

ELECTRIC STREET SWEEPER

# Product Information

LYNX  
CHARGE | 5000

Enviropath  
PTY LTD



# OVERVIEW

## LYNX 5000 at a glance

- Compact 5 m<sup>3</sup> vacuum sweeper
- Three versions of power train available:

LYNX 5000



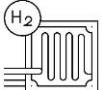
- Powered by EURO 6 E Diesel engine
- Driven by the hydrostatic motor

LYNX Charge 5000



- Powered by Lithium-ion battery pack
- Driven by electromotor

LYNX H<sub>2</sub> 5000



- Powered by H<sub>2</sub> fuel cell
- Driven by electromotor



# DRIVE

## LYNX 5000 at a glance



- 50 km/h maximum driving speed
- 20 km/h maximum working speed
- 2 wheels drive (rear axle)
- 4 wheels steering
- Gradeability (diesel version) 24% full, 30% empty

# AUTONOMY

- At least one working shift autonomy

LYNX 5000



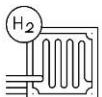
Low fuel consumption according to EN 15429-2 standard

LYNX Charge 5000



Working time up to 8 hours  
Fast charging: up to 3 hours using 80 kW DC charger

LYNX H<sub>2</sub> 5000



Working time 8 hours  
Fast refuelling

# LYNX 5000 at a glance



# Sweeping System



# LYNX 5000 at a glance

- 2 brushes as standard
  - fixed sweeping width 2535 mm
- 3<sup>rd</sup> brush as an option
  - Sweeping width up to 3525 mm
- Load sensing working hydraulic system
- Two hopper emptying systems:
  - High dump with unloading height of 1600 mm
  - Standard tipping with unloading height of 900 mm

# CABIN & COMFORT

- Proven LYNX Human Machine Interface design
  - Most frequently used functions placed on adjustable hand rest and adjustable central console
  - Less frequently used functions placed on the overhead console
  - Large 10,1" touch enabled main screen
  - Auxiliary screens for optional cameras
- Comfortable full-size seats for driver and passenger
- Automatic air conditioning
- Big glass surfaces, side mirrors and selection of cameras for great visibility

# LYNX 5000 at a glance



# DIMENSIONS

# LYNX 5000 at a glance

## Length

- 4940 mm with 2 brushes

## Width

- 1800 mm (without side mirrors)

## Height

- 2500 mm (without beacon)

## Ground clearance

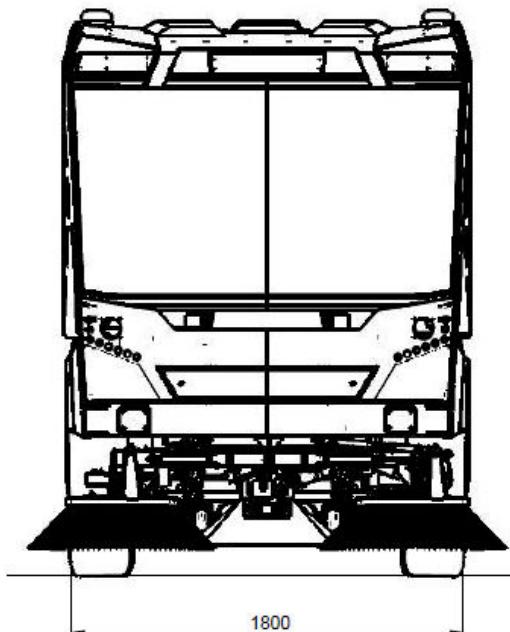
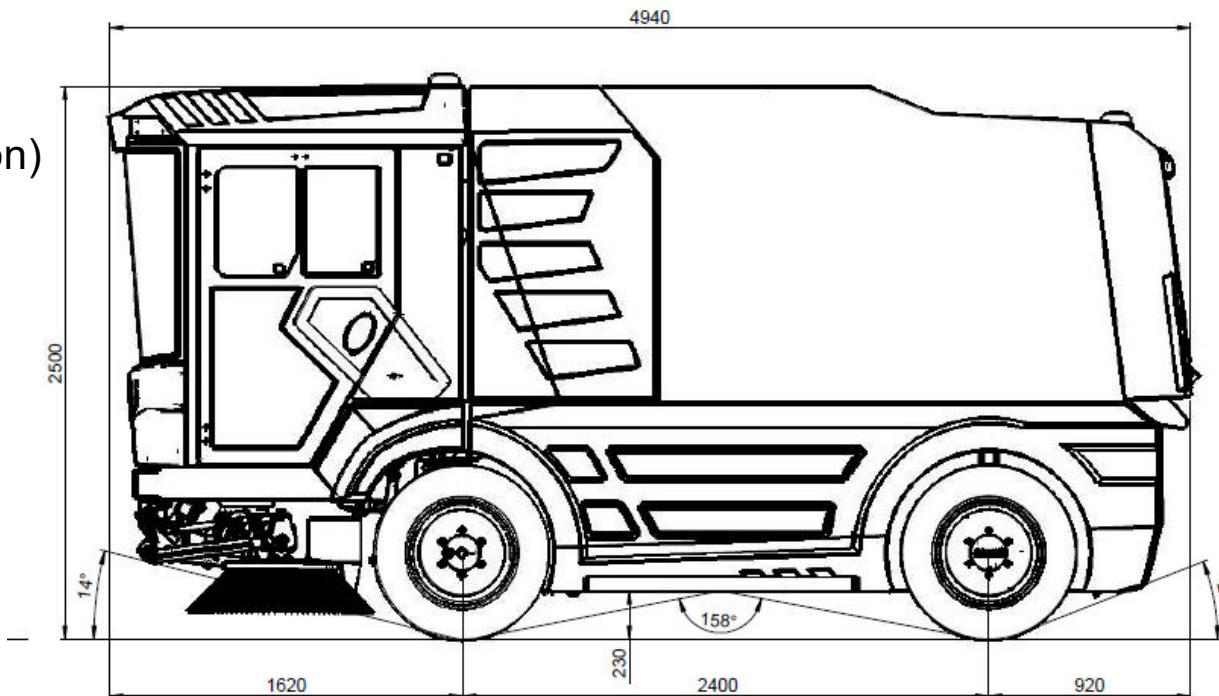
- 230 mm

## Wheelbase

- 2400 mm

## GVW

- 11.500 kg



## Sweeping efficiency

- Large brushes
- Wide suction mouth
- Wide suction hose
- High fan speed
- Low engine RPMs while sweeping
- 3rd brush optional



## Autonomy

- Large fresh water tanks
- Low fuel consumption
- Supporting operating time for 8-hours shifts
- Standard tipping or high dump hopper unloading option



## Maneuverability

- 4 wheels steering
- Small turning circle
- 24% gradeability



## Functional design

- Front tilted windshield
- Front panel in the roof
- Extended roof protecting the operator from direct sunlight
- Hidden manual high-pressure washer

## Easy to use

- Custom made HMI
- Push button reverse
- Manual suction hose ready to use
- Built in hopper washing system
- Cruise control

## Comfort

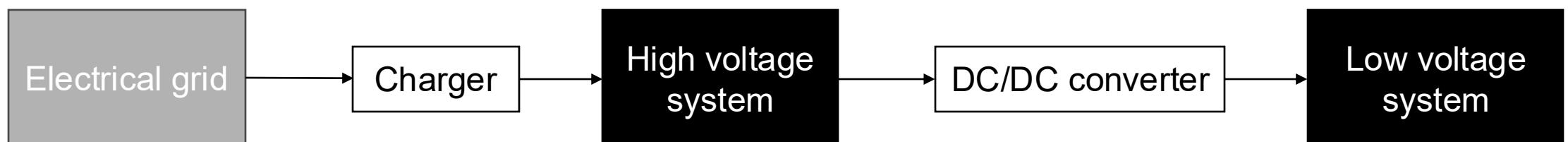
- Sound insulation of the cab
- Engine mounted using antivibration elements
- User friendly cabin design
- Unprecedented visibility from the cab
- Automatic air conditioning
- Full size seats

