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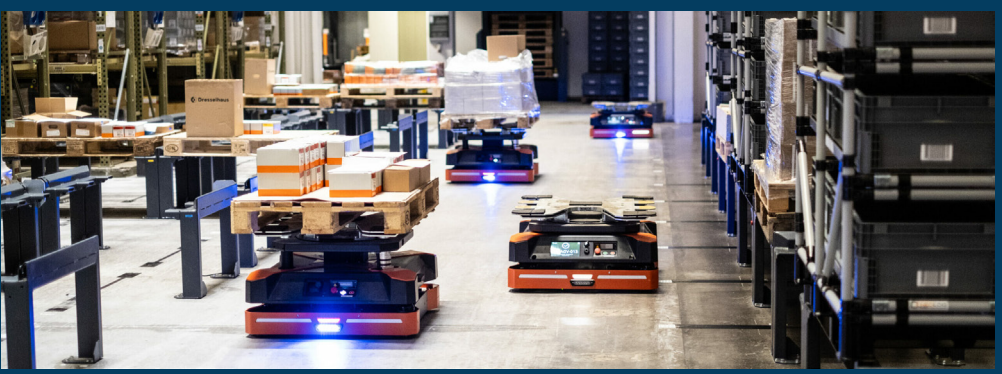
SAFELOG AGV – mobile robots



INTRODUCTION

Transsystem's offerings in the field of mobile transport in production and warehouse halls are complemented by AGV systems. For battery-powered mobile robots, we offer the reliable SAFELOG system, which includes a variety of trolleys with different transport options, inductive chargers, advanced software, and Wi-Fi communication. This European product is used in many projects around the world, and technical support is available from authorized partners in many countries. One great advantage of the offered robots is the ability to install additional accessories on them to transport loads of specific shapes. The mobile robots can perform transport functions based on individual control or a fleet management system using Wi-Fi communication. After launch, we provide full technical support, a warranty, post-warranty service, and access to spare parts and accessories.

1.1 SAFELOG XS1 (Pic. 1.11, 1.12)

The SAFELOG XS1 mobile robot is specially designed for fulfillment requirements. With its speed of up to 4.0 m/s, it is the perfect solution for minimizing transport times between the pick port and packing station. As the chassis is mounted on an oscillating bearing, the XS1 can also negotiate ramps with a gradient of up to 18%. A differential drive enables turning on the spot, even on sloping surfaces. In the SAFELOG XS1 core version, the mobile transport robot is equipped with customer-specific superstructures that are adapted to the respective process.

Pic. 1,11

Pic. 1.12

Dimensions	mm	660 / 450 / 230 (L/W/H)
Own weight	kg	40
Load	kg	85/50 [1]
Speed	m/s	0,1 to 4,0
Battery type and quantity		LiFePO4 (1)
Battery charging		Inductive
Capacity of battery	Ah	21
Operating voltage	V	24
Charging time 20–80%	min	20
Overcoming ramps with an inclination of up to	%	18
Turning radius	m	0,8
Communication		WLAN
Navigation / localization		Odometry, Grid codes, LiDAR
Positioning accuracy	mm	+/- 5[1,3]
Possibility of equipping with strucktures to user's needs		YES

/ [1] environment-dependent/ [2] without optional accessories / [3] dependent on localization method

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2.1 SAFELOG S3 core (Pic. 2.11)

In the basic SAFELOG S3 core version, the mobile robot can be equipped with variable, customer-specific superstructures, and active or passive conveyor technologies are also available as an option.

2.2 SAFELOG S3 tow (Pic. 2.21)

With its height of 220 mm, the SAFELOG S3 tow mobile transport robot can drive under the majority of standard trolleys and trailers on the market. These are automatically coupled and uncoupled via a lifting pin snap latch system.

Pic. 2.11

Pic. 2.21

Dimensions	mm	770 / 450 / 220 (L/W/H)
Own weight	kg	150
Load	kg	150 /core/
Tensile load	kg	500 /tow/
Speed	m/s	0.02 to 1.6
Battery type and quantity		LiFePO4 (1)
Battery charging		Inductive
Capacity of battery	Ah	21
Operating voltage	V	24
Charging time 20–80%	min	20
Max. grade	%	5[1]
Turning radius	m	0,8
Communication		WLAN
Navigation / localization		Inductive sensor, magnetic track, RFID, odometry, LiDAR, 2D camera
Positioning accuracy	mm	+/- 5[1,3]

/ [1] environment-dependent/ [2] without optional accessories / [3] dependent on localization method/

3.1 SAFELOG M4 core (Pic. 3.11)

The standard version of the SAFELOG M4 core mobile robot is suitable for transporting top loads of 300 kg. The load can be transported on optionally available or customer-specific superstructures. These can also be equipped with conveyor technology if required. It can also be used as an assembly platform. The M4 core can also be upgraded with suitable superstructures for this area of application.

3.2 SAFELOG M4 tow (Pic. 3.21)

The SAFELOG M4 tow model is the towing machine among the devices in the M4 series. The mobile robot was designed for transporting trolleys and roller carriages and can tow most of the trailers available on the market. They can be automatically coupled and uncoupled using a system of lifting pins and snap latches in conjunction with an RFID reader or light scanners for over-trolley detection.

