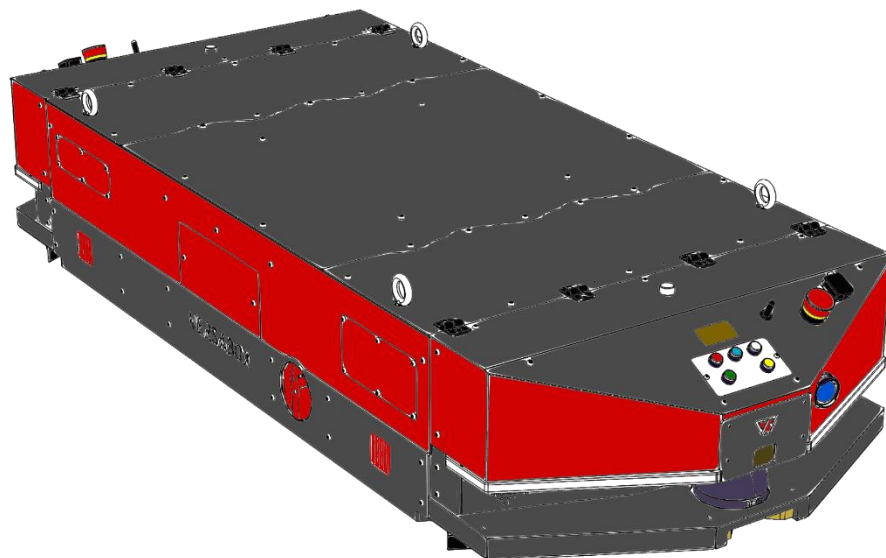

Autonomous Mobile Robot

VERSABOT 500 v.1.4 Specification



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1. Specifications

1.1. General Specifications

| | | | |
|--------------------------|------------------|--|--|
| Dimensions (L. × W. × H) | | 1707 × 704 × 347 mm ¹ 1707 × 704 × 559 mm ² 1707 × 704 × 381 mm ³ 1707 × 704 × 365 mm ⁴ 1707 × 704 × 404 mm ⁵ | ¹ No attachments ² With lifting module ³ With automatic coupler module ⁴ With mechanical coupler module ⁵ With signal connector for external attachment |
| Weight | | 350 kg ¹ 300 kg ² | ¹ With lead-crystal batteries ² With lithium-ion batteries |
| Environment | Noise emission | < 70 dB (A) | |
| | Temperature | 5 to 40°C | |
| | Humidity | 5 to 90% RH | Non-condensing |
| | Environment | Indoor use only, No excessive dust, No corrosive gas | Direct sunlight may cause safety laser false positive |
| | IP Class | IP22 | |
| Payload | Maximum payload | 500 kg | No attachment or lift module |
| | Pulling capacity | 0,5 kN | With coupler |

1.2. Specifications (details)

| | | | |
|------------------|---------------------------------|---|--|
| Floor conditions | Floor requirements | Level surface, Hard concrete or polymer, No water, dust or oil | |
| | Flatness and levelness | F _F 25 / F _L 20 <i>ACI 117 standard</i> ¹ | ¹ ACI 117: American Concrete Institute standard for concrete floors: F _F is flatness, F _L is levelness. F _F 25/F _F 20 is fairly lenient specification. |
| Navigation | Routing | Autonomous routing by localizing with Safety Scanning Laser based on environment mapping. | |
| | Environmental map making method | Scanning with SLAM (Simultaneous Localization and Mapping) | |
| Mobility | Maximum floor slope | 3% | Tilt in which the mechanical brake keeps the robot steady (with a maximum permissible load) |
| | Maximum speed | 2,0 m/s | With full load |
| | Rotation speed | < 0,3 m/s | Linear speed measured for the element farthest away from the center of rotation |
| | Docking accuracy | ± 10 mm, ± 1,5°(rotation) | |
| | Acceleration / Deceleration | < 0,6 m/s ² | |
| Drive wheels | Material | 2, hard elastomer PU, non-conductive | |
| | Size (dia. x W) | 230 × 65 mm | |
| Passive casters | Material | 4 two-wheeled, hard elastomer PU, non-conductive | |
| | Size (dia. x W) | 72 × 20 mm | two-wheeled caster width: 45 mm |
| Power | Batteries | Option 1: Li-ion | Option 2: Lead-crystal |
| | | Li-Ion, 52 V | Lead-crystal, 48 V |
| | Nominal Capacity | 57 Ah | 55 Ah |
| | Run time | > 8 h with half load | > 8 h with half load |
| | Recharge time | < 1,5 h | < 8 h |
| | Battery life cycles | > 1000 recharge cycles | > 400 recharge cycles |
| | Charging method | Automatic / manual | Automatic / manual |
| | Batteries replacement time | n/a | 5 minutes |

