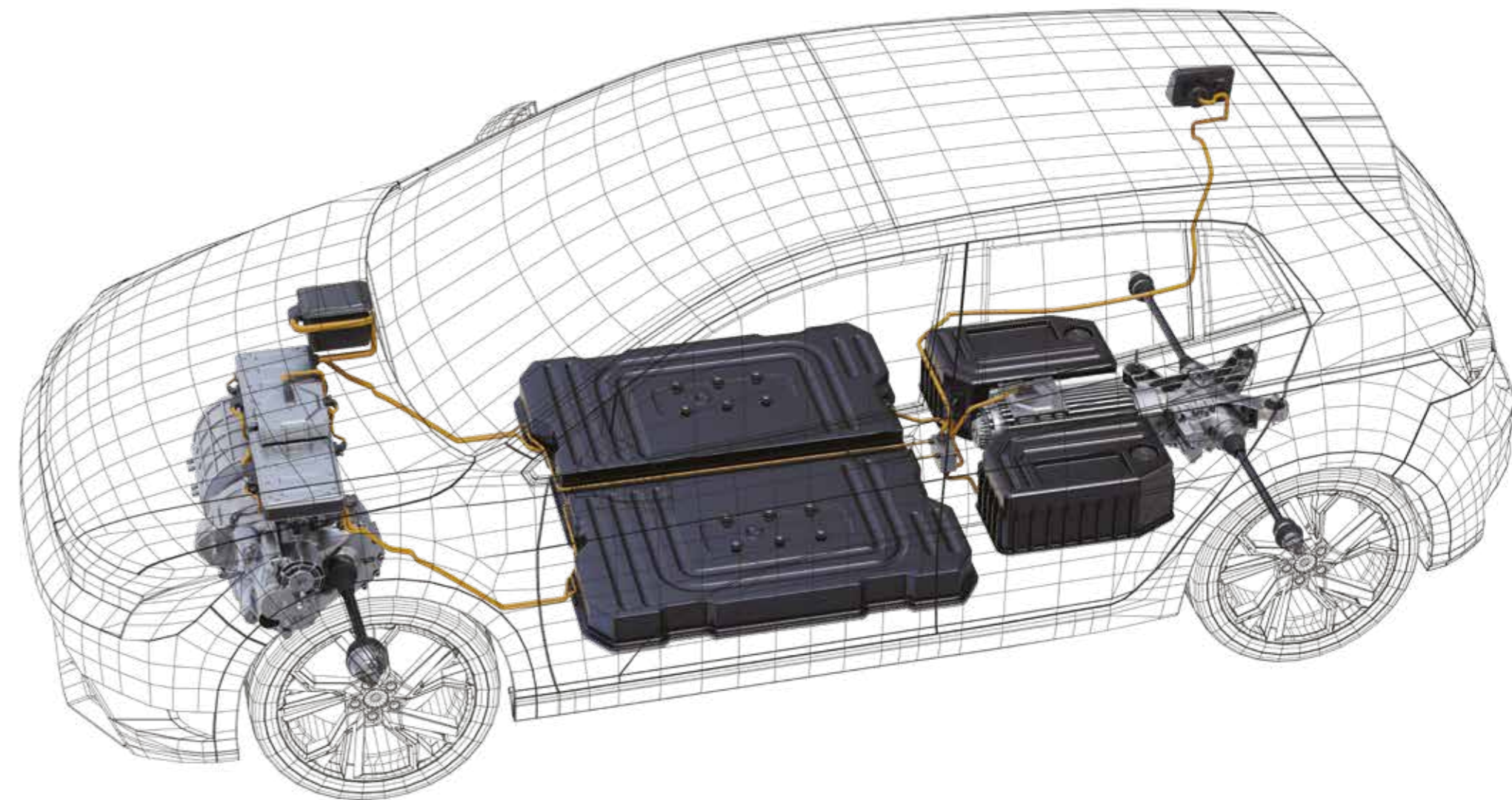




Automotive Fasteners & Components

www.trfastenings.com

Edition 5



TR is actively working with a number of organisations involved in the design, manufacture and development of Electric Vehicles (EVs), Battery Pack Modules (EVB) and Electric Vehicle Charging Units for both commercial and residential use.

