



VISUALMOTION
Open, flexible control and drive system
for packaging and food processing machines

SYSTEM200

VISUALMOTION

for improved competitiveness in world markets

How can you make packaging and foodstuffs processing machines more flexible and therefore more productive when product life cycles are always getting shorter? With VISUALMOTION, the open control and intelligent drive system from Rexroth Indramat.

VISUALMOTION ensures shorter cycle times for your machinery and faster format changes and with higher accuracy. Rigid mechanical transmission elements, such as gears, shafts and cams, are replaced by precision servo drives, thus simplifying machine design.

This convincing concept with its open architecture earmarks this automation system for all areas of your production - from the individual machine right up to the interlinked production plant:

- forming, filling and closing machines
- board-making machines
- thermo-forming machines
- blister packaging machines
- winding applications
- filling machines
- pick & place robots
- foodstuffs processing machines

As machine manufacturer or machine operator, utilise the advantages of VISUALMOTION for:

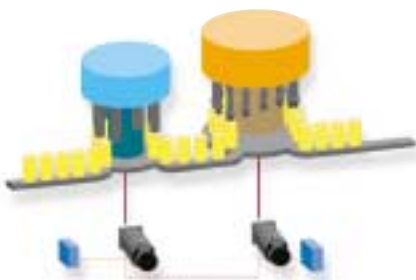
- faster format changes
- improved product quality
- improved cycle rates
- simplified machine design
- increased reliability
- faster commissioning
- simple programming
- reduced maintenance



Filling, seaming and capping

Beverage cartoning

Horizontal form, fill and seal





Open architecture, scalable power

The open system architecture allows machines to be exported worldwide with the predominant country-specific bus systems. With this concept, VISUALMOTION safeguards investments, standardises production plant and makes production processes more transparent.

This openness promotes problem-free dialogue between hardware and software solutions from different manufacturers.

The control therefore communicates via standards that have been introduced worldwide. For example:

- PROFIBUS
- INTERBUS
- DeviceNet
- RS 232/485

Precise, fast-response servo movements - as demanded in the packaging and foodstuffs industries – can only be provided via the SERCOS interface* – the digital interface between control and drive.

With VISUALMOTION's modular control software you control up to 32 axes. At the same time you standardise your specific functions and transfer these rapidly and easily to other machine units. Field bus systems can be easily adapted by simply replacing the interface cards and adjusting the configuration by means of a few parameter changes.

Our intelligent drives are also modular and have scalable functionality. They also cover all typical packaging and food industry requirements with a power range from 0.1 kW to 75 kW .



***SERCOS interface, the standardised international and European drive interface (IEC 61491/EN 61491) allows trouble-free operation between digital drives and controllers from different manufacturers, while utilising the best possible characteristics of the respective products.**

Vertical form, fill and seal



Cartoning



Case packaging

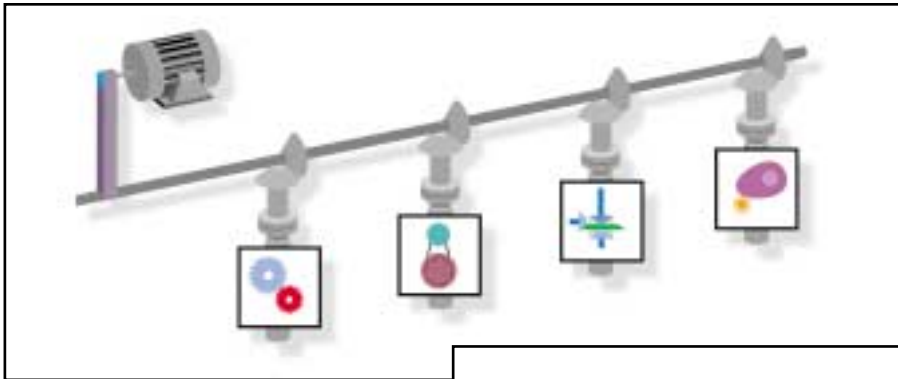


Palettizing



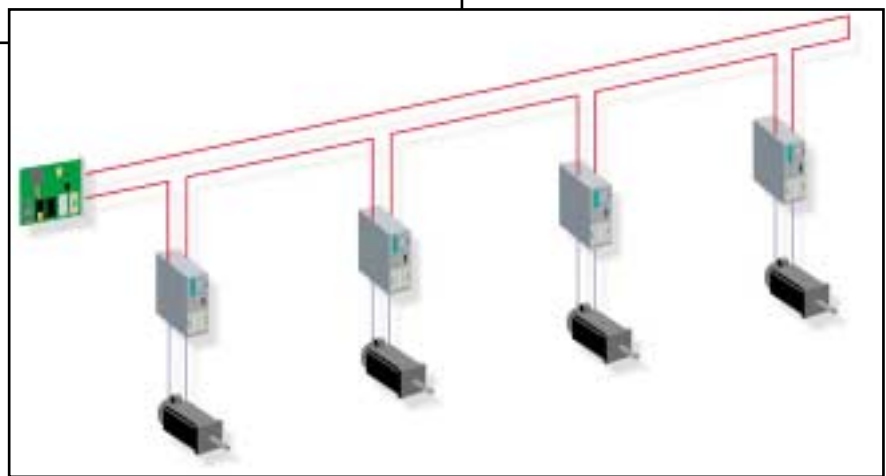
All the advantages at a glance

Flexible electronics instead of rigid mechanical system



In packaging and foodstuffs processing machines, VISUALMOTION from Rexroth Indramat replaces mechanical transmission elements, such as gears, line shafts and cams, with high-precision, electric servo drive technology.

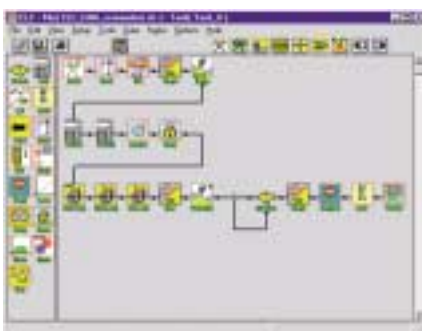
Mechanical drive solution: Traditional drive systems are very complex, expensive and rapidly wear out. Format changes are both time-consuming and labour-intensive and therefore reduce production output.



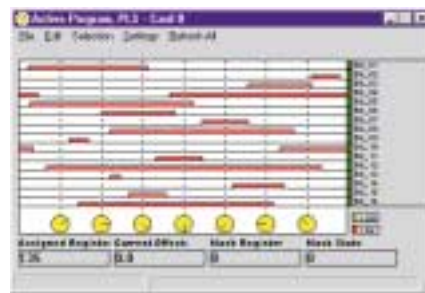
Rexroth Indramat's electronic system solution: The innovative VISUALMOTION control and drive system synchronises up to 32 servo axes with great precision. Product changes are made virtually at the touch of a button.