Specifications (details) (cont.)

| | | | |
|------------------------|------------------------|---|---|
| Standard | Safety standard | EN 1525, EN ISO 13850, ISO 3691-4:2020 | |
| | Wireless | IEEE 802.11 a/b/g/n/ac | |
| Safety | safety Scanning Lasers | SICK microScan3 Pro 1 at front, 1 at rear | 106 mm above floor, 220° Safety range: 5.5 m Measurement range: 40 m Laser class 1 (eye-safe) Typ 3 (IEC 61496) SIL2 (IEC 61508) SILCL2 (EN 62061) Category 3 (EN ISO 13849) PL d |
| | Emergency stop | 2, on each front | |
| | Lights | 4 Light bars (1 at each robot corner) 2 "Blue Spots", at front and rear of the robot | |
| | Sound | 2, at front and rear of the robot | |
| Operator Interface | Operator Panel | Start /Stop Button Power train Activation Button Safety Reset Button Run Predefined Operation Button Error Signalization Indicator Graphic Display Panel | |
| Wireless communication | Wi-Fi | IEEE 802.11 a/b/g/n/ac | Communication with Configuration software and Plant Logistics System |
| Wired Input / Output | Serial Ports | 1 x Ethernet | Maintenance Operations Use |

1.3. Robot suspension system

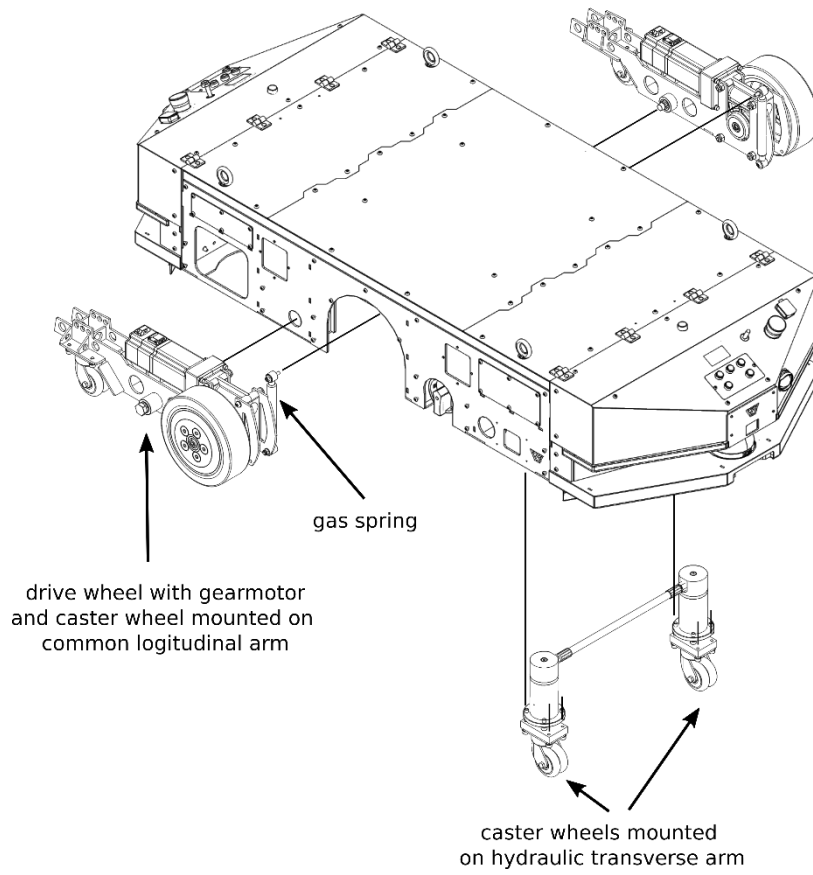


Fig. 1. Suspension system

1.4. Communication requirements



In order to ensure proper communication between the robot and the configuration software (as well as the infrastructure elements controlling the transport process), all following requirements for a wireless network in the robot environment must be fulfilled.

The robot control software (including navigation system) does not require any communication or data exchange with the environment. However, connection to a local Wi-Fi network is necessary to give the robot commands in Process Mode by an external IT or logistics system and to communicate with the configuration software.

