





## Automatic palletising systems

» Smipal palletising systems set a new standard in the industry of robotic palletisers with two Cartesian axes. Smipal APS series is the outcome of an intense activity of research and innovation, which allowed producing technologically advanced systems capable of providing each user with the fittest packaging solutions according to his specific needs.

SMI palletising systems enable to streamline the end-of-line operations of countless industrial sectors: beverages, food, chemicals, pharmaceuticals, detergents, glass, paper and many more.

The APS series is composed of automatic systems for the palletisation of cases, bundles, trays and other commonly used packs.

Thanks to the possibility to combine in various configurations the central body (column) with some standardized pallet-handling modules, the palletising systems proposed by Smipal are extremely flexible and easily adaptable to any logistic condition of the user's end-of-line area, both in existing plants and in new operations.

	FEATURES	SPEED*
APS 1035	BASIC MODEL	35 ppm
APS 3050		50 ppm
APS 3070		70 ppm
APS 3080		80 ppm
APS 3100 L		100 ppm
APS 1035 P	PAD-INSERTER MODEL	35 ppm
APS 3050 P		50 ppm
APS 3070 P		70 ppm
APS 3080 P		80 ppm
APS 3100 LP	GRIPPING HEAD ROTATION MODEL	100 ppm
APS 3050 R		50 ppm
APS 3070 R		70 ppm
APS 3080 R	MODEL WITH PAD-INSERTER AND GRIPPING HEAD ROTATION	80 ppm
APS 3100 LR		100 ppm
APS 3050 PR		50 ppm
APS 3070 PR		70 ppm
APS 3080 PR	SCARA TECHNOLOGY MODEL	80 ppm
APS 3100 LPR		100 ppm
APS 1550 P Plus		50 ppm
APS 3100 LP Plus		100 ppm



\*Maximum speed referring to pattern 21, 3x2 collations, 1.5 L bottles.

Smipal palletising systems enable to streamline the end-of-line operations of countless industrial sectors: beverages, food, chemicals, pharmaceuticals, detergents, glass, paper and many more.

### » Swift and precise movements

The central column is actuated by brushless motors, which guarantee highly dynamic, reliable and precise movements of the shafts of operation.

The employment of this technology within palletisation systems, which are characterized by repetitive actions, turns into higher reliability, fewer maintenance operations and lower operating costs.

### » Innovative technology

The machine automation and control are entrusted to the innovative Sercos Fieldbus technology, featuring an intuitive user interface for quick and easy management of end-of-line palletising operations.

A touch-screen display with advanced graphics and a complete array of utilities for real-time machine diagnosis and technical support further enhance the machine control features.

In addition to that, the HMI will display automatically all possible palletisation patterns just by entering the pack size and specifications, and the number of layers required.

### » Robustness and reliability

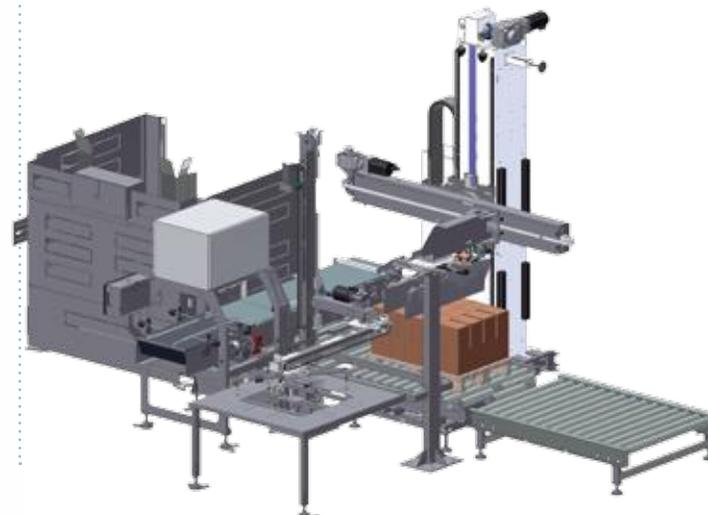
The accurate design of the column and of the horizontal beam, along with the creeping on recirculating-spheres skids, ensures fluid and uninterrupted movements, with nearly no dynamic buckling and virtual absence of vibrations: this is the key factor to be able to guarantee a lengthy life cycle of the mechanical components.