Introduction

Global footprint, local support.

TR Fastenings Ltd (TR) is part of Trifast plc and is a global specialist in the design, engineering, manufacture and distribution of high quality industrial and Cat C fastenings principally to major global assembly industries.

The TR Group is a full service provider to the automotive industry. We are able to assist in reducing the total cost of ownership for companies by working with them from early engineering and design stage right through to specification, manufacturing, quality and logistics.

Our team of Engineers are on hand to become technology partners with niche vehicle and start up electric vehicle manufacturers, using our industry experience to develop a cost effective BoM (Bill of Materials), leveraging industry volumes, and reducing complexity.

We offer a wide range of high quality fasteners and C-class products. In addition, we have developed an application engineering support function and an advanced supply chain structure.



UK

- Trifast plc HQ - Uckfield
- TR Fastenings - Uckfield
- TR Fastenings - Belfast
- TR Fastenings - Birmingham
- TR Fastenings - Blantyre
- TR Fastenings - Manchester
- TR Fastenings - Newton Aycliffe
- TR Fastenings - Poole
- Lancaster Fastener Co - Lancaster
- Precision Technology Supplies Ltd - East Grinstead

Europe

- TR Fastenings - Holland
- TR Fastenings - Hungary
- TR Fastenings - Ireland
- TR Fastenings - Norway
- TR Fastenings - Poland (Representative)
- TR Fastenings - Slovakia (Representative)
- TR Fastenings - Sweden (Nacka & Tidaholm)
- TR Fastenings España - Spain
- TR VIC (Viterie Italia Centrale) - Italy
- TR Kuhlmann - Germany

USA

- TR Fastenings - Houston

Asia

- TR Formac Asia Headquarters - Singapore
- TR Formac - Singapore
- TR SFE (Special Fasteners Engineering Co) - Taiwan
- TR PSEP (Power Steel & Electro-Plating Works) - Malaysia
- TR Formac - Malaysia (Penang & Kuala Lumpur)
- TR Formac - China (Shanghai & Beijing)
- TR Formac - India (Bangalore, Pune & Chennai)
- TR Formac - Thailand
- TR Formac - Philippines (Representative Office)
- TR Formac - Japan (Representative)

Technical & Innovation Centres

- TR Fastenings - Gothenburg, Sweden
- TR Fastenings - Birmingham, UK
- TR Fastenings - CUICAR - South Carolina, USA

Manufacturing

Dedicated to producing high volume parts specifically to customer drawings.

Our strategic partnerships with other major manufacturers allow us to offer a wide range of special parts, including:

- Cold headed products
- Complex multi stage forging
- Special parts to customer drawing
- Turned and machined parts

Our manufacturing network spans two continents and represents approximately a third of the Group's business.

We can ensure parts are made in the right part of the world to meet your quality, volumes, cost and delivery needs.

- 8 factories
- In-house heat treatment facilities
- Automated optical sorting facilities
- Specialised packing capability

Annual output approximately **8 billion parts**



TR SFE
(Taiwan) x 2



TR Formac
(Singapore)



TR VIC
(Italy)



TR PSEP
(Malaysia) x 2



TR Formac
(Malaysia)



TR Hank
(UK)





What We Supply

ST & Plas-Tech Screws:

For IP, DP, panels & seats. ST screws for thin sheet metal, thread forming screws for plastic panels.



Metric Screws & Bolts:

Metric screws & trilobular screws for interior & exterior applications, seats, DP & IP.



Spring Steel Clips:

Spring steel fasteners for A, B and C-pillar, panels, IP, DP, TC, luggage compartment & roof.



