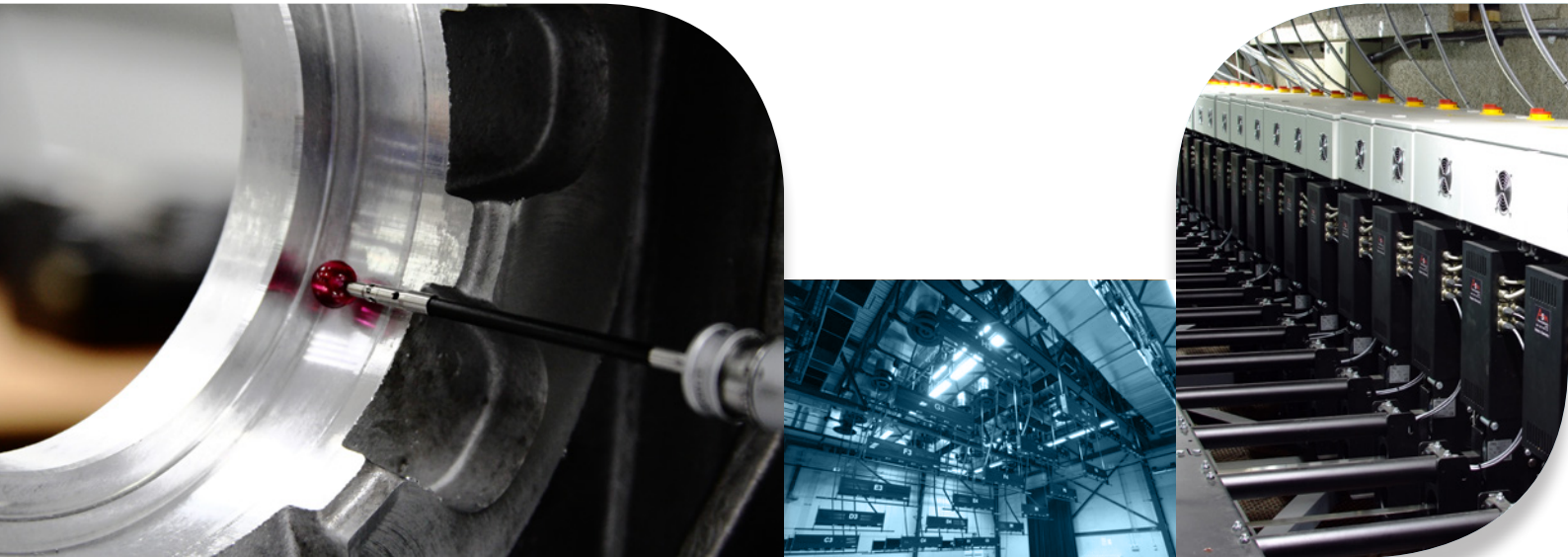


*Motorised Gear Solutions for the  
Stage and Studio Industry*

# Tornado Innovation, Quality, Knowledge –



## Your expert partner

As a leading provider of innovative geared motor solutions for industrial applications, Tornado has proven capability and expertise to serve customers in a variety of ways -

Initial  
Consultation

Manufacturing  
and testing

Product  
design and  
development

On-going  
support

Building close working partnerships with our customers is central to the success of our fully integrated service-driven offer, and we are committed to delivering solutions with flexibility, speed, precision and quality.

Tornado's motorised gear solutions for the stage industry have been developed and refined over 40 years of product innovation and through our close work with stage equipment manufacturers and drive and control technology companies.

This process has ensured we understand the market and the technical and service expectations of customers who operate in it.

## Enabling solutions for stage and studio

We provide outstandingly engineered solutions for many applications and requirements, both above and below the stage. These typically include:

- Automated Rigging Systems
- Fly Systems
- Hoist Systems
- Theatre Winches
- Curtain Track Motors
- Revolving Stages and Platforms

All of our solutions are backed up by a dedicated customer service and will deliver:

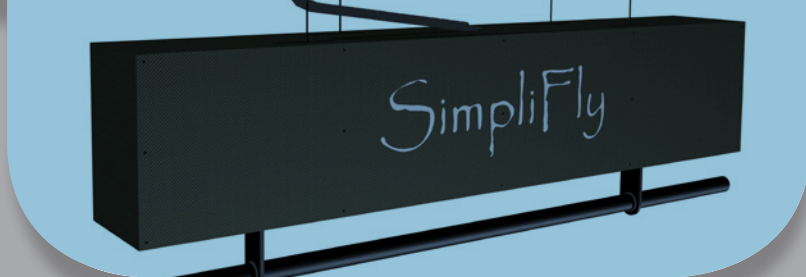
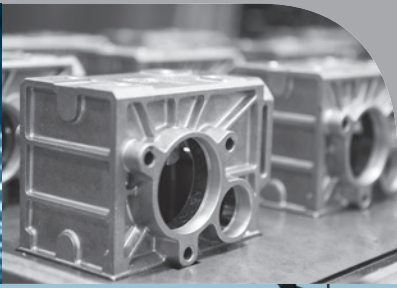
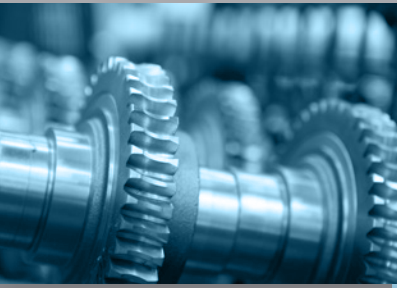
- The highest possible safety, quality and reliability
- Design flexibility
- Silent operation
- Maximum output torques of up to 1.500 Nm
- Production to the most stringent industry norms (BGV-D8/D8+ or C1)

## From complete systems to single components

Tornado can provide the optimum motorised gear solution for a stage application, comprising off-the-shelf products or customised design and manufacture, or a combination of the two.

