

4IGV

www.4igv.cz



Automation of intralogistics

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YOUR PARTNER IN AUTOMATION OF INTRALOGISTICS

4IGV has been acting as an integrator and dealer of technologies designed for automation of intralogistics processes. We focus our attention to efficiency and safety of material flow and handling. We help companies deliver goods necessary for production and storage, lower the costs, increase safety and gain time. We offer intralogistics suitable both for smaller and big logistics centres.

Our products include the intelligently guided unattended vehicles (IGV) of Agilox brand. The vehicles are suitable for production and storage facilities. They communicate with each other, can smoothly avoid obstacles, turn around their own axis, and they only need 3 minutes spent at the charging station for one hour of operation.

We also offer the **high density intelligent automated warehouses**. We shall prepare this warehouse design for you to fit your facility. This concerns a solution where the robots load and unload the automated warehouse stacking system. Mainly: the modular system allows you to save a lot of space, which you would otherwise need for storage.

Our assortment also includes automatic pallet stackers and aligners, including the automatic storage and unloading system. We also offer cleaning or sweeping autonomous AMR equipped with SLAM navigation capable of integrating into the common fleet management for industrial cleaning and vacuuming floors.

We would be happy to show you and explain in more detail the specific benefits directly

for your operations. We have already completed a number of successful implementations, and therefore we can also offer you a reference visit, where you can see everything in practice and ask our clients about their satisfaction and real benefits.

We adhere to the principles that planning and preparation equals 50 % success of your project.

In case that you are looking for an experienced partner for automation and maximize effectiveness in the production and storage facilities, you've just found him.

Contact us!

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AUTONOMOUS VEHICLE ONE

easy integration, solution for optimization in industry and logistics

DIMENSIONS

1511 mm × 810 mm × 1862 mm
(L × W × H)

POWER DATA

500 mm
max. lifting height

1 000 kg
max. lifting weight

1,4 m/s
max. speed

SPECIFICATIONS

4 omnidirectional drives
Drive system

LiFeP04 with BMS 3 min charging = 1 h running
Battery

< 12 hours (1 vehicle) / 15 minutes
Commissioning time

CE, declaration of conformity
Certification

400 kg
Weight

Dual electric spindles
Lift system

577 mm
Overall fork width

width: 203 mm / height: 100 mm
Fork dimensions



AGILOX ONE 1200 mm with obstacle avoidance, single scissors and signal light package.

Ideal for transporting pallets placed directly on forks over long distances in industrial halls or warehouses.