### » Top-level safety

The whole range of Smipal APS automatic palletisers is equipped as a base supply with the brand-new dedicated "safety PLC", which allows to program all protection systems in a flexible, reliable and efficient manner. The PLC monitors the accurate functioning of all safety devices, integrating their performances, for a safe intersection between areas



of handling inside the machine perimeter. This system enables to dramatically reduce machine downtimes, both in an emergency and during the pallet loading operation, the cardboard sheet loading operation, etc., thanks to dedicated solutions for each area of intervention. Maintenance operations are simple and easy, and the palletising systems adaptation to future safety rules will be quick and trouble-free as just an upgrade of the PLC software will be required.



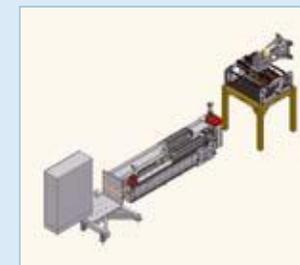
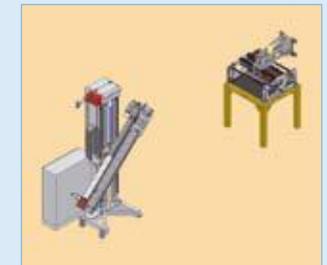
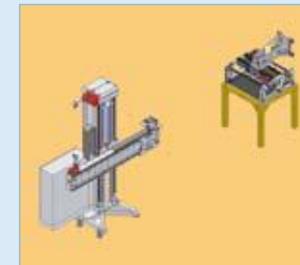
### » Low operating costs and slashed maintenance

Smipal APS palletising systems easily integrate into existing packaging lines or into new plants and can be set in motion immediately, since each single module composing the palletiser, conceived as an independent unit, is connected through a network to the central body.

Thanks to this designing feature, each module is assembled, pre-cabled and tested at SMI production plant, thus minimizing assembly and start up operations at the customer's site.

For example, the central body can be easily disassembled, conveyed or stored in a small room, and later re-assembled and set in motion again in less than 5 hours.

The mechanical simplicity, the employment of robot-based components and the structural optimization allow a remarkable reduction of the maintenance costs and of the energy consumption, as well as the extension of the machine life cycle.





## The packaging process

### » Central column

The APS is a single-column system with two Cartesian axes. The vertical axis is made up of a fixed column along which the horizontal beam slides on guides with recirculating ball bearings. The horizontal working axis consists of the beam on which the gripper-holder arm (APS 1035 models) or the gripping head-holding arm (APS models 1550, 3050, 3070, 3080 and 3100 L) slides on guides with recirculating ball bearings.

### » Packets grouping and row/layer pre-composition

#### APS 1035 models

Packs arriving on the single-lane infeed belt are grouped in the row pre-composition area and are arranged in one line, oriented in the same direction (all are fed either on the long side or on the short side), therefore creating the palletizing row.

The gripper picks up the row thus formed and places it on the pallet. An accessory device, if provided, turns the pallet 90° to change row orientation.

#### APS 1550, 3050, 3070, 3080 and 3100 L models

Packs arriving on the infeed belt, fitted with the cadencing devices, are grouped in the layer pre-composition area.

A conveyor belt equipped with product-insertion belts (or with a multi-way diverter in the case of infeed with continuous in-line pre-composition - mod. 3100 L) orients the packs according to the selected palletizing pattern.

The layer thus formed is inserted into the gripping head by an appropriate motorized pusher.

### » Composing the layer on the pallet

#### APS 1035 models

The gripper picks up the row of packs from the conveyor belt (located at operator height) and places it where required on the pallet with fast and accurate movements.

The beam's vertical movements and the horizontal ones of the gripper-holder are driven by brushless motors, which ensure perfect trajectories during all palletizing phases.