We provide complete 'plug-and-play' systems which include motor gearboxes, brakes and mechanical or electronic limit switches and encoders, but also, when required, single gearboxes to be combined into a suitable motor at the customer location.

# – Expert Solutions, Proven in Performance



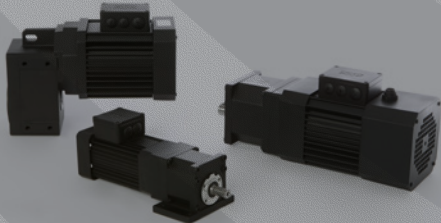
## Tornado's standard solutions

Tornado evaluates needs, defines best fit and implements optimised motor gearbox solutions. These are based on our standard worm and helical gear product ranges that are perfectly suited to stage and studio equipment applications.



### TD Series (Worm gear range)

Gear Sizes	4
Gear Technology	Worm Gear
Torque Range	30 Nm - 1.500 Nm
Gear Ratio	Up to 125
Type of Motors	DC or AC Motors



### TS Series (Helical gear range)

Gear Sizes	5
Gear Technology	Helical Gear
Torque Range	5 Nm - 180 Nm
Gear Ratio	up to 126
Type of Motors	DC or AC Motors

## Tornado's customised solutions

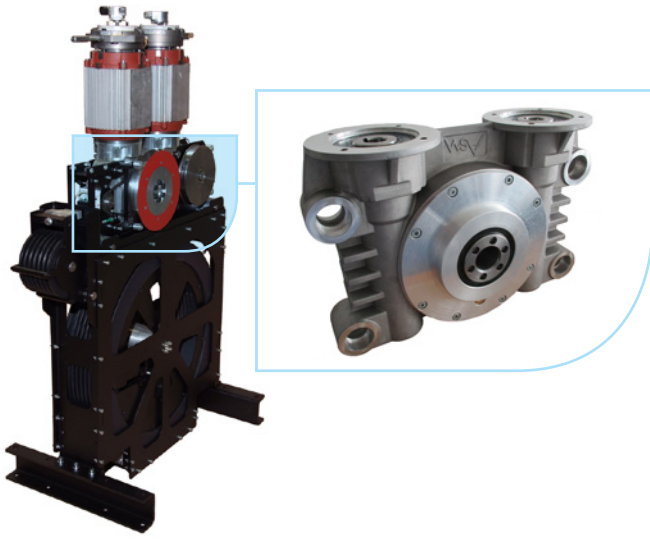
From design concept to finished product, Tornado has the capability to develop customer-specific motor gearbox solutions tailored to a particular stage and studio application.

Our development team has decades of experience in innovation. It works with customers to develop efficient, durable and economical motor solutions that are designed to meet the challenges of a stage or studio setting – complying with all applicable standards (BGV C1).

The design process begins with a clear understanding of the specific application, progressing to state-of-the-art CAD modelling and prototyping. Through a closed-loop feedback between Tornado departments, we adjust and optimise our solution before it is put into production.

Our solutions also combine with standard off-the-shelf motors and, when required, specifically developed motor solutions produced in collaboration with motor suppliers.





## Customised motor solutions

Our 40 years' experience in stage machinery drives enables us to support our customers from initial discussions on their concept to completion and delivery of tailor-made solutions meeting precise requirements.

### TWE 10 - Double Worm Gearbox

Integrated into high-end point hoist with twin motors

- Two-channel redundant safety concept
- Narrow gearbox housing (198 mm)
- Integrated safety catch
- Up to 2 m/s vertical speed
- Up to 1.000 kg load capacity
- Gearbox maximum torque : ~1.000 Nm

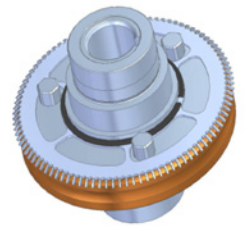
## Brake Systems

Depending on requirements and applications, our geared motors can be equipped with spring-loaded electro-magnetic brake systems, low noise single or double-brakes specially designed for this industry which operate independently of each other and meet the highest levels of safety. Our brakes can be mounted either on the gearbox side or the motor side (e.g. brake motors).

## Integrated Safety Catch

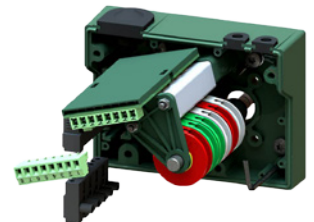
Our TÜV certified, integrated fall-arresting device can be installed in a motor gearbox as an ultimate safety feature.

In cases of exceptional wear, the teeth of a brass worm wheel may collapse and allow the wheel to turn underneath the steel worm shaft. The pilot wheel remains unaffected due to the relative rotation of the two wheels. A set of hardened lock-bolts is released and will immediately and permanently block the gearbox.



## Limit Switch

An integrated cam shaft or encoder can be added in order to monitor the system's course and our wide range of ratios guarantees we can meet perfectly our customers' accuracy requirements.



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