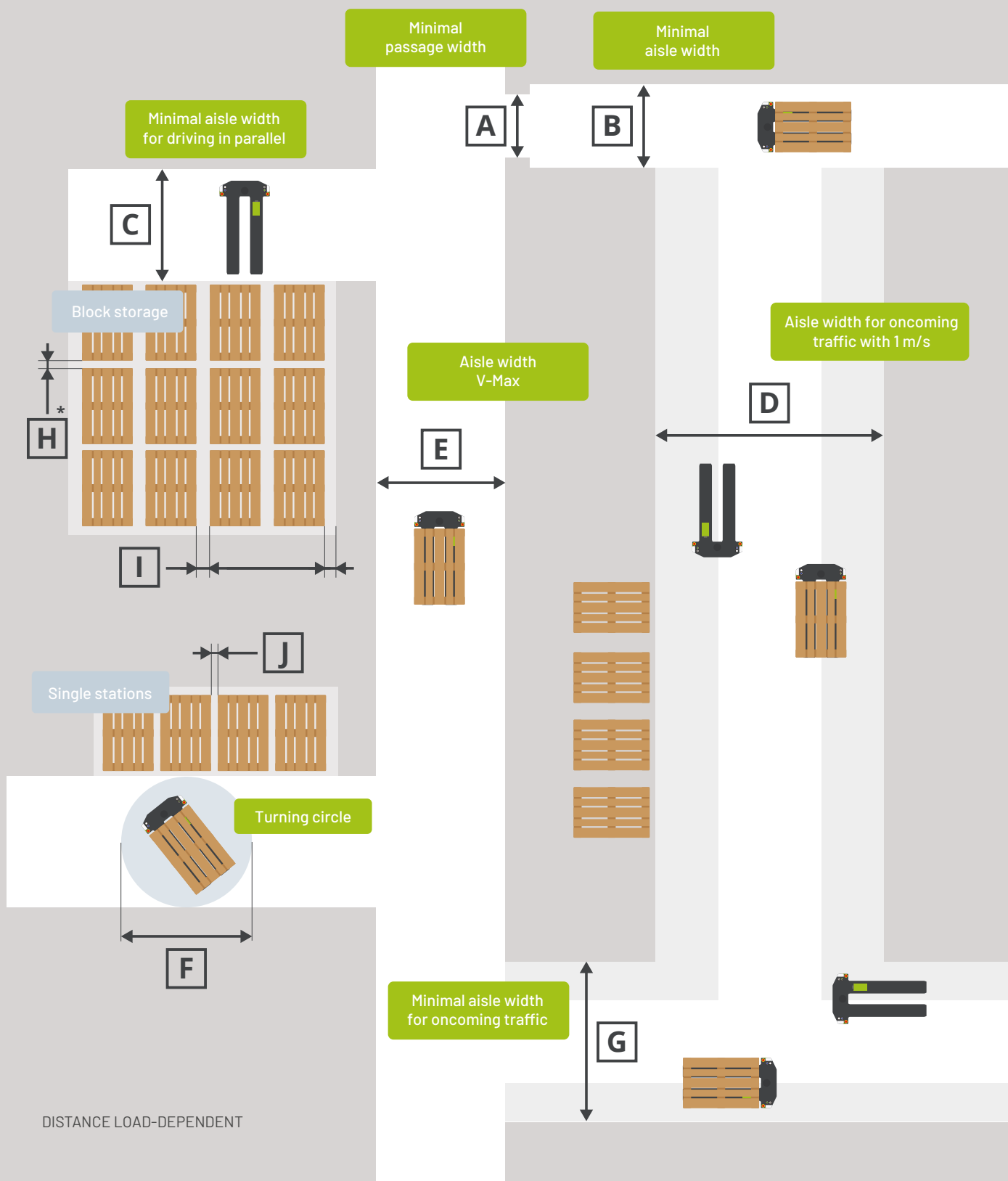


ROTATION ON THE PLACE

**MINIMUM
TURNING
CIRCLE
2,1 M**

AGILOX ONE
DRIVING SURFACE DESIGN

Load Carrier	A	B	C	D	E	F	G	H	I	J
Euro pallet 1200 × 800 mm	1400 mm	1500 mm	1800 mm	3 200 mm	1800 mm	2 100 mm	2 800 mm	50 mm	200 mm	100 mm



AGILOX ONE VARIATIONS



AGILOX ONE

Double Scissor Lift

AGILOX ONE 1 200 mm with a double scissor lifting system.

1 200 mm double scissor | 750 kg
1 000 mm lifting height



AGILOX ONE

Narrowfork

AGILOX ONE basic vehicle with only one fork.

1 200 mm single scissor
1 000 kg | 500 mm lifting height



AGILOX ONE

EXTENDED FORKS

AGILOX ONE basic vehicle with lifting forks in three different lengths (1 400 mm, 1 600 mm, 1 800 mm).

V1400: 1 400 mm | single scissor,
750 kg | 500 mm lifting height

V1600: 1 600 mm | single scissor
750 kg | 500 mm lifting height

V1800: 1 800 mm | single scissor

PRODUCT ACCESSORIES



Obstacle Avoidance

Additional 3D sensor system in the direction of travel to increase safety in man-machine mixing mode.



Barcode Identification Unit

Scanner for the detection of barcodes or QR codes.



ESD Protection

Protection or discharge measure for operation in areas with ESD requirements to prevent electrostatic charging.



Debris Protection

Dirt deflector in the front area of the vehicle, versions in rubber lip or brush.



Signal Light Package

Light signal to increase safety in man-machine mixing mode (color: blue / green / red), additional signal lights in the fork tips (color: white / yellow).



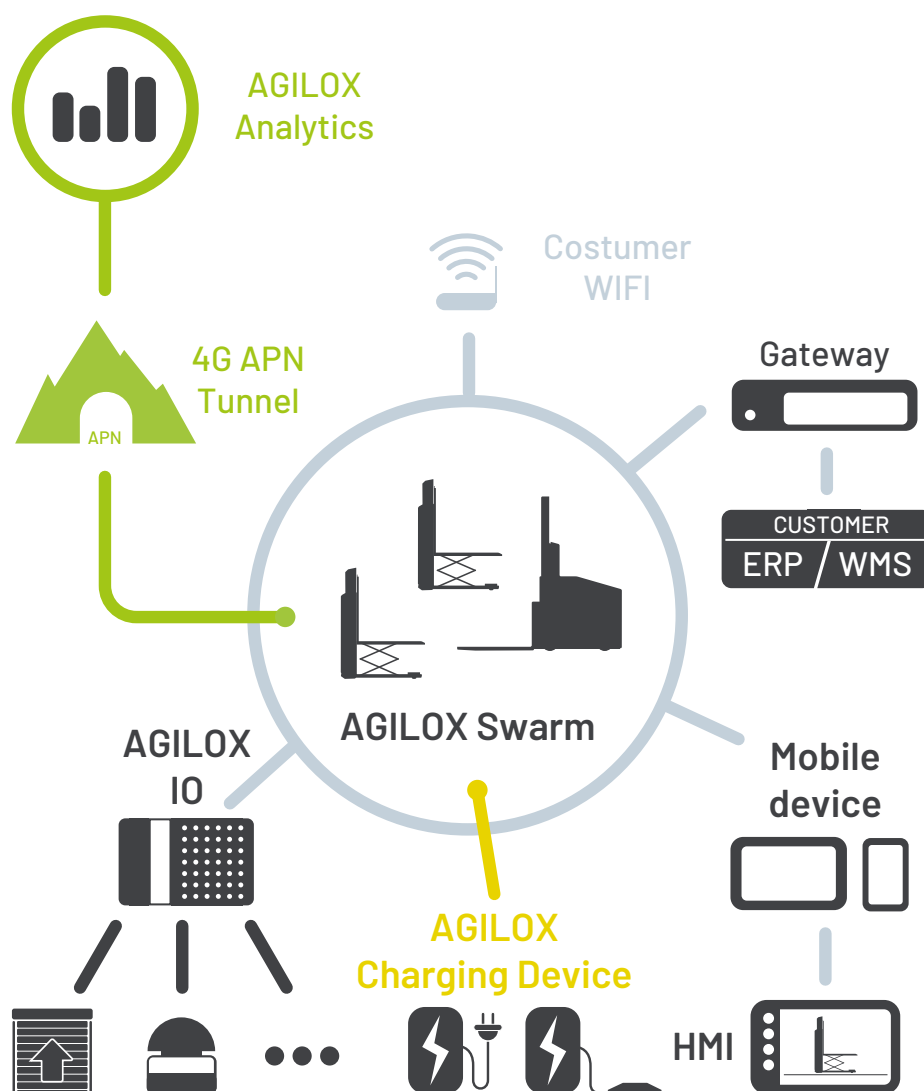
Mobile Charging Device

One mobile charger is recommended per AGILOX fleet (connection 230 V / 16 A).