# LYNX Charge 5000 Key Subsystems

(what is different vs. Lynx 5000)

# Lynx Charge 5000 low and high voltage systems

- Lynx Charge 5000 high voltage (800 V) system
  - On-board charger
  - 160 kWh battery
  - Inverter and electromotor for propulsion
  - Inverter and electromotor powering hydraulic LS power pack
  - Inverter and electromotor powering suction fan
  - Cabin heater
  - AC compressor
  - DC/DC converter
- Lynx Charge 5000 low voltage (24V) system
  - Auxiliary 24V 74 Ah battery
  - Lights
  - HMI (Human Machine Interface)
  - Fans (4 in total) on main heat exchanger
  - HVAC except cabin heater and AC compressor
  - Pumps used in cooling systems (3 in total)
  - All control logic



Power flow between the Lynx Charge 5000 electrical systems

# Battery pack

- Lithium ion cells (21700 cell, NCA chemistry)
- Custom designed pack – best used space
- BMS – advanced diagnostic and safety functions
- Protective contactors and fuses
- Insulation monitoring system
- 16 modules in series (50 V each module)
- Battery capacity: 160 kWh
- Max. Voltage: 800V
- Nominal voltage: 690V
- Battery pack placed between the axels – optimal center of gravity
- Active thermal management of the battery. HVAC of the sweeper and active thermal management of the battery implemented as one common system.
- AC and DC charging possible



# Charging

## Onboard charger

Brusa OBC768: 800 V, 22 kW

- AC charging
  - Single-phase input voltage range: 85-277 V
  - AC input current (per phase): 32 A
  - Input frequency: 45 - 65 Hz
  - Charging time of the LYNX CHARGE battery: 8 h (22 kW)
- DC charging
  - Up to 80 kW DC charging (depending on the charging station capabilities)
  - Charging time up to 3 hours



## Charging socket

- Standard CCS Type 2 (IEC 62196-3)

# Example of Type 2 charging station

## ABB charging station installed at RASCO

- Model: ABB Terra AC W22-G5-R-C-0 3ph, 22kW, 32A, Cable 5m, type2
- Vehicle socket type: type 2 (according to IEC 62196-1, IEC 62196-2)
- Output charging power: 22 kW
- 3-phase connection 3x230V, 32A, 50Hz
- Options Keylock and RFID need to be extra payed when selecting a station
- Options 4,6 / 11 / 22 kW depending on infrastructure



# Main drive

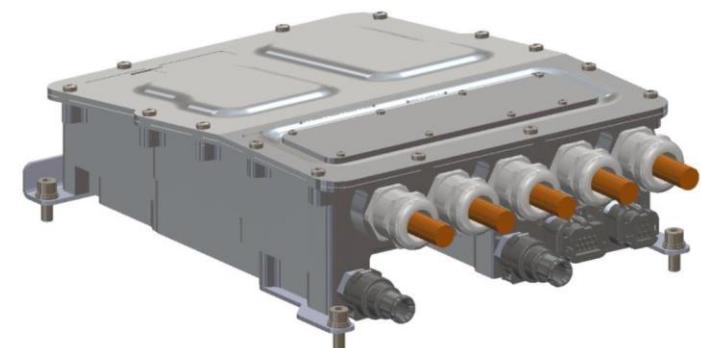
## Drive motor

- Max motor power: 200 kW
- Power limited to: 140 kW
- Motor efficiency: 92-98 % (diesel engine efficiency 28 %)
- Gear ratio 1:13,67 – same as on diesel version
- Axial flux motor
- Liquid cooled



## Drive inverter

- SiC technology. Higher power in the same volume than IGBT technology can
- PMSM (permanent magnet synchronous motor) motor controller
- Two drive modes – torque or speed control
- Output continuous current: 300 Arms
- Max. allowed current: 450 Arms



# Hydraulic power pack

## Why do we need hydraulic systems on electric sweeper

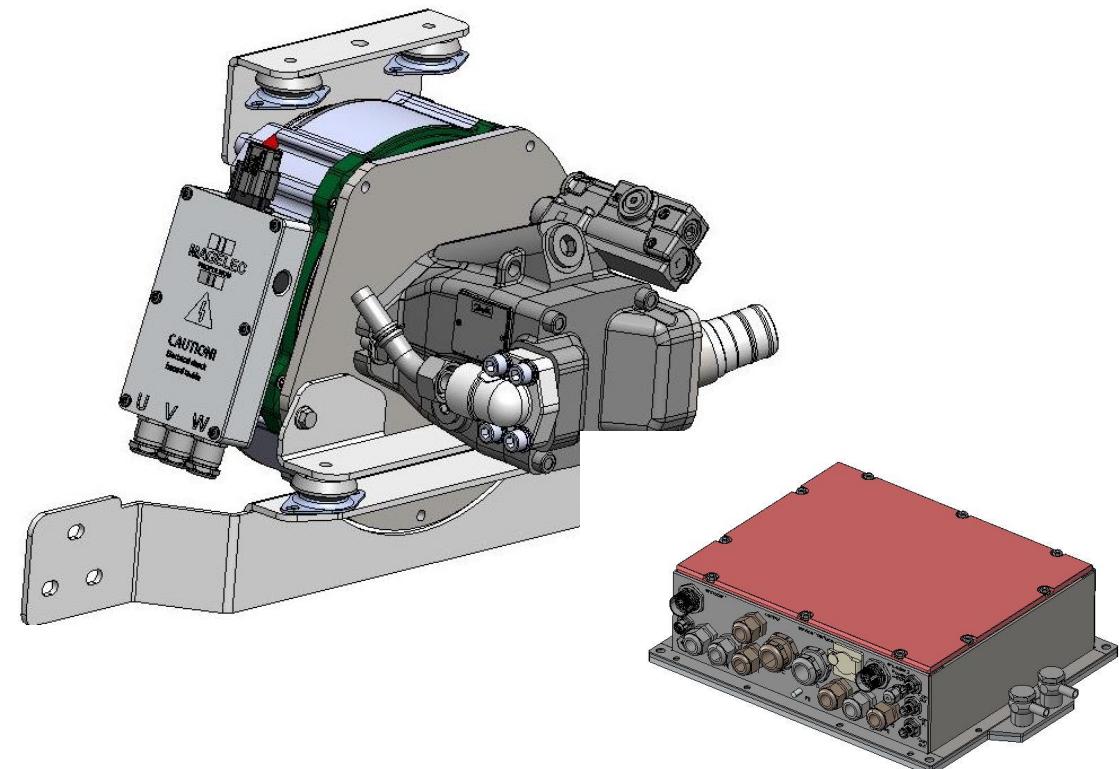
- Hydraulic powerpack used to power functions that have no electric technical equivalent or are not economically viable in electric version
- Hydraulic systems on the Lynx Charge 5000: steering, brakes, front suspension, hopper emptying system, high pressure water circuit pump, brushes movement and rotation, suction mouth control

## LS pump and LS pump drive motor

- Motor rated power: 58 kW
- Motor rated speed: 12000 RPM (max. used 2600 RPM)
- Motor is liquid cooled
- LS pump: 25 cm<sup>3</sup>
- Hydraulic tank size: 44 l