Improved transparency through graphical programming

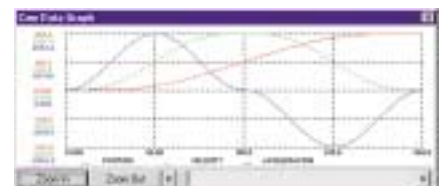
The system can be programmed using graphics or text. Graphical programming with defined icons shortens the training time, accelerates program development and also makes the production sequence transparent in the long term.



Graphical programming: simple, fast and straightforward.



Switch cams that can be modified on line save additional costs of separate cam controllers.

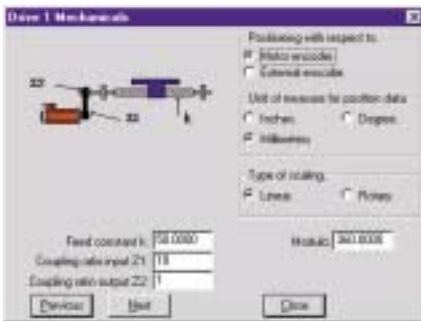


High-resolution electronic cams replace expensive mechanical ones

Economic machine design

VISUALMOTION controls up to 32 axes simultaneously via the SERCOS digital interface. For this, all drives are integrated in a fibre-optic ring. You therefore reduce the amount of cabling, simplify the installation and improve the diagnostic capability at the same time. If the requirements change, individual drives can be easily deactivated, replaced or added without having to revise all the control software.

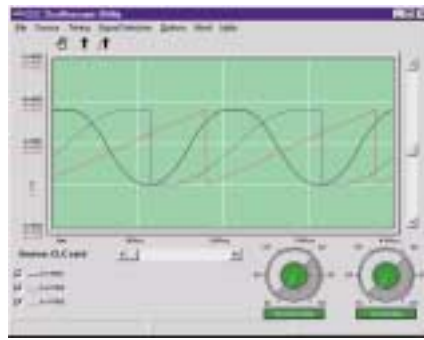
Simple commissioning



As when programming the control, the drives are also rapidly and conveniently commissioned via the PC with graphics support. You adapt and optimise VISUALMOTION to your machine by simply entering parameters. The drive is permanently monitored to ensure maximum operational reliability and machine availability.

Plain language diagnostics

The built-in oscilloscope function displays your parameters, variables and registers and therefore assists you during system optimisation. Plain language diagnostics help you in rapid troubleshooting. The diagnostic messages are recorded in a logbook.



Comprehensive functionality and always the correct operating mode

Whatever the requirements you place on your machine, the various operating modes meet them:

- electronic synchronisation with virtual or real master for:
 - speed synchronisation mode
 - angular synchronisation mode
 - electronic cam
- path interpolation for up to 3 axes
- single axis operation for event-controlled positioning of single axes.

Improved productivity, fewer bottlenecks

The sequential arrangement of packaging lines often means that faster machines are not fully utilised because product jams occur on slower machines. Eliminate these bottlenecks with VISUALMOTION by increasing the cycle rates of upstream machines, thus increasing the throughput of the packaging line.

Improved machine availability

The intelligent drive technology uses absolute position measurement and automatically recognises all current axis positions. This allows the machine to be restarted at any time without further referencing and synchronisation.

Format change at the touch of a button

With VISUALMOTION change your production for reformulation or a packaging change - without tools and in minutes instead of hours. All transmission gear ratios, cam settings and motion profiles can be changed electronically - virtually at the touch of a button.

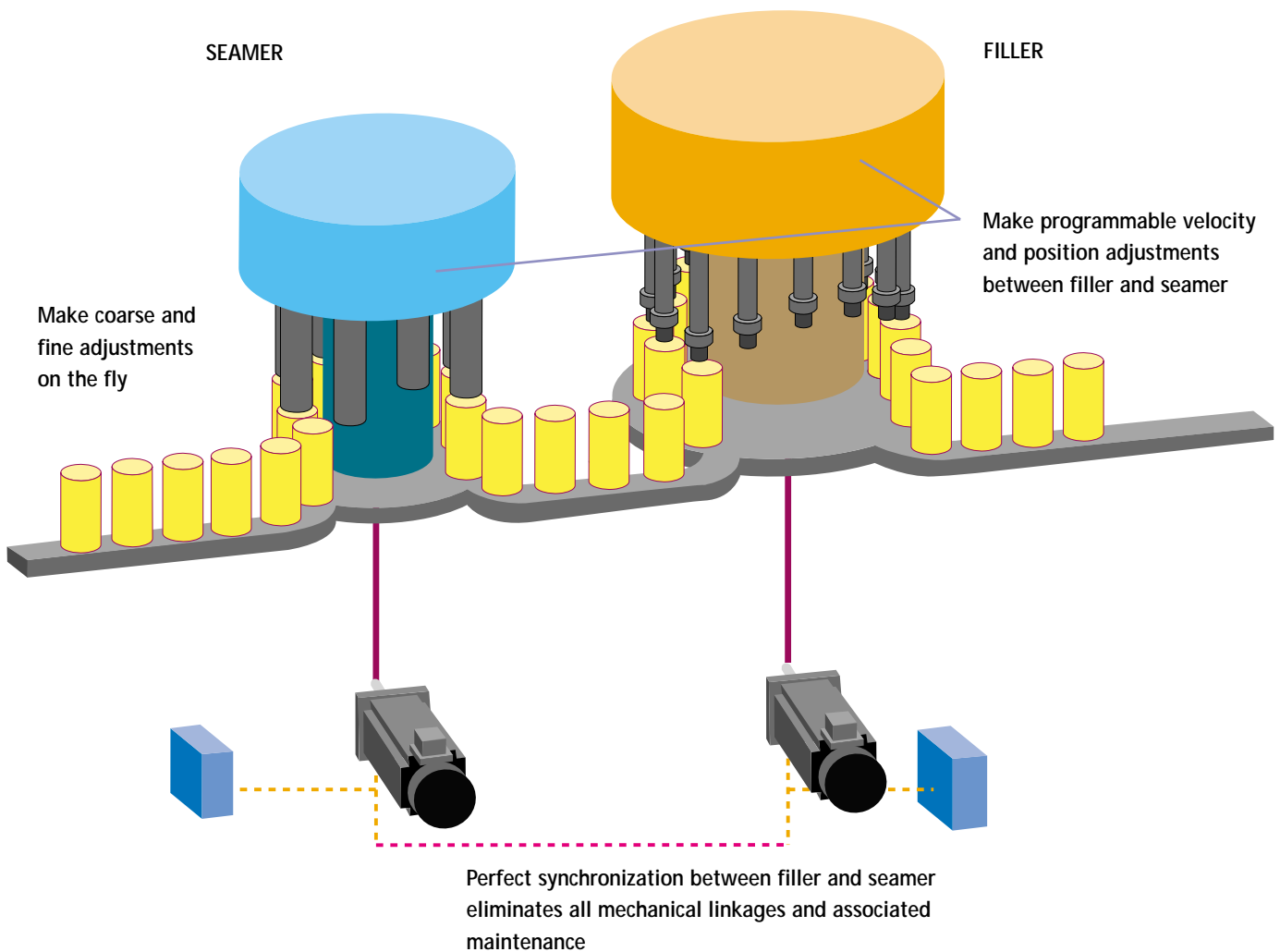
One control strategy, from start to finish

With Rexroth Indramat servo performance, mechanical packaging line bottlenecks are readily overcome. You can achieve a better balance between machine speeds. And you can increase line throughputs without jamming or registration problems. Our open architecture approach helps you reduce training, commissioning and manufacturing costs. Our connectivity gives you timely access to production management information

Synchronizing the filler and seamer/capper

Fillers, seamers and cappers are high throughput machines with large inertial loads. The motor, gearbox and lineshaft connecting them are maintenance intensive.