The use of an AGILOX IGV is possible without adjustments and additions to the IT infrastructure.

Thanks to swarm intelligence, neither a software nor a separate server for a master computer must be installed. AGILOX' plug and perform quality only requires customer provided WiFi and a 3-phase AC power connection. Open interfaces also allow the system to be flexibly and dynamically connected with the environment.

Since navigation takes place without additional infrastructure, the system adapts to its changing environment almost automatically and adheres to the highest security standards.



AGILOX Charging

24/7 operations without changing the battery. 60 minutes of operation - 3 minutes to charge.

Customer WIFI

Customer-provided WiFi is required in order for vehicles to communicate with each other.

Customer ERP / WMS

Customer systems (e.g. ERP, WMS, MES, etc.) can be connected via the AGILOX JSON API.

AGILOX Swarm

Swarm Intelligence underpins the AGILOX fleet's navigation.

Mobile Device

The IGVs are controlled via mobile devices (e.g. smartphone, tablet, etc.) with browser access.

AGILOX HMI

The HMI is mapped in the web browser and is always available to interact with AGILOX vehicles.

AGILOX IO Box

The IO Box assists the customer in connecting their existing infrastructure (e.g. roller doors, fire alarm systems) with the AGILOX network.

AGILOX Analytics

Access to the most important KPIs and data anytime and anywhere.

AUTONOMOUS VEHICLE OFL

easy handling, solutions for optimization in industry and logistics

DIMENSIONS

1 665 mm × 800 mm × 1 988 mm
(L × W × H)

POWER DATA

1 390 mm | **800 kg**
max. lifting height | max. lifting weight

1,4 m/s | **1 200 mm**
max. speed | max. station height (EPAL)