## Inverter DC/AC

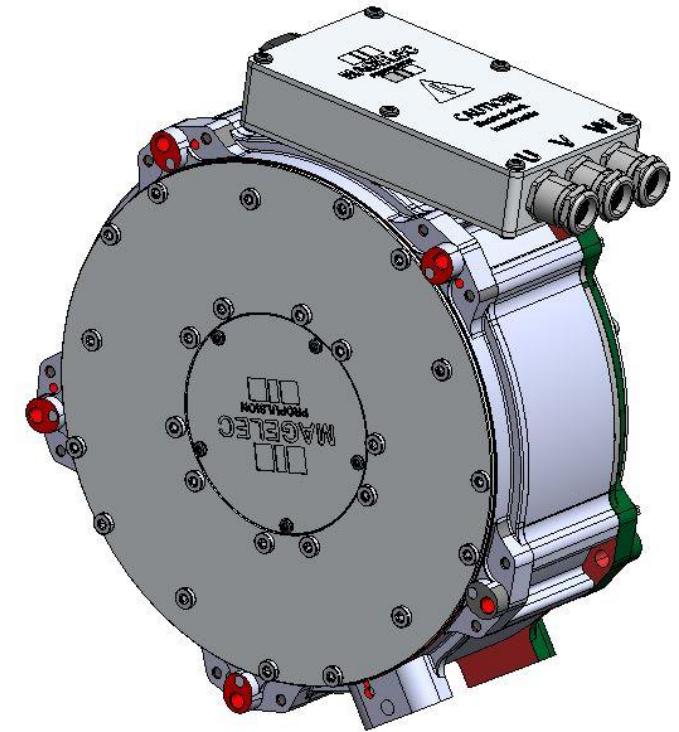
- One inverter with two drives used. One drive for LS pump motor, the other for the fan motor
- Regulates RPMs depending on the working conditions
- Liquid cooled



# Suction fan motor

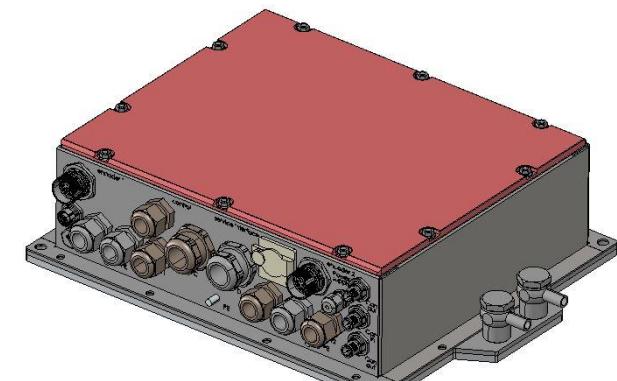
## Suction fan motor

- The same motor used as on the LS pump drive
- Rated power: 58 kW
- Rated speed: 12000 RPM (max. used 3000 RPM)
- Liquid cooled



## Inverter DC/AC

- One inverter with two drives used. One drive for LS pump motor, the other for fan motor
- Different RPM depending on the working conditions
- Liquid cooled



# DC/DC converter

- Used to satisfy energy requirement in 24 V system
- Rated power: 4 kW max.
- Input voltage: 350-890V
- Efficiency: > 92%
- Output voltage: 20-31 V
- Liquid cooled
- CAN communication
- Energised when sweeper is turned on and when main battery is being charged. In these situations low voltage system is powered from the main battery



# HVAC and battery thermal management systems

- Lynx Charge 5000 has active battery heating and cooling system connected with the cabin HVAC system
- Cooling
  - Battery cooled to the ambient temperature using liquid circulating through the heat exchanger (dedicated part of the combi block)
  - If battery is to be cooled to the temperature below the ambient temperature battery cooling liquid is cooled using AC part of the cabin HVAC system
- Heating
  - High voltage heater used to heat cabin and battery as needed

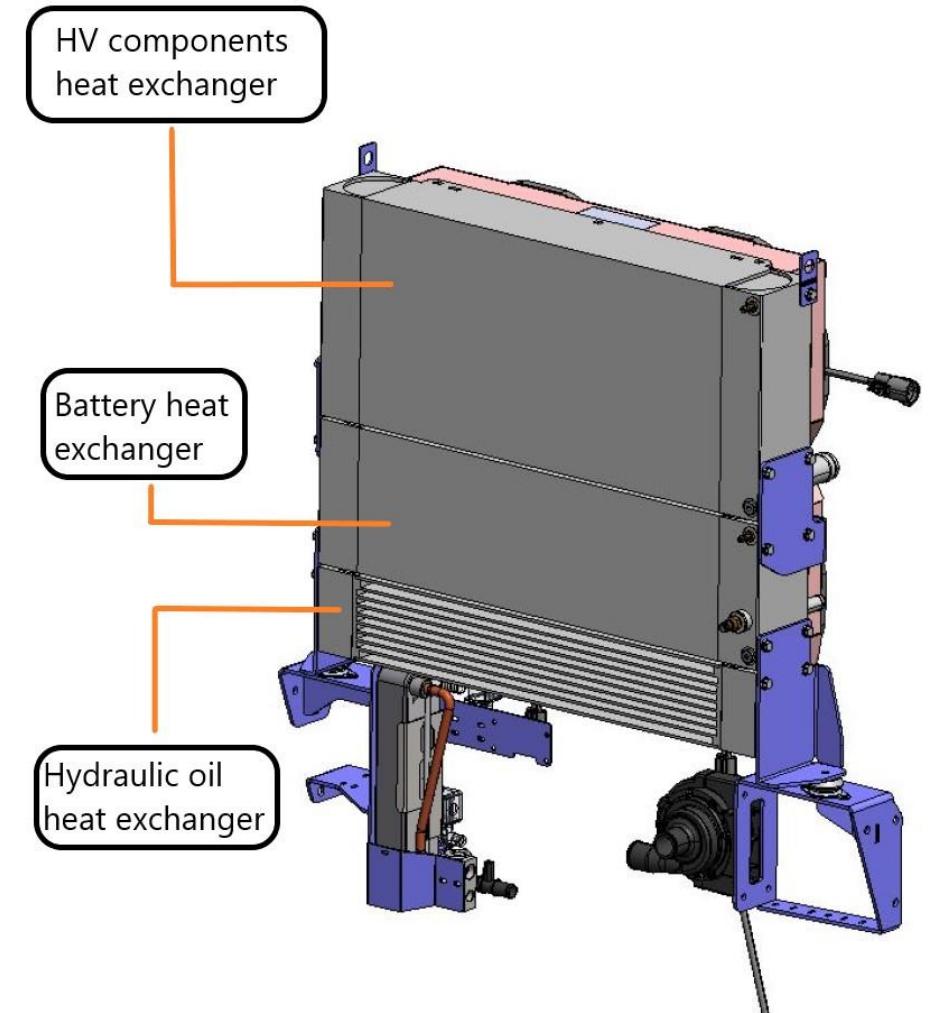
## Cabin heater

- Rated power: 10 kW max.
- Input voltage: 450-870 VDC
- State of the art component (automotive sector)



# Electromotors and inverters thermal management system

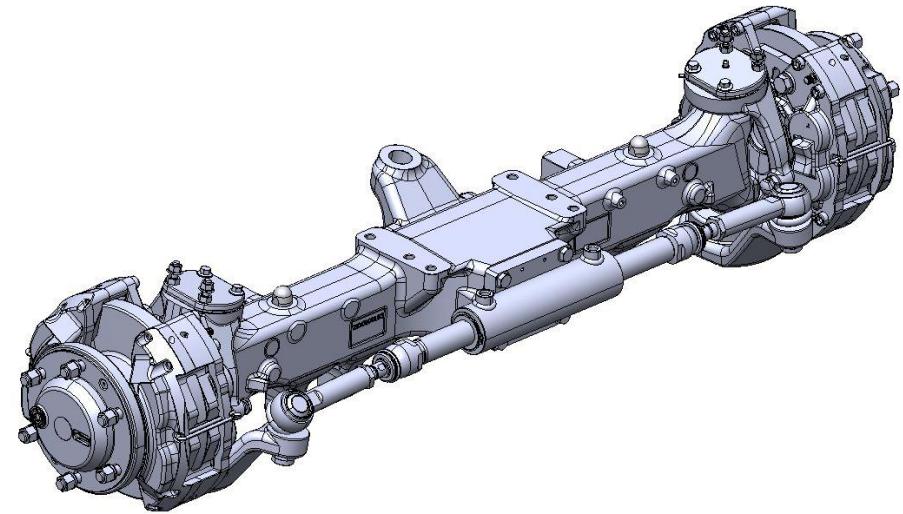
- Electromotors, inverters and charger
  - Cooled using separate circuit with dedicated part of the heat exchanger assembly (combi cooler)
- Hydraulic oil
  - Cooled using dedicated part of the heat exchanger assembly (combi cooler)



