



Automatic Guided Vehicles – INDEVA[®] AGV

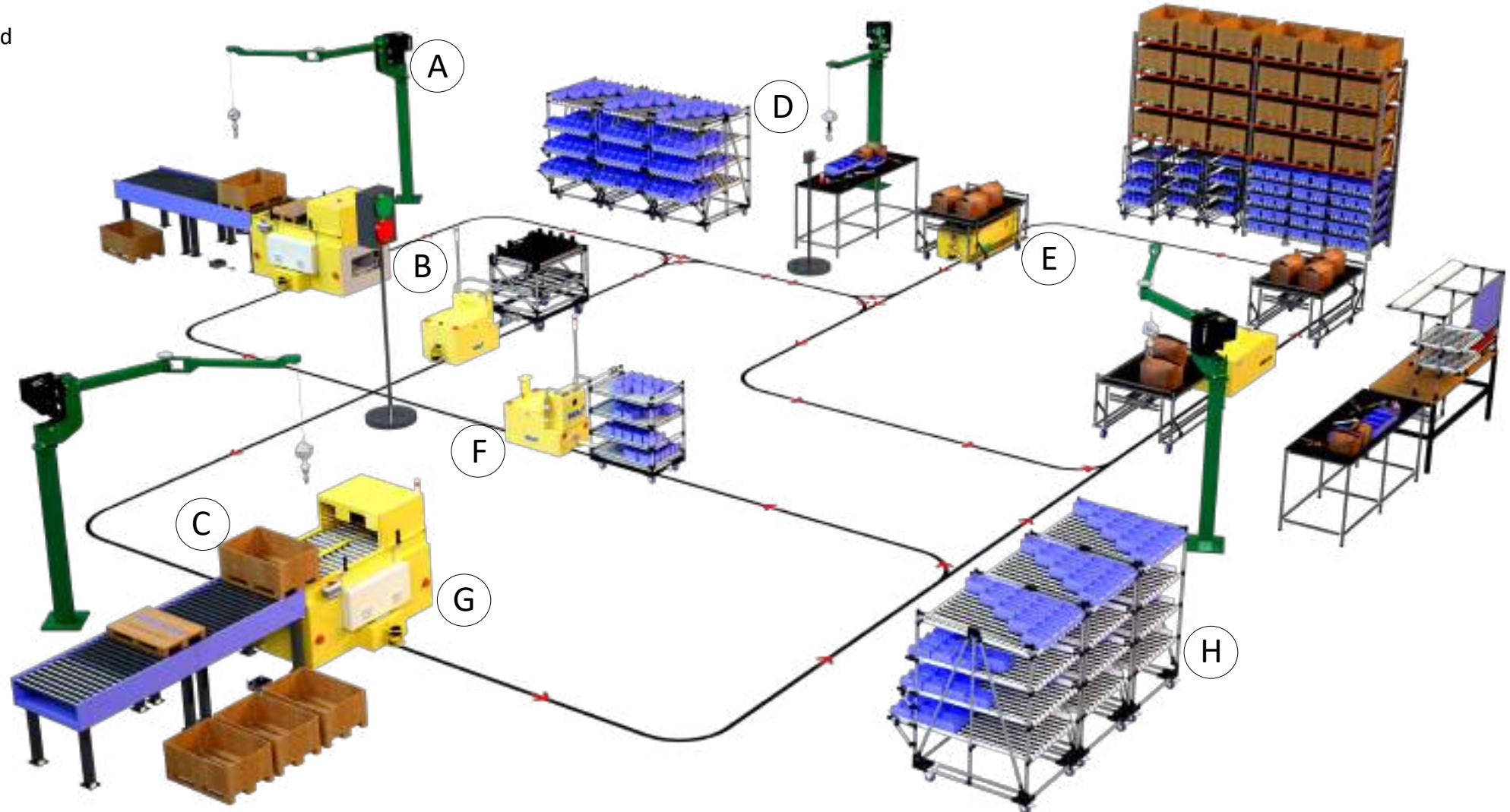
Extensive expertise in the design of Automatic Guided Vehicles, materials handling solutions and industrial automation

Scaglia Indeva® is in the business of the low cost automation since 1980 and has been supplying solutions for lean manufacturing applications, namely components for modular structures (Indeva Lean System®) and **Automatic Guided Vehicles (AGVs)** since year 2000.