SPECIFICATIONS

4 omnidirectional drives
Drive system

LiFePO4 with BMS 3 min charging = 1 h running
Battery

575 kg
Weight

< 12 hours (1 vehicle) / 15 minutes
Commissioning time

CE, declaration of conformity
Certification

2 200 mm
Turning circle

1 600 mm
Min. aisle width

Scissor-free lifting system
Lift system

576 mm
Overall fork width

width: 204 mm / height: 95 mm
Fork dimensions

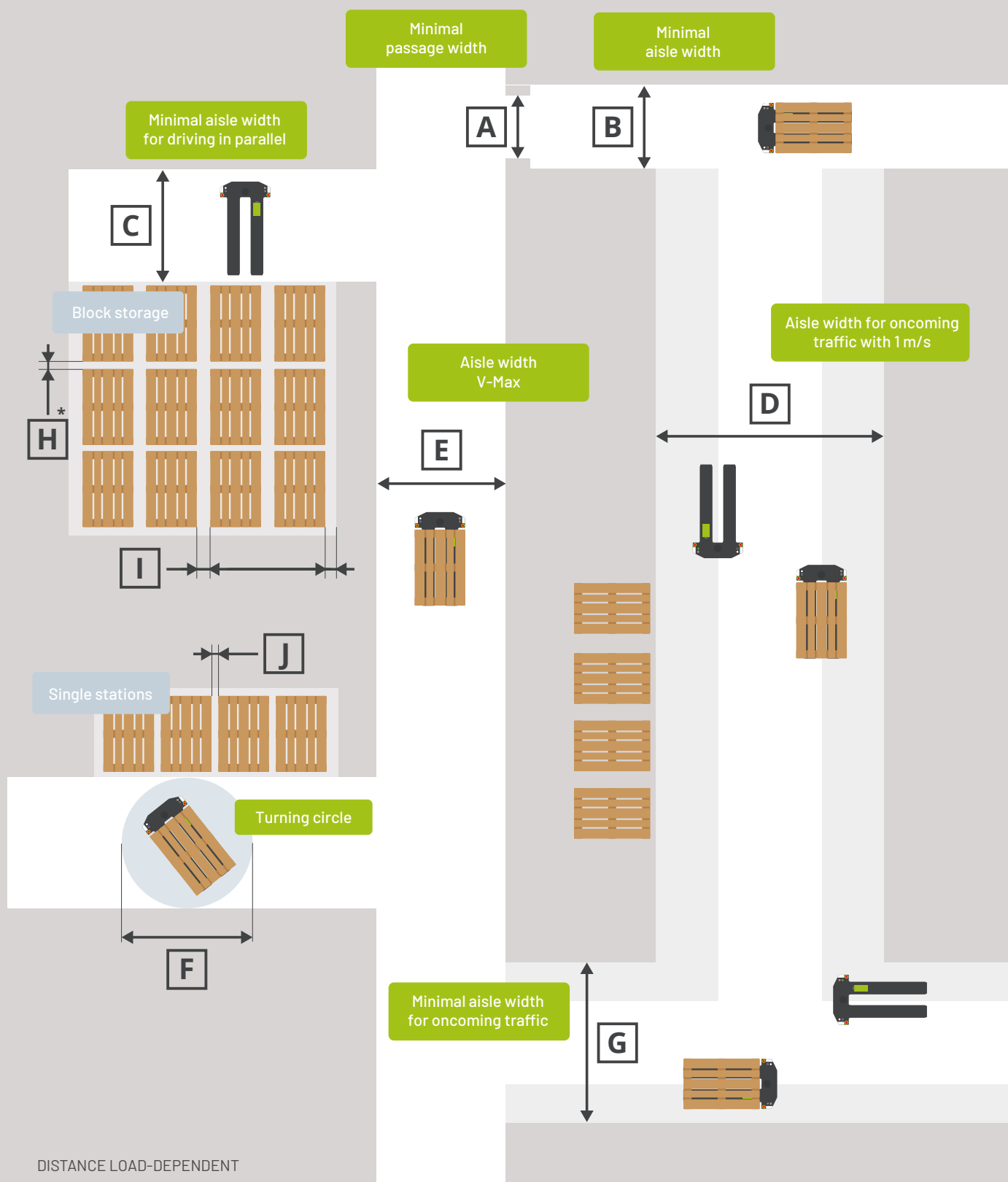


The AGILOX OFL is the latest innovation in the AGILOX product family. The scissor-free, AI powered Autonomous Mobile Robot can effortlessly transport and lift pallets and custom-tailored load carriers weighing up to 800 kg from floor to station without the need of any infrastructure changes.



AGILOX OFL
DRIVING SURFACE DESIGN

Load Carrier	A	B	C	D	E	F	G	H	I	J
Euro pallet 1200 × 800 mm	1400 mm	1600 mm	1900 mm	2900 mm	2000 mm	2200 mm	2600 mm	50 mm	200 mm	100 mm



DISTANCE LOAD-DEPENDENT

AUTONOMOUS ROBOTIC VEHICLE OCF

with counterweight

DIMENSIONS

2 784 mm × 1 200 mm × 2 566 mm
(L × W × H)

POWER DATA

1 600 mm
max. lifting height

1 500 kg
max. lifting weight

1,4 m/s
max. speed

SPECIFICATIONS

3 omnidirectional drives
Drive system

LiFeP04 with BMS 3 min charging = 1 h running
Battery

3 600 kg
Weight

< 12 hours (1 vehicle) / 15 minutes
Commissioning time

CE, declaration of conformity
Certification

Electric
Lift system

min. 450 mm / max. 950 mm
Overall fork width

width: 125 mm / height: 70 mm
Fork dimensions

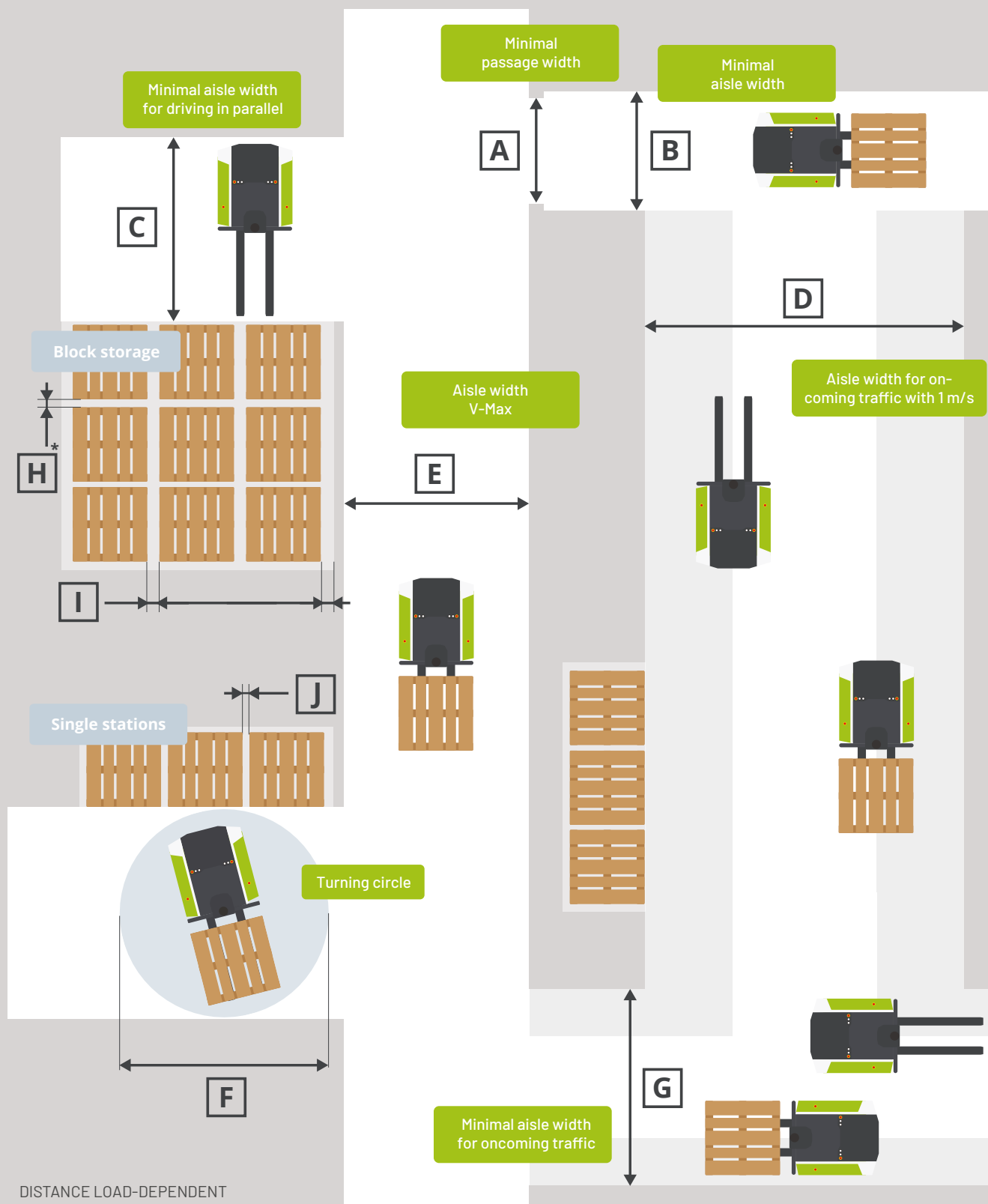


AGILOX OCF 1200 mm
with obstacle avoidance.