1. Wi-Fi network access requirements

- Wi-Fi signal coverage along the entire route of the robot.
- One static IP address for each robot with open ports:
 - 22 tcp,
 - 80 tcp,
 - 443 tcp,
 - 22222 tcp,
 - ICMP protocol.
- One dynamic IP address for each computer with configuration software active session.
- One dynamic IP address for each element of the infrastructure that communicates with the robot in order to issue a command or read the robot's state (dock, user's IT system, ANDON, etc.).
- The data rate capacity for each element of the system should be 300 KiB.
- Preferred authentication method: WPA2 Personal (preferred) or WPA2 Enterprise.

1. Internet access (VPN access) for system installations where remote diagnostics is to be provided.

1.5. Dimension drawings

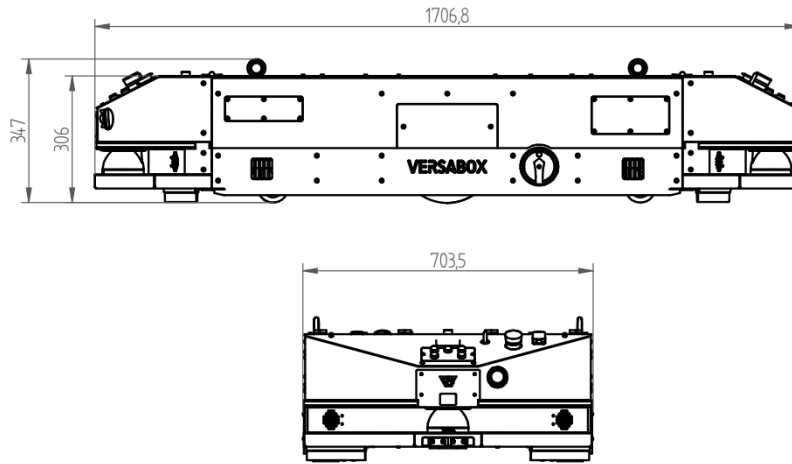
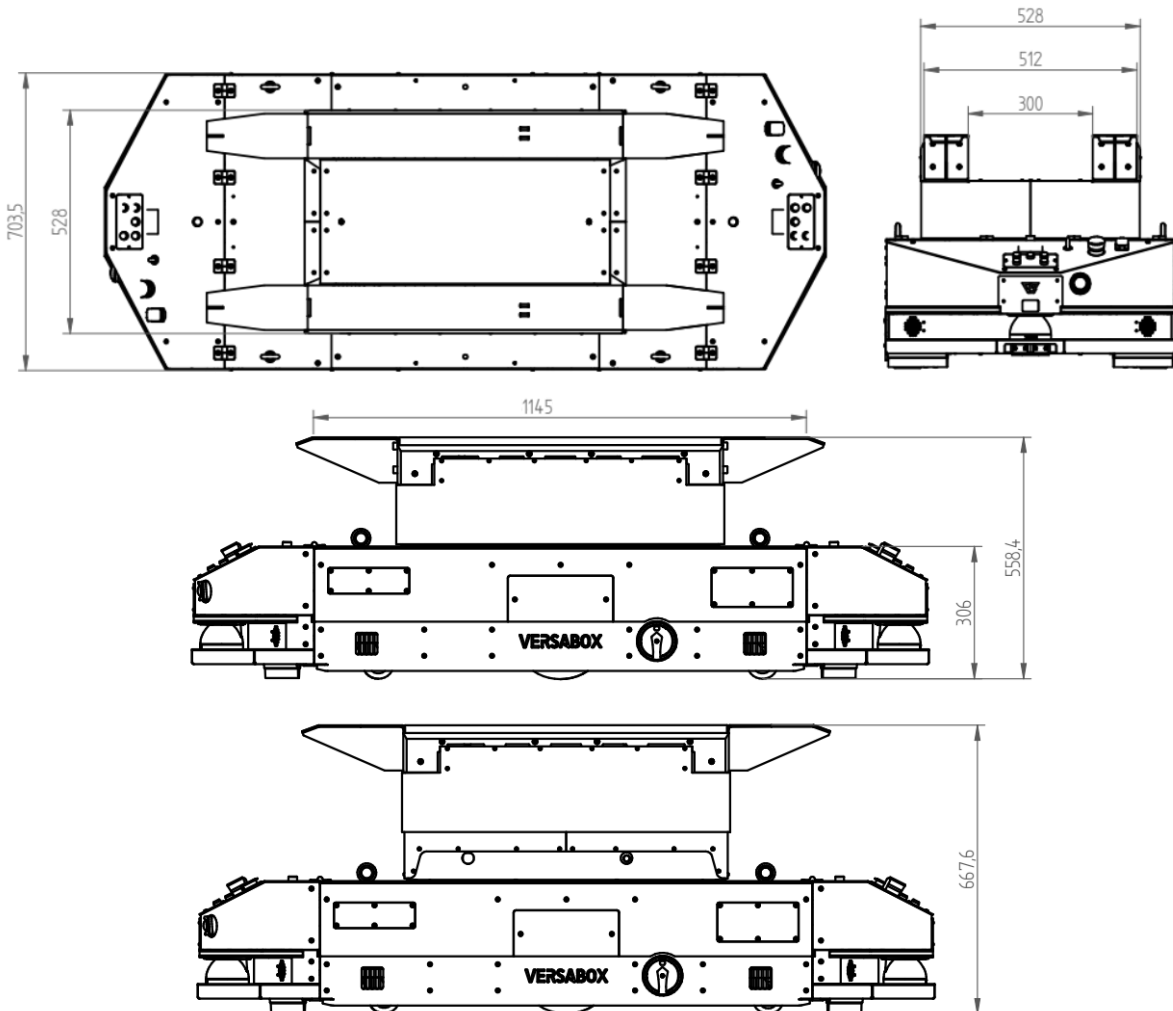