Washers:

Washers for bolts & axles, interior applications, seats, headliners, IP & DP.



Rubber Bumpstop, Damper Grommets:

For interior applications, TC, glovebox & IP.



Bushings:

Bushings for airbag applications, door grab handles, IP & where high torque load requires a bushing.



Spring Staples & Hog Rings:

Spring staples & hog rings for IP, TC & seats.



Plastic Clips & Rivets:

Fasteners for mounting interior & exterior applications, ABC-pillar, panels, DP, IP & seats.



Plastic Parts:

Plastic fasteners for IP, seats, TC, cable management & edge protection.



Special Parts:

Fasteners for special applications, rear seat, airbag applications, belt restraints, gear box & more.



Where We Supply

Safety Systems

Airbag

Powertrain

Engine

EVBC - Electric Vehicle Battery Casing

Transmission

Interior Trim

Ancillary Electronics Devices i.e. Sat Nav

IP (Instrument Panel) inc HVAC

TC (Tunnel Console)

ICE (In Car Entertainment)

Seating

Frame

Trim including armrests

Restraints (Seatbelts)

Braking & Steering Systems

Parking Brake

Service Brake

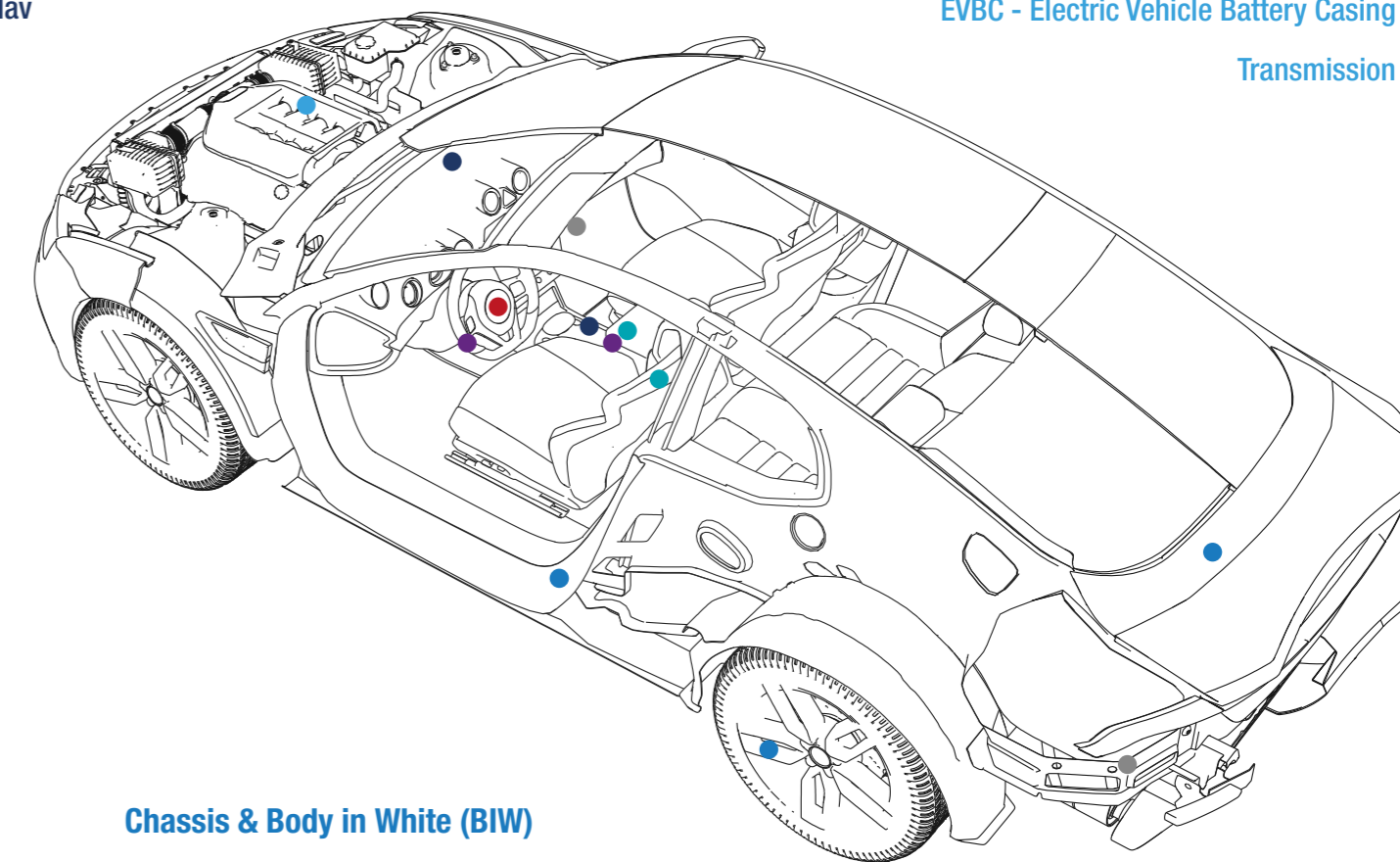
Steering Wheel

Steering Column

Lighting Clusters

Interior

Exterior



Chassis & Body in White (BIW)

Door Trim

Chassis including wheels

Body in White including luggage compartment & tailgate

Licences

TR has invested in a number of manufacturing licences.

TORX PLUS®

Available in a standard or tamper proof version, the Torx Plus® design increases torque transfer, therefore extending tool life and increasing productivity during assembly.

STRUX®

Strux® self clinching studs and nuts offer a stronger and more reliable assembly to traditional clinch fasteners. Resisting push out or rotation when installed, Strux® fasteners save significant time and cost compared to welded or other staked fasteners during installation, specifically when combined with MATHread®.

MATHREAD®

A patented system to prevent cross threading - the unique first threads align with the bolts accurately ensuring optimum assembly time. This feature has been incorporated in the design of the engine sump plug for a newly developed model. The clear advantage is that at both original assembly and subsequent servicing, thread damage is avoided. The principal usage is in the automotive industry.

MORTORQ® SUPER