Can seamers in high volume plants require rebuilds as often as every 3 years. Electronic line shafting (see definition, page 4) can double or triple the service life – paying for itself in the first year of operation through reductions in spares and mechanical maintenance.

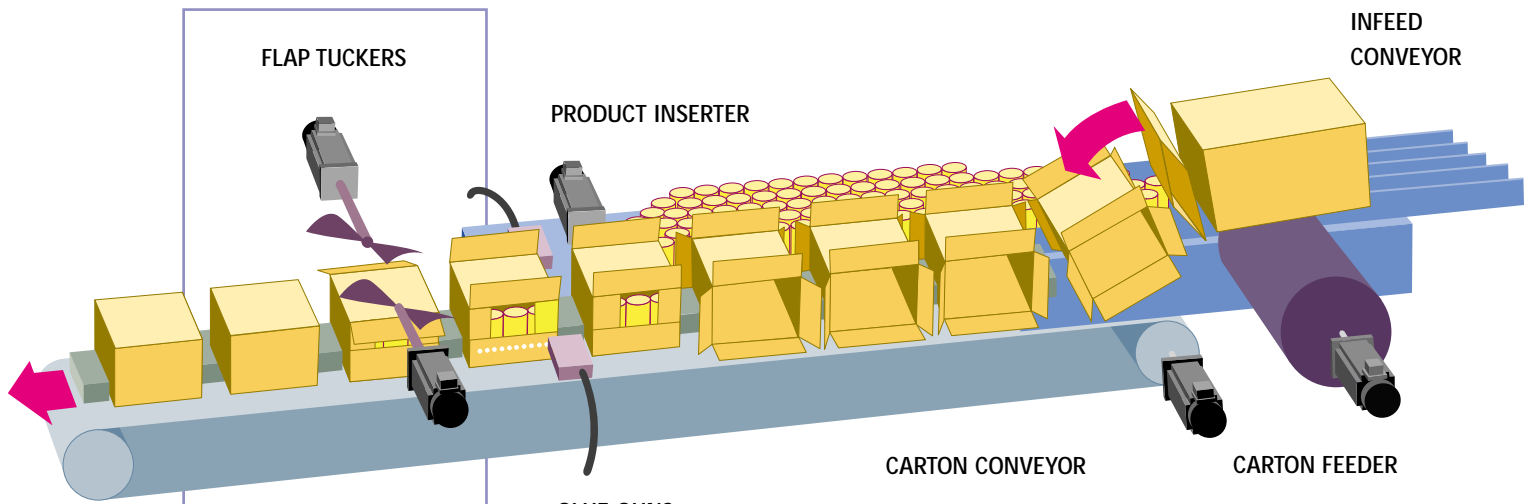


Increasing throughput with continuous motion beverage cartoners

Fast servo position loop updates and high resolution feedback enable you to increase top speeds by tightly performing electronic gearing.

Our virtual master feature isolates mechanical disturbances in mechanical lineshafts, assuring tighter control over the electronically geared servo drives.

When changing carton size, you can configure new geared positions for each servo drive at the push of a button.



Servo-driven flap tuckers assure quality sealing and gluing

The flap tuckers can run different motion profiles for different size cartons without mechanical changeovers

1,024 point cam software tables eliminate costly cam followers and mechanical cams

GLUE GUNS

Built-in programmable limit switch function fires glue guns

CARTON CONVEYOR

CARTON FEEDER

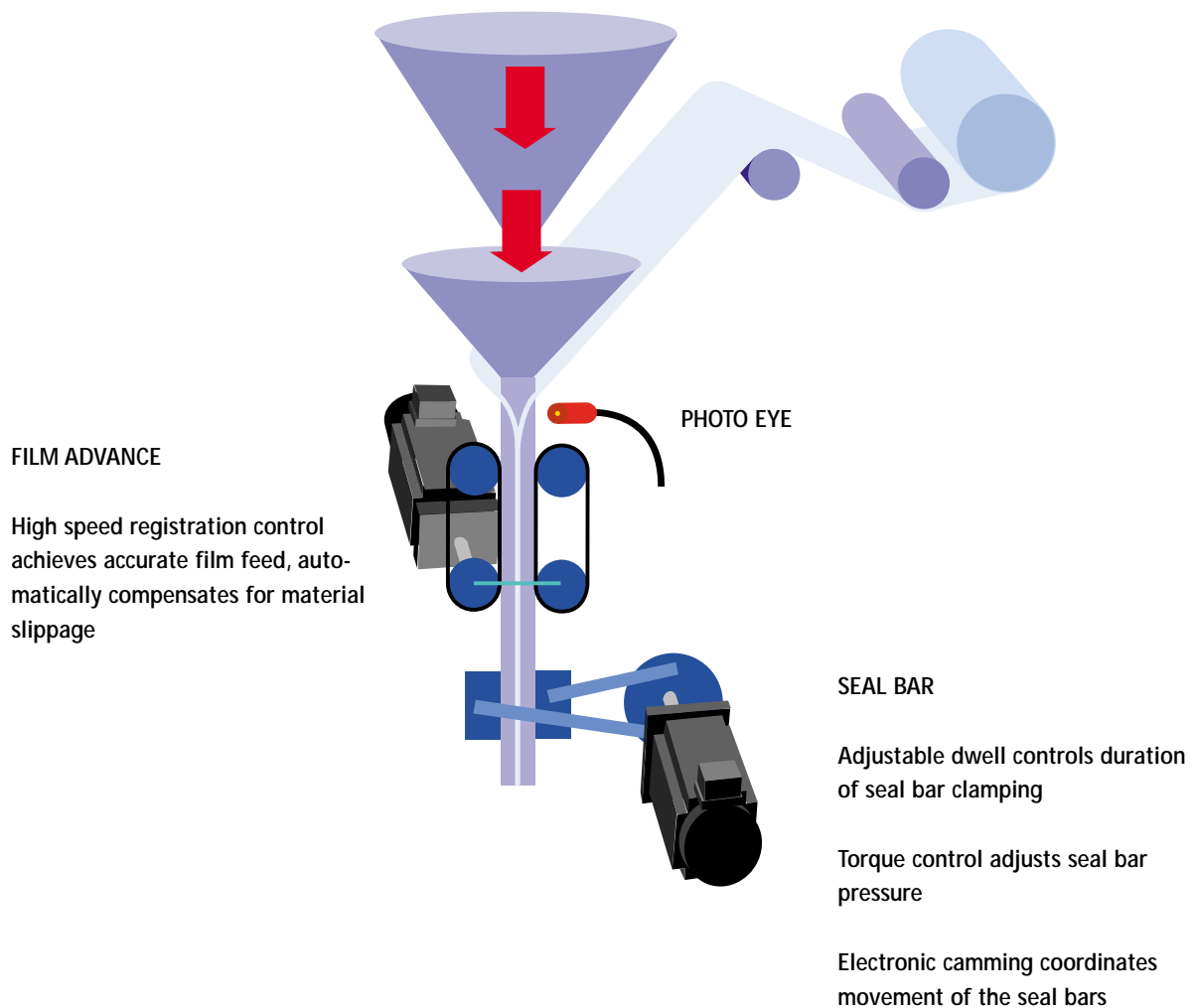
One motion controller can synchronize up to 32 axes