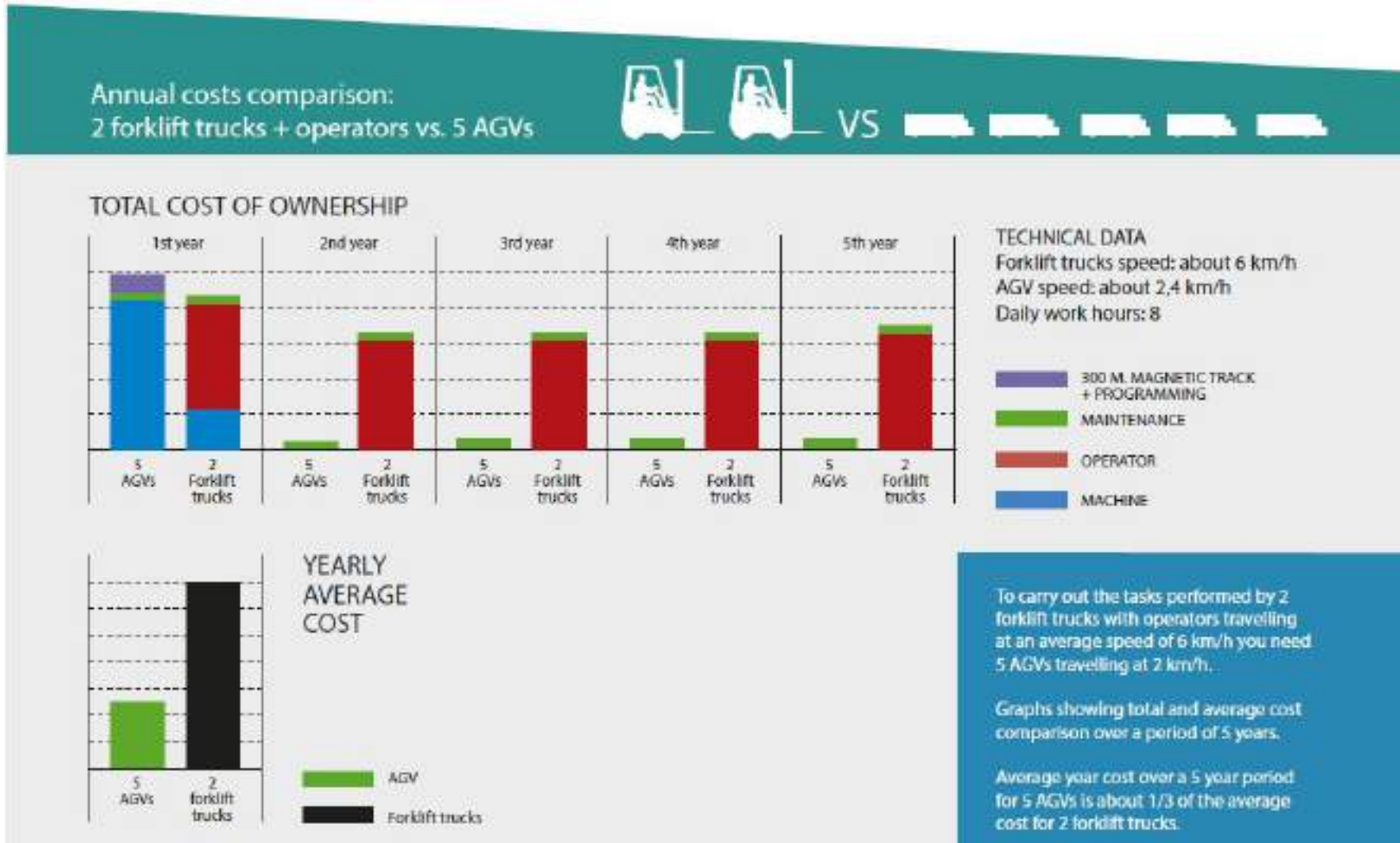
Scaglia Indeva has industrialized its products for more reliability and faster delivery

- A) INDEVA® Manipulator
- B) WI-FI controlled stop light
- C) WI-FI controlled load/unload
- D) Remote button
- E) INDEVA® AGV Tunnel
- F) INDEVA® AGV Tugger
- G) INDEVA® AGV Custom
- H) Modular structure INDEVA Lean System®



Annual costs comparison: 2 forklift trucks + operators vs. 5 "Indeva AGVs"

To carry out the tasks performed by **2 forklift trucks with operators** travelling at an average speed of 6 km/h you need **5 AGVs** travelling at 2 km/h. Graphs showing total and average cost comparison over a period of 5 years. Average year cost over a 5 year period for 5 AGVs is about 1/3 of the average cost for 2 forklift trucks.



Indeva AGVs classification

AGV INDEVA® Standard Models



INDEVA® AGV standard models range comprises Tugger AGV 750 -1500 kg and Tunnel AGV 750 kg.

Main features:

The AGVs follow a magnetic tape which is quickly and easily laid along the required route.

Each standard AGV can be configured for different functions and can be upgraded from a range of optional accessories.

An INDEVA® AGV is programmed for automatic start by means of either a preset timing or reception of a signal from customer's line.

Comes complete with standard interfaces. Customer can use these to perform special functions or to control external devices.



**INDEVA®
TUGGER AGV**

INDEVA® TUGGER AGV is typically a standard product used to tow a train of trolleys. We can supply trolleys designed according to the materials to be moved.