Fig. 2. VERSABOT 500 Dimensions (no attachments)



Rys. 3 VERSABOT 500 Dimensions (with lift module)

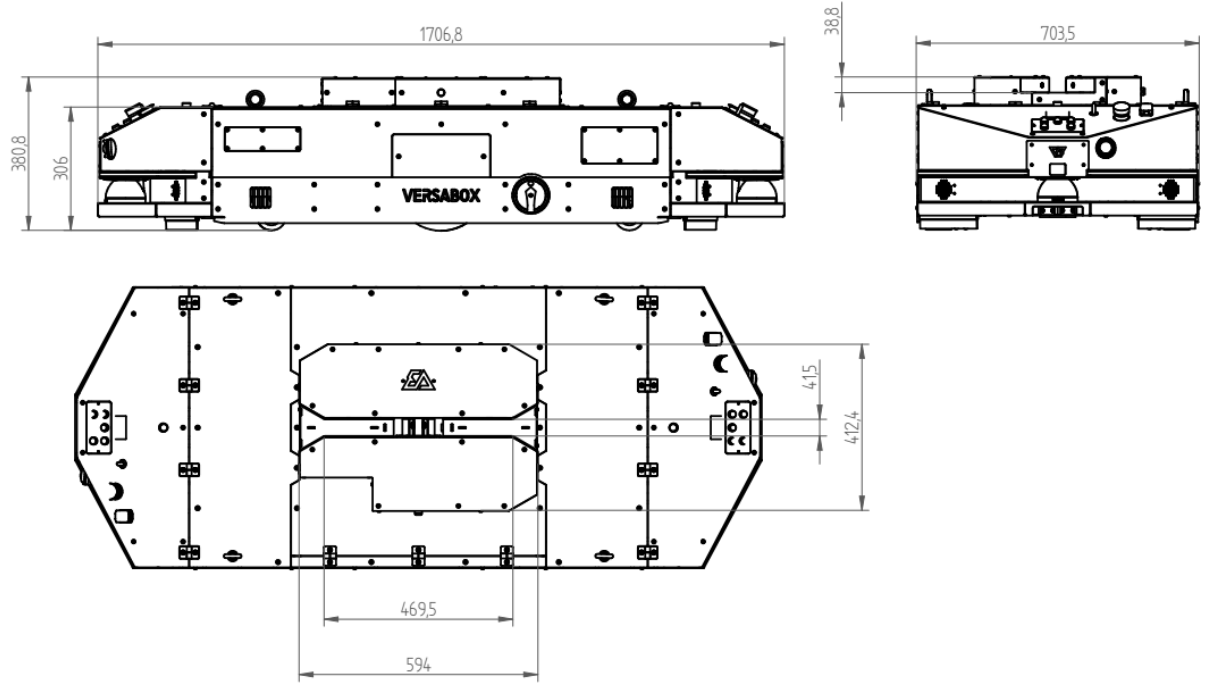


Fig. 4 VERSABOT 500 Dimensions (with automatic coupler module)

