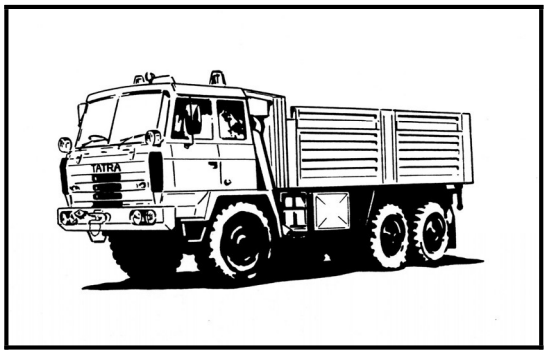


BEML - TATRA 815

26RR36 22 255 6x6.1R/50T, 51T

Workshop manual

Part 0 – VEHICLE COMPLETE

Publication numer: 03-0254-ENG/00

TATRA, a.s. **1-st Edition 28-2-2007**

0 VEHICLE COMPLETE

0.1 Vehicle Specification

The vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and **T 815 - 26RR36 22 255 6x6.1R/51T** are off-road trucks designed for transport of personnel and payload of maximum weight up to 8,000 kg. The vehicles may haul trailers of maximum connecting weight up to 65,000 kgon public roads and trailers of maximum connecting weight up to 16,000 kgin terrain conditions. The vehicle BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** is fitted with a winch.

The unique design of the three-axle vehicle with the central member frame, independently sprung half-axles and air-cooled engine allows the operation in the rough terrain conditions and in various climatic zones within the temperature range from – 40 ^{o}C to + 50 ^{o}C.

The vehicle is marked with a numerical code whose individual symbols are shown in the figures (See Fig. **0.1**)and (See Fig. **0.2**).