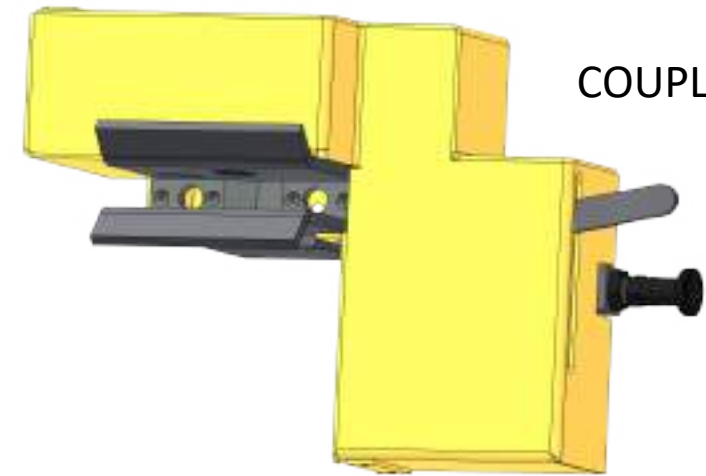


**INDEVA®
TUNNEL AGV**

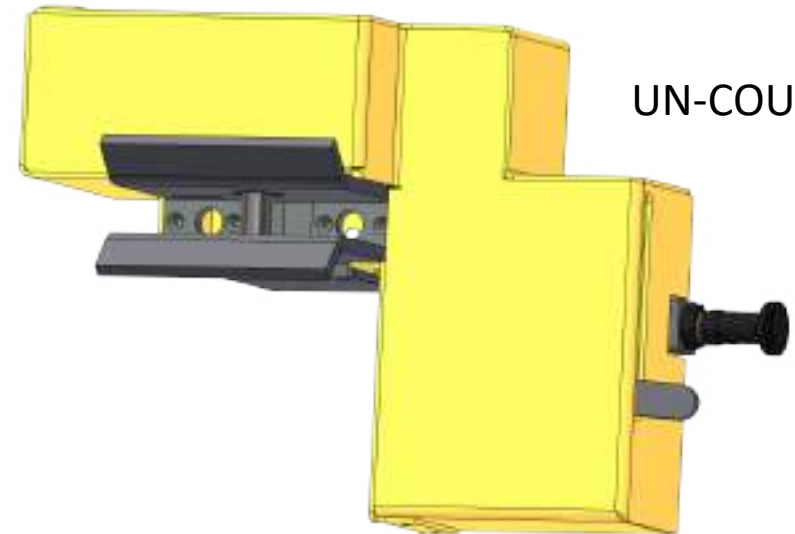
INDEVA® TUNNEL AGV is used to move trolleys through the workshop and warehouse. This AGV positions itself beneath a trolley or cart that, using a fully automated pin-hook system, is then guided to the destination. At the destination, the AGV moves forward, automatically releasing the full trolley and hooking the empty trolley for return to the warehouse. Towing capacity up to 750 kg.

This AGV model is largely used to transport accessory kits from warehouse to the assembly line of automotive industry.

