INDEVA® AGV

Automatic Guided Vehicles

GRUPPO Scaglia 1838

INDEVA®

INTELLIGENT DEVICES FOR HANDLING

The Company was founded in 1838 by the Scaglia family and remains in their ownership to the present day. It was the foundation stone of an important industrial group, which has now diversified into a wide range of commercial and manufacturing businesses, with plants and subsidiaries worldwide.

Internal Material Handling Experts

Today, Scaglia Indeva is recognised worldwide as the supplier of state of the art materials handling solutions, individually designed with the purpose of improving ergonomics, safety and productivity in manufacturing and Logistics. We boast extensive expertise in designing solutions that are compliant with the latest Directives, Standards and Guidelines on ergonomics and safety as well as Lean Manufacturing principles.
The INDEVA® solutions range of products includes Intelligent Assist Devices, AGVs and Modular Structures.

AGVs INDEVA® have been chosen by large manufacturing companies in the Automotive, Mechanical, Electronic and Fashion Industries, because we provide our customers with expert, dedicated attention to their requirements from concept to commissioning and beyond.

Shown below is a layout of a typical AGV route in a manufacturing environment.

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®
I) Cobot

Advantages

Precise and safe operation
Very definite logistic flow with fixed route.
Operation 24/7 with no human intervention required.
Elimination of the risks associated with use of forklift trucks. No damage caused by AGVs to goods, machinery or permanent structures.

Easy-to-assemble and easy-to-maintain
Thanks to “all plugs” feature.

Advanced programming interface
Quick and easy programming by means of a touch panel or PC interface. Possibility to introduce interfaces with external input/output signals.

Higher speed and stability in turns
A closed loop control system enables precise tracking of the magnet guide tape without deviation or variation.

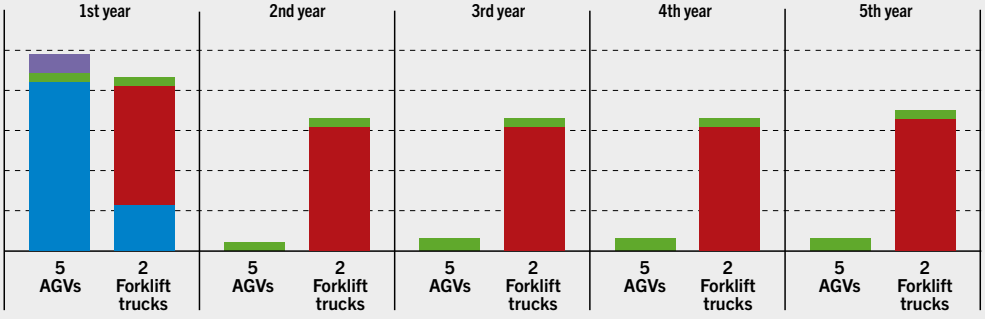
Flexibility
No conventional materials-handling infrastructures required. The number of AGVs can be increased as business grows. Updates are possible without shutting down the entire system.
Work flow shared efficiently and dynamically between AGVs in use. Routes are easy to reconfigure if needed, new AGVs easily added. Compatibility with any type of automation. Traffic management system guaranteed to avoid collisions.

Efficient, reliable and flexible transport
Just-in-time delivery.
No destination errors.
More precise inventory management.
Elimination of material stocked on the production floor.

Optimum quality to price ratio
Low running and maintenance costs.

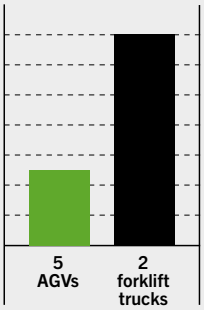
Annual costs comparison:
2 forklift trucks + operators vs. 5 AGVs

TOTAL COST OF OWNERSHIP



TECHNICAL DATA
Forklift trucks speed: **about 6 km/h**
AGV speed: **about 2,4 km/h**
Daily work hours: **8**

300 M. MAGNETIC TRACK + PROGRAMMING
MAINTENANCE
OPERATOR
MACHINE



YEARLY AVERAGE COST

AGV
Forklift trucks

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® AGV

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.

