Transmissions for Military Tracked Vehicles
EXPERIENCE

• More than 140 years’ experience in design, manufacture and maintaining transmission technologies
• Over 70 years’ know-how and experience in the field of transmissions for military tracked vehicles
• RENK – World’s market leader in transmissions for medium to heavy military tracked vehicles

INNOVATION

• State-of-the-art and future hybrid transmission technologies
• Secure for the future and support for decades
• Easy to maintain integrated logistic concept

TECHNOLOGY

• RENK transmissions: the key link between engine and tracks; drive, steer and brake

REFERENCES

• RENK transmissions in service with more than 30 armies world wide
• Used in more than 40 types of military tracked vehicles
RENK – World Leading

RENK designs and manufactures transmissions for military ‘tracked’ vehicles. Each RENK transmission ‘drives’, ‘steers’ and ‘brakes’ the complete vehicle, all from one single drop-in assembly. This is the technology of RENK know-how and expertise.

Tracked armoured vehicles require an especially highly developed transmission technology. RENK can look back at over 70 years of experience in this sector. 1965 marked the year that RENK invented the hydrostatic-hydrodynamic steering drive – a concept universally acknowledged as second to none.

With continuous sustained investment and innovation it is no surprise that RENK, together with its subsidiary RENK France, is the world’s leading supplier of transmissions for military tracked vehicles, with an impressive range of modern products, technology and manufacturing facilities.
Transmissions for Military Tracked Vehicles

Technologies for Superior Mobility
Motion for Missions

The main operational advantage of tracked vehicles is their superior mobility especially in heavy terrain. High performance and reliable transmissions are the requirement and therefore the decisive element between engine and track – determining the mission efficiency of the vehicle system, responsible for all the drive, steer and brake functions.

Founded in 1873, based in Augsburg, Germany, RENK AG has continuously committed itself to manufacturing advanced transmission technologies for a variety of specialist applications. Today RENK AG is one of the world’s leading manufacturers of power transmission engineering and is the market leader in transmissions for military tracked vehicles. RENK and its French subsidiary RENK FRANCE develop and produce vehicle specific transmission solutions principally for medium to heavy tracked vehicles.

As transmissions are RENK’s core business, RENK can confidently be relied upon to develop, manufacture, support and serve our international customers and to continue to provide superior products for military tracked vehicles for the next decades and beyond.

Today, RENK offers a broad range of automatic transmissions of high efficiency, low weight and low life-cycle cost for military tracked vehicles in a power range from 300 to 1,300 kW. RENK is supplying gearboxes and transmissions to the Armed Forces of more than 30 nations.

RENK transmissions are in the most modern infantry fighting vehicles (IFV), main battle tanks (MBT) as well as all applicable family vehicles.

Key elements providing maximum mobility for tracked vehicles are integrated within the new generation:

- Full load powershift transmission of planetary design either in 4-, 5-, 6- or 8-speed versions
- 1:1 reversing gear stage (for unrestricted installation)
- Torque converter with automatic lock-up clutch, for maximum performance
- Superimposed steering system, infinitely variable
- Fully integrated vehicle brake system comprising non-wearing brake retarder and mechanical service and parking brakes
- Electronic/electrical remote driver control with fully automatic gear selection and optional manual gear shift
- Full data bus compatibility with extensive monitoring and support options
- Prepared for vehicle drive-by-wire solutions
- Final drive options, including close coupled arrangements for minimal vehicle width

Infantry Fighting Vehicle PUMA (Germany)
Product Range

<table>
<thead>
<tr>
<th>Type</th>
<th>Vehicle Installation</th>
<th>Typical vehicle weight*</th>
<th>Power in kW</th>
<th>Power in hp</th>
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Guide only: Please contact RENK with specific vehicle details. Vehicle installation is typical; Alternative option on request.

RENK transmission arranged as a powerpack

[Image of RENK transmission arranged as a powerpack]
Steering, Braking and Shifting

Meeting the highest military requirements and all safety demands is ‘daily business’ at RENK. All the brake system, including brake pressure accumulators (where applicable) are delivered pre-installed and piped as part of the RENK integrated product; all steering is fully integrated, as well as all necessary pumps and controls. RENK provides the one complete ‘drop-in’ product for all steering, gear-shifting and braking functions of the vehicle.

STEERING
- Highest mobility under all driving conditions
- Safe in all terrains
- Highly reliable and precise control

BRAKING
- Fully advanced braking equipment
- Integrated into one system, with powerful retarder
- Low life-cycle cost
- Easy to maintain

SHIFTING
- Fully automatic gear shifting
- 4-8 speed high performance
- Excellent efficiency
- Highest mobility under all driving conditions
- Built to highest reliability and durability standards
RENK Transmissions – Initial Selection Guide

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This list is intended for new vehicles; various RENK transmissions excluded. Development options possible for new applications and existing vehicles.