Fast, smooth operation in vertical bag forming, filling and sealing machines

Fast, jam-free operation for vf/f/s machines

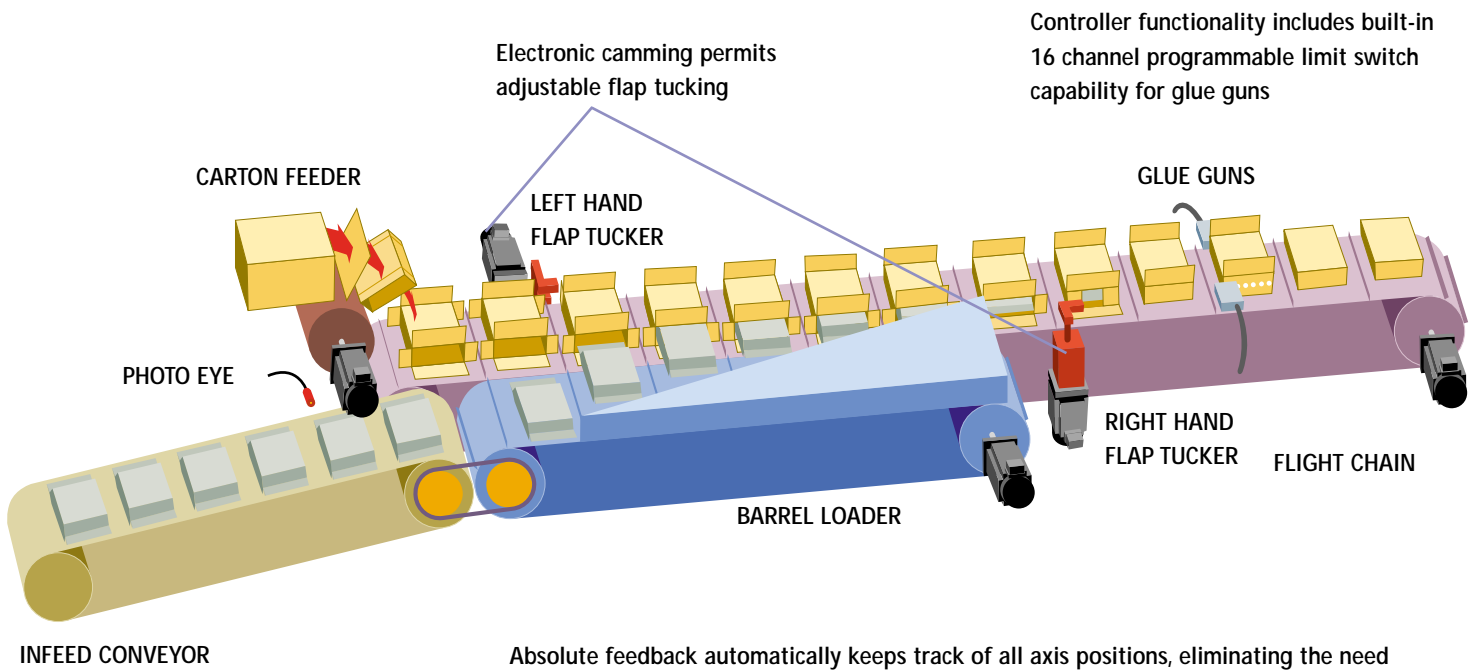
To manage costs, form/fill/seal machines must adapt to changing material characteristics without generating scrap. Rexroth Indramat's controllability accommodates different wall thicknesses, surface finishes and resistance to sealing.

Servo drives from Rexroth Indramat can also be more economical than mechanical components. Adding two servo axes with electronic gearing on a film advance can cost less than a single servo driving a dual output gearbox.



Precision equals speed in continuous motion cartoners

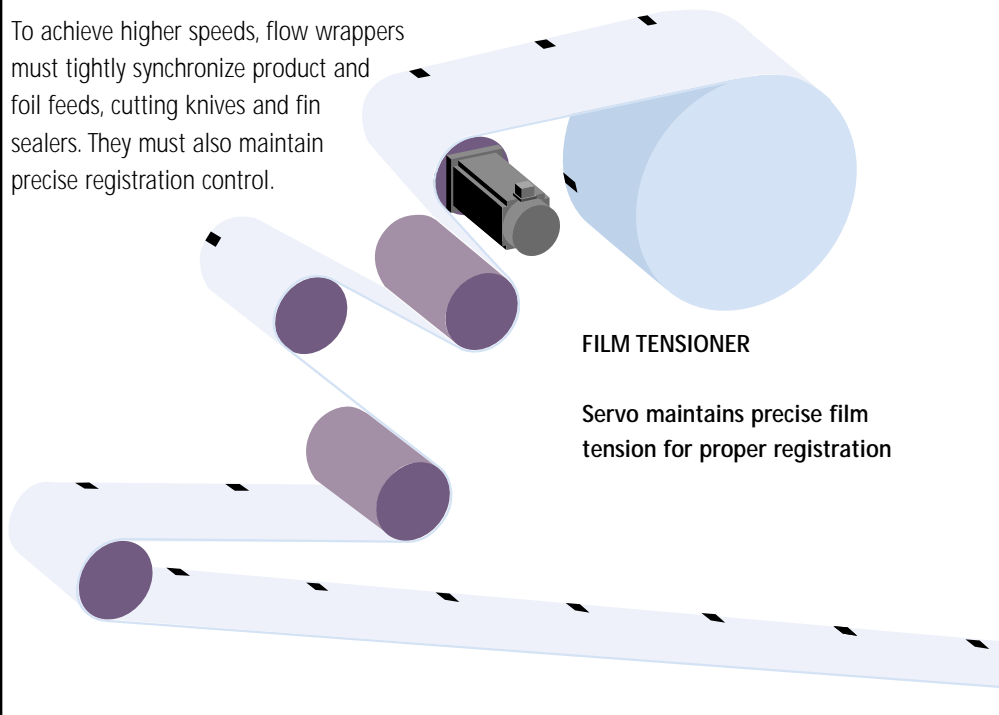
Thanks to multi-axis digital motion control, cartoners are using 5, 10, even 15 servo drives to increase speed and functionality.