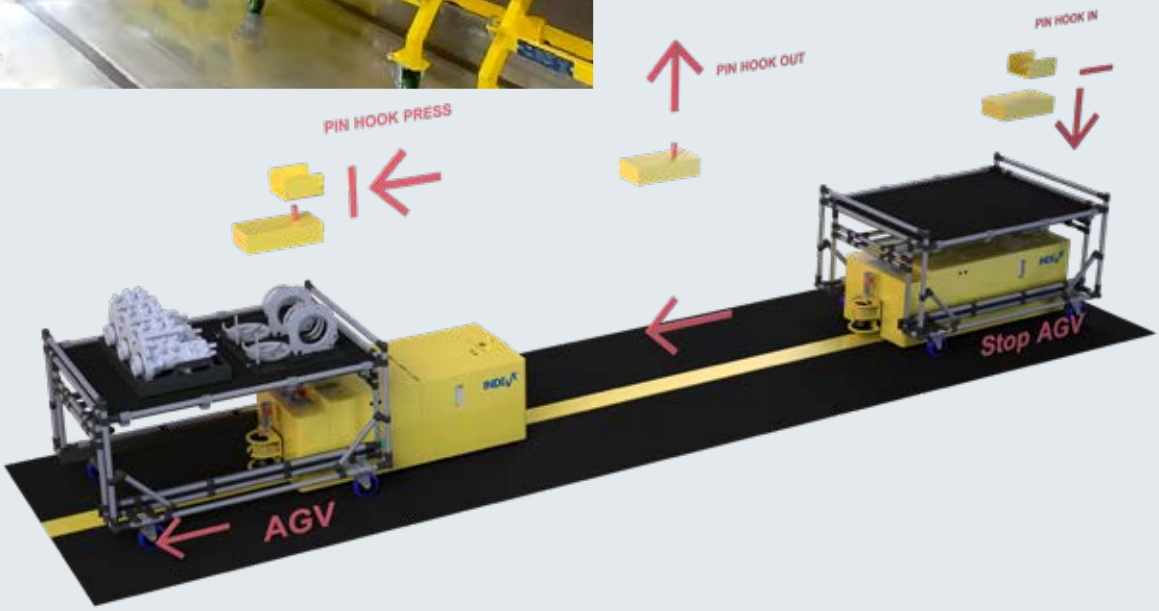
INDEVA® TUGGER AGV
750 - 1500 kg

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
750 kg

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 industries.



Custom solutions

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

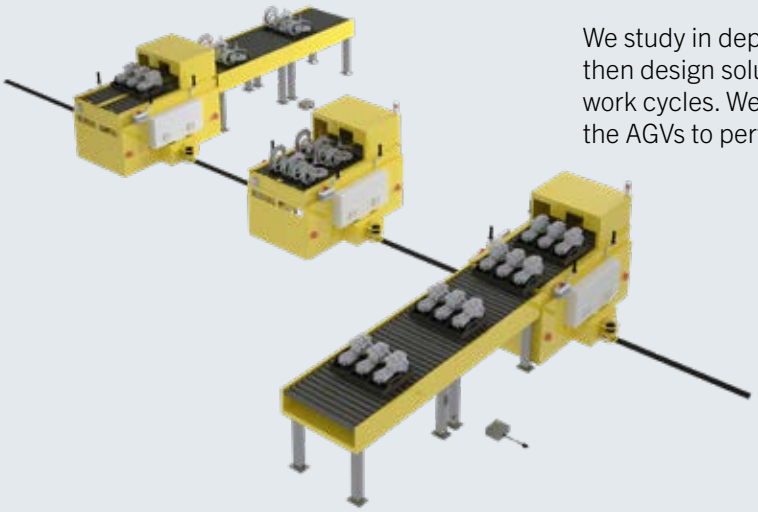
Custom AGVs can be constructed to your exact specifications using either modular pipes and joints from our INDEVA Lean System® range of components or a steel base structure.

Samples of custom solutions

The INDEVA® AGV shown below 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.

An INDEVA® custom gravity AGV is used to transport boxes and small containers in both directions between the warehouse and assembly line. 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.
The dimensions of the roller tracks are designed according to the size and the number of boxes to be carried.

We study in depth your material flow and requirements, then design solutions that best suit your product type and work cycles. We provide the complete program allowing the AGVs to perform all the required tasks.



These AGVs are 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 speeds so providing a smooth, controlled transfer of product. Potential applications are the transfer of heavy loads and fragile materials.

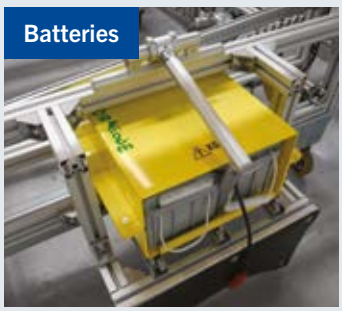
Kit of standard AGV modules

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.

It is possible to purchase a kit of standard INDEVA® modules to turn your trolley into an AGV.