Maximum ratings apply for new transmissions, dependent on vehicle weight and speed. Please contact RENK for exact limits and full details.
The HSWL 106 transmission features the latest developments of RENK and ensures highest mobility and performance of the vehicle, including under difficult operating conditions or driver stress situations. It is ideal for high-performance tracked vehicles and includes an excellent brake system.

The reliability is extraordinarily high and attributes to the safety of both vehicle and, most importantly, the crew. The HSWL 106 meets all propulsion system requirements for a modern tracked armoured vehicle.
Latest state-of-the-art, the RENK HSWL 256 transmission for the most advanced mid-weight fighting vehicles, PUMA for the German Army, new family of vehicles for the British Army. The new generation HSWL 256 has been developed and built based on RENK’s experience and continuous development. The HSWL 256 transmission combines a most compact design with regard to size and volume while also using optimal weight components with long-term durability and high performance to drive, brake and steer the vehicle over a wide range of vehicle weights. This transmission is proved for the latest generation of medium weight vehicles.
This transmission is a fully proved modern development with advanced technology for the coming decades. It ensures highest mobility, performance and acceleration of the vehicle in every terrain. The electronic automatic gear shift relieves crew stress under difficult operating conditions. The advanced brake system enhances maximum vehicle drivability. Extraordinary high reliability and durability contribute to the safety of both the vehicle and most importantly, personnel.
The HSWL 295 is the transmission of choice for main battle tanks. Extremely compact with the powerpack arranged in U-configuration with the engine across the vehicle. Highly proven in extreme operation conditions it features five speeds forward and reverse. This transmission meets the highest requirements for new-build main battle tanks and retrofit programs.
The HSWL 354 is a highly proven and reliable transmission as used in the excellent Leopard 2 main battle Tank and Leopard 2 family. The latest version, volume produced since 1983, has been in service with 18 countries to date, all fully supported by RENK for new-build vehicles of the highest standard.
RK 304S
50–70 t

This transmission is a fully proved modern development with advanced technology for the coming decades. It ensures highest mobility, performance and acceleration of the vehicle in every terrain. The electronic automatic gear shift relieves crew stress under difficult operating conditions. The advanced brake system enhances maximum vehicle drivability. Extraordinary reliability and durability contribute to the safety of both the vehicle and most importantly, personnel.
RK 325
50–70 t

The RK 325 transmission is designed for front installation in L-configuration for main battle tanks (MBT’s) and family vehicles. It ensures highest mobility, performance and acceleration of the vehicle in every terrain. The electronic automatic gear shift unit and the advanced brake system enhance maximum vehicle drivability. An excellent choice of transmission for world’s leading tracked vehicles.

RENK RK 325
for 50–70 t tracked vehicles
Power range 800–1,200 kW (1,600 HP)

Power-shift transmission
5 speed forward
5 speed reverse
The ESM 350 is a high-performance transmission developed and in serial production by RENK France for T-type main battle tanks (T-72 incl. derivatives), featuring eight speeds, infinitely variable superimposed steering system and a high-performance brake.

It is suitable for T-type tank new-build programs as well as upgrade programs. The integration process is easy, preserving the original silhouette of the vehicle. RENK France also offers a complete powerpack solution.
ESM 500
50 – 70 t

The ESM 500 is an excellent transmission for modern main battle tanks. It features five forward speeds and two reverse speeds. It is equipped with a high-performance braking system with secondary retarder and carbon friction brakes. The ESM 500 is developed and manufactured by RENK France for the French LECLERC MBT.
Electric Drive Systems

RENK: Informed and Leading

RENK is a knowledgeable leader in electric propulsion for military tracked vehicles, patenting the all-important concept of using a ‘serial’ electric system for driving and steering in combination with ‘cross-drive’ mechanics, over 25 years ago.

RENK design of modern generation systems, new drive concepts and physical proof of concept by actual test-bed running means RENK has a key understanding of real usable technology and demands in this specialised field.

The latest RENK electric technology is the REX Drive. A parallel drive combined mechanical-electro transmission system for military tracked vehicles that demand advanced modern power management and distribution and redundant steer control. A concept taking the best of electric drive, balanced with highest-performing mechanical attributes. Optimal hybrid performance for tracked vehicles requiring high-load electric power.
RENK Final Drives

The Final Drives are an important key component of the propulsion system. Left and right mounted Final Drives transfer all the propulsion, all the braking and all steering functions from the Transmission to each track. RENK offers a range of state-of-the-art Final Drives for optimal vehicle Safety, Durability and Performance.