# Axles

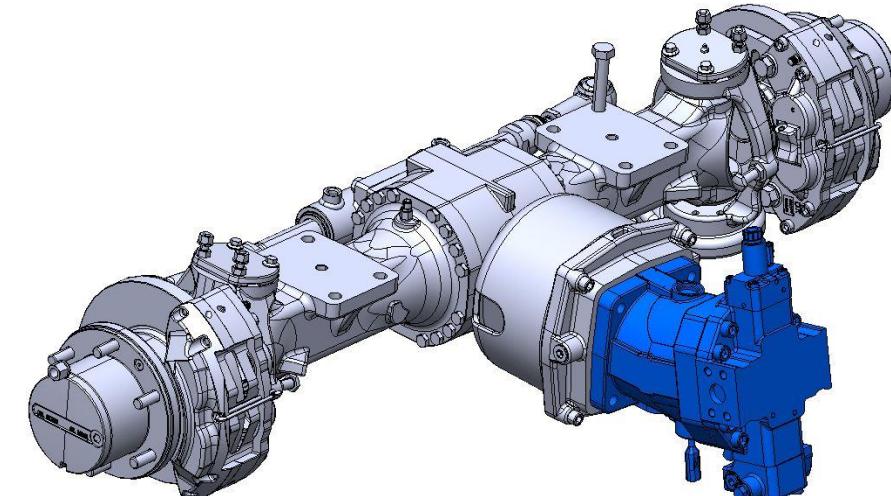
## Dana front and rear axles

- High dynamic load capability – up to 5,75 t per axle
- Limited slip differential
- 19,5" front and rear wheels
- Negative parking brake after differential
- Disc brakes on all wheels



## Customer benefits

- 2 wheel drive (rear axle)
- 4 wheel steering
- Capable of climbing 150 mm curbs head on
- Small wall to wall and kerb to kerb turning radiiuses (see Steering)
- Limited slip differential enables transfer up to 45% of power to the wheel that is not slipping



# Suspension

## Front suspension

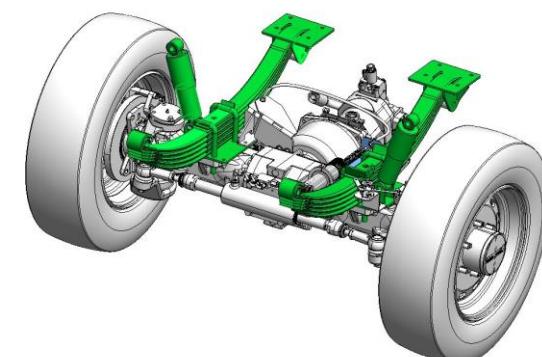
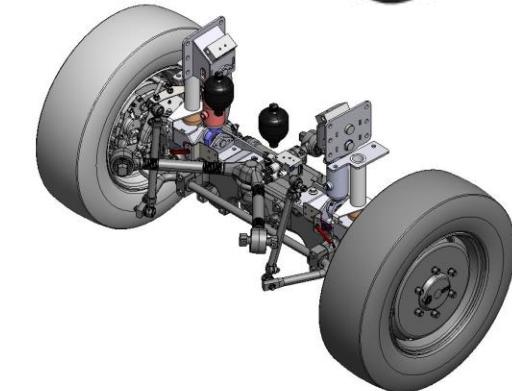
- As standard - mechanical suspension consisted of 2 cylindrical springs, 2 shock absorbers, stabilization bar with 2 connecting links, 2 main push rods/levers
- As option hydropneumatics suspension
  - All components from one supplier
  - Fully electronically controlled

## Rear suspension

- Only mechanical suspension consisted of 2 parabolic springs and 2 shock absorbers

## Customer benefits (front hydropneumatic suspension)

- Overall suspension on front axle travel – 85 mm
- Unmatched comfort level compared to conventional suspension systems
- Height control when driving over obstacles (i.e. speed bumps)
- Simple HMI for calibration and suspension mode selection
- Automatic suspension levelling



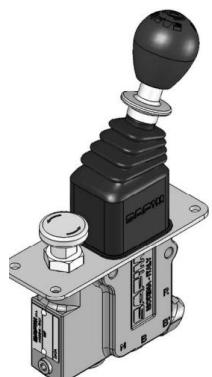
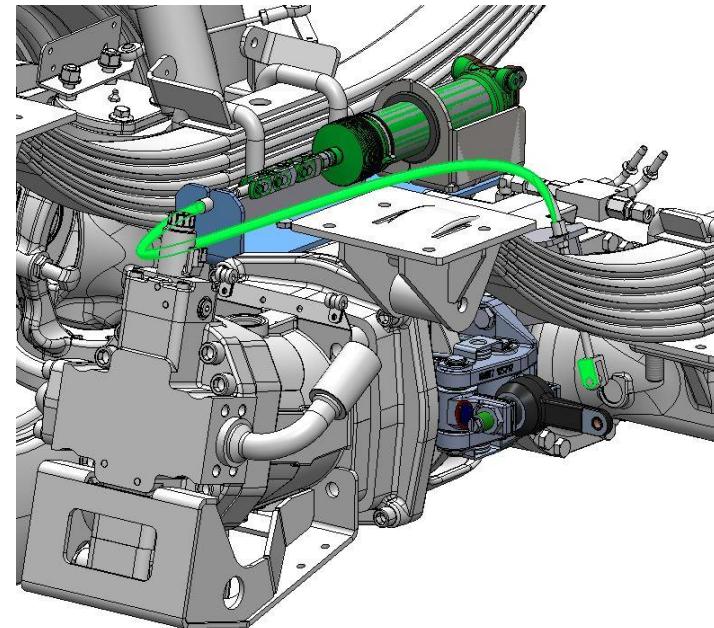
# Brakes

## Disc brakes front and rear

- Hydraulic disc brakes on front and rear wheels
- Safim components used
- Hydraulic parking brake:
  - Mechanical clasp on braking disc after the differential
  - negative parking brake – activated with spring, released with hydraulic pressure
  - automatic compensation of the cable extension

## Customer benefits

- safer braking:
  - discs ensure higher braking torque
  - parking brake works without oil pressure
- durability – disc system last longer than drum system
- less sensitive to overheating compared to drum brakes
- easy maintenance:
  - easy exchange of the brake pads
  - no need to compensate parking brake cable extension for longer periods of time



