3S LIFT

SAFE | SIMPLE | SPECIALIZED
ACCESS EQUIPMENT

Retrofitting Solutions

Improving Health & Safety and Maximizing Returns

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SAFE | SIMPLE | SPECIALIZED

Our Vision,
Our Mission

The Leading Wind Turbine Tower Internals Solution Provider

Since our company was founded in 2005, it has been our mission to combat climate change. That's why we offer solutions that contribute to the effectiveness, efficiency and acceptance of renewable energy.

We want to enable people to service wind turbines safely and protect their health. We believe in delivering safe, innovative and cost-efficient wind turbine tower internals that benefit our customers, employees and the planet.

3S Lift | Company
Introduction

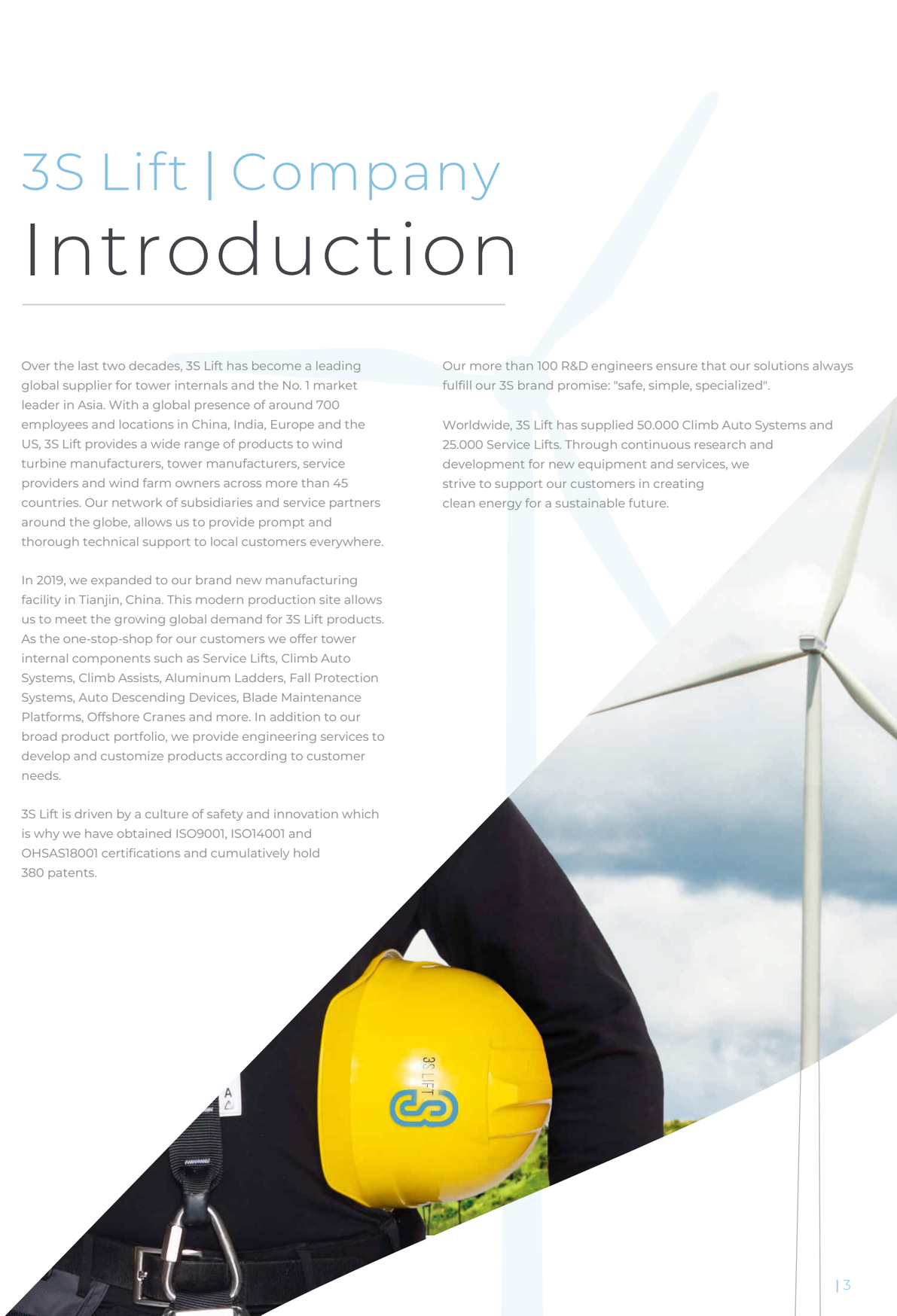
Over the last two decades, 3S Lift has become a leading global supplier for tower internals and the No. 1 market leader in Asia. With a global presence of around 700 employees and locations in China, India, Europe and the US, 3S Lift provides a wide range of products to wind turbine manufacturers, tower manufacturers, service providers and wind farm owners across more than 45 countries. Our network of subsidiaries and service partners around the globe, allows us to provide prompt and thorough technical support to local customers everywhere.

