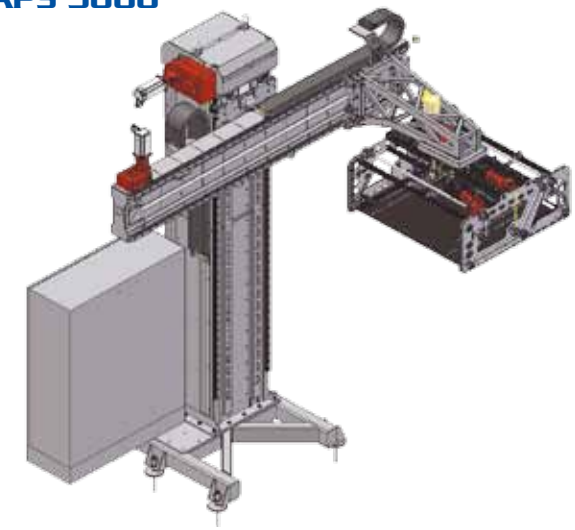
smipal division




Automatic palletising systems

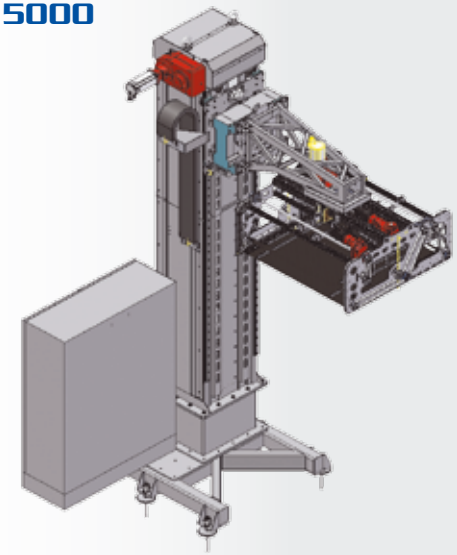
» Smipal palletising systems set a new standard in the industry of antropomorphous robotic palletisers.
Smipal APS series is the outcome of an intense activity of research and innovation, which allowed producing technologically advanced systems capable of providing each user with the fittest packaging 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.

APS 3000



Speed: up to 300 layers/hour for bottom-to-top movement systems
Dimensions: central body: 4.500 x 3.600 x 5.000 mm

APS 5000



Speed: up to 500 layers/hour for top-to-bottom movement systems
Dimensions: central body: 2.500 x 3.600 x 5.500 mm

*Maximum actual speed in layers/hour, referred to a EUR-EPAL pallet (800 x 1200 mm). Speeds above indicated are related to 3x2 bundles of 1.5 liter bottles, equal to some 38,000 bph, for APS 3000 systems and to 6x4 bundles of 0.33 liter cans, equal to some 100,000 cph, for APS 5000 systems.
**Length x width x height.

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 6 axes of operation (the vertical axe, the horizontal axe, the grip-head rotation axe, two axes of layer-centering in the grip-head and the layer-placing axe – ref. APS 3000).
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

» APS 3000 Model

The APS 3000 is a single-column system based on two Cartesian axes motion. The vertical axe is composed of a hard-set vertical column along which a horizontal beam runs on recirculating-sphere guides. The horizontal axe of operation is made up of the beam, along which, again on recirculating-sphere guides, the grip-head holding arm moves. The grip-head picks the pack layers up from a conveyor belt positioned at waist height and, with swift and precise movements, deposits them on the pallet in the desired spot. The beam's vertical motion and the grip-head holding arm's horizontal motion (depending on the palletising system chosen) are driven by brushless motors, which ensure perfect trajectories during the whole palletisation process.

The APS 3000 system's functions can be widened by adding an optional device enabling the grip-head to rotate around its own vertical axe, allowing, if required, for configurations other than orthogonal.

» APS 5000 Model

The APS 5000 is a single-column system based on one Cartesian axe motion (vertical).

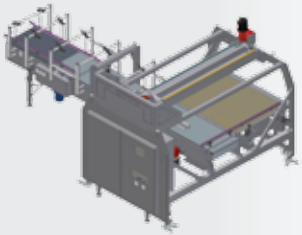
This system is not equipped with a horizontal beam, since the grip-head holding arm -driven by brushless motors- runs vertically along the hard-set column.

The APS 5000 system's functions can be widened by adding an optional device enabling the grip-head to rotate around its own vertical axe. The packs are picked up by the grip-head and placed on the pallet in the desired spot.

The APS 5000 achieves a higher output rate if compared with the APS 3000, as it performs movements along its vertical axe only.

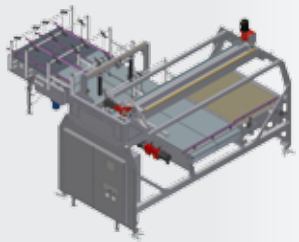
Infeed / outlet modules

1 Single-entry infeed with simple preformation



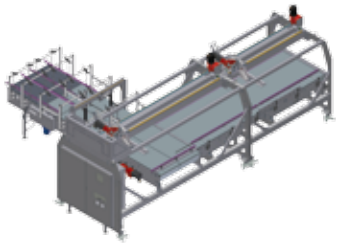
Layer-forming system with a single-entry infeed including 1 double rubberized cadencing belt, 1 pack-rotating system, 1 line/layer-forming product infeed belt, 1 controlled axis pusher (brushless) and 1 layer-preforming plate.
The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.
The start-up consists of connecting the connectored cable of signals, power and sercos to the central module of the APS.