3.3 SAFELOG M4 lift (Pic. 3.31)

The SAFELOG M4 lift mobile robot picks up load carriers such as pallets or mesh boxes from a rack as well as trolleys or mesh trolleys stored on rollers via lifting rails mounted on the long sides. This makes the AGV ideal for a wide range of internal transportation tasks. The lifting rails, which run along the entire chassis, offer a more even load distribution on the mobile transport robot than selective lifting mechanisms. This results in more stable load storage on the device.

Pic. 3.11

Pic. 3.21

Pic. 3.31

Dimensions	mm	1460 / 450 / 220 (L/W/H) 1460 / 600 / 220 (L/W/H) /Lift/
Own weight	kg	235 /305[2] Lift/
Topload	kg	300[1] /Core/
Tensile load	kg	1.500[1] /Tow/
Topload of lifting mechanisms	kg	1000 /Lift/
Lifting height of the scissor lift syst.	mm	40 /Lift/
Speed	m/s	0.02 to 1.6
Battery type and quantity		LiFePO4 (1)
Battery charging		Inductive
Capacity of battery	Ah	21 optional 42/63/84
Operating voltage	V	24
Charging time 20–80%	min	20[1] optional 30/40/60[1]
Max. grade	%	5[1]
Turning radius	m	1,0
Communication		WLAN
Navigation / localization		Inductive sensor, magnetic track, RFID, odometry, LiDAR, 2D camera
Positioning accuracy	mm	+/- 5[1,3]

/ [1] environment-dependent/ [2] without optional accessories / [3] dependent on localization method/

4.1 SAFELOG L2 core (Pic. 4.11)

Within the L2 device family, SAFELOG offers the mobile robot L2 core, a device without load handling devices that is particularly suitable as an assembly platform for loads. The AGV can also be used as a classic transport robot for intralogistics tasks using special attachments.

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4.2 SAFELOG L2 lift (Pic. 4.21)

A lift table with scissor bearings enables the SAFELOG L2 lift to actively lift and transport loads. The mobile robot can be used in combination with peripheral devices such as the Palomat or customer-specific transfer stations on the shopfloor.

Pic. 4.11

Pic. 4.21

Dimensions	mm	1200 / 700 / 310 (L/W/H)
Own weight	kg	329
Topload	kg	1500[1]
Maximum travel of the lifting device	mm	160 /Lift/
Speed	m/s	0.02 – 1/1.6[1] (w/wo load)
Battery type and quantity		LiFePO4 (1)
Battery charging		Inductive
Capacity of battery	Ah	42 optional 63/84
Operating voltage	V	24
Charging time 20–80%	min	30[1] optional 40/60[1]
Max. grade	%	5[1]
Turning radius	m	1,0
Communication		WLAN
Navigation / localization		Inductive sensor, magnetic track, RFID, odometry, grid codes, LiDAR, Triton
Sensors		3D camera, RFID, light barrier
Positioning accuracy	mm	+/- 5[1,3]

/ [1] environment-dependent/ [2] without optional accessories / [3] dependent on localization method/

5.1 SAFELOG X1 core (Pic. 5.11)

The focus of the SAFELOG X1 core base unit is on its use as an assembly platform. The mobile robot can be equipped with various carrier superstructures for this purpose. Customer-specific superstructures are also available as an option. The maximum load capacity of the transport robot is 1,500 kg.

5.2 SAFELOG X1 lift 1200 (Pic. 5.21)

The SAFELOG X1 lift 1200 mobile robot picks up the load via a central lifting unit. This can be equipped with various attachments for transporting pallets, shelves or other load carriers. With a maximum load capacity of 1,200 kg, the lifting height is up to 80 mm. Due to its high flexibility in picking up load carriers, the AGV is particularly suitable as a G2P platform in fulfillment centers or for supplying production lines.

5.3 SAFELOG X1 spin (Pic. 5.31)

With the **SAFELOG X1 spin**, SAFELOG meets the challenge of minimizing process times in large warehouses and where space is at a premium.
The mobile robot picks up the load via a central, rotatable lifting unit. It can lift loads up to 80 mm and has a maximum lift capacity of 1,200 kg.. The AGV is equipped with a rotating unit that allows the robot and load to rotate independently of each other. This makes it possible to realign the load even in tight spaces. The Goods-to-Personplatform is primarily used in fulfillment centers and on production lines.