In 2019, we expanded to our brand new manufacturing facility in Tianjin, China. This modern production site allows us to meet the growing global demand for 3S Lift products. As the one-stop-shop for our customers we offer tower internal components such as Service Lifts, Climb Auto Systems, Climb Assists, Aluminum Ladders, Fall Protection Systems, Auto Descending Devices, Blade Maintenance Platforms, Offshore Cranes and more. In addition to our broad product portfolio, we provide engineering services to develop and customize products according to customer needs.

3S Lift is driven by a culture of safety and innovation which is why we have obtained ISO9001, ISO14001 and OHSAS18001 certifications and cumulatively hold 380 patents.

Our more than 100 R&D engineers ensure that our solutions always fulfill our 3S brand promise: "safe, simple, specialized".

Worldwide, 3S Lift has supplied 50.000 Climb Auto Systems and 25.000 Service Lifts. Through continuous research and development for new equipment and services, we strive to support our customers in creating clean energy for a sustainable future.

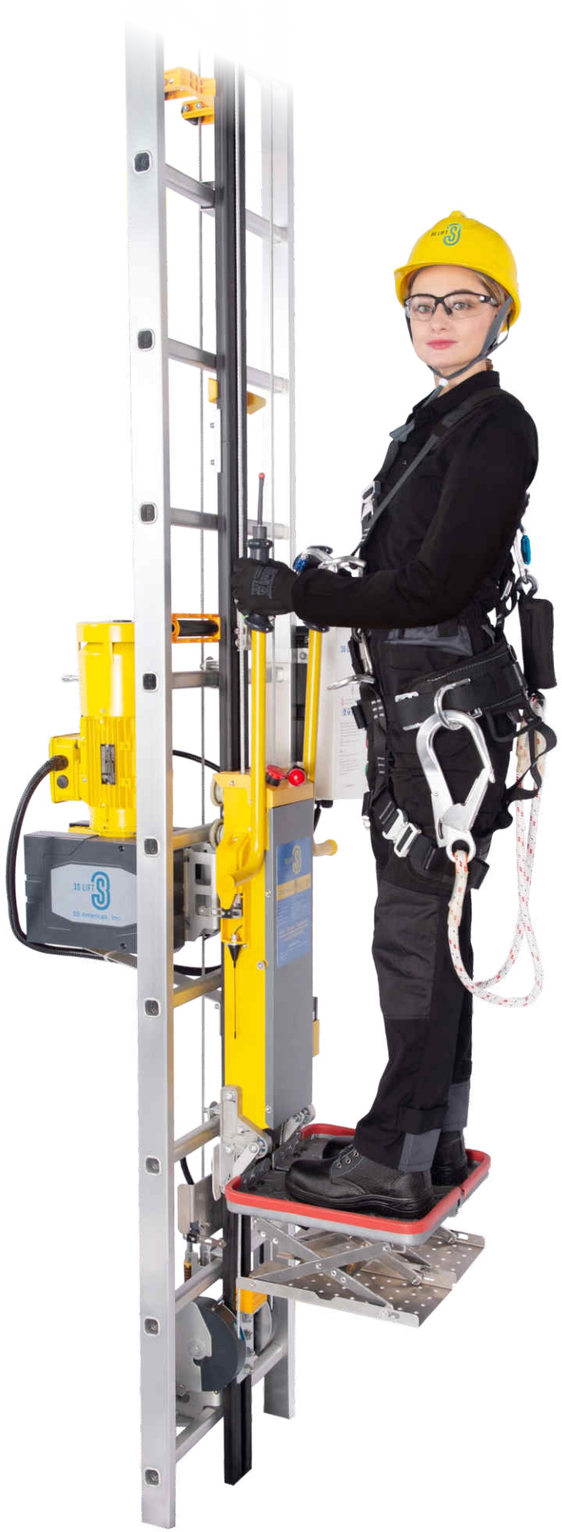


Retrofitting Solutions

Improving Health & Safety and Maximizing Returns

3S Lift offers specialized retrofit solutions that can add considerable value, improving both, Health & Safety and economic performance. These climbing aid solutions allow technicians to ascend towers more quickly and with little or no effort. This way, they can reach the top rested and start their work right away. In addition, climbing aid solutions protect the health of the technicians against the strain put on the body by climbing. On wind farms with climbing aids, there are considerably fewer soft tissue injuries which would otherwise lead to sick days, reduced motivation and would stress the operational efficiency of the project.

Having recognized the value of climbing aids, a number of large developers have recently retrofitted their entire fleets with 3S Lift's solutions. While one developer in the US has chosen to install a large number of Climb Assists into his turbines, other customers have ordered hundreds of Climb Auto Systems.