#### APS 1550, 3050, 3070, 3080 and 3100 L models

The gripping head picks up the layers of packs from a conveyor belt at operator height and places them where required on the pallet with fast and accurate movements.

The beam's vertical movements and the horizontal ones of the head-holding arm are driven by brushless motors, which ensure perfect trajectories during all palletizing phases.

The functionality of the APS system can be expanded by adding an optional accessory that allows the gripping head to rotate around its own vertical axis so as to give, where appropriate, the possibility of configurations that are not only orthogonal.



## Configurable modules

### 1 Single-entry infeed with simple preformation

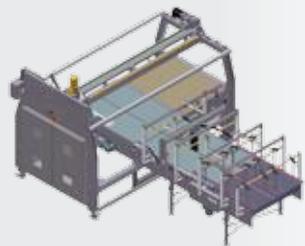


Layer-forming system with a single-entry infeed including 1 double rubberized cadencing belt, 1 pack-rotating system, 1 line/layer-forming product infeed belt, 1 controlled shaft pusher (brushless) and 1 layer-preforming plate.

The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.

The start-up consists of connecting the connected cable of signals, power and sercos to the central module of the APS.

### 2 Double-entry infeed with simple preformation



Layer-forming system with a double-entry infeed including 2 double rubberized cadencing belts, 2 bundle-rotating systems, 2 line/layer-forming product infeed belts, 1 controlled shaft pushers (brushless) and 1 layer-preforming plate.

The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.

The start-up consists of connecting the connected cable of signals, power and sercos to the central module of the APS.

### 3 Double-entry infeed with motorised preformation

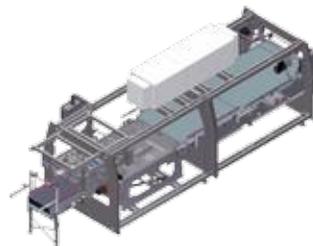


Layer-forming system with a double-entry infeed including 2 double rubberized cadencing belts, 2 bundle-rotating systems, 2 line/layer-forming product infeed belts, 2 controlled axis pushers

(brushless) and 2 motorised belts for layer preformation.

The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled. The start-up consists of connecting the connected cable of signals, power and sercos to the central module of the APS.

### 4 Infeed with continuous in line preformation

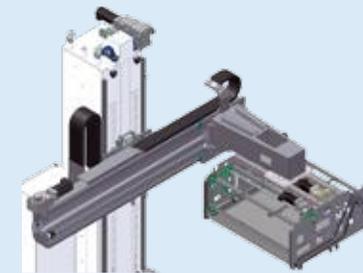


System that continuously prepares the layer in line. By means of an innovative multilane diverting/shifting device, loose bundles coming along a belt in single line are

turned or shifted and arranged onto multiple lanes according to the palletisation pattern, thus pre-forming the layer. A special mechanical actuator separates the pre-formed layer from the accumulating bundles, while the multilane diverting/shifting device prepares the next layer. The layer thus formed is pushed into the roller gate by a bar system. The compact continuous layer-forming infeed allows to optimize end-of-line space management and runs up to 100 packs/minute with

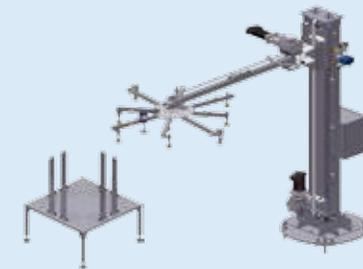
single line infeed (200 packs/minute with double line infeed). The continuous layer-forming infeed differs from traditional systems for its one-way motion and for the possibility to arrange the bundles in whichever position.

### 5 Head Rotation for the central body



Controlled shaft (brushless) head-rotating group, capable of crossing the palletisation layers and/or forming the pallet according to a different angle compared with the head infeed direction.

### 6 Pad magazine and interlayer pad-inserting device



- Pad magazine adjustable in accordance with the interlayer pad dimensions.
- Controlled-shaft (brushless) pad-inserting group, composed of a fixed column with vertical lifting of the rotating arm.