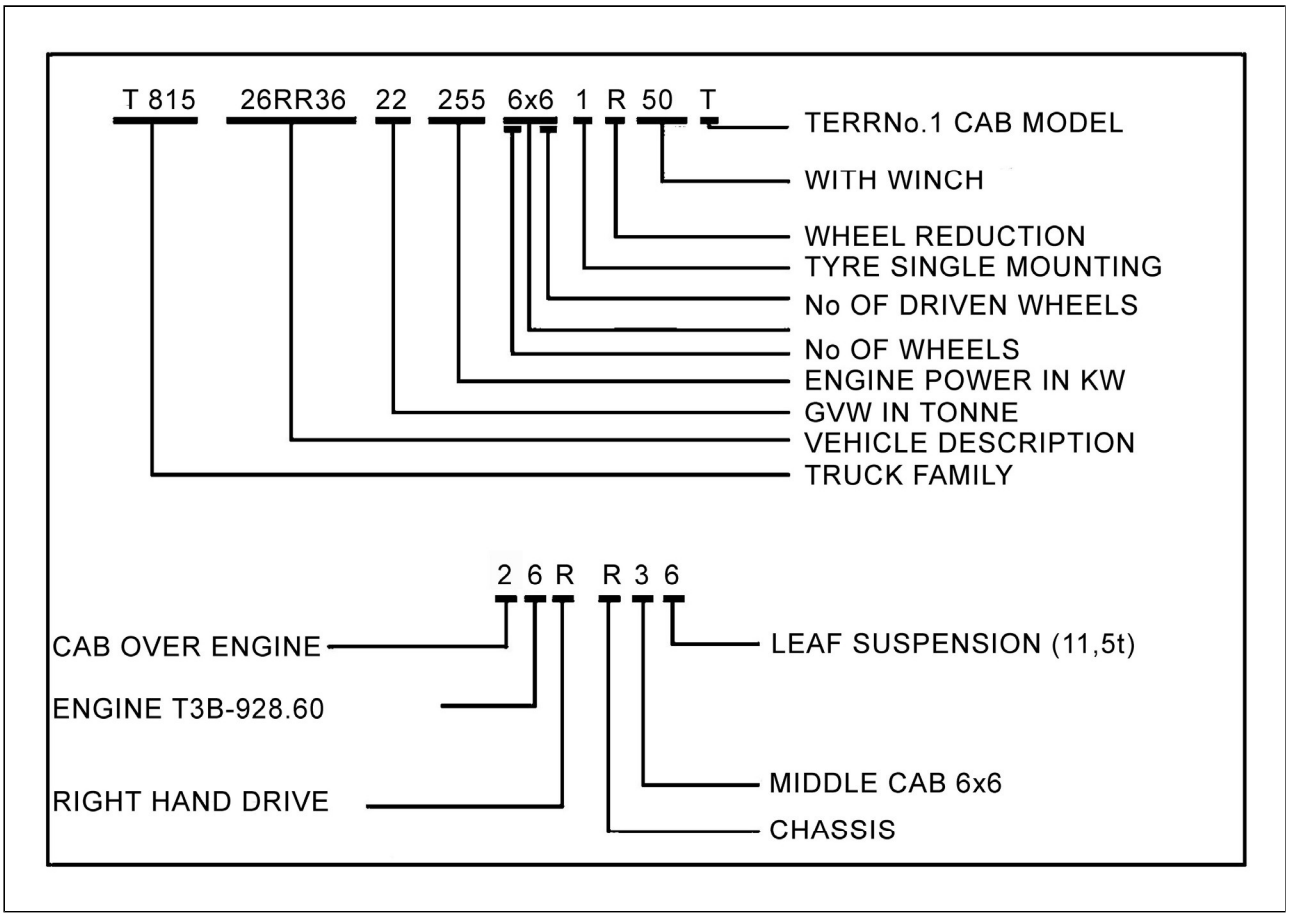


Fig. 0.1 Vehicle marking (BEML - TATRA T815 - 26RR36 22 255 6x6.1R/50T)