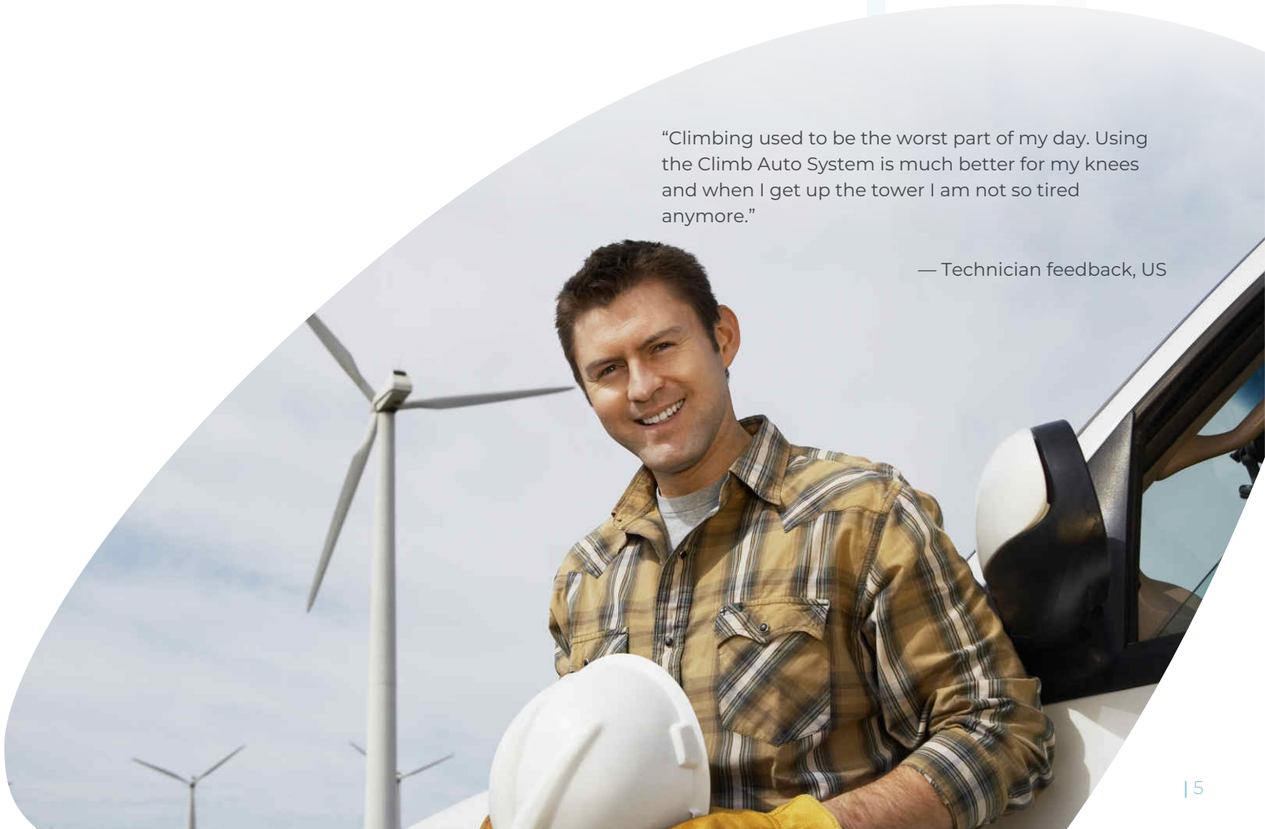


Proven Solutions to Add Value to Wind Farm Operations

Climb Assists alleviate technicians from some of the strain of climbing and can be retrofitted to almost any ladder. 3S Lift's innovative Climb Auto System eliminates the need for climbing completely. This single technician ladder-mounted lift can transport personnel or equipment and offers a variety of benefits. It is easily retrofitted using the existing ladder and can often be installed in 8 hours or less. Worldwide, 3S Lift has already installed more than 50,000 Climb Auto Systems.

Retrofitting Benefits

- Improved Health & Safety
- Higher satisfaction and motivation
- Greater employee efficiency
- Higher technician retention
- Increased uptime and AEP
- Decreased amount of sick leave
- Lower hiring and training costs
- Reduction of labor costs



"Climbing used to be the worst part of my day. Using the Climb Auto System is much better for my knees and when I get up the tower I am not so tired anymore."

— Technician feedback, US

Optimize Operations

Increase Efficiency and Save Costs

Improved Health & Safety

The repetitive motion of climbing towers puts extraordinary strain on the muscles and joints of technicians and causes countless injuries. These injuries lead to sick days and reduced motivation among technicians. The decreased technician availability stresses the project's potential to maximize operational efficiencies. With the Climb Assist, technicians can climb the ladder with substantially less strain on their body. Even better, when using the Climb Auto System, technicians can safely reach the top of a tower putting zero stress on their muscles and joints.

Cost Savings Through Reduced Technician Turnover

Wind turbine technician is a fast-growing job, but sometimes sees high turnover rates and limited job longevity if technicians need to climb towers on a daily basis. Solutions like the Climb Assist and especially the Climb Auto System improve technician satisfaction, resulting in more competent and longer tenured employees. The higher employee retention leads to lower turnover costs.