AGILOX OCF
DRIVING SURFACE DESIGN

Load Carrier	A	B	C	D	E	F	G	H	I	J
Pallet 1200 × 1200 mm	1700 mm	1900 mm	3 200 mm	5 000 mm	2 700 mm	3 600 mm	3 800 mm	100 mm	200 mm	100 mm



DISTANCE LOAD-DEPENDENT

AGV/AMR ensures transportation of goods and loads using the autonomous unmanned handling machinery. The use, maintenance or new configuration allows the machinery fleet to be easily and seamlessly distinguished.

ADVANTAGES OF ROBOTIC DEVICES



Transportation control system that avoids collisions



The number of IGV may increase in proportion to production processes



Delivery just-in time



Upgrade without equipment downtime



No errors at the destination



Easy route configuration or adding new machines to be served



Inventory management greater efficiency



The AGV/AMR vehicles do not harm goods, machinery or fixed structures



Low operating costs



The work flow has been distributed among the AGVs/AMRs themselves in an efficient and dynamic manner



Operation 24/7



The transport flow effective optimization depending on the number of vehicles available, transportation conditions and tasks



5G technology



Compatibility with any automation type



Error rate and harmful events elimination



Saving labour costs, transfer of workers to more qualified jobs



It ensures maximum safety in operation



Easy integration into the existing customer's processes and structures



Quick return on investments



AGILOX OCF

DYNAMIC SAFETY FIELD

IGV REACTION WHEN A PERSON OR OBJECT
IS DETECTED IN THE SECURITY FIELD

IGV DOES NOT ACCELERATE

IGV SLOWING DOWN

IGV STOPS IMMEDIATELY



AUTONOMOUS VEHICLE ODM

FOR TRANSPORTING SMALL CARRIERS

DIMENSIONS

1095 mm × 400 mm × 1235 mm
(L × W × H)