Absolute feedback automatically keeps track of all axis positions, eliminating the need to re-home and resynchronize if a jam does occur.

Maintaining registration as flow wrapper speeds exceed 1,000 CPM

To achieve higher speeds, flow wrappers must tightly synchronize product and foil feeds, cutting knives and fin sealers. They must also maintain precise registration control.

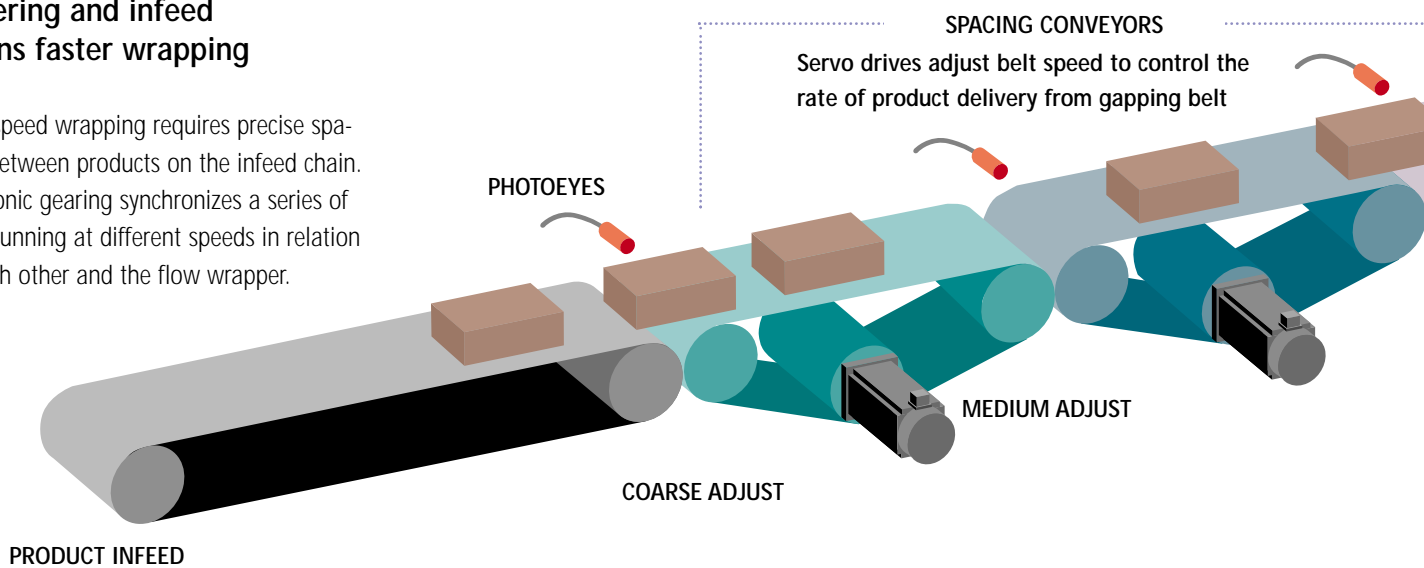


FILM TENSIONER

Servo maintains precise film tension for proper registration

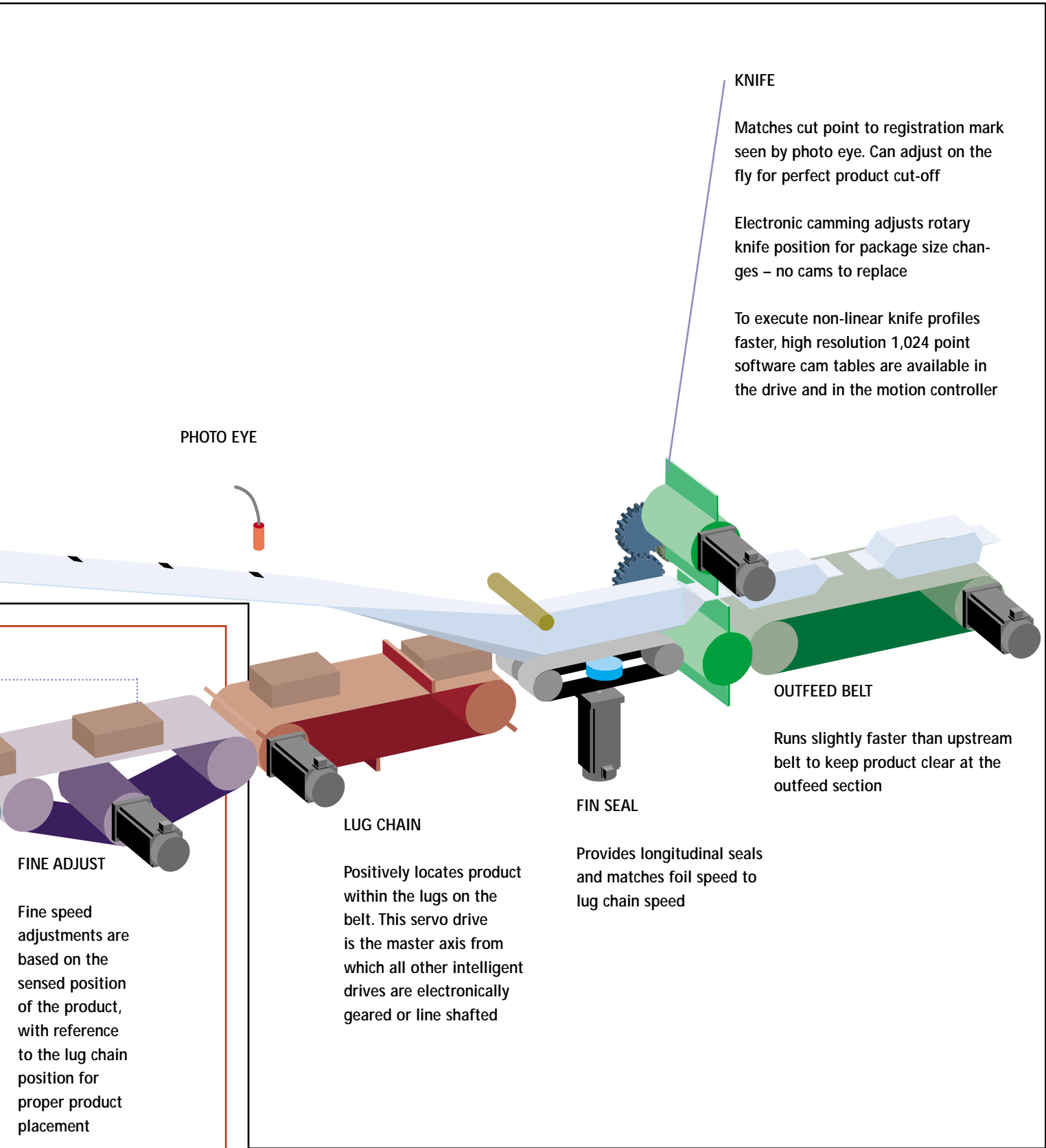
Intelligent gapping, metering and infeed means faster wrapping

High speed wrapping requires precise spacing between products on the infeed chain. Electronic gearing synchronizes a series of belts running at different speeds in relation to each other and the flow wrapper.