INDEVA® TUGGER AGV - Automatic trolley release



COUPLING

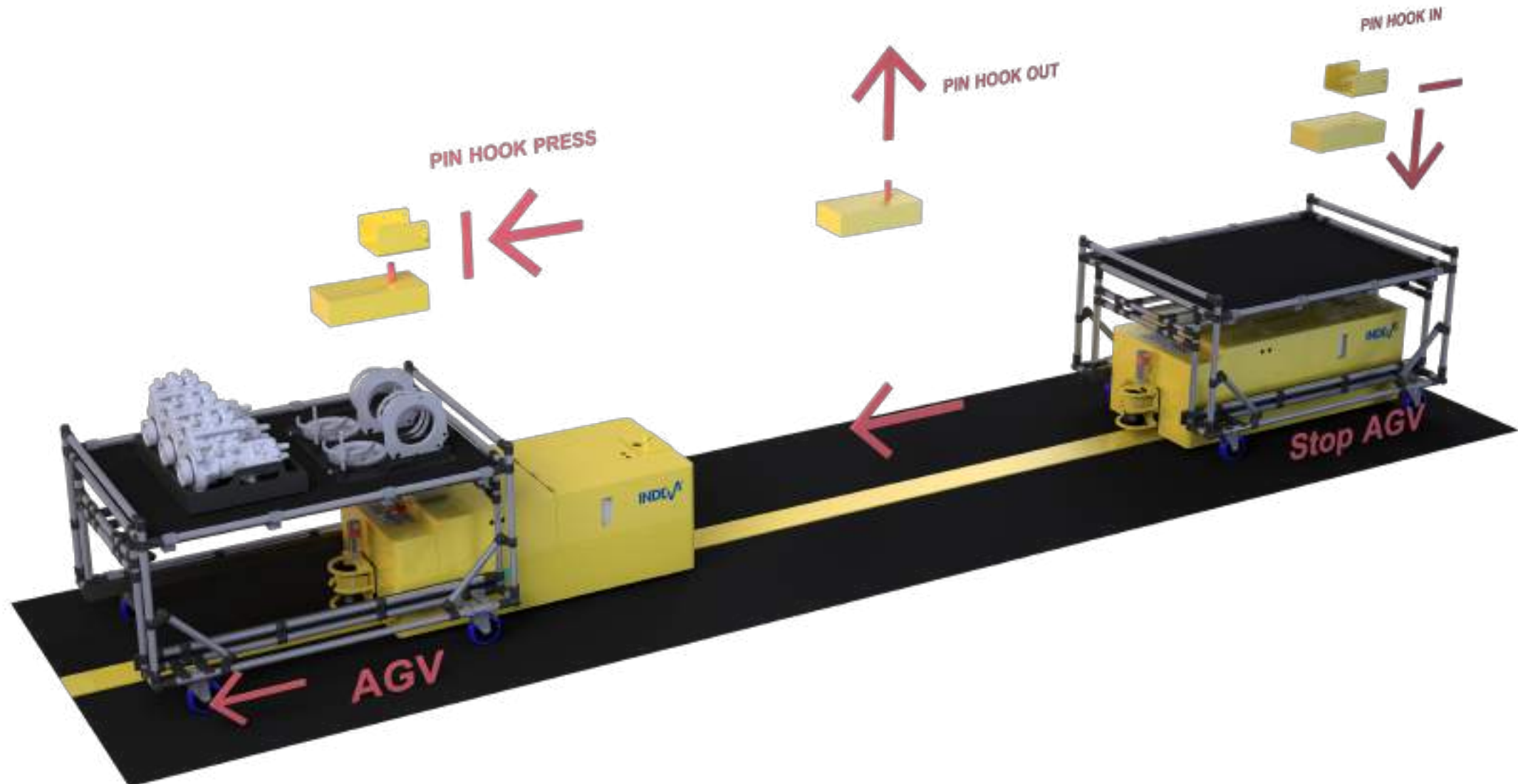


UN-COUPLING

INDEVA® TUGGER AGV



INDEVA® TUNNEL AGV – Automated pin hook system

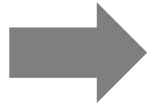


INDEVA® TUNNEL AGV



INDEVA AGVs classification

AGV INDEVA® Custom built Solutions



A custom built INDEVA® AGV is designed specifically to meet special site and operational requirements regarding structure, layout, size and program.

Custom AGVs can be constructed to your exact specifications using either modular pipes and joints from our INDEVA Lean System® range of components or a steel base structure.

INDEVA® AGV WELDED STRUCTURE



The INDEVA® AGV shown above is complete with **power driven rollers** for uploading large containers from the conveyor line that carries material between the warehouse and assembly line. It can carry loads up to 1500 kg.

INDEVA® AGV MODULAR STRUCTURE



An INDEVA® **custom built gravity AGV** is used to transport boxes and small containers in both directions between the warehouse and assembly line. Could be possible the loading/unloading of the boxes from/to the AGV is carried out with a completely automatic and simple mechanism using gravity to slide boxes from the AGV to the rack and vice-versa.

INDEVA® AGV WELDED + MODULAR STRUCTURE



The above shown custom built INDEVA® AGV is equipped with **custom made power driven conveyors**, matched by similar conveyors at the load and offload positions. On arrival at correct location, the AGV establishes contact with the conveyor using Wi-Fi. This sets both powered conveyors rotating at the same speed, so **providing a smooth, controlled transfer of product**. Potential applications are the transfer of heavy loads and fragile materials.

INDEVA® AGV WELDED STRUCTURE

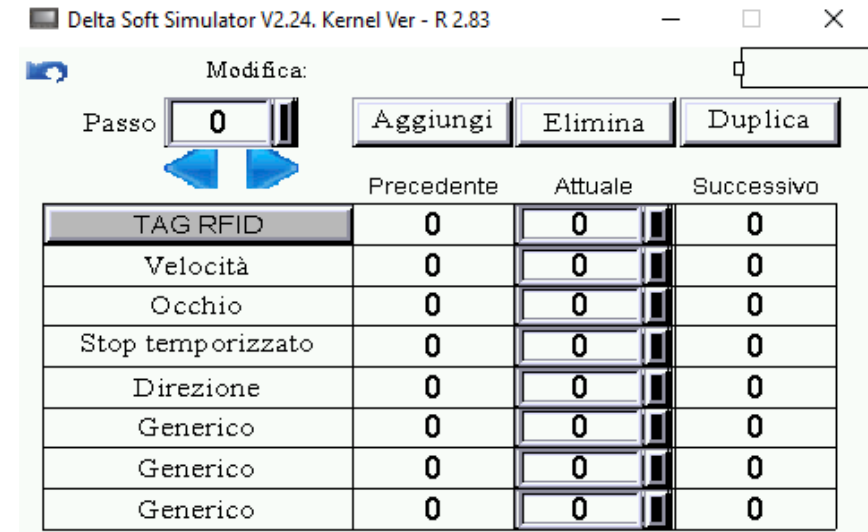
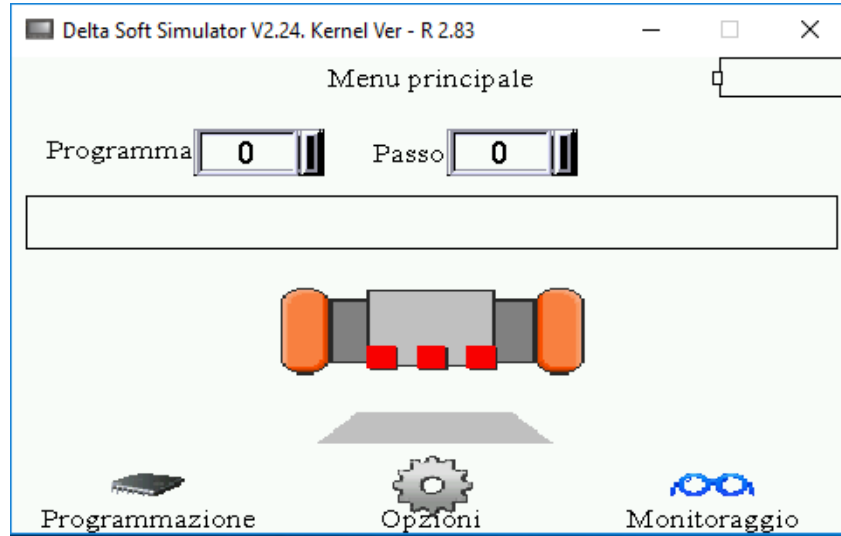