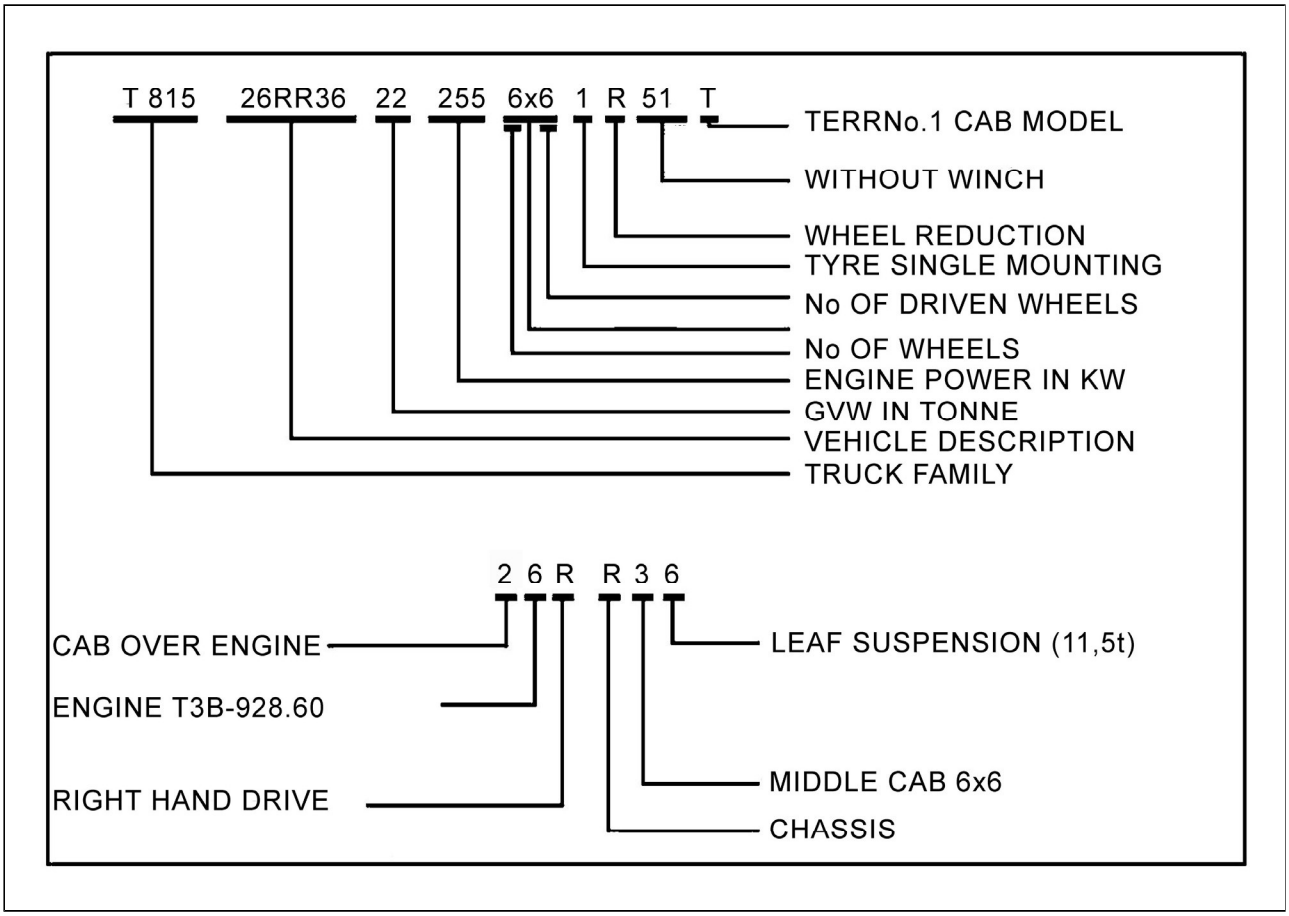
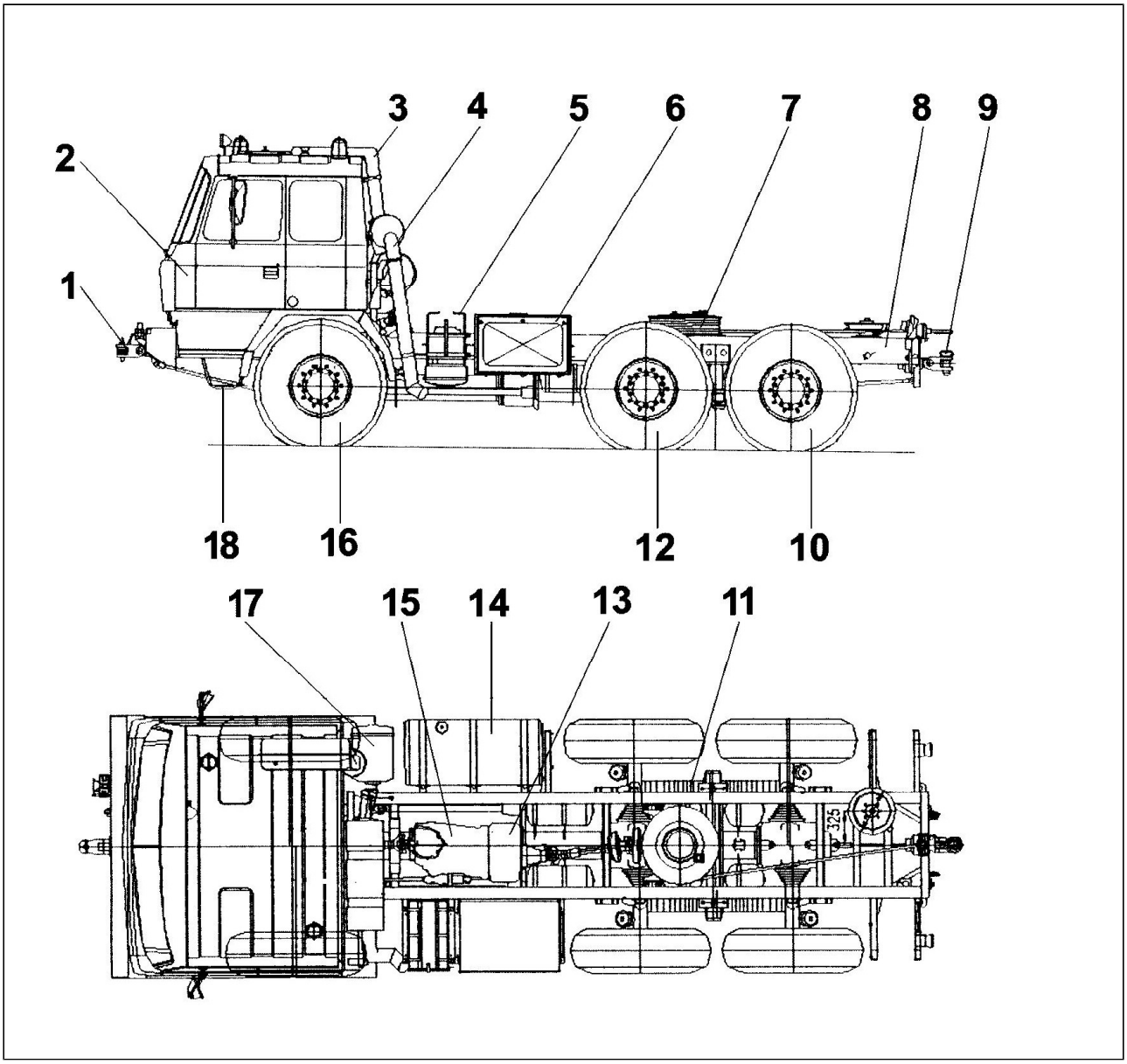