PRODUCT INFEEED

Servos run one or more gapping belts faster than the upstream infeed belt to create a gap between products



KNIFE

Matches cut point to registration mark seen by photo eye. Can adjust on the fly for perfect product cut-off

Electronic camming adjusts rotary knife position for package size changes – no cams to replace

To execute non-linear knife profiles faster, high resolution 1,024 point software cam tables are available in the drive and in the motion controller

PHOTO EYE

OUTFEED BELT

Runs slightly faster than upstream belt to keep product clear at the outfeed section

FIN SEAL

Provides longitudinal seals and matches foil speed to lug chain speed

LUG CHAIN

Positively locates product within the lugs on the belt. This servo drive is the master axis from which all other intelligent drives are electronically geared or line shafted

FINE ADJUST

Fine speed adjustments are based on the sensed position of the product, with reference to the lug chain position for proper product placement

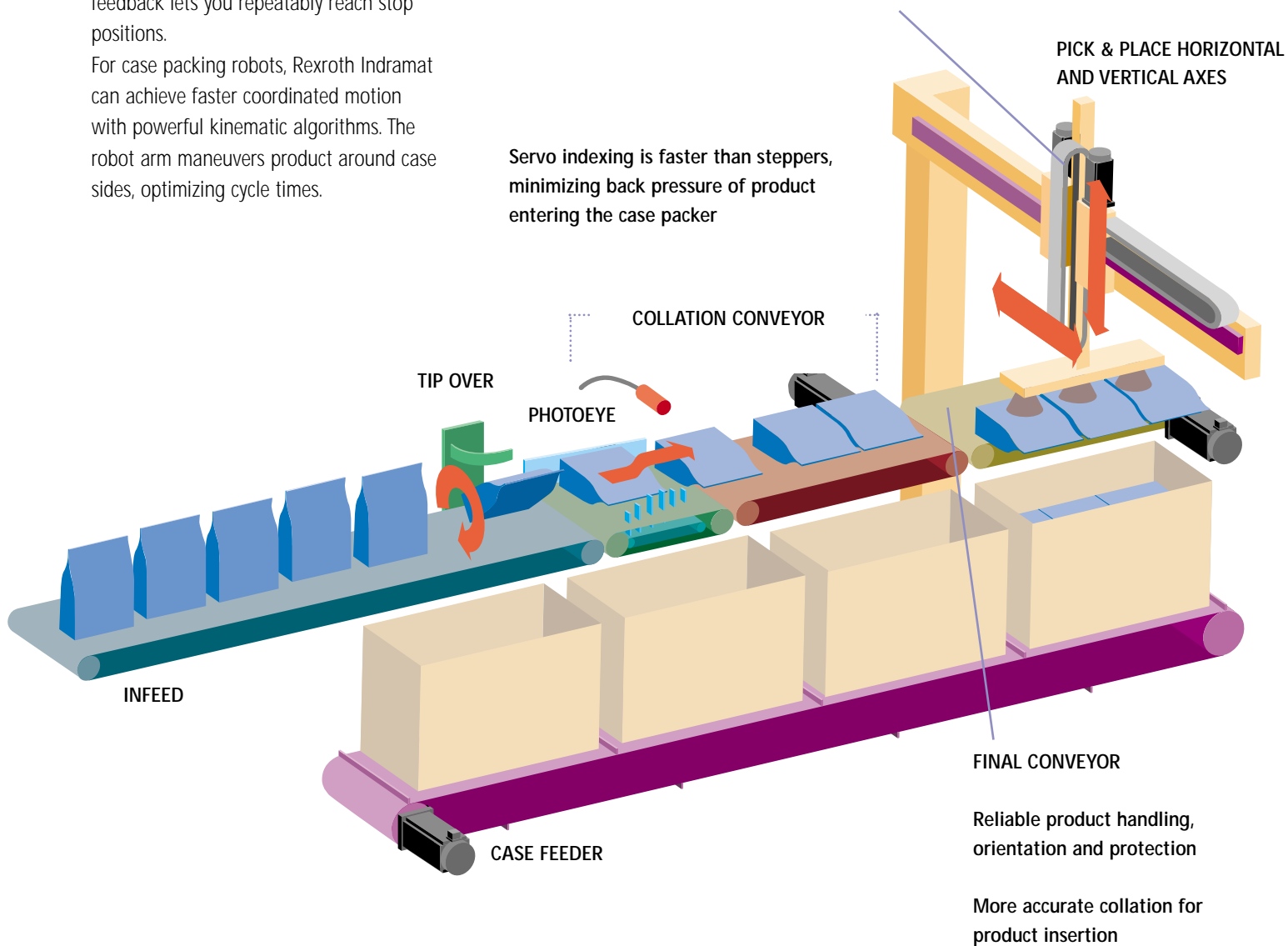
Adding performance to case packers

With our economical new ECODRIVE03, it now becomes cost-effective to automate lower cost machines.

High resolution cam tables let case packers achieve more accurate case erection and alignment of unstable packages within cases. High resolution feedback lets you repeatably reach stop positions.

For case packing robots, Rexroth Indramat can achieve faster coordinated motion with powerful kinematic algorithms. The robot arm maneuvers product around case sides, optimizing cycle times.