RENK designs and supplies

- Coaxial Final Drives
- Offset Final Drives
- Two-Speed Final Drives

RENK designs and manufactures the highest quality range of purpose designed and warrantied, durable Final Drives for operation in the harshest of off-road conditions.

Purpose matched to required vehicle speed, vehicle growth weight and impact shocks of cross-country performance in the worst exposed conditions of mud, water, sand and extremes of heat, to our Customers specifications. RENK Final Drive solutions meet the highest demands and safety standards of the very latest high speed tracked vehicles.

Final Drives

- Purpose matched to RENK transmissions
- Designed for Vehicle Weight Growth
- Maximum Strength and Reliability
- Multi-sealed for Highest Durability
- Fully interchangeable Left and Right
**Electronics and Monitoring**

RENK’s dedicated vehicle transmission electronics team, complete with modern laboratories, provides the expertise behind the controls and monitoring of every RENK transmission:

- Fully advanced digital electronics
- Gear shift points adapted to driving style
- Emergency control functions
- Extensive reporting outputs
- Full monitoring of RENK ‘mechanically actuated’ brake and steer systems

The driver’s gear selector, with direction of travel, neutral and pivot turn selection, fully proved for military use, provides the command input. System communications with RENK digital electronics provides control inputs for high-performance safe operations and optimisation of whole powerpack performance. Emergency mechanical gear selector and steer-to-stop safety system. Extensive CANbus data to vehicle systems, health and usage monitoring, provides the customer data for timely driver information and maintenance actions.

### Customer Options

- Commanders controls, emergency brake
- Transmission diagnostic unit with digital graphical displays, for depot maintenance and in-vehicle checks (RENK TDS-G)
- RENK diagnostic software for PC use
- Transmission data recorder (notebook download of detailed data) for trials and specific in-service use
- Transmission data module dedicated to every transmission for overview record keeping (RENK TDM)
- RENK driver’s steering wheel, adjustable, with full digital display and functionality
- Preparation for vehicle drive-by-wire

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![Canbus Diagram](image-url)

**Vehicle CANbus**
- Engine Controller
- Driver’s Display
- Transmission Controller
- Gear Selector
- Steering
- Brake Pedal
- Parking Brake
- Emergency
- Brake Release

**Electronic Control**

**Mechanical**
Test and Support

Every RENK transmission is full load tested for all drive, steer and brake functions before it leaves RENK factory, with the mass and inertia of the hull replicated at in-service weight. This high level of RENK test is a repeatable ‘health check’ for each transmission throughout its life, assuring optimal in-service, trouble-free performance and to customer specifications, on every delivery.

Our expert RENK team provide full engineering and support services to the Vehicle Builder and End-User, from first hull concept requirements through to build, test, delivery, initial vehicle support for Customer first trials, to Serial Production and years of use.

RENK offers a full service of specialist engineering, with emphasis on the needs of our Customer, for initial vehicle trials and through life support of fielded equipment.

• Full load transmission testing with simulated vehicle masses
• Accelerated product endurance testing
• Trials data collection and evaluation
• Full Customer trials support, in field
• Special purpose developments of in-service products e.g. for increases in vehicle weight
• Expert advice and lifetime support
RENK Full Integrated Logistics Support

ILS Management
- MTBF data calculation
- Logistic support analysis
- Recommended field support

TRAINING
At your place or ours.

SERVICE
RENK service engineers and technicians provide on-site or remote support in the event of any problem, big or small.

UPGRADES
RENK will rejuvenate your systems to the newest technology — such as by installing new electronic controls, repairing or completely replacing components, to re-set your product to ‘as-new’.

COMMISSIONING
For the installation of your transmissions RENK provides skilled personnel for on-site support and advice.

PARTS PACKAGES
Custom-tailored packages for scheduled usage and availability.

TOOLS
- Special tool packages
- Lifting / handling equipment
- Repair shop equipment
**REPAIRS AND OVERHAULS AT RENK**

Our work shop will repair damaged equipment by installing RENK OEM parts quickly and knowledgeably.

**OEM PARTS**

Only inspected and genuine parts backed by the quality and assurance of an OEM throughout the life of your vehicle.

**OBSOLESCENCE MANAGEMENT**

RENK offers full obsolescence management by trained staff.

**TRIALS SUPPORT**

As required, our engineers will fully support initial vehicle operations.

**M&R CONTRACTS**

Maintenance contracts transfer responsibility to RENK for all necessary work.

**DOCUMENTATION**

- User manuals
- Repair manuals
- Illustrated part catalogues
- Wear limit catalogues
- Training manuals and documentation
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