Drive unit

Batteries



Laser scan system

Main control box

Accessories

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

Power System

Battery trolley

Made with INDEVA Lean System® modular structure. Very useful accessory for changing batteries: the battery smoothly slides unto 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.

Recharging station with plate fixed onto the floor and item fixed on the AGV.

Route and Markers

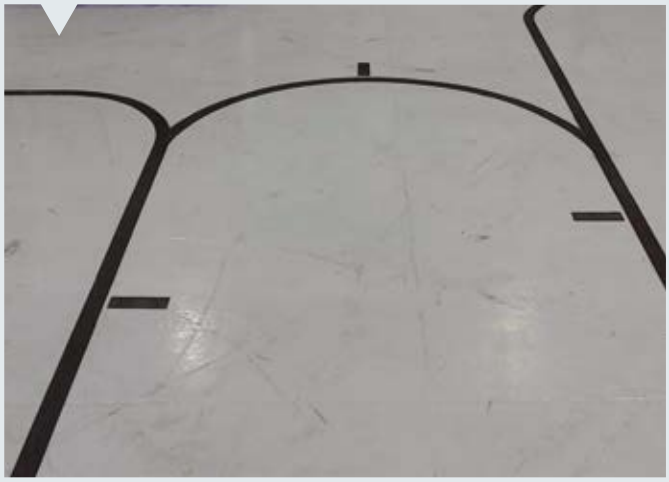
We design the route and lay the magnetic tape to your specific requirements.

Magnetic markers

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

RFID (Radio Frequency IDentification)

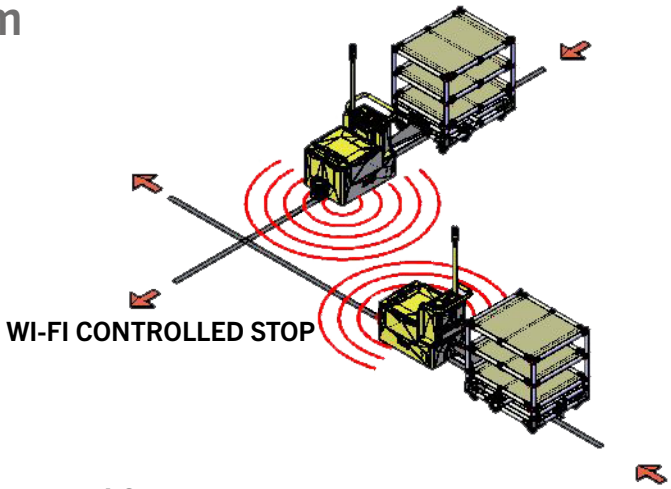
System for the univocal identification of position so that an AGV can be added to the route without any external input.

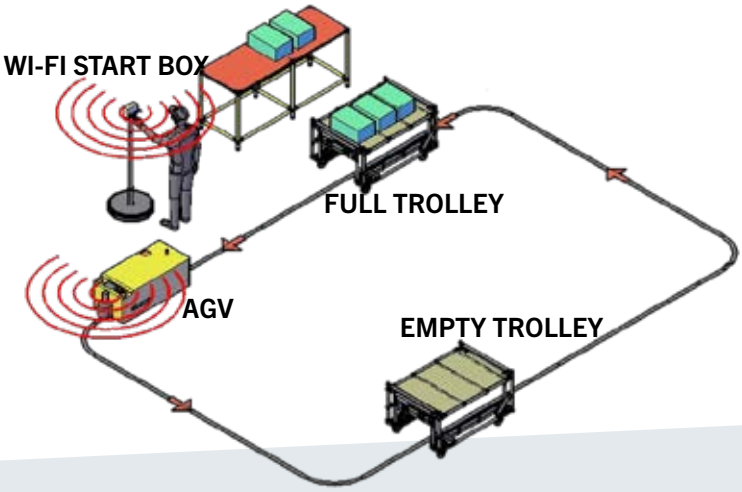


Communication and Control System

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..