Fig. 0.2 Vehicle marking (BEML - TATRA T815 - 26RR36 22 255 6x6.1R/51T)

0.2 Overall Vehicle Arrangement

The vehicle body consists of the driver's cabin for the crew and cargo platform. The driver's cabin is all-metal, two-door, tilting and mounted on the front frame. The cargo platform is attached to the frame behind the driver's cabin. The vehicle is powered by the eight-cylinder Diesel engine T 3B-928-60 with direct fuel injection mounted at the front of the frame under the driver's cabin. The vehicle features the so-called central member frame (frameless design), which is composed of individual housings of main assembly units and backbone tubes, which are connected mutually via flanges. There are: front axle final drive housing, front backbone tube, auxiliary gearbox housing, rear backbone tube, 1st rear axle final drive housing, connecting part and 2nd rear axle final drive housing. To cross girders a through-frame is attached welded of thick "U" sections, to which cabin, engine c/w clutch, air filter, steering gear, winch, cargo platform, front and rear bumpers with coupling hitches are attached. The vehicle has three axles with constant drive of both rear axles. The rear axles are driven permanently. The front axle is driven separately and is fitted with the equipment, which allows engaging the front wheels drive as need be. The wheel reduction gears decrease the stress imposed upon the drive train and increase the vehicle traction power. The driving properties, especially on slippery surfaces, are improved by locked axle differentials and inter-axle differential. All differential locks are controlled electro-pneumatically by means of knobs situated on a panel of the knobs and manual brake valve. The swinging half-axles with independent wheels suspension are almost the same in design. The front axle shafts are sprung by torsion bars. The half-axles of rear axles are sprung by longitudinally mounted leaf springs. The vehicle employs the RHD steering. The steering wheel controlled power-steering is of a worm-type, fitted with one finger. It is equipped with hydraulic working cylinder. The vehicle is equipped with four independent brake systems - brake (foot-actuated, dual circuit brake acting on all wheels), emergency brake (manual spring brake acting on wheels of the rear couple of axles), parking brake (manual spring brake acting on wheels of the rear couple of axles) and the engine brake (exhaust-type).

The total arrangement of the vehicle BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T** is illustrated in (See Fig. **0.3**).