Increased AEP Through Climb Time Savings

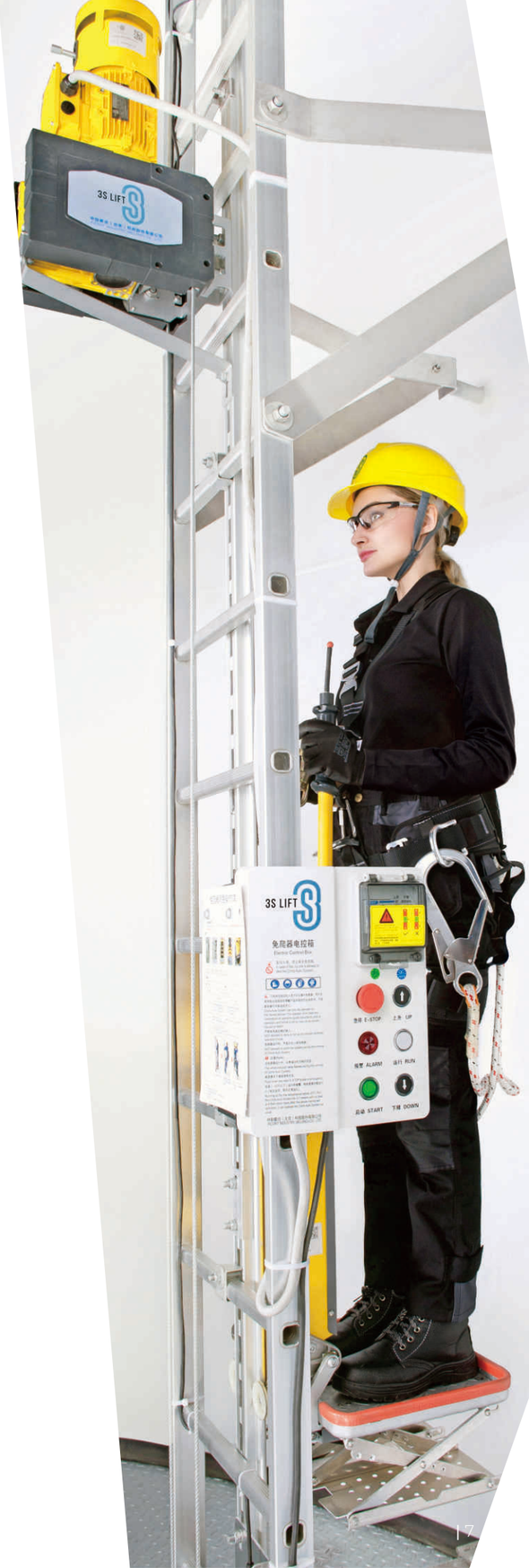
Using a Climb Assist or Climb Auto System allows technicians to ascend towers more quickly than with no climbing aids. The Climb Auto System reaches the top of an 80 m tower in under 5 minutes and the technician is fresh and ready to begin efficient work immediately. The savings in climb time result in increased AEP.

Improved Uptime Through Proactive Maintenance

On wind farms with Climb Assists or Climb Auto Systems, there is a reduced delay of crucial maintenance, as technicians are no longer pressed to bundle activities in order to keep the number of ascents to a minimum. Necessary maintenance is completed in a timelier manner, leading to increased uptime, extended turbine life and lower operational costs.

Labor Cost Reduction Through Increased Technician Efficiency

Wind farms that are outfitted with Climb Assists or even Climb Auto Systems can decrease their headcount by up to 10% and save on labor costs, because with these systems the efficiency of their technicians is increased and the chance of climbing related injuries is reduced.



Climb Auto System

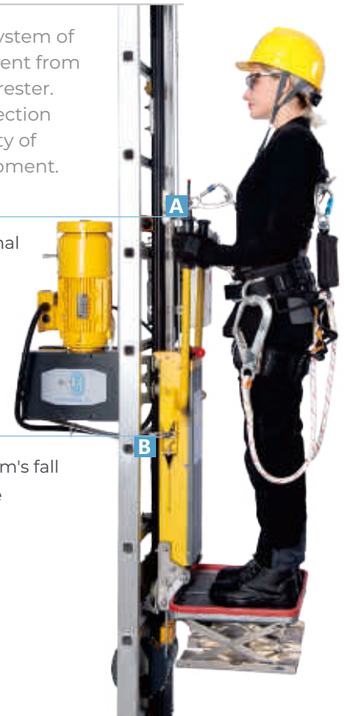
Single Technician Ladder-Mounted Lift

No more climbing – thanks to the 3S Lift Climb Auto System. The CAS is a single technician ladder-mounted lift that completely eliminates the physical and mental strain of climbing. It improves health and safety while reducing the cost of ownership.