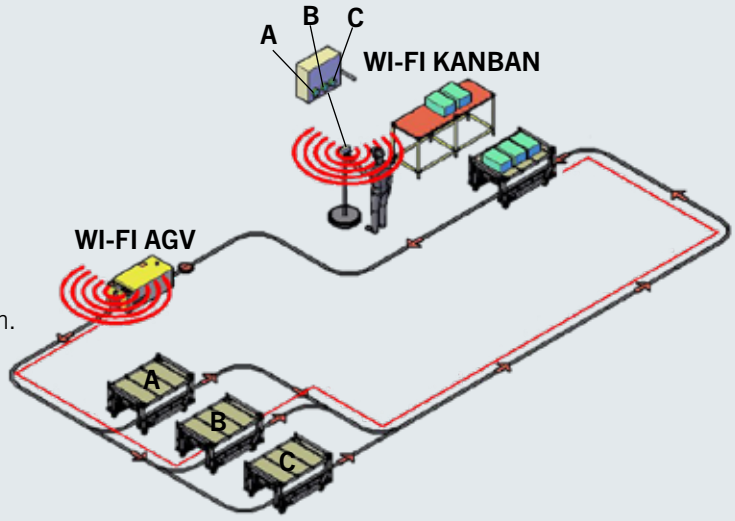


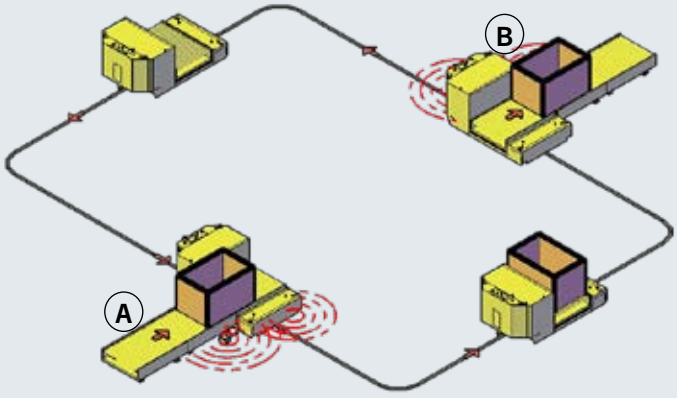
WI-Fi Start-Box

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”). These pushbuttons can be placed in different spots of the workshop within a limited distance from the Kanban System. The AGV receives the task only when it is at the start point “0”.





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.

(A) **CONNECTION WI-FI LOAD AGV**
(B) **CONNECTION WI-FI UNLOAD AGV**

Supervisor & Controller

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.

Supervisor Architecture

The system architecture is based on Wi-Fi connections between each vehicle and the access-points placed in different spots of the work area.

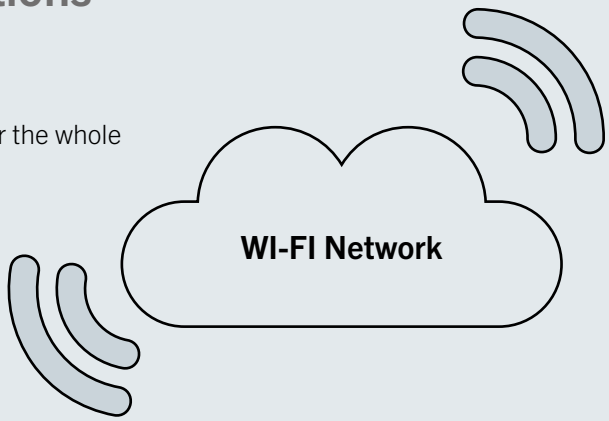
The Wi-Fi infrastructure is dedicated to the AGV network.

The control system is installed on a PLC connected to a personal computer, using the SCADA for visualizing the AGV status.

Different devices can be connected within this WI-Fi infrastructure, such as push buttons or I/O modules to achieve a variety of functions

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.



PLC

ACCESS POINT

Functions

Layout Real time Visualization

- 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;

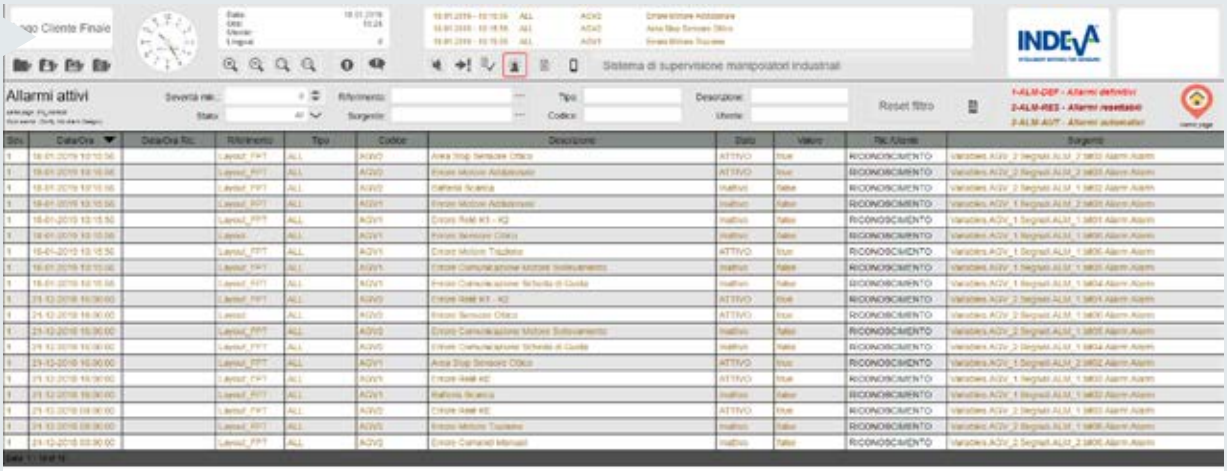
Crossing manager;