2 Double-entry infeed with simple preformation



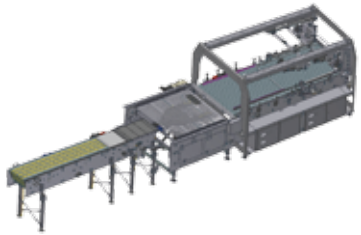
Layer-forming system with a double-entry infeed including 2 double rubberized cadencing belts, 2 bundle-rotating systems, 2 line/layer-forming product infeed belts, 1 controlled axis pushers (brushless) and 1 layer-preforming plate.
The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.
The start-up consists of connecting the connectored cable of signals, power and sercos to the central module of the APS.

3 Double-entry infeed with motorised preformation



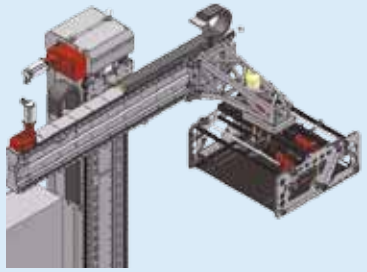
Layer-forming system with a double-entry infeed including 2 double rubberized cadencing belts, 2 bundle-rotating systems, 2 line/layer-forming product infeed belts, 2 controlled axis pushers (brushless) and 2 motorised belts for layer preformation.
The system, designed in accordance with FCR (Full Cost Reduction) methodologies, is tested in SMIPAL factory and is supplied to the client fully assembled and cabled. The start-up consists of connecting the connectored cable of signals, power and sercos to the central module of the APS.

4 Infeed with continuous pre-forming



Continuous layer-forming system. 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 80 packs/minute with single line infeed (160 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-axis (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.
The APS central module is prearranged for the assembly of the head-rotating group; the prearrangement simplifies the optional future installation of this accessory.

6 Pad magazine and interlayer pad-inserting device

Pad magazine adjustable in accordance with the interlayer pad dimensions.
Controlled-axis (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.
Start-up time is really short, since you just have to connect the connectored cable of signals, power and sercos bus to the central module of the APS.

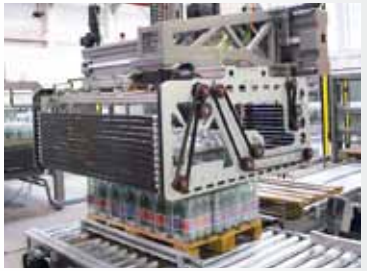
7 Pallet magazine

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: some 15 pallets with standard height (i.e. euro 144 mm).

8 Pallet chain-conveyor

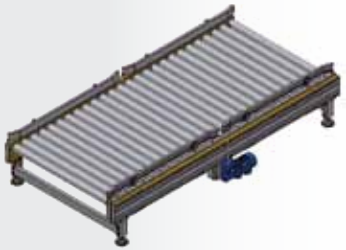
Zinc-coated steel frame and pallet conveyance by means of 3 chains with 3/4 inch pitch and 500 mm center distance, for a smooth motion in the "non-rollable" direction.
Electronically reversible central motorization.
The system is tested in SMIPAL factory and is supplied to the client fully assembled 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 (with frame allowing for the simoultaneous accumulation of 2 pallets).