INDEVA® AGV MODULAR STRUCTURE



INDEVA® AGV WELDED + MODULAR STRUCTURE





KIT OF STANDARD AGV MODULES

The kit is complete with safety light, battery charger and fully marked wiring for easy assembly; you can convert a trolley yourself with the help of the included manual or optionally by attending a training. Alternatively, we can do the job for you.



A range of accessories and options are available to enhance your AGV with items for: power system, route & markers, communication & control and custom trolleys.

Battery trolley



Made with INDEVA Lean System® modular structure. Very useful accessory for changing batteries: the battery smoothly slides onto the AGV and from the AGV to the trolley by means of roller tracks.

Battery pack



Spare standard batteries are available in 40A/h and 70A/h 24 volt DC. Batteries of different capacities are available on request.

Trickle charger



Each AGV crosses a charging point whilst travelling which helps to maintain the battery in a charged condition.

Magnetic marker



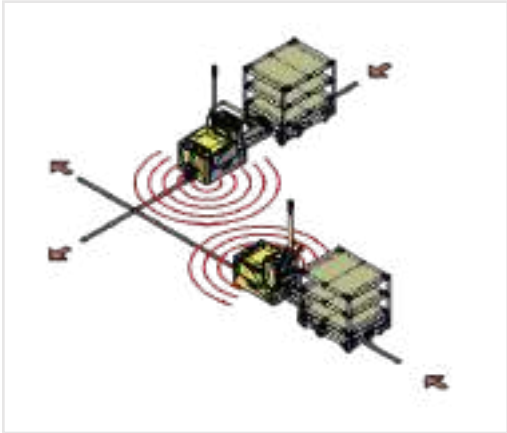
Glued or fixed with resin to the floor are the indicators where each AGV must stop to carry out a task.

RFID



System for the univocal identification of position so that an AGV can be added to the route without any external input.

Wi-Fi Device



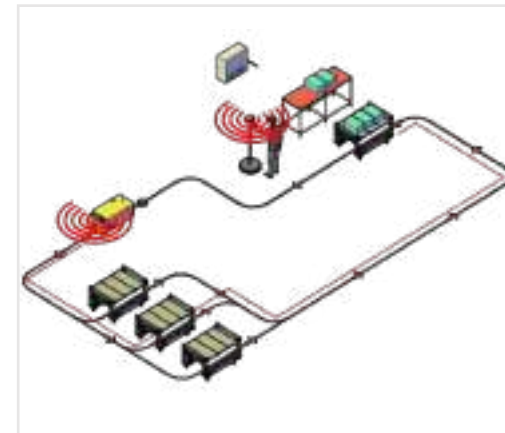
You can equip your AGV with a Wi-Fi card to allow it to communicate with other devices, for example other AGVs, to control crossings or Start-Box, etc..

Wi-Fi Start-Box



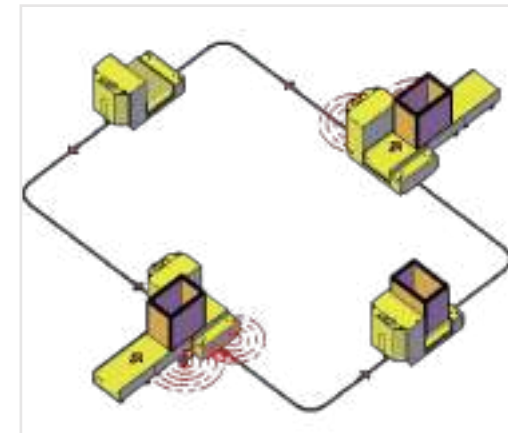
Remote Push Buttons allows to start AGVs by means of Wi-Fi. This device can be installed near the operator, not on the AGV, in order to improve ergonomics for the operator. This accessory can be also used in order to interface an AGV with other machines on the line.