A design that provides an enhanced drive capability and up to 25% material reduction to the head. This shallow head fastener has an attractive appearance and provides customers with the opportunity to reduce weight in vehicles. This drive is also available in a tamper resistant style.

SPIRALFORM®

A thread forming fastener design ensuring an optimum contact with metallic mating materials to provide consistently high strength capable joints.



TORX®

TORXplus®

CLINCH STUD®
Strux®

MATHread®

SPIRALFORM®

THE
Phillips
Screw™
COMPANY
The Original. Since 1935.




TR Quality

TR operate in a quality focused environment to ensure customer requirements are fully integrated in our processes.

- **Quality Management Systems** - IATF 16949, ISO 9001 and ISO 14001 form the backbone of our management system and are supported by processes that ensure we meet our customers' expectations.
- **Product Quality** - TR use a fully integrated PPAP package that captures product requirements and enables realisation of product approval based on an agreed timeline. Feasibility review is carried out by TR Engineers with both design and application knowledge. We adopt a team approach to product development – by providing input to our customers' design verification programs, we ensure that product quality requirements are understood and appropriately managed to reduce unnecessary inspection costs.
- **Supply Chain Quality** - TR recognise the importance of every stage of the supply chain in delivering quality product to the customer. From the supplier of raw materials to in-house processes and outside service providers, the team works to ensure quality is fundamental in every process.
- **Quality Targets** - At TR everyone is focused on quality and by working with customers on their requirements we are able to drive home our “zero defect” philosophy with quality ingrained in our processes.
- **Quality Deliverables** - Accuracy of information and customer response are key to achieving results and on-time delivery within our customer projects.
- **Quality Equipment** - Our feasibility teams ensure that the selected quality equipment provides the most efficient path to demonstrating product compliance. Where possible we use computerised inspection equipment to enable focused reviews and analysis of trends which are fed into product development processes.