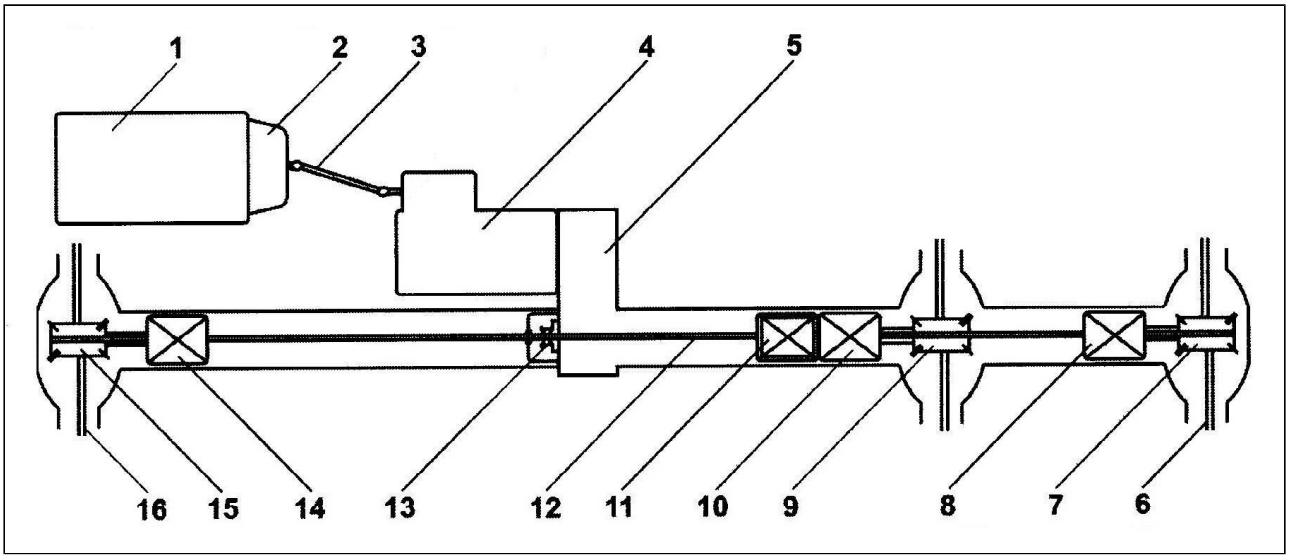


Legend: 1 - *front hitch coupling;* 2 - *cab;* **3** - *intakt;* **4** - *exhaust manifolds and hoses system;* **5** - *spare canisters holder;* **6** - *toolbox;* **7** - *winch;* **8** - *frame c/w bumper;* **9** - *rear hitch coupling;* **10** - *2nd rear axle ;* **11** - *rear axles leaf springs;* **12** - *1st rear axle;* **13** - *auxiliary gearbox;* **14** - *fuel tank;* **15** - *gearbox;* **16** - *front axle;* **17** - *air filter;* **18** - *footres*t;

Fig. 0.3 Total arrangement of the vehicle BEML - TATRA T 815 - 26RR36 22 255 6x6.1R/50T a T 815 - 26RR36 22 255 6x6.1R/51T

The vehicle drive-train is shown in (See Fig. **0.4**).

The vehicle drive train consists of the engine, dry friction-type clutch, and three-shaft gearbox with gears, auxiliary gearbox with gears, spur inter-axle locked differential, double-sided constant axle drives with locked spur axle differentials.



Legend: ***1*** *- engine,* ***2*** *- clutch,* ***3*** *- propeller shaft,* ***4*** *- gearbox,* ***5*** *- auxiliary gearbox,* ***6*** *- drive shaft of the wheels of the 2nd rear axle,* ***7*** *- final drive of the 2nd rear axle,* ***8****- 2nd rear axle differential,* ***9*** *- final drive of the 1st rear axle,* ***10*** *- 1st rear axle differential,* ***11*** *- inter-axle differential,* ***12*** *- drive shaft,* ***13*** *- shift of the front axle drive,* ***14*** *- front axle differential,* ***15*** *- final drive of the front axle,* ***16*** *- articulated drive shafts of the wheels of the front axle*

Fig. 0.4 The drive-train schema of the 6x6 version

0.3 Principal Vehicle Specifications

The main technical specifications of the vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T** are mentioned in (See Tab. **0.1**).