Electronic Kanban



The Electronic Kanban System, using the wi-fi network, allows to assign one or more preset tasks to an AGV, by simply pressing the push button related to each task (e.g.: in the drawing buttons marked "A" "B" "C").

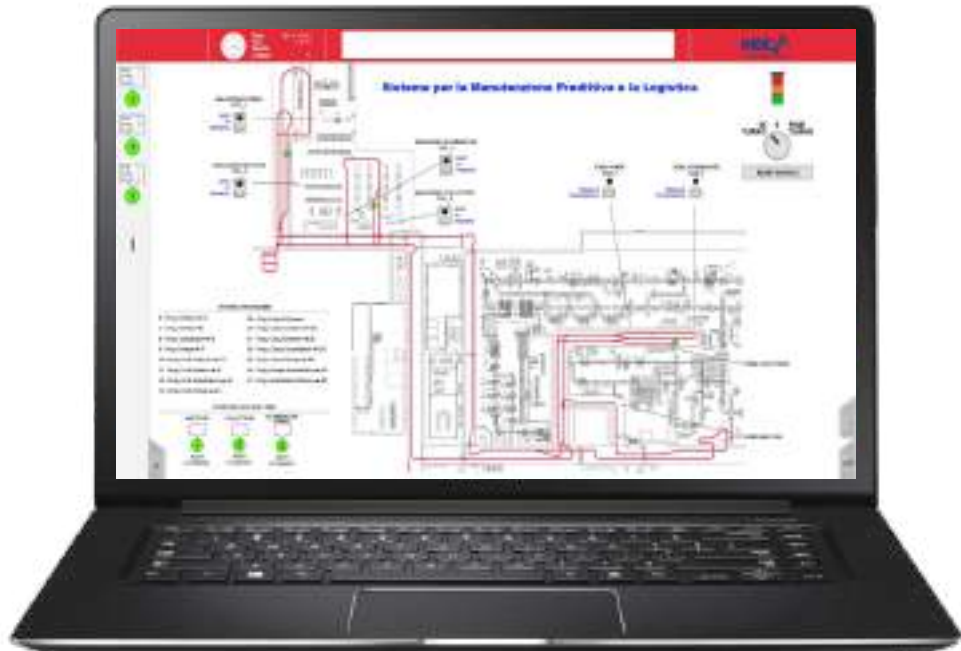
Bridge



The bridge provides an interface between the AGV and the customer's system (e.g.: roller conveyors, production lines, robot, etc..). Communication of all data relative to the transfer of goods according to custom preset sequences occurs through the Wi-Fi network.

It is the brain interacting with all the vehicles in the entire system: it receives from the AGVs information on their position and work parameters and controls crossings and overall traffic flow.

- controls AGV and all the other line components we supply such as roller conveyors, WI-FI start-stop, etc...
- controls crossings
- controls position on the route
- assigns the task to be completed by the AGV
- controls battery level and other parameters
- informs about failure and position of the AGV in case of unplanned stop.



Wi- Fi Network Specifications

- Wi-Fi 2,4 GHz / 5GHz;
- Static IP addressing;
- Authentication: WAP2 - PSK;
- Wi-Fi signal minimum power (that must cover the whole work area) - 60db.

INDEVA® AGV – SUPERVISOR & CONTROLLER FUNCTIONS

- Visualization of the variables and parameters of each vehicle or wi-fi device;
- Vehicle Status:
 - Battery tension;
 - Speed;
 - Running pitch and program;
 - Maintenance request;
- Visualization and management of the alarms, logs and trends;
- Visualization of each wi-fi device connections.



Event manager;

Crossing manager;

Start, stop lights and electronic kanban push buttons manager;

Stop lights;

Data analysis and management:

The AGV supervisor allows data analysis in real time, as well as at a later time, as all data is stored.

The alarms allow the operator to see current and past working status of each AGV

(e.g. “exhausted battery on AGV n° 3). It is also possible to export data such as battery values, number of kilometers travelled, number of stops, etc...



We can design and manufacture custom trolleys for the INDEVA® TUGGER and TUNNEL AGVs. We can give guidance in the design and manufacture of the trolleys and the best system for the automatic loading/unloading of materials.