Quality Control / Assurance

Inspection Equipment	Testing Equipment	Stereo Microscope	Static Tensile Testing
Digimatic Indicator	Salt Spray Testing	First Scan Inspection Machine	Torque / Axial Tension Testing
3-D Microscope	Hardness Testing	Profile Projector	Plating Thickness Testing

Quality Management System
IATF 16949
ISO 9001

Environmental Standards
ISO 14001



Electric Vehicle Charging Units

TR has extensive product ranges and technical expertise to support the design, manufacture and development of charging units for electric vehicles.

TR is actively working with a number of organisations involved in the design, manufacture and development of Electric Vehicles (EVs), Battery Pack Modules (EVB) and Electric Vehicle Charging Units for both commercial and residential use. As this sector continues to emerge and develop, TR is able to supply an extensive product range and has the necessary technical knowledge, expertise and experience to support this industry.

TR's qualified engineers and sales staff are on hand to advise designers, production and purchasing teams on a number of matters, from Design for Manufacture (DfM) to new fastener technology, sourcing insight and cost reduction.

EV charging stations typically include the following fastener groups, many of which include **TR branded product ranges**:

<p>Standard Fastenings DIN/ISO/ANSI (Steel and Stainless Steel), Threadforming Screws For Metal</p>	<p>Fasteners for Plastic Threadforming Screws For Plastic, Brass Inserts</p>	<p>Fasteners for Sheet Metal Hank® Self Clinch Fasteners, Rivet Bushes, Blind Rivet Nuts, Blind Rivets, Weld Nuts</p>
<p>Enclosure Hardware Locking Systems, Locks, Lock Components, Hinges and Latches, Clamps and Terminals</p>	<p>Security Fasteners Machine Screws, Self Tapping Screws, Wood Screws, Self Drilling Screws, Nuts</p>	<p>Plastic Hardware Circuit Board Hardware, Cable Management, Rivets, Machine Screws, Nuts</p>

Industry Targets

The rapid growth of the EV sector is further accelerated by political-economic developments such as the UK Government's initiative to ensure that by 2040, all new vehicles will either be electric or hybrid, zero-emission models.



Fasteners for Sheet Metal

Security Fasteners

Locks & Locking Systems

Threadforming Screws

Gaskets

Hinges

Clamps

Cable Management

Fasteners for Plastic

General Fasteners

Application Engineering

TR recognises that development of applications is a time consuming process, which is why our team of fastening specialists is on hand to support and guide you from developing new products to adapting existing ranges.

TR follow a simple process that can be adapted for your individual application.

- **Function:** Confirm the performance requirements of the fastener and application, does the product need to screw, clinch, rivet, weld, glue or clip together?
- **Application Environment:** Our team will support you to ascertain whether the product will require any specific design features for your application.
- **Assembly Method:** Fastener installation is a key part of the assembly process. Early involvement in the design or specification stage by our application engineers allows streamlining of your manufacturing planning process leading to systematic reductions in cost in assembly and production.
- **Manufacturing Process:** Upon confirming the product specifications TR will assess the best method of manufacturing.
- **Evaluation:** Prototype parts allow you to test the application and assess if amendments to the specification are required.

TR adopts a full service provider ethos, supporting your designers and engineers to ensure your finished part is as required for your application. TR's team of global specialists will work with you from design through to manufacturing and will be on hand to guide and advise where required.