POWER DATA

250 mm
max. lifting height

300 kg
max. lifting weight

1,4 m/s
max. speed

SPECIFICATIONS

2 omnidirectional drives
Drive system

LiFePO4 with BMS 3 min charging = 1 h running
Battery

160 kg
Unit weight

< 12 hours (1 vehicle) / 15 minutes
Commissioning time

CE, declaration of conformity
Certification

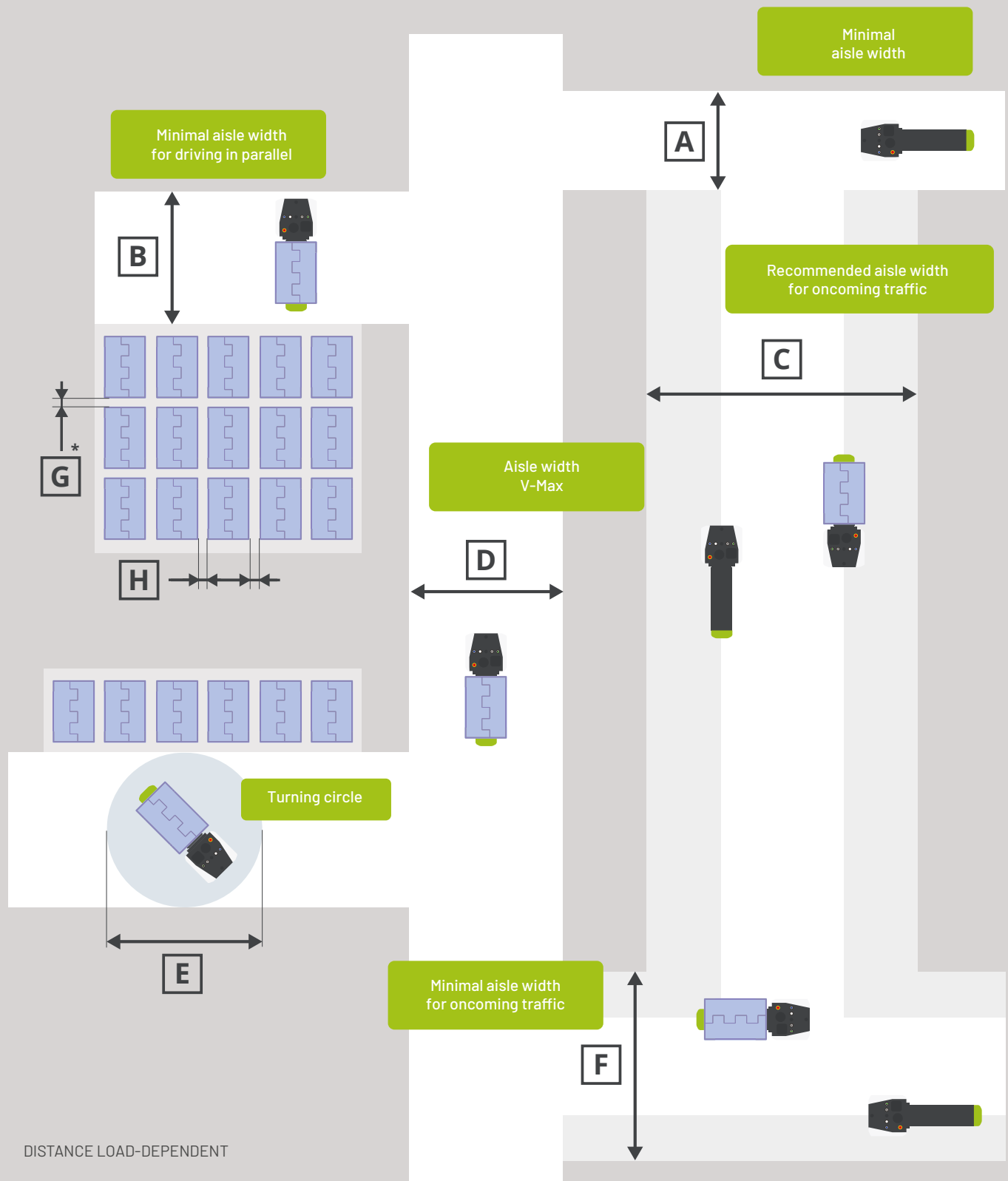
Single electric spindles
Lift system

width: 205 mm / height: 95 mm
Fork width



AGILOX ODM
DRIVING SURFACE DESIGN

Load Carrier	A	B	C	D	E	F	G	H
Pallet 600 × 400 mm	900 mm	1300 mm	2 400 mm	1400 mm	1600 mm	1 600 mm	50 mm	50 mm





AGILOX ODM

CUSTOMING COLORS

CHOOSE YOUR OWN COLOR





AGILOX OFL



AGILOX ONE

WHERE TO MEET US IN PERSON

There have been a lot of opportunities to meet us. You will get more familiar with our technologies at all meetings. We will be happy to visit you or we can talk during the events, such as logistics conferences, where we and other experts will provide you with an overview of the up-to-date trends in the field of logistics.



We visit both the customers and, of course, companies where we introduce our technologies. After the presentation, we shall go straight to the production plant and, on the spot, we shall tell you whether the technology is suitable or not for your company. We offer the solution directly tailored to you. To make a final decision, we shall individually process the relevant details with clearly quantified benefits for you.



For instance, you could meet us at the Trends in Automotive Logistics conference.

Our 4IGV company regularly attends the EASTLOG logistics conference.



You can also visit our exposition at the International Engineering Fair, Brno.

We also organize our own conferences.



For more information, please visit our website

AGILOX IO BOX

ALLOWS COMMUNICATION WITH PERIPHERAL DEVICES

The AGILOX IO is an industrial control system (optionally Beckhoff or Siemens) with potential-free relay outputs and digital inputs (24VDC), which is connected to the AGILOX network. It can be used as an interface with the system operator's automation world and connects fieldbus systems and the IOs with the AGILOX network to ensure the required data exchange.



Siemens



Beckhoff



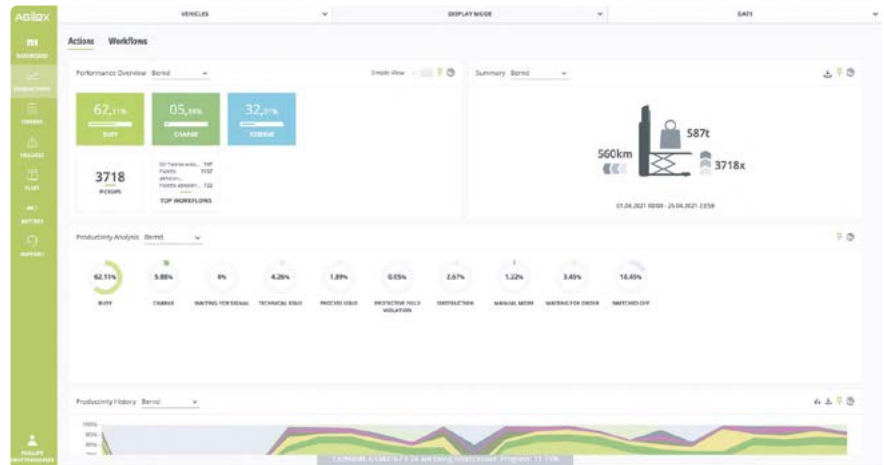
Type	StandardSI 14/10	StandardBE 12/6	MiniSI 6/4
Art.-Nr.	AGIIO-NSI	AGIIO-NBES	AGIIO-MSIS
PLC Manufacturer	Siemens	Beckhoff	Siemens
Control Cabinet	760 × 760 × 300 mm (W×H×D)	400 × 300 × 155 mm (W×H×D)	Ano
Input Count	14	12	6
Output Count	10	6	4
Output Characteristics	potential-free	potential-free	potential-free
I/O Extension Possible	max. 7 × 10 rozšíření SI 16/16	Ne	Ne
Network Connection	Ethernet	Ethernet	Ethernet
Decentralized IOs possible	Ne	Ne	Ne
Assembly and Wiring	by customer	by customer	by customer
Required Power Supply	110-230 VAC	110-230 VAC	110-230 VAC

AGILOX ANALYTICS

ENABLES PERFORMANCE ANALYSIS AND INCREASED EFFICIENCY OF LOGISTICS PROCESSES IN REAL TIME

Agilox Analytics

Collecting various process data and analyzing it is a key factor in optimizing operations in the material handling industry – especially when it can be done easily via a browser without any additional effort. As logistics processes are automated by an AGILOX, the volume of data increases, and with it the opportunity to make use of it. In AGILOX Analytics, the collected data is compiled and clearly presented. While our vehicles directly increase efficiency in operation, our private cloud-based data analysis platform AGILOX Analytics offers the possibility to do performance analysis as well as to get software support for the complete AGILOX fleet.



