development without any external development partners. This ensures a deep and ever growing product and technology know how inside the company.

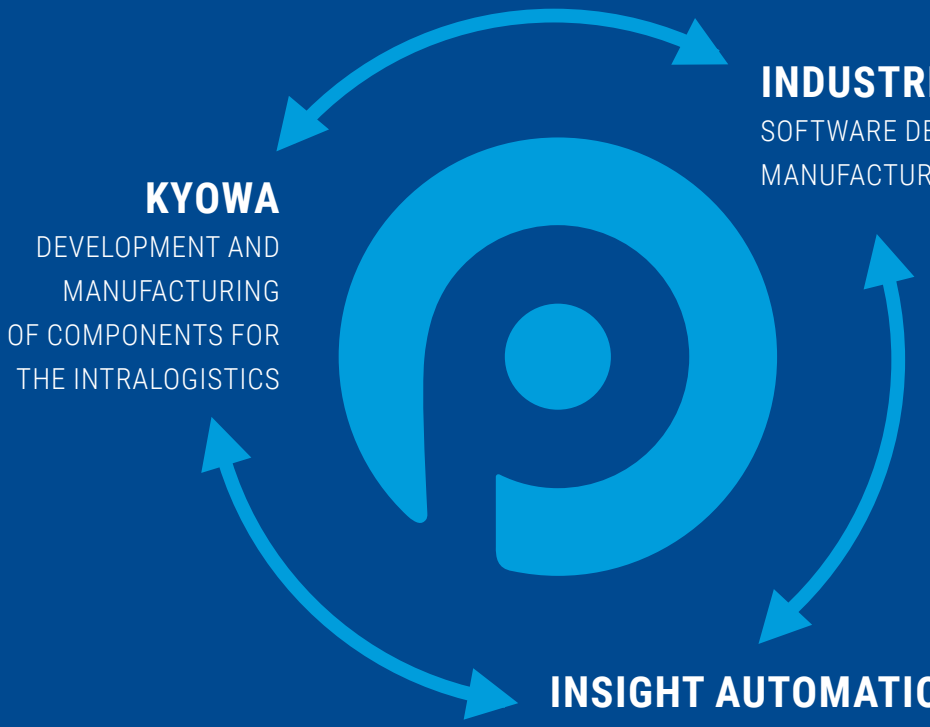
Close by Industrial Software, Kyowa Europe Ltd, as the European manufacturing facility, is located.

Insight Automation, USA

Insight Automation was founded in the year 2000 by a couple of US conveyor experts as a hardware and software supplier for conveyor industry. Following the philosophy “we do not make conveyors, we only make them smart” Insight Automation focused right from the beginning on only controls and drive components. Today Insight Automation is Pulse Roller’s sales, marketing, product development and test organization for the US market with high competence in specialized conveyor software applications.

Close by Insight Automation, Kyowa USA, as US manufacturing facility, is located.

Pulse Roller’s structure and history forms a very strong global team promoting reliable and high-end conveyor technology worldwide.



KYOWA
DEVELOPMENT AND MANUFACTURING OF COMPONENTS FOR THE INTRALOGISTICS

INDUSTRIAL SOFTWARE
SOFTWARE DEVELOPMENT AND HARDWARE MANUFACTURING FOR THE INTRALOGISTICS

INSIGHT AUTOMATION
SALES AND SUPPORT IN THE USA

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