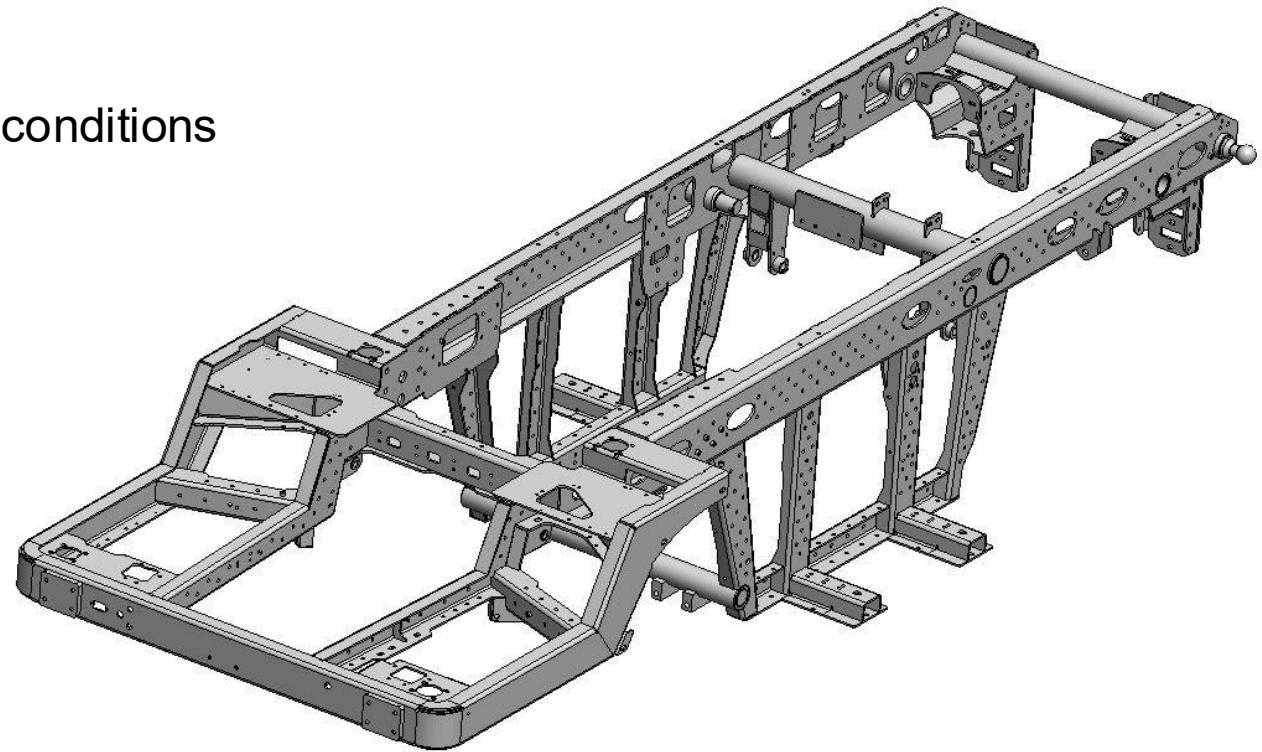
# Chassis

## Welded rigid chassis

- High strength steel for the most demanding load conditions
- Designed for up to 11.5 t GVW

## Customer benefits

- Long wheelbase provides stability



# Steering

## Wall to wall and curb to curb turning diameters:

- 2 brushes

	Wall to wall (mm)	Curb to curb (mm)
2WS	11.030	9.780
4WS	7.530	5.900

- 3 brushes

	Wall to wall (mm) – left turn	Wall to wall (mm) – right turn	Curb to curb (mm)
2WS	13.000	12.400	9.780
4WS	8.330	8.050	5.900

## Safety

- Direct hydraulic connection between front and rear axle steering cylinders
- As system is not steer by wire it is hydraulically simpler than steer by wire systems

# Cabin

## Design

- Large heated laminated glass windscreens
- Tempered glass side doors
- Made of welded steel profiles
- Forward tilted roof
- Custom made HMI

## Customer benefits

- Excellent visibility (front, lateral and rear)
  - Panoramic rear-view mirrors
  - Rear camera
  - Large windscreens
  - Floor glass window for suction mouth visual control
- Custom made HMI – ergonomically placed controls
- Best in class comfort
  - Full size seats with 3 point seat belts
  - Automatic air conditioning
  - Sound insulation and anti vibration mounting
- Comfortable working position for the driver
- Compartments for documents and mobile phone



# Human Machine Interface



## In-house custom development

- Controls grouped according to functionality and frequency of use – easily accessible
- 4 main locations of controls in the Lynx 5000
  - Side Console – integrated in the hand rest on the door
  - Central Console
  - Overhead Console
  - Steering column
- State of the art displays
- Carefully designed display interface with usability and simplicity as imperative
- Factory defined and custom machine working modes
- Designed for basic and advanced users
- State of the art, CANBus connected, input units and display

# Human Machine Interface

## Side console

### In-house custom development

- Most used working functions
  - Two joysticks to control brushes movements
  - Buttons to control suction mouth and suction mouth flap movement
  - Button to switch on the control of the third brush if installed
  - Cruise control and cruise control speed adjustment
  - Fast reverse
- Ergonomic design with polyurethane hand rest
- Configurable position of the handrest
- Customized keyboard with laser etched icons and LED backlight, with key life over 3 million cycles, resilient rubber and IP 6K9K level
- Hall effect joysticks for unmatched movement feel
- Integrated door knob for easy door opening
- Compact design doesn't impair lateral visibility of working tools



# Human Machine Interface

## Central console

### Inhouse custom development

- Secondary sweeping controls integrated in central console
  - Clean water circuit control
  - Front axle hydropneumatics suspension control, if installed
  - Control of the brush speed and rotation direction
  - Control of the recirculation circuit and high pressure water pump
  - Control of the spinning direction of the third brush
  - Control engine diesel engine RPMs
  - Control of suction fan speed
  - Emergency switch visually highlighted - stops all work functions
- Screen for suction mouth camera mounted on central console as an option
- Air conditioning control placed next to central console
- USB charger 5V 1A and 5V 2.1 A placed on the back of central console



# Human Machine Interface

## Overhead console

### Inhouse custom development

- Slightly inclined surfaces provide accessibility without distraction
- Less used working functions and auxiliary functions located on overhead keyboard
  - Lights controls
  - Central doors locking, if installed
  - Rear drive buzzer control
- 10.1" color touchscreen display with supreme visibility, can be used with work gloves (PCAP)
- Rear-view camera, IP69K, or 360° camera (optional) integrated with the main display
- Digital auto-radio system with USB and Bluetooth connectivity



# Human Machine Interface

## Steering column

### Inhouse custom development

- All functions required for safe and easy driving located on steering wheel column
  - Forward – Neutral – Reverse button
  - Working – Transport mode button
  - 2WS – 4WS
- OMNIA CAN Bus steering column switches for intuitive control
- Steering wheel knob for better steering feel
- Modern column design and small dimensions for improved work tool visibility
- Two angle adjustable steering column



# Cleaning system

## Hopper

### Hopper

- 5.0 m<sup>3</sup> hopper made of stainless steel
- Rear door with hydraulic actuation
- High performance suction fan with air flow up to 14000 m<sup>3</sup>/h and total pressure difference of XXX Pa for outstanding sweeping performance
- Easy fan wash system with freshwater connection
- Easy hopper wash system with freshwater connection as an option (connection to hydrant required)
- Two tipping systems
  - Standard tipping 900 mm
  - High tipping with push plate 1600 mm
- Automatic safety mechanism that prevents unwanted lowering of the hopper when raised.
- Hopper control unit placed in cab, can be operated when standing outside
- 2 inspection hatches from left and right side
- Connection point for filling recirculation water
- 3,36 m<sup>2</sup> surface of the air filter, 0,92 m<sup>2</sup> (standard tipping) / 0,56 m<sup>2</sup> (high tipping) surface of the recirculation water filter