On every wind farm there are countless soft tissue injuries due to the repetitive motion of climbing. These injuries can lead to sick leave, long term health issues and reduced motivation among wind turbine technicians. With the CAS, technicians can safely reach the top of the tower while putting zero stress on their muscles and joints.

Independent Fall Protection System

The fall protection system of the CAS is independent from the operator's fall arrester. Redundant fall protection guarantees the safety of personnel and equipment.

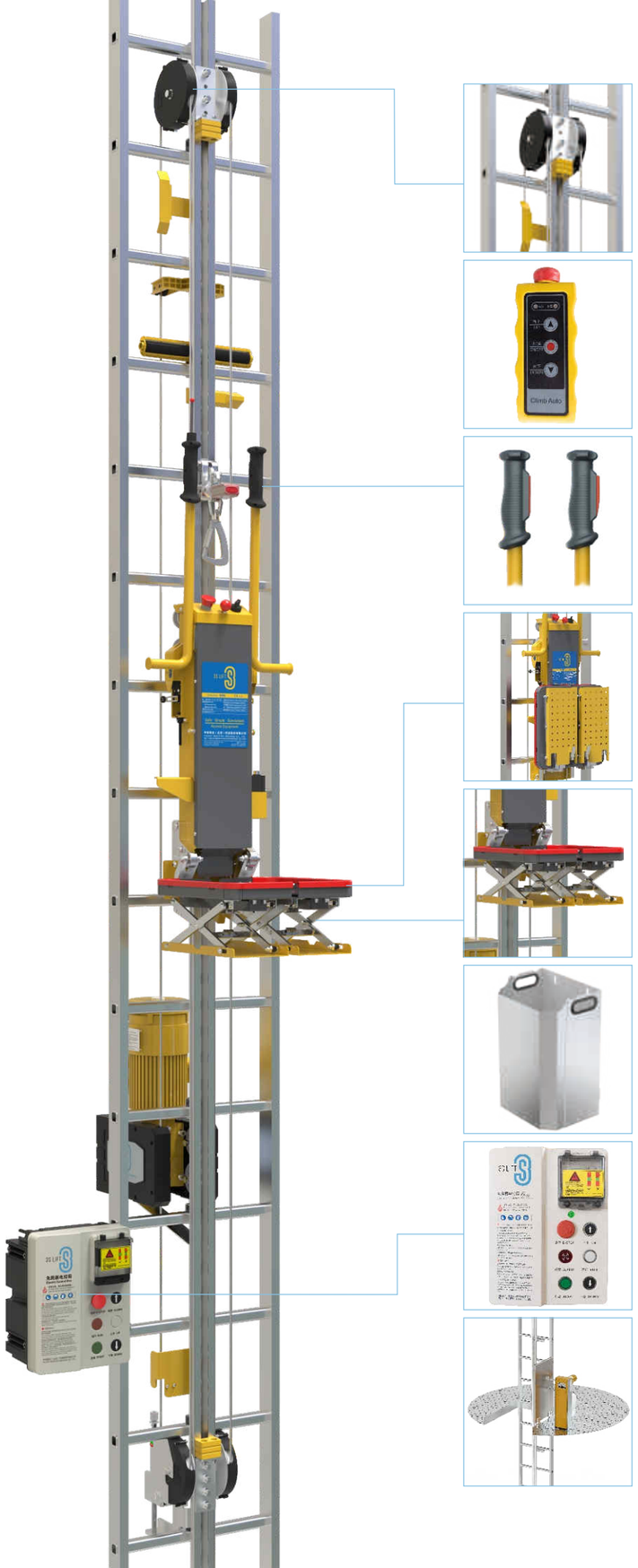


A Operator's personal Fall Arrester

B Climb Auto System's fall protection device

Climb Auto System Specifications

Constructing materials	Aluminum, steel
Rated load	Man load capacity: 140 kg (310 lbs) Freight load capacity: 60 kg (132 lbs)
Speed	18 m/min
Control method	Frequency conversion vectorial technology
Rated voltage	Single / 3 phase, AC, 220 V, 50 Hz / 60 Hz (400 V optional)
Dimension	415 x 390 x 1180 mm (customizable)
Certification	CE, ETL; UL and OSHA compliant



Top Sheave

The top sheave's compact design allows the CAS car to reach the uppermost platform.

Remote Control

The convenient remote control feature allows technicians to call the car to their position in the tower or send equipment to a co-worker on another platform.

Two-Handle Start-Up Switch

To use the CAS car, the operator must press and hold the switches on both handles simultaneously. If the operator releases either switch, the system stops immediately.

Collapsible Footboards

The collapsible footboards enable rapid evacuation in case of emergency.

Bottom Sensing Panel

When coming in contact with an obstacle, the panel is compressed and the sensor is triggered. This immediately stops the CAS car, thus preventing collision.

Toolbox

The custom metal toolbox can be firmly attached to the footboards to send materials up or down tower via remote control.

Control Cabinet

Located down-tower, the control cabinet is used to power the system up and down. It can also be used to operate the CAS car remotely.

Optional Auto Hatch System

The Auto Hatch System makes CAS operation even more convenient by automatically opening and closing platform hatches as the car passes through them.

Climb Assist

Climbing Assistance for Improved Health & Safety