Tab. 0.1 Vehicles main technical specifications

Data		Unit	Value
DIMENSIONS :			
Lenght		(mm)	8,450
Width			2 500
Height over the spot lamp (unloaded/loaded)			3,152/3,132
Height over the suction main (unloaded/loaded)			3,030/3,010
Height over the tarpaulin (unloaded)			3,690 ± 20
Ground clearance (unloaded)			415
Axle wheelbases:	- between 1st and 2nd axle		3,270
	- between 2st and 3nd axle		1,450
Wheel track:	- front axle		2,044
	- rear axle		1,988
WEIGHTS :			
Curb weight		kg	12,800+5%
Payload (including crew)			8,000
Maximum gross vehicle weight			21,500
Maximum trailer weight	in off-road operation		16,000
	in on-road operation		65,000
Curb weight distribution on axles	front		6,300
	rear		2 x 3,250
Quotient of gross vehicle weight on individual axles (axle loads)	front axle		7,000
	rear axle		2 x 7,250

Tab. 0.2 Vehicle main technical specifications - continued

Data	Unit	Value
DRIVING PROPERTIES :		
Outer turning track diameter	m	20 ± 5
Approach angle	o	32
Departure angle		36
Climbing ability (vertical step)	mm	600
Crossing ability (trench width)		900
Fording (up to level height including water wave surge)		1 400
Maximum permitted speed	km /hr	90
Driving range (Cruising range)	km	min. 1,000

The main and additional data of the vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T** are mentioned in figure (See Fig. **0.5**). '**x**' marked dimensions hold for the unloaded vehicle.

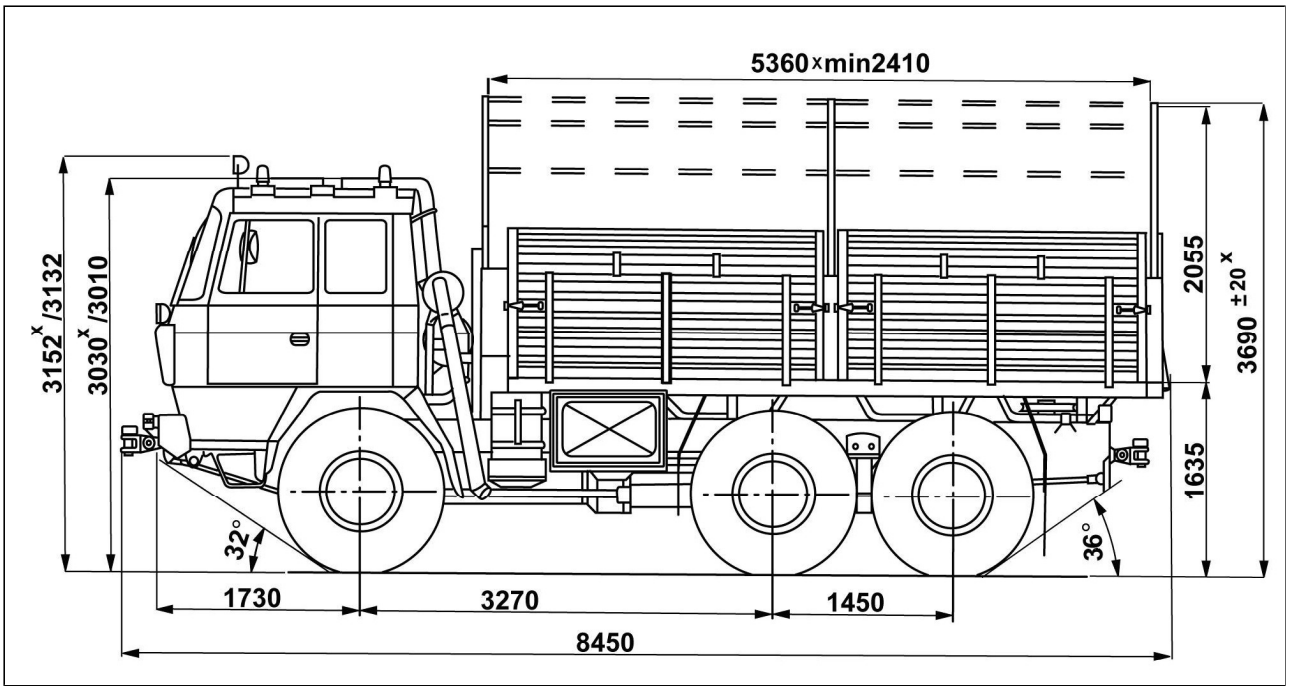


Fig. 0.5 Dimensional data

0.4 Technical Specifications of Main Vehicle Assemblies and Systems

The technical specifications of main assemblies and systems installed on the vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T** are mentioned in tables bellow.