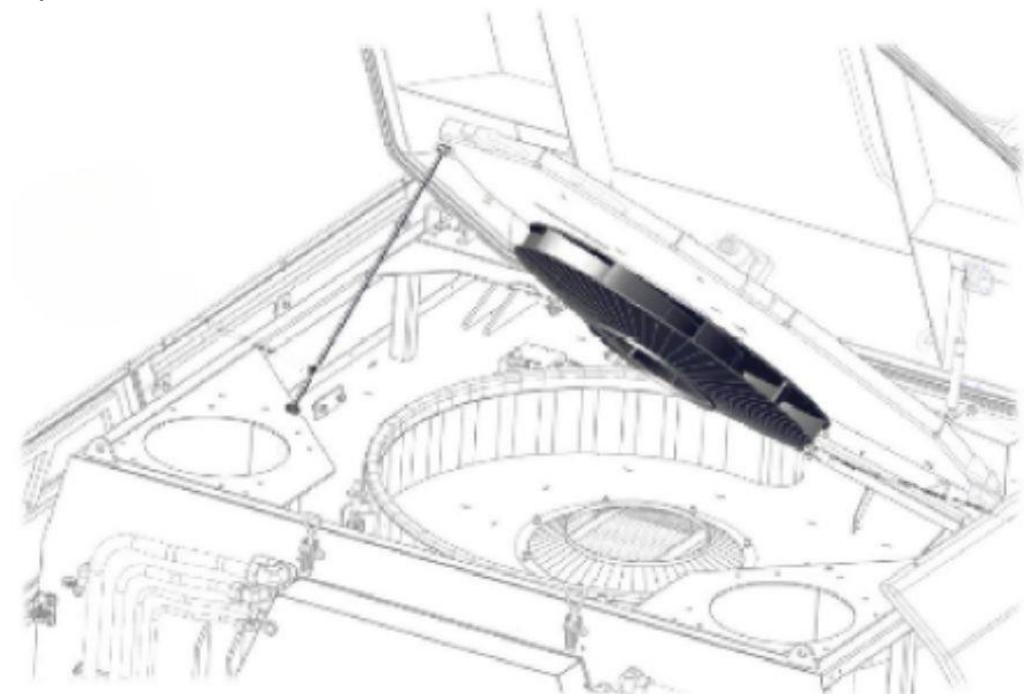


# Cleaning system

## Fan

### Fan

- Impeller made of hard anodized aluminium
- Housing made of Hardox (side) and stainless steel (bottom)
- Maximum speed 3000 RPM
- Placed on the top of the hopper
- Horizontal placement
- Easily accessible for maintenance



# Cleaning system

## Brushes and suction nozzle

### Brushes and suction nozzle

- Pulled brushes system
- Minimal number of lubrication points due to use of ball joint connections
- robust orbital hydraulic motors driving the brushes
- simple yet robust design
- 700 mm suction nozzle width
- suction nozzle kinematics with parallelogram and one castor wheel
- easy speed bump crossing without suction nozzle lifting
- Stainless steel suction tube with inspection hatch in the cabin
- 225 mm suction tube inner diameter – no material clogging
- Brushes and suction mouth can be moved left or right up to max 350 mm
- Selection of brushes
  - A – polymer
  - B – polymer + wire
  - C – wire with polyurethane coating (silent)
  - D – full wire



# Cleaning system

## Brushes selection

### Standard

- Polymer
- Polymer + wire
- Wire with polyurethane coating (silent)
- Full wire



### Weed

- Light
- Medium
- Heavy

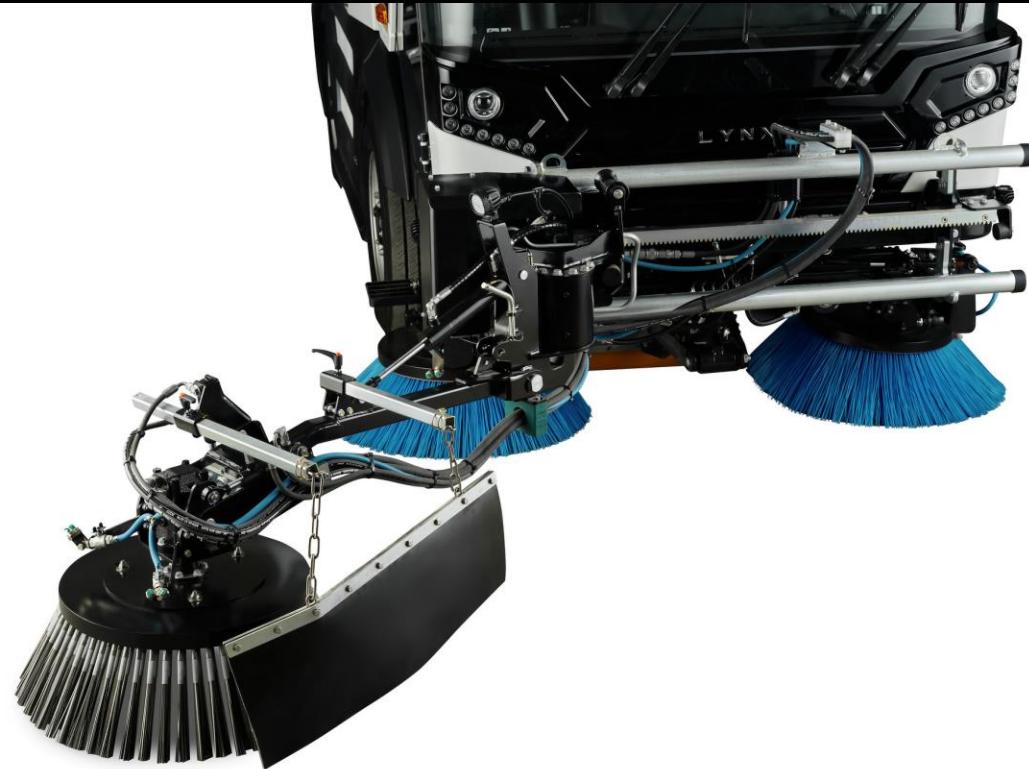


# Cleaning system

## Third brush

### System description

- simple but robust construction with minimal wear parts
- Stainless steel round tube pulley and robust gear rack enables third brush lateral movement
- Rotatable arm driven by hydraulic rotator for extended reach
- suited for working on both vehicle sides, with easy side switching
- standard size brushes in combination with third brush – higher maximum reach of the brushes
- simple way of securing the third brush arm for transport – single pin
- third brush system is easily attached/detached on the vehicle (8 screws, quick hydraulic couplings, use of well balanced support construction on wheels for detachment and storage)
- software system automatically recognizes if the third brush is attached, changing all vehicle settings without any need of operator intervention
- possibility to order machine with third brush preparation, and afterwards easily upgrade it with third brush

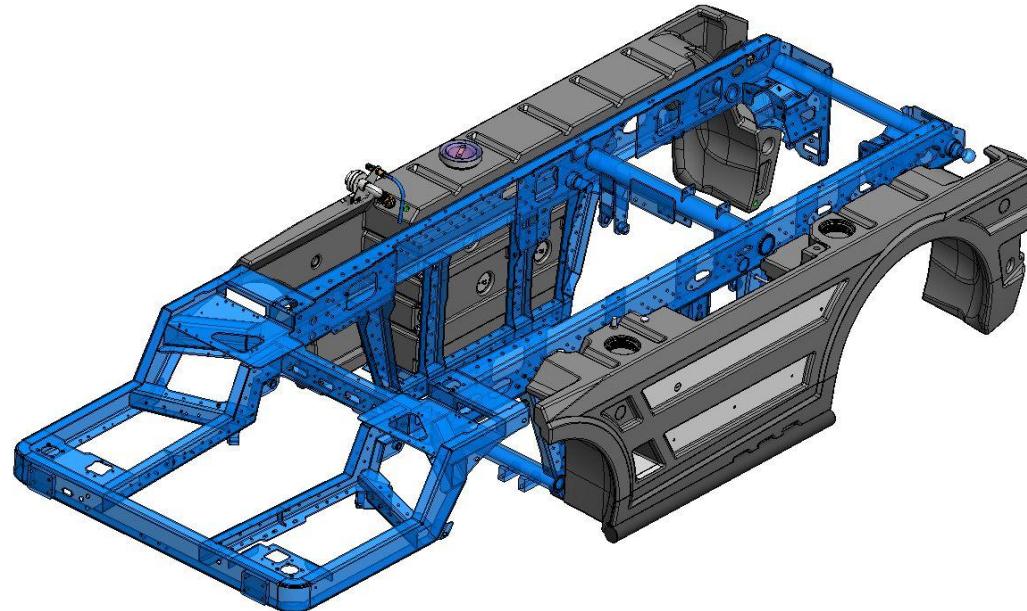


# Cleaning system

## Water tanks and water system

### System description

- System consists of fresh water circuit and recirculation water circuit
- Fresh water circuit
  - Used for:
    - Dust suppression using nozzles on the brushes
    - Lubrication of the suction hose (4 nozzles on the suction mouth and one nozzle on the top of the main suction hose)
    - Lubrication of the manual suction hose
    - Water supply all for high pressure washer options on the Lynx 5000
  - Water tanks laterally placed along the left and right side of the sweeper (600l on Diesel and Charge, 350 l on H2)
  - Optional additional fresh water tank in the hopper (600 l or 1200 l)
  - Nozzles – easy to demount and clean
  - Pumps
    - Low pressure, high flow pump (on Diesel powered by diesel engine over electromagnetic pulley, On Charge and H2 two 24V electric pumps)
    - Optional high pressure pump for high water pressure options (high pressure washers and front washing bar)
  - With all dust suppression nozzles turned on and fresh water used for suction tube lubrication sweeper autonomy is 2,5 hours