The repetitive motion of climbing the turbine tower is time-consuming and strenuous. Our Climb Assist provides a constant lifting force during tower ascent and descent, significantly reducing fatigue and strain. This boosts health and safety while also augmenting employee satisfaction and retention.

The 3S Lift Climb Assist features an advanced design that automatically adapts to the climber's speed. Variable-frequency vector control assures precisely attuned assistance, whether climbing up or down the tower. No manual operation is required to start or stop the system, allowing the operator to always maintain a safe hold on the ladder.

Climb Assist Specifications

Lifting force	Adjustable from 30–50 kg
Wire rope diameter	6 mm
Protection class	Motor: IP 55; control box: IP 66
Power supply	Single / 3 phase, 220 V, 50 / 60 Hz. Optional: 3 phase, 400 V, 50 Hz
Lifting speed	Adapts to climber's speed; max. 37 m/min
Operating temperature	-40°C – +60°C
Weight	Control box: 3.3 kg; motor: 17 kg
Certification	CE, ETL, OSHA compliant

Advanced Speed-Adapting Technology

Equipped with advanced speed adapting technology, the Climb Assist provides steady assistive force, adapting dynamically to the climber's speed.

Variable-Frequency Vector Control

Variable-frequency vector control enables excellent dynamic performance and comfortable assistant force.

Ascent and Descent Assistance

The Climb Assist offers a constant lifting force of 30–50 kg (65–110 lbs) during ascent and 30 kg (65 lbs) during descent. This reduces stress on the body, especially on the knees and ankles.

Minimal Maintenance

The drive and the control box are designed to require no annual maintenance, reducing the overall maintenance time of the Climb Assist to a minimum.

Top Sheave

The top sheave fits between the top two rungs, thus minimizing required installation space.

Traction Wire Rope

The traction wire rope is made of steel, providing safe and reliable performance in addition to extraordinary durability.

Control Box

The lightweight control box is waterproof and vibration-proof. It features an industrial cable plug for convenient and quick connection. If desired, it can be used as a portable device to support multiple Climb Assist units.

Motor

The motor provides a continuous lifting force of 30–50 kg.