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 kilometres travelled, number of stops, etc…



Custom Trolleys

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

Custom U-shaped base to lodge trolleys.

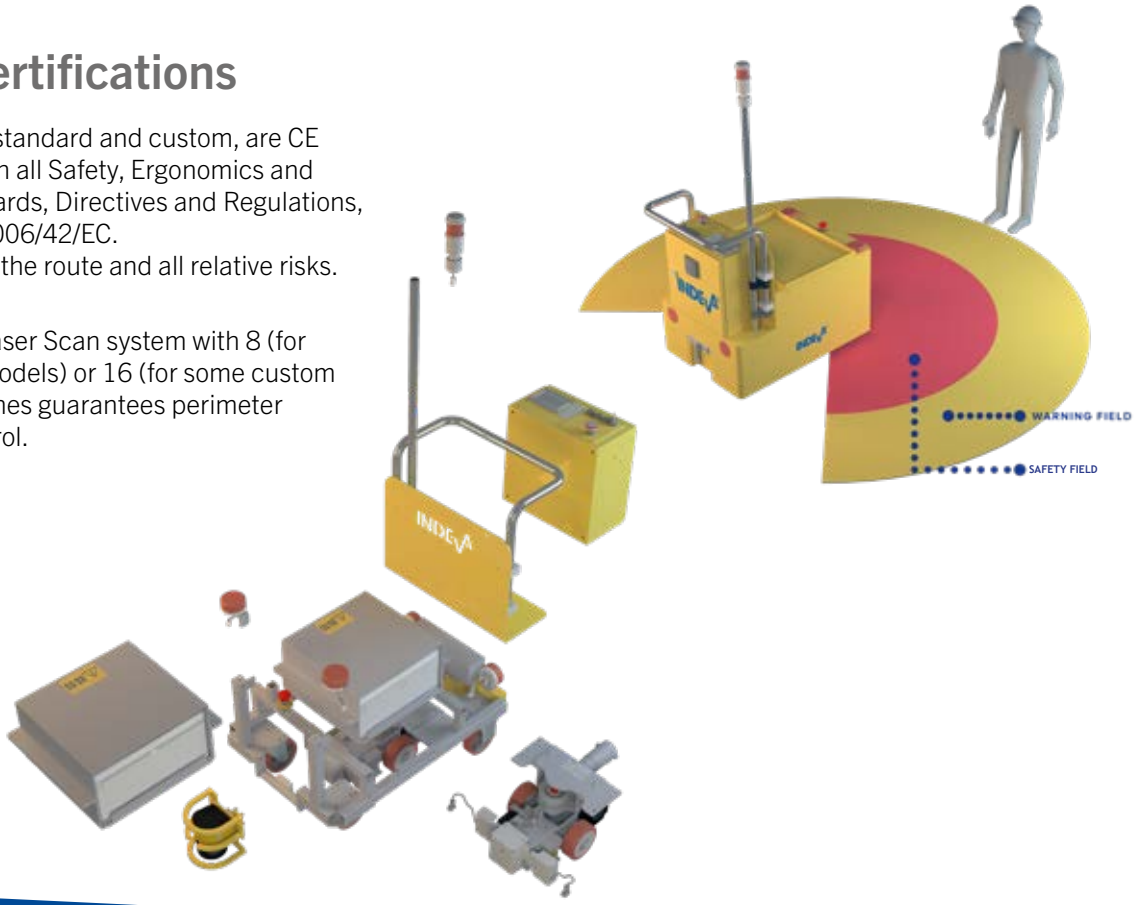
This system allows quick trolley replacement with no need to unhook the trolley from the train.
A convoy consisting of a tractor and several trailer trolleys can travel more easily and safely when all vehicles move along the same trajectory.
Our auto-synchronised steering system, made with high precision 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.

Technical data

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.



	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 LxWxH Tugger	965 mm x 544 mm x H 1.500 mm	1400 mm x 920 mm x H 1150 mm
DIMENSIONS LxWxH Tunnel	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)	

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SCATOLE N.2
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