Pic. 5.11

Pic. 5.21

Pic. 5.31

SAFELOG X1

Dimensions	mm	840 / 820 / 340 (L/W/H) 840 / 820 / 367 (L/W/H)/Spin/
Own weight	kg	181/Core/, 210/Lift 1200/, 232/Spin/
Topload	kg	1500[1] , 1200[1]/Lift 1200, Spin/
Lifting height	mm	80/Lift 1200, Spin/,
Speed	m/s	0.02 – 1/1.6[1] (w/o load)
Battery type and quantity		LiFePO4 [1,2,3]
Battery charging		Inductive
Capacity of battery	Ah	21[1] optional 42/63[1] 21[1] optionaly 42[1]/Lift 1200, Spin/
Operating voltage	V	24
Charging time 20–80%	min	20[1] optional 30/40[1] 20[1] optional 30[1] /Lift 1200, Spin/
Max. grade	%	5[1]
Turning radius	m	1
Communication		WLAN
Navigation / localization		Inductive sensor, magnetic track, RFID, odometry, grid codes, LiDAR, Triton, 2D cameras
Sensors		RFID, light barrier
Positioning accuracy	mm	+/- 5[1,3]
Possibility of equipping with strucktures to user's needs		YES

/ [1] environment-dependent/ [2] without optional accessories / [3] dependent on localization method/

6.1 SAFELOG GT1

The **SAFELOG GT1** is specially designed to meet the requirements of pallet and shelf handling, e.g. in fulfillment centers. As a goods to person (GTP) and shelf to person solution, the GT1's maneuverability and compact dimensions of 1200×830 mm (LxW) allow it to be used even where space is limited. With a height of only 275 mm, the mobile robot can pass under most standard shelves and lift them up to 70 mm with a lifting system. The maximum payload is 1,300 kg. The SAFELOG GT1 reaches a maximum speed of up to 2.2 m/s with load and up to 3 m/s without load. Additional flexibility is provided by the differential drive, which enables the robot

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to turn on the spot – ideal for use in narrow aisles and with frequent changes of direction. Like all SAFELOG robots, the GT1 is VDA5050 compliant, but can also be operated without a master control station thanks to its swarm intelligence.

6.2 SAFELOG GT1 spin

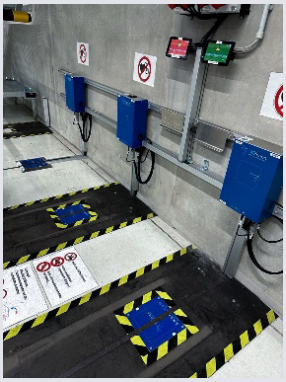
In the **GT1 Spin** version, the mobile robot is equipped with a turntable that allows the orientation of the transported goods independently of the robot. This saves a significant amount of time when positioning shelves and pallets and optimizes workflows.

SAFELOG GT1

Dimensions	mm	1200x830x270 (L/W/H)
Own weight	kg	210 [2]
Topload	kg	1300[1]
Lifting height	mm	70
Speed	m/s	0.02 – 2.2/3.0[1] (w/o load)
Battery type and quantity		LiFePO4 (2) optionaly LiFePO4 (4)
Battery charging		Inductive
Capacity of battery	Ah	21 optionaly 42
Operating voltage	V	48
Charging time 20–80%	min	20[1] optional 30[2]
Continous driving (w/[o] load) (h)	%	[3.2] 1.91[1,4] optional [6.3] 3.7[1,4]
Turning radius	m	1
Communication		WLAN
Localization		Odometry, grid codes optional LiDAR (LLS)
Sensors		Optionaly: light barrier, QR sensor, 3D-TOF camera
Positioning accuracy	mm	+/- 5[1,3]

[1] environment-dependent/ [2] without optional accessories/ [3] dependent on localization method/
[4] at linear speeds of 1.5 m/s without acceleration, load of 1,000 kg, 80% driving share

Charging systems



Inductive charging system from Wiferion (permanently installed)

The Wiferion etaLINK 3000 is a patented inductive charging system for industrially used electric vehicles and mobile robots. The system does not require any plug or sliding contacts and therefore enables in-process charging – the intermediate charging of batteries in the process.

SAFELOG mobile charging system

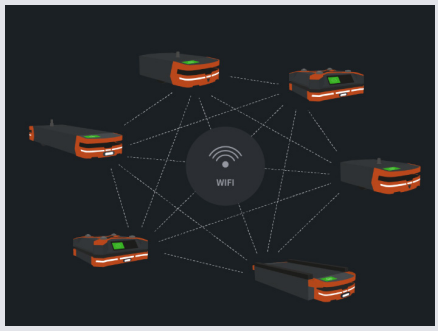
SAFELOG offers a mobile, wired charger for flexible charging of the mobile robots.
This is used, for example, during commissioning or after maintenance work to charge the devices outside the inductive charging stations. The efficiency is up to 94% . Power is supplied via a 230V connection plug. The mobile charger is compatible with all SAFELOG S3, M4, X1 and L2 models via a universal plug.

SOFTWARE

The **SAFELOG IntelliAgent** control software offers a cost-effective and lean solution as a decentralized fleet manager for driverless transport systems. The software is also 5G-capable. A connection to customer-specific PLCs is also possible. However, the SAFELOG IntelliAgent can also be taken offline in favor of a central control system, into which the mobile robots from SAFELOG are integrated via the VDA 5050 interface, for example.

For service is possible to install **SERVICE MOBILE App on your device** (iPhone & iPad).

Modular **SAFELOG IntelliPick** control software fulfils diverse requirements along the supply chain. It forms the basis for efficient picking processes which means the best possible integrated concept can be developed for individual processes.



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