- Recirculation water circuit (highly recommended option)
  - Gravitational system with hopper as a recirculation water container (no dedicated recirculation water tanks). Recommended amount of water in the hopper – 350 l
  - Water filtrated through a fine mesh
  - Used to lubricate the main suction hose (one nozzle in the suction mouth)

# Cleaning system

## Options

### Manual High pressure washer

- 15 L/min at 150 bar or 30 L/min at 150 bar with 20 meters of hose stored below the hopper
- automatic hose reel



### Manual High pressure washer on the top of the hopper

- Coming soon

### Front washing bar

- Fixed front washing bar with nozzles for street washing



### Manual suction hose

- Top mounted manual suction hose, 130 or 200 mm in diameter, 5000 mm in length
- Already connected and mounted, manual suction hose mode available through HMI controls (push of the button turn on/off)

# Lights and visibility

## Lights

- all light modules in LED as standard equipment

## Customer Benefits

- attractive and functional design of the daytime running lights, exceptional vehicle visibility in daytime working conditions with minimal energy consumption
- maintenance free modules – LED lifetime is significantly longer than halogen modules
- better illumination performance compared to halogen modules
- smart positioning of work lights ensures no annoyance to the operator
- rear work lights helps with emptying and cleaning of the hopper in night shifts



# Lights and visibility

## Visibility

- large glass surfaces allows unobstructed view of work tools
- windshield glass without transversal profile for better visibility
- very good visibility of the vehicle surrounding for safe work in pedestrian and traffic intensive areas:
  - using rear camera for reverse driving
  - 360° camera as an option - full panoramic view of the surroundings – eliminates blind spots, increase safety, helps preventing accidents and vehicle damage
  - front camera for suction nozzle monitoring
  - large panoramic rearview mirrors and rear glass



# LYNX 5000

# Options Catalogue

# Steering and suspension

Code	Option name	Description
P003	four-wheel steering system (4WS)	both axles can be used for steering in working mode; in transport mode 4WS shuts off automatically for safety reasons, as cornering at high speed could otherwise make the vehicle unstable; the rear axle is locked in a straight position during the first alignment of both axles
P004	mechanically suspended front axle	standard suspension of the front axle, without the possibility of adjusting the height of the suspension
P005	automatic hydropneumatic suspension on the front axle, with in-cabin lifting / lowering control	increases vehicle stability and comfort, allows raising and lowering the chassis in relation to the ground for easier passage over obstacles, with control from the cabin of the vehicle



# Suction and hopper

Code	Option name	Description
P006	water recirculation system	enables the re-use of suctioned waste water from the tank and reduces the time spent refilling the tank with fresh water; water is poured directly from the tank into the suction hose without the need for a pump
P007	manual wander hose, 360 °, 5m length, 150 mm hose diameter, with water circuit	used for cleaning inaccessible corners, emptying garbage bins and clearing drainage ditches of debris; the manual suction hose is activated simply by choosing the appropriate working mode in the sweeper's user interface, without the need to connect it to the suction fan manually
P008	manual wander hose, 360 °, 5m length, 200 mm hose diameter, with water circuit	used for cleaning inaccessible corners, emptying garbage bins and clearing drainage ditches of debris; the manual suction hose is activated simply by choosing the appropriate working mode in the sweeper's user interface, without the need to connect it to the suction fan manually
P009	manual winch for lifting and lowering the in-hopper suction filter mesh	makes it easier to clean the suction filter by manually raising and lowering the filter mesh using a winch
P010	electrical winch for lifting and lowering the in-hopper suction filter mesh	makes it easier to clean the suction filter by electrically raising and lowering the filter mesh with a winch
P011	standard hopper dumping system	emptying the tank by tipping at a height of 900 mm
P012	high dump hopper dumping system with integrated push-plate	emptying the tank with a push-plate at a height of 1600 mm
P099	electric motor for closing the main suction pipe	Allows closing of the main suction pipe using a button from the vehicle cabin. Mandatory with the manual wander hose option.



# Washing system

Code	Option name	Description
P013	high pressure pump 150 bar, 15 litres	water pump used to drive all pressure washing options
P014	high pressure pump 150 bar, 30 litres	water pump used to drive all pressure washing options
P015	high pressure manual washer gun with 20-meter hose on an automatic reel	it enables manual high-pressure washing of roadside surfaces and can be used to wash the sweeper, with the option of automatic winding
P016	fixed high pressure front washing ramp	fixed front ramp with high-pressure nozzles for road washing
P017	connector at priming water circuit for low-pressure washing / watering	enables connecting hoses for low-pressure washing or watering plants
P018	hopper interior cleaning system using high pressure	enables simple and effective cleaning of accumulated dirt inside the hopper
P019	simultaneous sweeping and washing function	simultaneous operation of brushes and high-pressure washer for simultaneous cleaning and washing of the road



# Two-brush system

Code	Option name	Description
P020	independent hydraulic lifting and lowering of left and right brush with in-cab controls and individual brush weight relief	independent hydraulic lifting and lowering of left and right brush with in-cab controls and individual brush weight relief
P021	lateral movement of the 2 brush system	moving both brushes simultaneously to the left or right
P022	hydraulic pitch and roll system for front brushes	front brush pitch and roll control from the vehicle cabin
P023	polymer brushes	softest type of brush, good for sensitive surfaces
P024	polymer + steel combined brushes	general use brush
P025	steel brushes	hard aggressive brush, good for cleaning caked up mud and debris next to curbs
P026	steel brushes with polymer coating (silent brushes)	durable as standard steel brush, but more sensitive to the surface and produces less noise



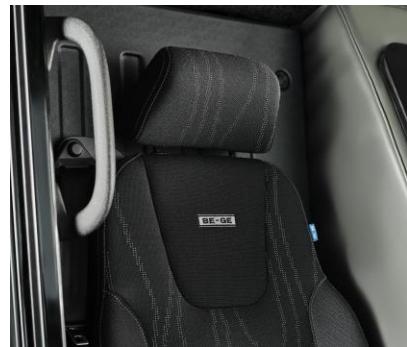
# Three-brush system

Code	Option name	Description
P027	reinforced 3rd brush system with hydraulic movement control, brush pressure adjustment, brush hydraulic pitch/roll, brush speed control; polymer brush	increases the sweeper's total reach - can be used to clean gutters or side walks that are not on the same level as the road the sweeper is driving on, or as a weed brush; hydraulic movement allows the user to precisely position the brush for optimal cleaning results
P028	demount cart for 3rd brush system	facilitate mounting and dismounting of the 3rd brush when not in use
P029	reinforced 3rd brush system with hydraulic movement control, brush pressure adjustment, brush hydraulic pitch/roll, brush speed control; polymer brush - for vehicles with preparation for 3rd brush	option of subsequent plug-and-play installation of a third brush
P030	preparation for 3rd brush system	preparing the vehicle for subsequent plug-and-play installation of the third brush
P031	polymer + steel combined brush for three-brush system	general use brush
P032	steel brush for three-brush system	hard aggressive brush, good for cleaning caked up mud and debris next to curbs
P033	steel brushes with polymer coating (silent brushes) for three-brush system	durable as standard steel brush, but more sensitive to the surface and produces less noise
P034	weed brush for 3rd brush system	brush intended for cleaning weed and hard-to-remove dirt