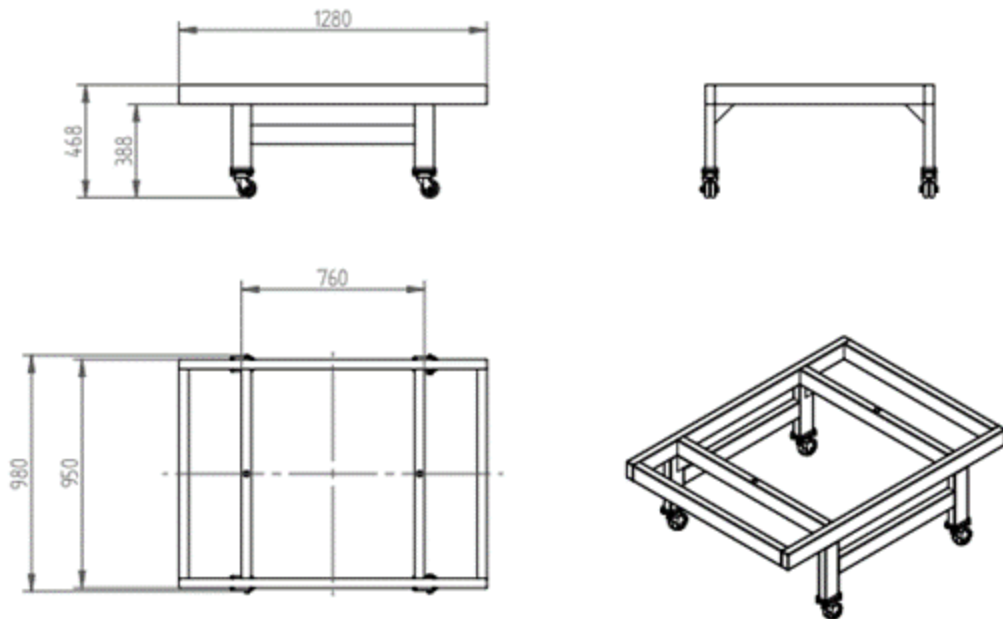


Fig. 5 VERSABOT 500 Dimensions of standard transportation trolley

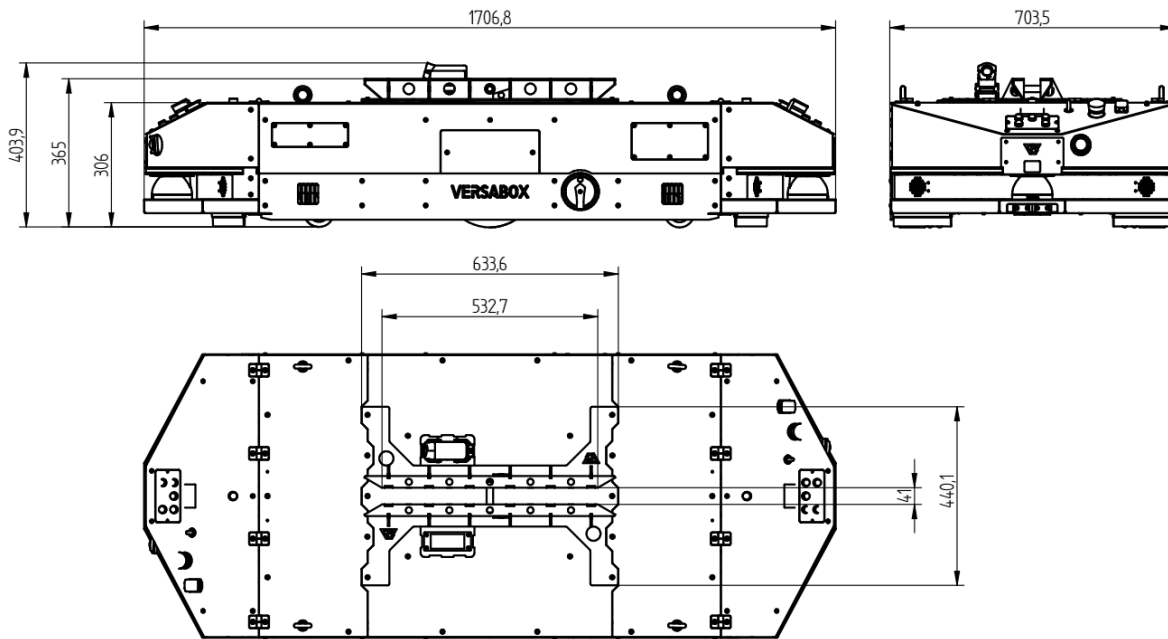


Fig. 6 VERSABOT 500 Dimensions (with permanent coupler module and signal connector)