TR's Technical & Innovation Centre - Gothenburg

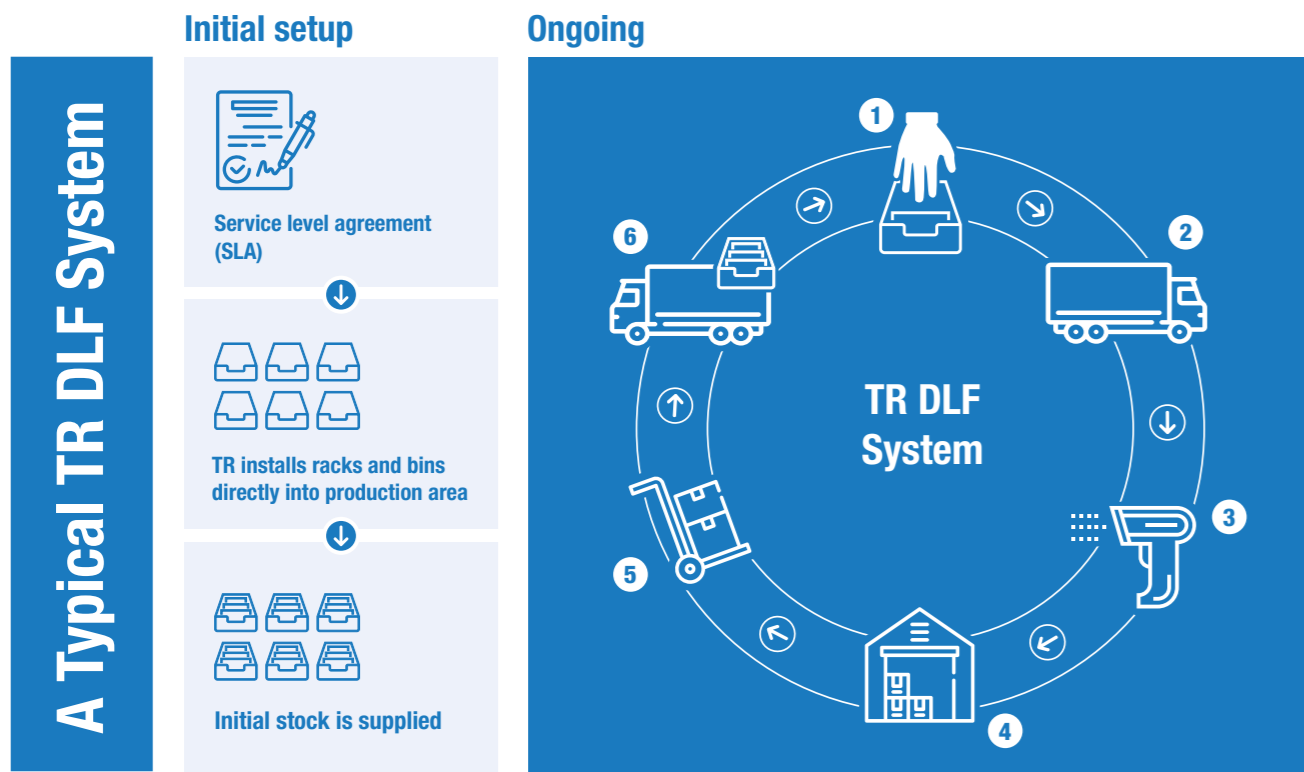
Full Service Provider

As a full service provider we are able to assist in reducing the total cost of ownership for companies by working with them from early engineering and design stage, right through to specification, manufacturing, quality and logistics.