Guaranteed data safety

Because data security plays an essential role, AGILOX relies on a sophisticated security concept with a certified data center (ISO 27001). Data encryption to the highest security standards and a private connection to our cloud-based analytics platform, where the data is processed, guarantee the protection of customer data from unauthorized access and thus maximum data security.



Detailed data reports

AGILOX Analytics offers the possibility to analyze logistics processes as well as the condition of vehicles. More than 3.5 billion data points generated per vehicle in a year enable near real-time performance analysis down to the second over the entire service life. Sophisticated and detailed reports as well as an ongoing expansion of functions accommodate profound performance analysis. As a result, the productivity and efficiency of the entire logistics and production processes can be continuously improved, and forward-looking strategic decisions can be made. Browser-based access to the data is possible anytime and anywhere – whether via PC, tablet or smartphone.

ID	Name	Start	End	Duration	Distance	Switches	Position
4221786021779018	Patrol vehicle 31 (start)	25.04.2021 11:41:40	25.04.2021 11:49:22	00:07:42	26.49m	1%	0
2750886021779002	PAKE	25.04.2021 11:22:06	25.04.2021 11:22:58	00:00:50	5.93m	0%	0
4221786021779003	Patrol vehicle 31	25.04.2021 11:16:35	25.04.2021 11:30:06	00:13:30	157.58m	3%	1
2750886021779001	PAKE	25.04.2021 11:18:38	25.04.2021 11:18:52	00:00:16	67.02m	1%	0
2750886021779005	Supply Workflow V1 Ungefahen 31	25.04.2021 11:06:45	25.04.2021 11:10:38	00:03:52	122.33m	2%	1
4221786021779018	Supply V1 Ungefahen 31 (start)	25.04.2021 11:04:35	25.04.2021 11:06:44	00:02:11	74.2m	1%	0
4221786021779003	AGRO_3	25.04.2021 10:58:33	25.04.2021 11:00:34	00:02:00	64.05m	2%	1
2750886021779006	Patrol vehicle 31	25.04.2021 10:54:11	25.04.2021 10:59:30	00:05:18	109.08m	3%	1
Action		Start	End	Station			
PICKUP		25.04.2021 10:54:11	25.04.2021 10:56:42	V1, V1, V1			
DROP		25.04.2021 10:56:42	25.04.2021 10:59:30	Agilox			
2750886021779004	Patrol vehicle 31	25.04.2021 10:48:05	25.04.2021 10:54:09	00:06:03	157.03m	3%	1
2750886021779005	Patrol vehicle 31	25.04.2021 10:44:19	25.04.2021 10:49:03	00:04:43	155.04m	2%	1
2750886021779007	LOCK/ADLOCK	25.04.2021 10:47:08	25.04.2021 10:47:30	00:00:20	1.78m	0%	0
4221786021779014	Patrol vehicle 31 (start)	25.04.2021 10:41:48	25.04.2021 10:46:17	00:04:29	72.03m	1%	0
2750886021779008	PAKE	25.04.2021 10:33:19	25.04.2021 10:34:15	00:00:45	18.99m	0%	0

OUR STATE-OF-THE-ART TECHNOLOGY IS YOUR ADVANTAGE

SAMPLE ORDER

*Transportation of goods
from place **A** to place **B***



PRODUCTION HALL

CASE STUDIES

THE AUTONOMOUS VEHICLES IMPLEMENTED IN THE DATART LOGISTICS CENTER, JIRNY

In the logistics center DATART Jirny, which is operated by HP TRONIC Zlín, autonomous Agilox trucks from 4IGV are currently being put into operation. This system-controlled handling technology in the DC6 hall helps to increase efficiency and safety in the warehouse handling operations of various retailers belonging to HP TRONIC Zlín. Specifically, shipments are dispatched from this distribution centre to the DATART and ETA sales network.

The automation of handling came as a logical development in response to the labour market situation. „It is problematic to find employees in Prague - East with a significantly low unemployment rate. But it was also a strategic decision related to the economy. Properly set up automation clearly brings savings. Calculations have confirmed that autonomous trolleys are clearly worthwhile in our three-shift operation,” says Michal Prádl, head of the Jirny logistics centre at HP TRONIC Zlín.

Five AGVs will be in the fleet by the end of October

Currently, the implementation of the Agilox One automated handling technology from 4IGV is underway at DC Jirny. „Two Agilox vehicles are now being used in the warehouse, and three more machines will be added to the fleet by the end of October,” says Radka Zobaníková, business and marketing manager at 4IGV.

This technique allows transport from one place to another and at different height levels, without human operators. „The trolleys

are fitted with safety features to prevent collisions. They therefore increase not only efficiency but also safety. Agilox trolleys are suitable for repetitive operations. The fastest return on investment is in three-shift operation,” notes Dušan Šutka, sales manager at 4IGV.

The manipulation technology was named Arty

Employees of the entire HP TRONIC Zlín company had the opportunity to compete for the best design for the naming of this range of handling equipment. The winning design was ARTY, which fits in with Datart's marketing concept.