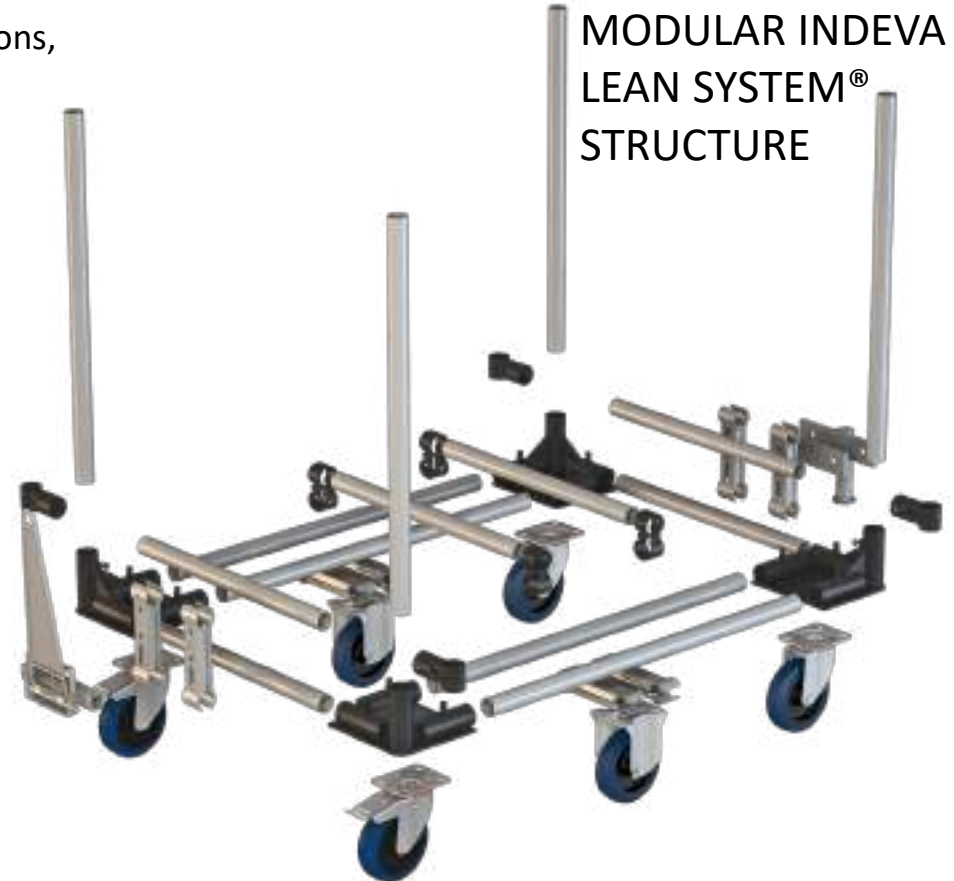
Options available for Custom trolley structure:

- Steelwork structure
- Modular INDEVA Lean System® structure; This allows to build it to your exact specifications, at a reduced cost.

STEELWORK STRUCTURE



MODULAR INDEVA LEAN SYSTEM® STRUCTURE



INDEVA® AGV – CUSTOM U-SHAPED BASE LODGE TROLLEYS

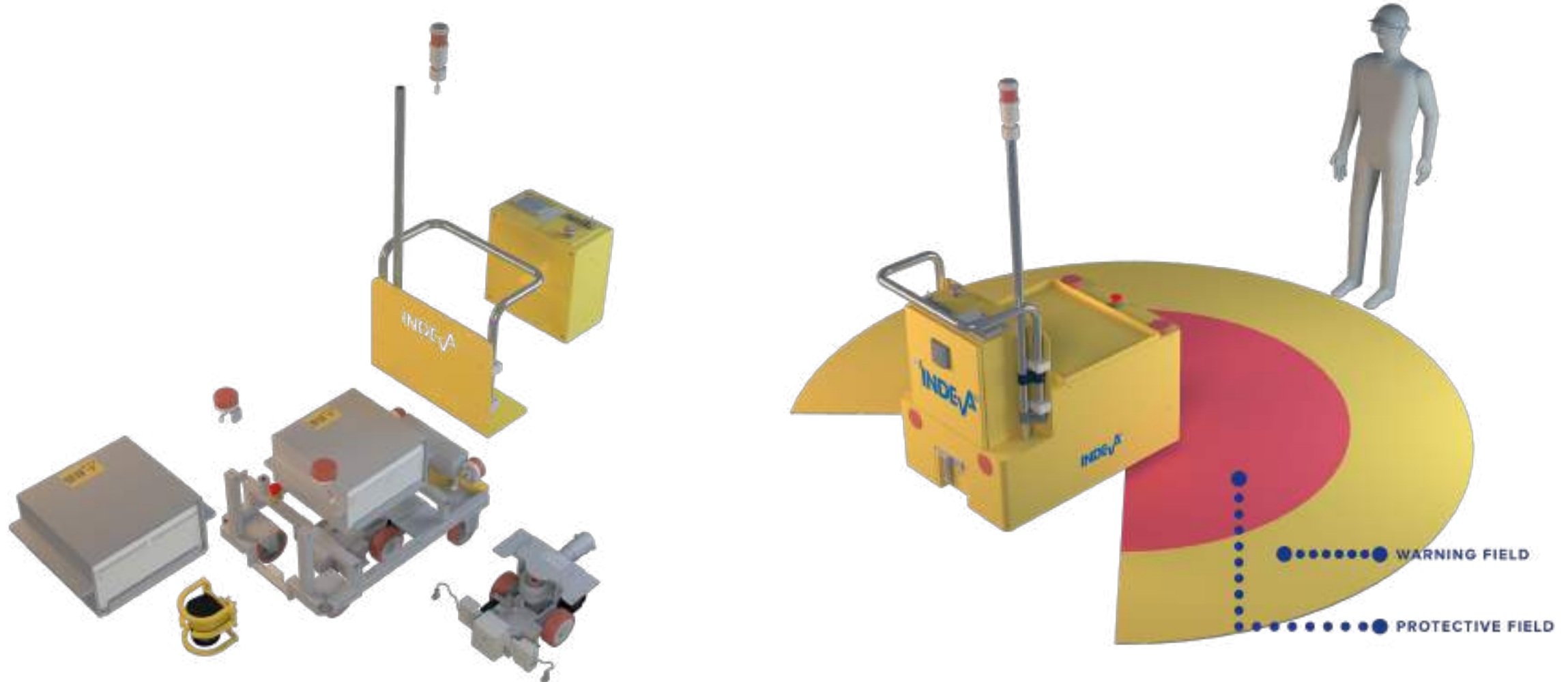
This system allows quick trolley replacement with no need to unhook the trolley from the train. A convoy consisting of a tractor and several trailer trolleys can travel more easily and safely when all vehicles move along the same trajectory. Our auto-synchronised steering system, made with high precision rigid guide bars, needs no maintenance and guarantees that the entire convoy will follow a single track, with gaps of only a few millimeters. The design begins by studying the floor plan and cargo size, to identify the best possible route to suit the turning circle of the train.