- Adjustable cogged belt system to set the pad gripping and releasing angle according to the process layout (grip/release parallelism keeping)
- Suction-cup gripping system with 8 adjustable points, which ensures the accurate lifting of any kind of interlayer pad.
- The system is tested in SMIPAL factory and is supplied to

the client fully assembled and cabled.

- Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module.

### 7 Pallet magazine

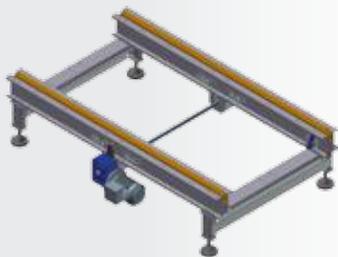


Adjustable fork magazine for empty pallets, capable of:

- 1) loading the pallets into the magazine in both directions;
- 2) releasing the pallet to the line

both headways and sideways (both right and left), in order to ensure the layout top flexibility. The pallet magazine is usually combined with a roller or chain conveyor belt (according to the pallet loading and releasing direction) with increased length, which allows the build-up of a pallet at the outlet without compromising the magazine functionality. Storage capacity: about 12 pallets of std height (i.e. Europallet 144 mm).

### 8 Pallet chain-conveyor



Zinc-coated steel frame and pallet conveyance by means of 3 chains with 3/4 inch pitch and 500 mm center

distance, for a smooth motion in the "non-rollable" direction.

Electronically reversible central motorization.

The system is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.

Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module.

Available in three different lengths: 1500 mm, 2000 mm, 3000 mm.

### 9 90° roller/chain pallet translation



Zinc-coated steel structure.

Mixed system with rollers and chains for the orthogonal deviation of the pallets, with reverse of the forward-facing side. Electronically reversible central motorization. The system is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.



Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module.

### 10 Pallet roller conveyor



Rollers with 76mm  $\phi$  and 150 mm pitch, motorised through a 5/8 inch chain. Electronically reversible central motorization. This structure enables the simultaneous build-up of 2 pallets.

The system is tested in SMIPAL factory and is supplied to the client fully assembled and cabled. Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module. Available in three different lengths: 1500 mm, 2000 mm, 2500 mm, 3000 mm.

### 11 Pallet rotation



Zinc-coated steel structure. Roller or chain system for the pallet rotating keeping the forward-facing side. Electronically reversible central motorization. The system is tested in SMIPAL factory and is

supplied to the client fully assembled and cabled. Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module.