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

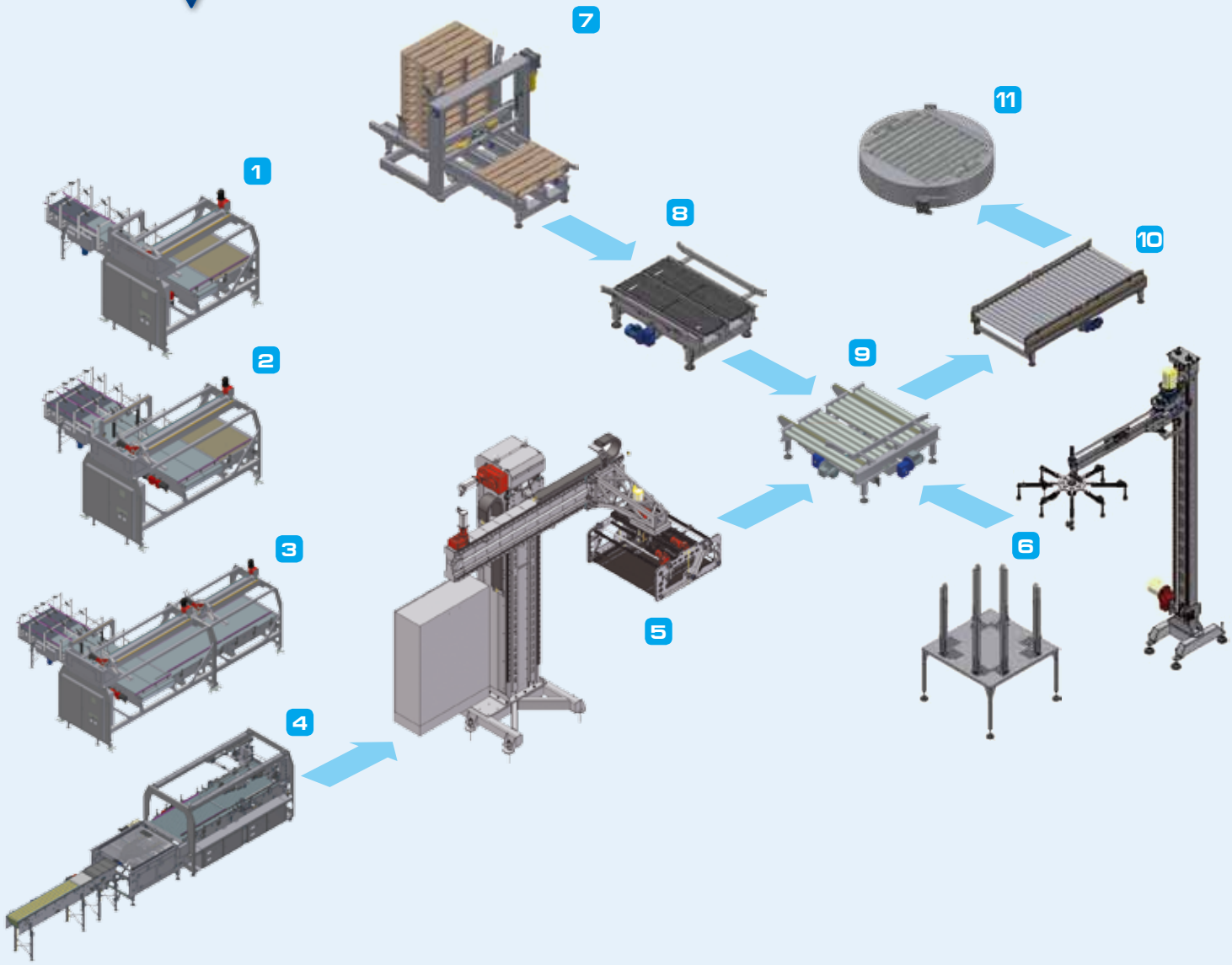


Rollers with 90 mm ø and 130 mm pitch, motorised through a 3/4 inch chain. Electronically reversible central motorization.
This structure enables the simultaneous build-up of 2 pallets. The system is tested in SMIPAL factory and is supplied to the client fully assembled and cabled. Designed in accordance 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, 3000 mm (with frame allowing for the simoultaneous accumulation of 2 pallets).

11 Pallet rotation

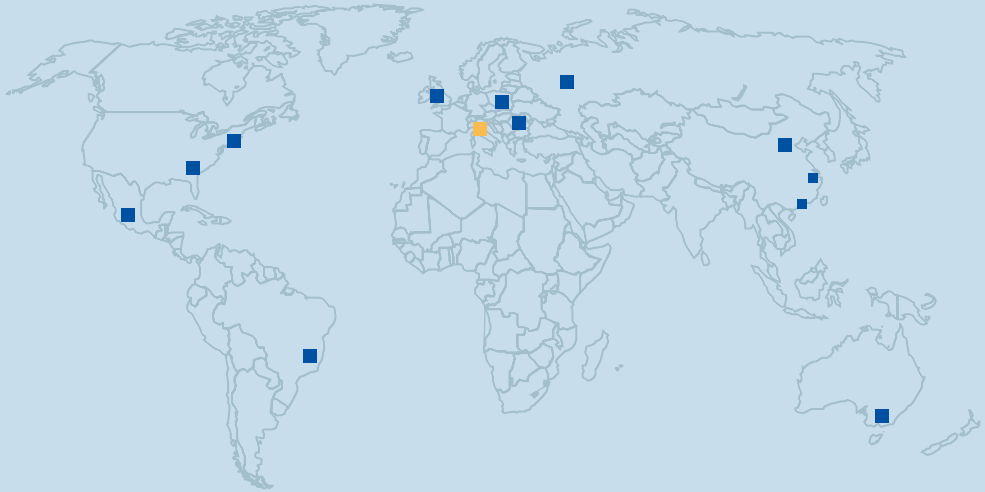
Zinc-coated steel structure.
Roller or chain system for the pallet rotating keeping the forward-facing side.
Electronically reversible central motorization.
The system is tested in SMIPAL factory and is supplied to the client fully assembled and cabled.
Designed in accordance with FCR (Full Cost Reduction) methodologies, this accessory device is controlled by the electrical cabinet of the APS central module.

Example of column / modules combination



www.smigroup.it

SMI S.p.A. - Headquarters
Via Piazzalunga, 30
24015-IT San Giovanni Bianco (BG)
Tel.: +39 0345 40.111 - Fax: +39 0345 40.209
info@smigroup.it



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