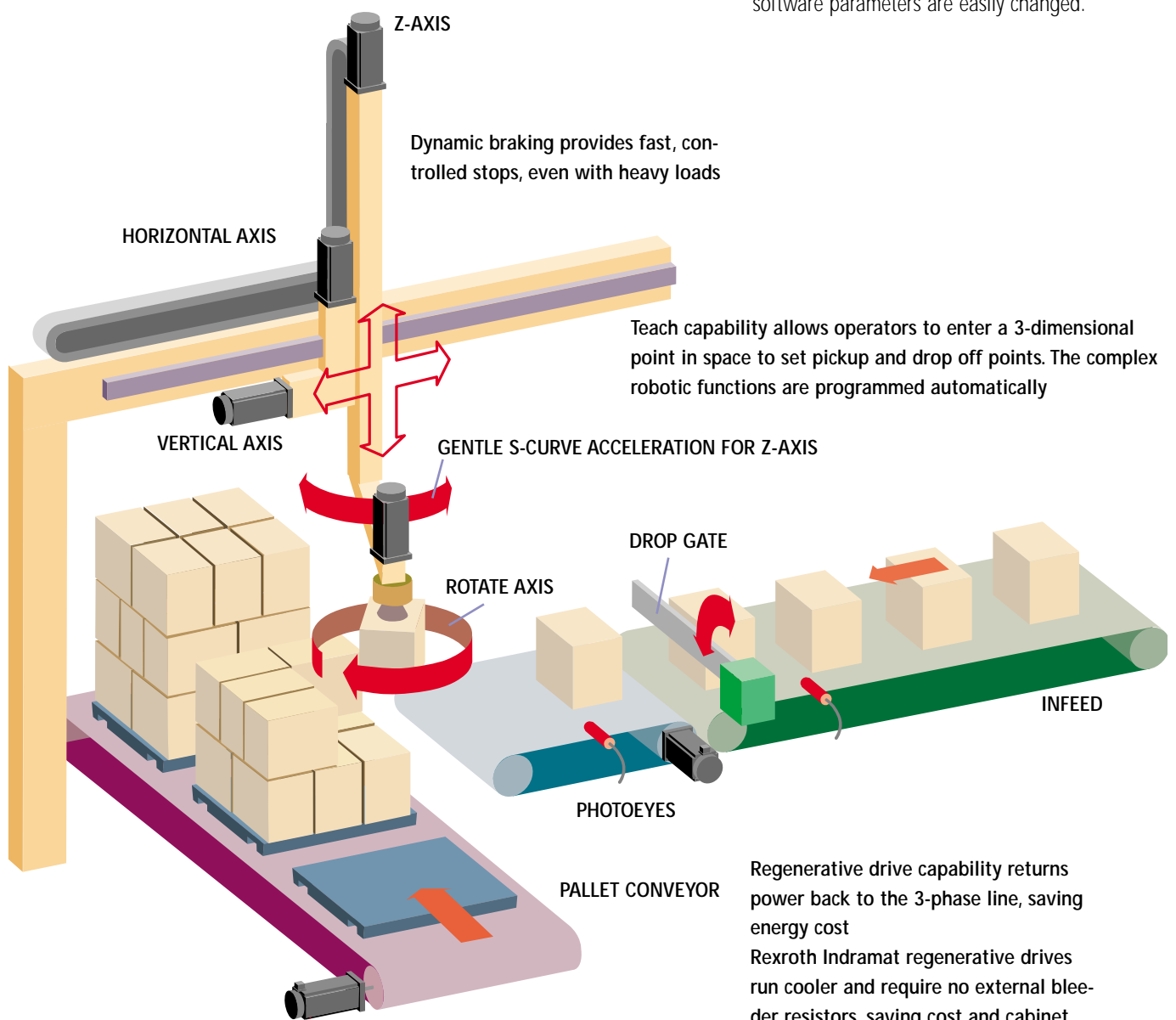
Absolute feedback lets you remove jammed product and continue without re-homing the machine, saving downtime



S-curves speed up palletizers

Palletizers are major capital investments that often become downstream bottlenecks. To keep pace with the rest of your line, Rexroth Indramat can perform intelligent accumulation and adjust palletizer infeed rates on the fly, based on actual product flow.

S-curve acceleration profiles rapidly but gently accelerate loads for maximum throughput without product slippage or damage. Unlike mechanical cams, S-curve software parameters are easily changed.



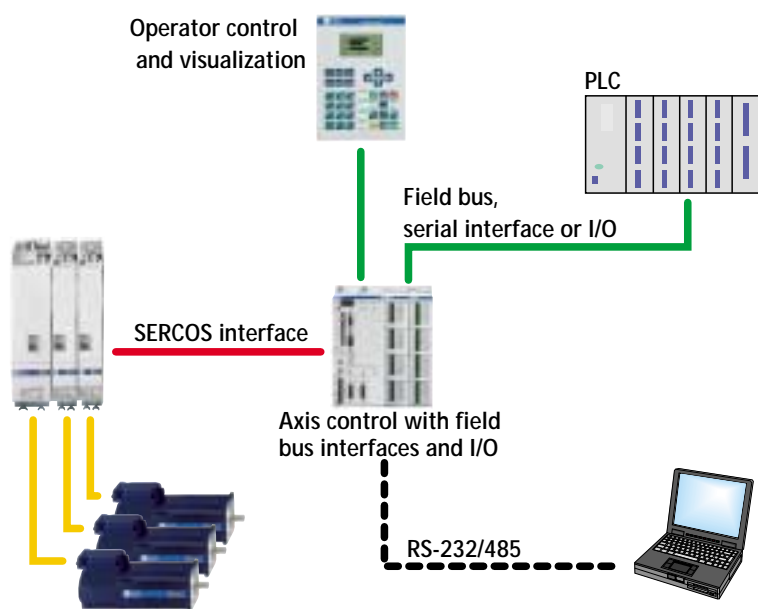
Always the optimum system solution for your machine

VISUALMOTION from Rexroth Indramat covers all control and drive requirements in the packaging and foodstuffs processing industries - from the simple stand-alone machine to complex production plants.

The open control structure and the use of field bus systems with worldwide acceptance enable you to easily integrate this system solution, even in existing plants.

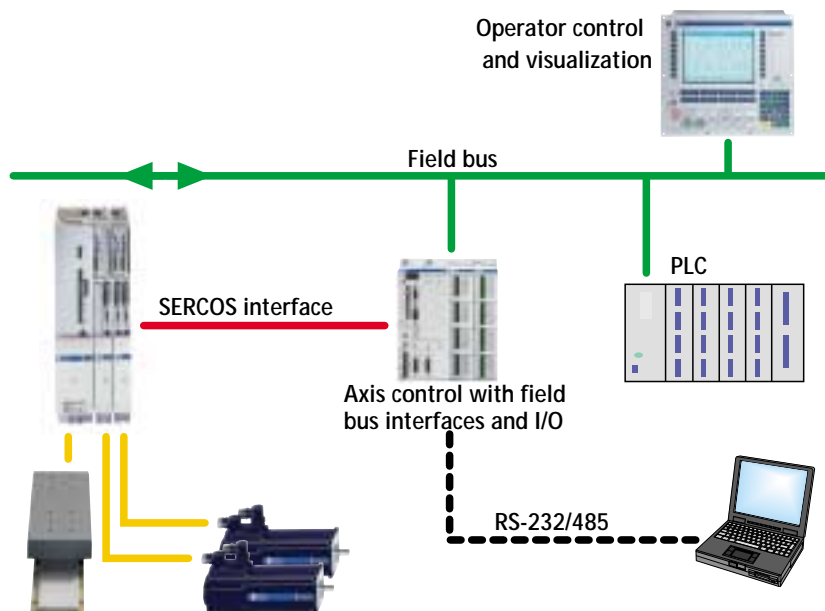
System solution with single-axis controller

Automation tasks in single-axis applications are carried out very economically with compact ECODRIVE drives. Various HMI units are available for your specific operator control and visualization requirements.