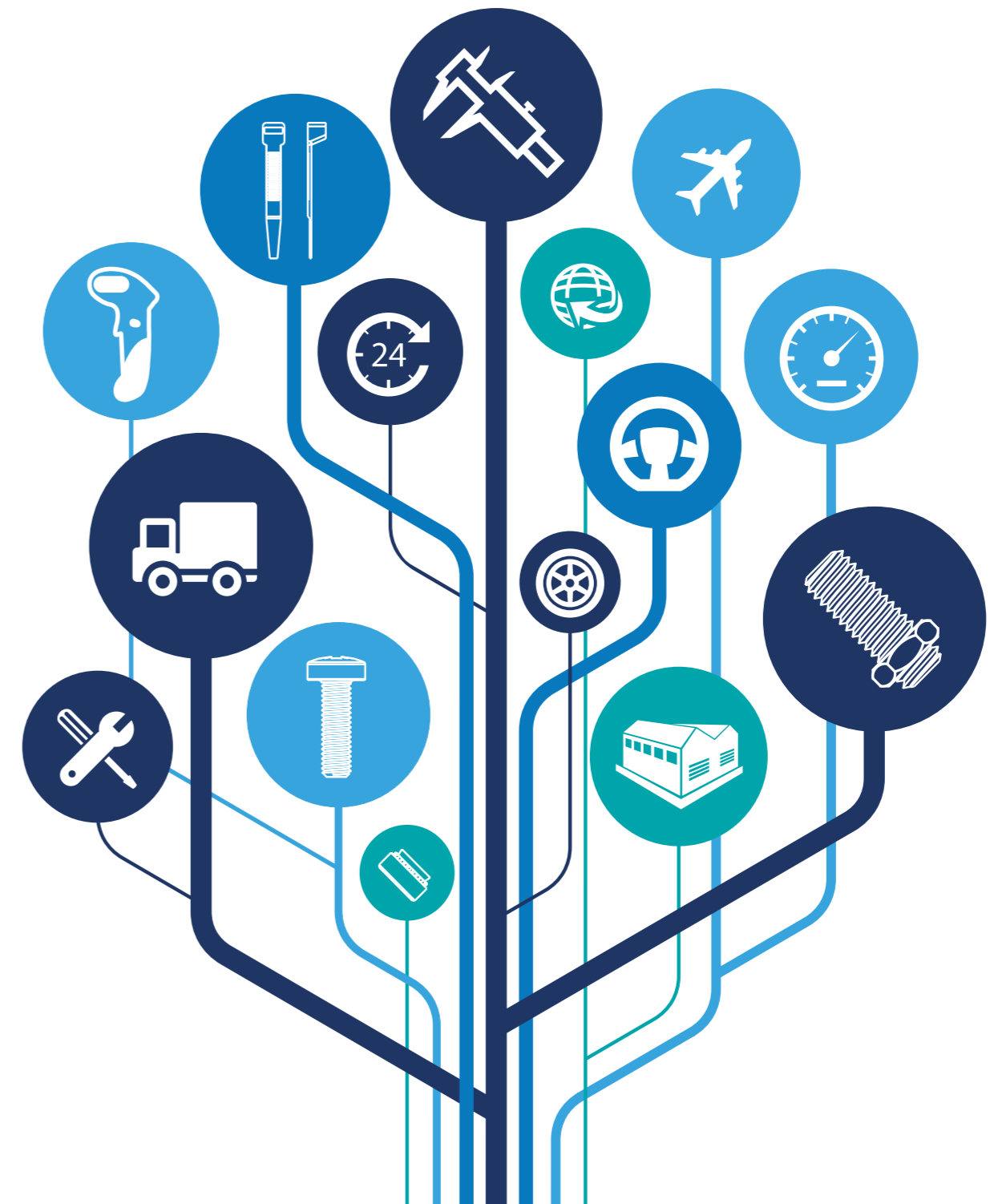
We adopt a three-tier approach that includes local, national and international teams. TR understands that a global solution creates some challenges; including communication, culture and security.

TR's global delivery model has been designed from the ground up to address these challenges. Most importantly, TR's global delivery operations provide our customers with both the quality and economic advantages that they require.

Locations in **18** countries
Supply into **c.75** countries



- | | |
|--|---|
| 1. Production takes stock from bins | 2. On agreed day, TR DLF operator visits customer |
| 3. TR DLF operator scans all bins that need replenishing | 4. TR DLF operator downloads information to TR location |
| 5. TR removes empty bins off site and returns to TR location | 6. TR DLF operator delivers stock and replenishes bins |







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