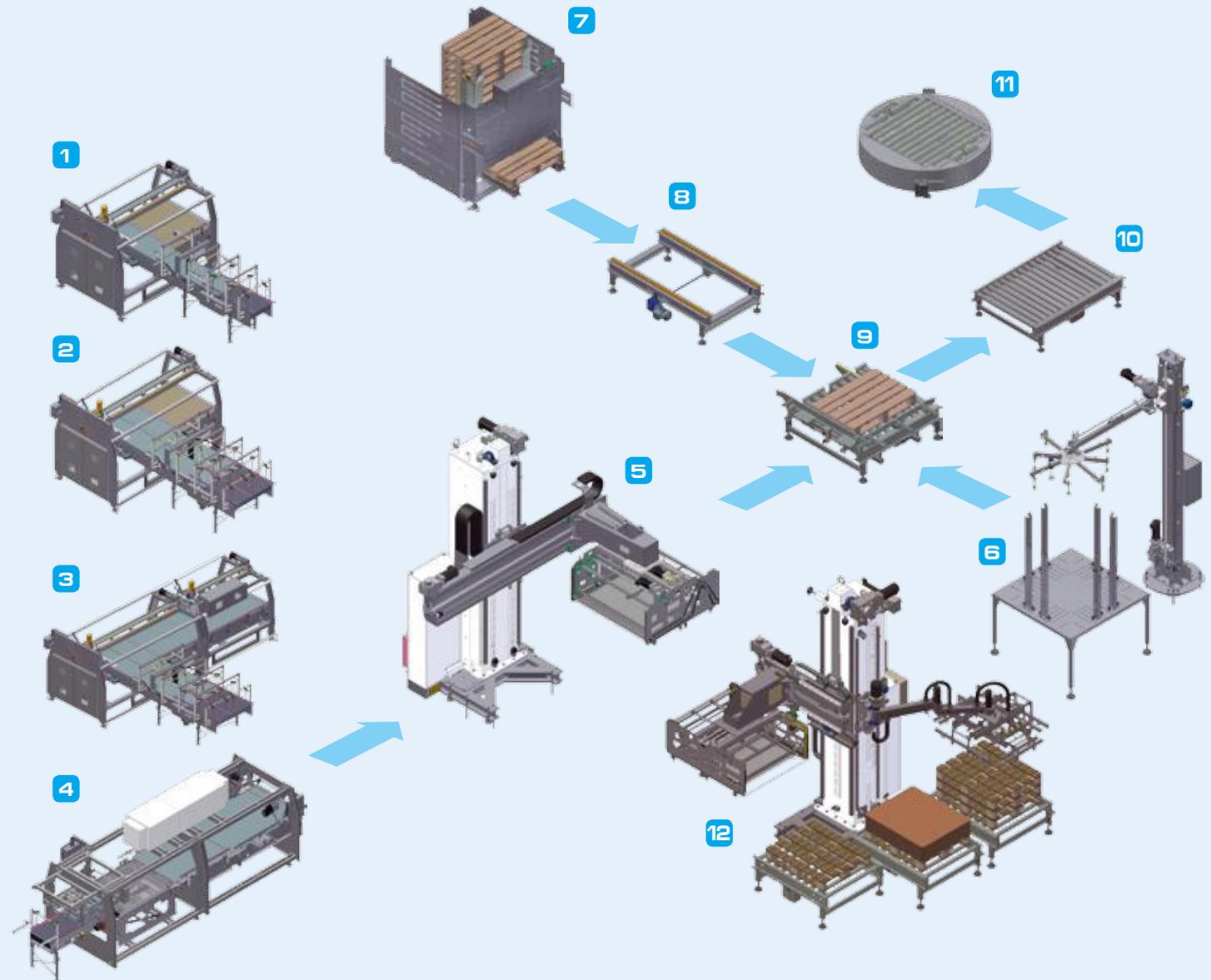
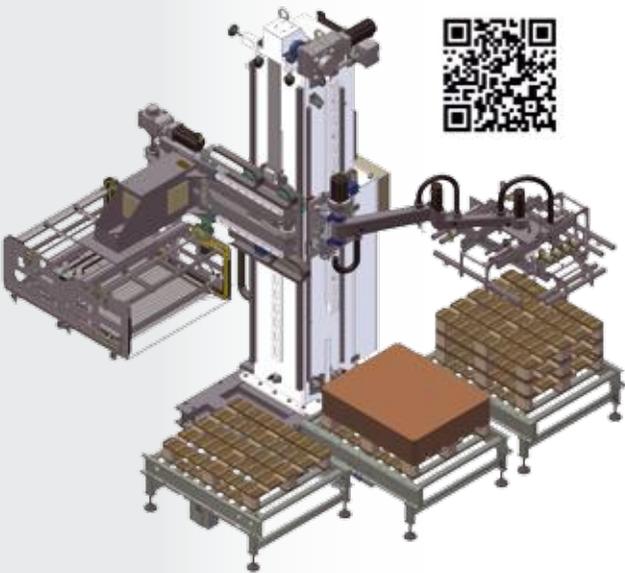
## Configurable modules

### 12 SCARA technology arm



The adjustable arm featuring SCARA technology performs both vertical and horizontal movements for the empty pallets infeed and the pad insertion. This adjustable mechanical group, located on one

side of the central column, is perpendicular to the beam holding the loading basket. The SCARA arm moves vertically by running along the central column for the operations of pick up and release of pallets and pads, whilst it moves horizontally within a range of 180° for the transfer of pallets and pads from their magazines to the palletising stillage.



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