INDEVA® AGV – SAFETY AND CERTIFICATIONS

All INDEVA® AGVs, both standard and custom, are CE certified and comply with all Safety, Ergonomics and European Quality Standards, Directives and Regulations, in particular Directive 2006/42/EC. Certifications cover also the route and all relative risks.

A class 3 Laser Scan system with 8 (for standard models) or 16 (for some custom models) zones guarantees perimeter safety control.



EXPERTISE AND REPUTATION

Our partners are: ABB (ITALY) – BREMBO (ITALY) – CARL ZEISS (ITALY, HUNGARY) – COM40 (POLAND) - COMAU (ITALY) – DELPHI (HUNGARY) – FAURECIA (CZ. REP., GERMANY, FRANCE, POLAND) – FCA (ITALY, POLAND BOTH SEVERAL PRODUCTION SITES) – FPT (ITALY, POLAND) – KUBOTA (FRANCE) – MAGNETI MARELLI (ITALY) – PEGUFORM (SPAIN) – PLASTIC OMNIUM (FRANCE) – PSA PEUGEOT CITROEN (SEVERAL PRODUCTION SITES IN FRANCE) – PREMIUM SOUND SOLUTIONS (HUNGARY) – TECHNOGYM (ITALY) – TPV (POLAND) – VESTEL (TURKEY) – VOLVO TRUCKS (FRANCE) – VM MOTORI (ITALY) – WABCO (POLAND) – YANMAR (ITALY) – POSTE ITALIANE (ITALY) – ROBOPAC (ITALY) – SUZUKI (HUNGARY).



	Tugger/Tunnel 750 Kg	Tugger 1500 kg
POWER SUPPLY	24 Volts DC	48 Volts DC
DRIVE UNIT	Motor type DC Brushless (with brake) power 100W x 2	Motor type DC Brushless (with brake) power 400W x 2
TOWING CAPACITY	Max towing capacity: 750 kg	Max towing capacity: 1500 kg
TOWING FORCE	350 N - 36 kgf - (maximum at max speed)	700 N – 72 kgf (maximum at max speed)
MAX SPEED	50 m/min (selectable from 5 to 50 m/min)	50 m/min (selectable from 5 to 50 m/min)
GUIDANCE SYSTEM	Magnetic	Magnetic
DIRECTION	Forward	Forward
STEERING SYSTEM	Differential speed between drive wheels	Differential speed between drive wheels
MIN TURNING RADIUS	600 mm	1000 mm
MAX FLOOR INCLINATION	1%	1%
FLOOR LEVELNESS	± 5 mm every 2 meters	± 5 mm every 2 meters
STOP PRECISION	± 30 mm	± 30 mm
BATTERIES	Set of 24V (2x12V) Gel 40Ah or 70 A/h (charger included)	Set of 48V (4x12V) Gel 135A/h (charger included)
BATTERY RUN TIME	About 6 hours for 40A/h and 10 hours for 70A/h	About 16 hours
PROGRAMS	56 programs - 250 lines each program	56 programs - 250 lines each program
DIMENSIONS LxWxHTugger	965 mm x 544 mm x H 1.500 mm	1400 mm x 920 mm x H 1150 mm
DIMENSIONS LxWxHTunnel	1.350 mm x 570 mm x H 450 mm	
OBSTACLE SENSOR	SICK Laser Scanner 8 zones	SICK Laser Scanner 8 zones
SAFETY	According to all relevant standards (EN1525, EN13839): Obstacle sensor, flashing lamp, melody unit, emergency stop button, turn indicators (optional)	