Solution with modular axis system

With the DIAX drive system you can manage control and drive tasks in inter-linked production plants with higher requirements and a large number of axes. Individual plants communicate via field bus systems and can be very simply integrated into production control systems.



The right components for every system solution

Control software

- Windows-based programming interface
- Programming with graphics and text
- Fast commissioning via convenient editing
- Control with multi-tasking capability
- Event-controlled programming
- Electronic cam function built into control and drive. Online support for cam calculation and editing functions.
- Electronic cam switchgroup
- Oscilloscope function
- Logic task for inputs and outputs

Modular control hardware



- Various versions of plug-in controller cards:
 - with computing power for standard applications for drives or modules, as well as ISA bus or PC 104 variants
 - as subrack with maximised computing power for complex applications
- Various plug-in cards for the I/O interface
- On-site diagnostics facility via built-in displays
- Bus system connection: PROFIBUS, INTERBUS, DeviceNet

Convenient HMI units



- Straightforward visualization and diagnosis of system data
- Universal operating philosophy
- Wide range of simple LCD operator displays - from handy handheld units to PC-based control terminals.

Powerful DIAX drive system



- Modular, intelligent drive system for high continuous power levels up to 75 kW
- Power supply modules with direct AC supply connectivity and energy regeneration
- Very slim single-axis and twin-axis control units
- Wide range of rotary and linear motors with extensive choice of ratings

ECODRIVE economical drive system



- Compact drive system for continuous power ratings up to 24 kW
- Space-saving control units with built-in power supply
- Wide choice of ratings with rotary and linear motors
- Plug-in programming and parameterization modules
- Auxiliary functions such as:
 - cam switchgroup
 - fast inputs
 - analogue inputs and outputs
- Can also be used as an independent single-axis positioning drive with field bus or parallel interface.

Convincing software functions und hardware solutions

	Software	VM06	VM07
1	Control hardware		
1.1	CLC-D02	●	●
1.2	CLC-P01	●	●
1.3	CLC-P02	●	●
1.4	PPC-R01		●
1.5	PPC-R02		●
2	Graphical programming	●	●
3	Textual programming	●	●
4	Debugging - Wizards	●	●
4.1	Program sequence analysis (online)	●	●
4.2	Program structure and write analysis	●	●
4.3	Single step mode (Trace Mode)	●	●
5	User programs (multitasking)	4	4
6	Logic task for I/O (4 ms or 8 ms equidistant processing)	●	●
7	Events (simultaneously executable)	4 per user program	4 per user program
7.1	Time triggered	●	●
7.2	Probe input triggered (Registration input)	●	●
7.3	Path triggered (positioning and path interpolation)	●	●
7.4	I/O triggered	●	●
8	Single axis operating modes	●	●
8.1	Torque controlled axes	●	●
8.2	Speed controlled axes	●	●
8.3	Positioning axes	●	●
9	Electronic line shaft (ELS)	●	●
9.1	Phase synchronised axes	●	●
9.2	Velocity synchronised axes	●	●
9.3	Electronic cams	●	●
9.4	Virtual master	1	2 *
9.5	Real master	2	3 *

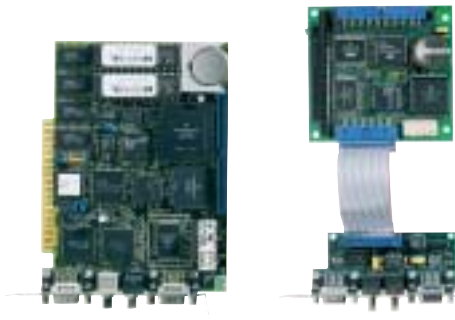
	Software	VM06	VM07
9.6	Number of masters activated simultaneously (including group masters)	1	6 *
9.7	ELS groups		8 *
9.8	Superimposed cams		● *
9.9	Electronic cams (control side)	8	40 *
9.10	Dynamic synchronisation between real and virtual masters	●	●
9.11	Simultaneous lock-on and lock-off of synchronised axes		● *
9.12	Online calculation of cams	●	●
9.13	Online calculation of process-dependent cams (CAM indexer)	●	●
10	Kinematic function	●	●
10.1	Kinematic transformations	●	●
10.2	Linear interpolation	●	●
10.3	Circular interpolation	●	●
10.4	Absolute co-ordinates	●	●
10.5	Relative co-ordinates	●	●
10.6	Protection zones	●	●
10.7	Teach-in function	●	●
11	Programmable limit switches (PLS – control side)	16	16
11.1	Online modifications	●	●
11.2	PLS – lead time		●
12	Predefined registration function (print mark control)		●
13	Diagnostic log file (number of diagnoses)	100	100
14	Oscilloscope	●	●
14.1	Number of channels (control side)	3	3
14.2	Number of channels (per axis)	2	2

* in conjunction with PPC-P; with CLC-XX compare to VM06

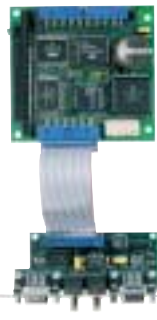
	Hardware	CLC-D2.3	CLC-P1 (ISA-Bus)	CLC-P2 (PC-104)	PPC-R01	PPC-R02
15	Serial communication (RS-485/422/232)	2	2	2	2	2
15.1	Max data transfer rate	38400 Bd	38400 Bd	38400 Bd	115200 Bd	115200 Bd
16	SERCOS interface master	●	●	●	●	●
17	Number of axes	32	32	32	32	32
18	Field bus slave interface modules	●				●
18.1	PROFIBUS	●				●
18.2	DeviceNet	●				●
18.3	INTERBUS	●				
19	SERCOS I/O support	●	●	●	●	●
20	I/O interface modules	3 (for Field bus use 2)	0	0	15 (max. total of I/O modules)	14 (max. total of I/O modules)
20.1	Input modules	Plug-in card (DEA) - 32 x 24 V/DC inputs - 24 x 24 V/DC 80 mA outputs			Digital modules (RME) options - 2 x 8 inputs, 24 V/DC - 4 x 8 inputs, 24 V/DC - 2 x 8 inputs, 115 V/AC	
20.2	Output modules				Analogue modules (RMC) - 2 x inputs (+/- 10 V 20mA) - 1 x output (+/- 10 V 20mA)	
					Digital modules (RMA) options - 4 x 8 outputs, 24 V/DC, 500 mA - 2 x 8 outputs, 230 V/AC, 2 A - 2 x 8 inputs, 115 V/AC	
					Relay modules (RMA) - 2 x 8 relay outputs, 230 V, 200 W	
21	Fast inputs on board				3	
22	Diagnostic display	1 x 7 segment display with rolling status indicator			4 x 7 segment display with plain text diagnostics	
23	Data memory	Memory with battery backup			Flash ROM (PCMCIA card) – without battery	



CLC-D2.3



CLC-P1



CLC-P2



PPC-R01



PPC-R02