# Cabin

Code	Option name	Description
P035	automatic air conditioning	provides comfort to the operator when working with the sweeper even at high temperatures
P036	pneumatically suspended driver's seat	pneumatic suspension seat, depth and height adjustable, adjustable seat back angle, adjustable headrest height, 3-point safety belt
P037	mechanically suspended passenger's seat	mechanical suspension seat, depth and height adjustable, adjustable seat back angle, adjustable headrest height, 3-point safety belt (basic device)
P038	pneumatically suspended passenger's seat	pneumatic seat suspension, adjustable in depth and height, adjustable backrest angle, adjustable headrest height, 3-point safety belt
P039	tinted non-heated windshield	laminated glass, low reflection index, heat reflective (tinted),
P040	tinted heated windshield	windshield with electric heating elements for quick defrosting and defogging
P041	manually adjustable non-heated mirrors	combined rear-view mirror - R1200 and R300 for better coverage of blind spots, adjustable rear-view for better coverage of blind spots, manually adjustable rear-view mirror angle
P042	electrically adjustable heated mirrors	mirrors with electric heating elements for quick defrosting and defogging, with the possibility of electric adjustment
P043	remote cabin door locking, with additional in-cabin control	safety system for locking the cabin door on the vehicle with additional control inside the vehicle cabin
P044	rear-view camera, IP69K, with monitor in the cabin	camera mounted on the back of the vehicle for better visibility of the space behind the sweeper



# Cabin

Code	Option name	Description
P045	front camera on suction nozzle	camera mounted on the suction mouth for better control of cleaning efficiency
P046	rear camera with AI powered detection and display of people and hazards	camera mounted on the back of the vehicle with the ability to detect and display people and hazards
P047	360 camera	provides a 360° bird's-eye view of the immediate vicinity of the vehicle, including all blind spots
P048	additional work mirror - front	
P100	additional working mirror – left	provides better visibility during work
P101	additional working mirror - right	
P049	additional sound proofing of the cabin	improved noise reduction in vehicle cabin
P050	sunscreens for driver and passenger	folding sun protection for the driver and passenger
P051	DAB radio + bluetooth	digital auto-radio system with USB and Bluetooth connectivity
P102	steps on brush construction	helps the operator to enter the cabin
P103	steps on chassis	



# Lighting and visibility

Code	Option name	Description
P052	LED front work lights, high-mounted on cabin (2 pcs.)	LED lights mounted on the top of the vehicle cabin to illuminate the area in front of the sweeper
P053	LED front work lights, brushes illumination (2 pcs.)	LED lights mounted on the brushes to illuminate the brushes and the area around them
P054	LED rear work lights (2 pcs.)	LED lights mounted on the back of the vehicle to illuminate the area behind the sweeper
P055	LED work light for suction mouth	LED light mounted on the suction mouth to illuminate the area around the suction mouth
P056	LED rotating light on the vehicle's cabin	LED rotating light on the front of the vehicle for better visibility in traffic
P057	LED rotating light on the vehicle's cabin, additional	additional LED rotating light on the front of the vehicle for better visibility in traffic
P058	LED rotating light on the rear end of the hopper	LED rotating light on the back of the vehicle for better visibility in traffic
P059	work light on wander hose	work light mounted on the suction hose to illuminate the space being vacuumed
P060	LED flashing lights on the front end of the vehicle (2 pcs.)	LED flashing lights on the front of the vehicle for better visibility in traffic
P061	LED flashing lights on the rear end of the vehicle (2 pcs.)	LED flashing lights on the back of the vehicle for better visibility in traffic
P062	reflective stickers for vehicle marking according to DIN 30710	safety reflective markings for better visibility in traffic
P063	reflective yellow side stripes	safety reflective markings for better visibility in traffic



# Gross vehicle weight

Code	Option name	Description
P067	gross vehicle weight - 10.500 kg	construction of the sweeper adapted to the maximum permissible weight of 10,500 kg
P068	gross vehicle weight - 11.500 kg	construction of the sweeper adapted to the maximum permissible weight of 11,500 kg

# Maintenance, tracking and safety

Code	Option name	Description
P069	manual central lubrication system	manual central vehicle lubrication, saves time spent on daily vehicle maintenance
P070	automatic central lubrication system	automatic central vehicle lubrication, saves time spent on daily vehicle maintenance
P071	biodegradable hydraulic oil	
P072	emergency triangle	serves for marking the vehicle in the case of a breakdown, for better visibility to road participants
P073	lifting jack	used for lifting the vehicle when changing tires
P074	2 kg powder extinguisher fixed in the cabin	2 kg powder fire extinguisher mounted in the cabin
P075	first aid kit	first aid kit
P076	assembly for front towing	connection point on the front of the vehicle chassis for towing the sweeper in the case of a breakdown
P077	rear towing clevis	connection point on the back of the vehicle chassis for towing the sweeper in the case of a breakdown
P078	ARMS tracking and diagnostic system (12 months subscription included)	vehicle remote tracking and diagnostics system (includes 12 months of subscription to the remote tracking and diagnostics application)
P079	ARMS subscription- 24 months total	vehicle remote tracking and diagnostics system (includes 24 months of subscription to the remote tracking and diagnostics application)
P080	ARMS subscription- 36 months total	vehicle remote tracking and diagnostics system (includes 36 months of subscription to the remote tracking and diagnostics application)
P081	ARMS subscription- 48 months total	vehicle remote tracking and diagnostics system (includes 48 months of subscription to the remote tracking and diagnostics application)



# Tires

Code	Option name	Description
P084	all-season tires standard	standard tires on all four wheels
P104	all-season premium tires	premium tires on all four wheels
P085	spare wheel with all-season tire - standard	spare wheel with standard all-season tire
P105	spare wheel with all-season tire - premium	spare wheel with premium all-season tire



# Attachments

Code	Option name	Description
P086	legs for demounting and storing sweeper's hopper	facilitates easy dismounting of the hopper from the sweeper and its storage during the period of non-use
P087	electric and hydraulic preparation for front attachments	electrical and hydraulic preparation necessary if a snow plough is to be mounted on the sweeper
P088	electric and hydraulic preparation for rear-mounted attachments	electrical and hydraulic preparation necessary if a salt spreader is to be mounted on the sweeper
P089	SOLID X salt spreader, 1.5m <sup>2</sup> with 400 litres of brine, EPOS 5 control unit, demountable	a salt spreader that is mounted on the back of the sweeper instead of a hopper
P090	single-segment snow plough, 2m width, with spring-loaded scrapers	a snow plough that is mounted on the front of the sweeper
P091	reinforced chassis for heavy loads - winter maintenance	preparation of the vehicle chassis for the installation of winter maintenance attachments

# Charging and warranty

Code	Option name	Description
P092	warranty 12 months / 1000 hours	factory warranty for 12 months or 1000 working hours - in order for the warranty to remain valid, the user must adhere to the maintenance procedures described in the user manual
P093	warranty 24 months / 2000 hours	factory warranty for 24 months or 2000 working hours - in order for the warranty to remain valid, the user must adhere to the maintenance procedures described in the user manual
P094	warranty 36 months / 3000 hours	factory warranty for 36 months or 3000 working hours - in order for the warranty to remain valid, the user must adhere to the maintenance procedures described in the user manual
P095	charging cable for fast charging up to 22kWh	TYPE 2 battery charging cable with a maximum power of 22 kW
P096	supercharging, up to 80kW charging power	the option of fast battery charging with an external DC charger with a maximum power of 80 kW



# Surface protection and colours

Code	Option name	Description
P097	vehicle colour according to the customer request (colour change of the white lateral sides)	changing the color of the white lateral sides of the vehicle according to the customer's request
P098	vehicle colour according to the customer request (change of roof colour)	changing the color of the roof of the vehicle according to the customer's request



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