Radka Zobaníková adds that the Agilox trucks are used in Datart's logistics centre to move pallets from point A to point B, in fact it is still about moving goods from the ramps to the transfer locations for storage. They also carry picked pallets as they are moved to the dispatch ramp. They also assist in other intralogistics activities, moving pallets with boxes to sorting locations, for example. „The Agilox autonomous

technology can help us wherever manual intervention by a warehouse operator is not required,” says Michal Prádl.

The implementation phase included loading the warehouse map

The implementation phase included, for example, loading a map of the warehouse, but also changing the habits of employees so that they don't leave obstacles in the aisles. „Agilox can avoid obstacles, but any extra movement or slowing down means delaying it. So we had to instruct employees not to create obstacles. Employees understand that automation doesn't take away their work. Automation has been an integral part of our distribution center since its inception. With the growth that Datart has continuously experienced, employees know that the machine helps them in their work and that it does not threaten their jobs,” says Michal Prádl.

The company 4IGV, which focuses on simplifying and streamlining handling in logistics, sees HP TRONIC Zlín as one of the leaders in the field of innovation and automation of warehouses and distribution centers. „We are also a company focused on innovation. We are constantly looking for ways to make intralogistics more efficient for companies. The trucks communicate with the customer's ERP system and fulfill orders based on Just in Time orders, plus around the clock. The automated technology does not need breaks, its charging takes place continuously in between,” says Marek Matovcik, Managing Director of 4IGV.

Plan: acquisition of additional Agilox autonomous technology

Michal Prádl added that once the use of Agilox trucks from 4IGV proves itself in the operation of the Jirny distribution centre, the company is already considering the acquisition of additional Agilox autonomous technology. •



THE FULL SCOPE ARTICLE

CASE STUDIES

IN GREINER PACKAGING, THE AGILOX VEHICLES MAXIMIZED EFFECTIVITY AND SIGNIFICANT SAVINGS

In Greiner Packaging, Louka u Litvínova, where plastic packaging, mainly crucibles for food industry are produced using K1 technology, they focus on intralogistics and process automation. The implementation of four fully automated Agilox vehicles by 4IGV has been one of the last projects bringing the significant savings.

Greiner Packaging wanted to streamline its production logistics and warehousing processes, with an emphasis on product transport within the plant, and therefore commissioned several analyses from external companies. These compared the advantages and disadvantages of different solutions. For example, the use of conveyor belts and the option of implementing mobile collaborative robots that move around the production and warehouse operations by reading a warehouse map were considered. „In the case of using mobile under-running robots, metal platforms would need to be installed in the production hall, on which the pallets would only be placed, which in our case was evaluated as not ideal from a safety point of view; moreover, these platforms would need to be installed in the floor, which is not advisable in cases where positions are not obvious or are changing,” says Stanislav Čakovský, project manager at Greiner Packaging, which focuses on the implementation of Lean principles, production automation and process efficiency.

He added that the disadvantages of the mentioned alternative solutions outweighed the disadvantages for the operation. Based on detailed analyses, Greiner Packaging management decided to purchase Agilox autonomous handling technology. 4IGV delivered four Agilox ONE autonomous vehicles to the Greiner Packaging plant last year.

Very fast implementation

The implementation of the Agilox autonomous vehicles took place at the beginning of July 2021. „The experts from 4IGV helped us with the installation, which was very fast. The implementation phase took about ten days. To achieve maximum efficiency, we had to set clear rules for the layout,” says Stanislav Čakovský.

Agilox autonomous technology transports pallets of semi-finished and finished products. „The routes are from production



THE FULL SCOPE ARTICLE

lines to warehouses or for further processing, so the vehicles transport the pallets from defined locations to designated sites. They also transport pallets of products from warehouses to production lines,” says Dušan Šutka, sales manager at 4IGV.

Autonomous guided vehicles bring pallets of products to defined locations in the warehouse, where they are then stacked in the racked warehouse by handlers with other equipment.

Internal signal system

The AGVs are called to the pallets based on a system of internal signals. „As soon as a pallet of products is needed at the line, a worker on the line presses a button that sends a signal to the trolley via a web interface. The truck immediately arrives and brings the pallet to the line. Workers then call for the trolleys in a simple way.

Thanks to this system, we do not accumulate pallets in the production hall,” says Stanislav Čakovský. On the other hand, when a pallet is ready to be transported away from the production line, the worker simply presses the appropriate symbol on a tablet mounted on the wall and the trolley arrives based on this instruction.

Autonomous handling technology at the Greiner Packaging plant transports pallets over distances of approximately 100 to 120 m. In addition, the autonomous technology continuously charges itself at the charging points. Charging the battery to maximum capacity takes just 10 minutes.

„The AGVs communicate with each other using intelligent X-SWARM technology. When the system detects that one charging trolley has a larger battery capacity than another, they even give each other priority when charging.

In addition, the trolleys communicate with each other even when working. When, for example, six jobs come together for them in a minute, they pass tasks to each other. The trolley that is closer to the point of need does the job. Unnecessary transfers are eliminated,” explains Stanislav Čakovský.

The return on investment for the purchase of four trucks in this company is four years.

Production supply in Just in Time mode

The main advantages of 4IGV's Agilox trolleys are significant efficiency gains and cost savings. The supply system has become faster thanks to automation. In addition, the inventory that was on the production floor has been substantially eliminated. There was material waiting to be processed in various locations on the shop floor. Now the production supply is virtually Just in Time. •

„Must have“



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