Tab. 0.3 Vehicle main assemblies and systems technical specifications

Data	Unit	BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T - /51T**
ENGINE :		
Type		TATRA
Model		T3B-928-60
Kind		Four-stroke, Diesel, air-cooled, compression ignition, electronically controlled, direct fuel injection, turbocharged, charge air cooling, compliance with BS II (Euro II) emission norms
Arrangement of cylinders		separate cylinders in two banks in “V” shape including an angle of 90°
Cooling		air, forced, electronically controlled
N^{o}of cylinders		8
Bore / stroke	(mm)	120 / 140
Displacement	(cm^3)	12,667
Valve gear		OHV
Compression ratio		17,5 ± 0,7 : 1
Injection sequence		1-6-3-5-4-7-2-8
Max. net engine power-output	(kW)	255 (342 hp) at 1,800 rpm ISO
Maximum controlled speed	(rpm)	2,100
Max. torque (net)	(Nm)	1,570 at 1,200 ± 200 rpm ISO
Idle speed	(rpm)	500 - 600 rpm
Engine working ability at longitudinal /transversal slope	(°)	35 / 25
Lubrication		pressure, circulation-type
Injection system		Bosch 0 402 648 602
Injection valve		VA 51S 490 - 2672
Oil filter		Oil filter with paper cartridge, centrifugal oil filter
Intake air filter		SPP 1200 R - with paper element without oil filling
Turbocharger		type HOLSET HX50W
Compressor		single-cylinder, 4192 type
Alternator		28 V / 55 A not waterproof
Starter motor		24 V / 6.6 kW not waterproof
Engine weight	(kg)	1,100 (w/o oil filling and clutch)

Tab. 0.4 Vehicle main assemblies and systems technical specifications - continued

Data		Unit	BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T - /51T**
CLUTCH :			
Type			TATRA MFZ 1 x 430
Kind			friction-type, dry, single-plate with disc spring, hydraulically actuated and fitted with the pneumatic booster
The method of the control			hydraulically actuated and fitted with the pneumatic booster
Weight		(kg)	98
PROPELLER SHAFT :			
Kind			Flange-type with universal joints
GEARBOX :			
Type			TATRA
Model			10 TS 140
Kind			Mechanical, ten-speed synchromeshed gearbox with gearshift booster , H and L gears are shifted electro-pneumatically using the pre-selector
No of gear speeds			10 + 2 reverse
Transmission ratios: (H/L)	1^{st}gear		6.694 / 8.740
	2^{nd}gear		3.743 / 4.886
	3^{rd}gear		2.109/ 2.753
	4^{th}gear		1.244 / 1.624
	5^{th}gear		0.731 / 0.955
	Reverse		5.839 / 7.624
The method of the control:	main part		Direct with pneumatic booster
	H / L gear		Indirect, electro-pneumatically actuated with pre-selector
Lubrication			Pressure, circulation type
Weight		(kg)	334
TRANSFER BOX :			
Type			TATRA
Model			2.30 TRK 1.1 / 1.8
Kind			two-stage, step-down type, with winch PTO, with gears in constant mesh, both gear speeds and neutral are shifted electro-pneumatically by the claw coupling
Transmission ratio (H / L)			1.060 / 1.765
Engagement (including the front axle drive)			Indirect, electro - pneumatically
Equipment of the auxiliary gearbox			gear-shifting mechanism, winch drive and engagement through the drive shaft
Lubrication			Pressure, circulation type
Weignt		(kg)	209

Tab. 0.5 Vehicle main assemblies and systems technical specifications - continued

Data		BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T - /51T**
DIFFERENTIALS :		
Kind	inter-axle	spur, symmetrical c/w locked differential
	axle	spur, symmetrical c/w locked differentials
N°of differentials		1x inter-axle, 3 x axle
Way of locks control		air working cylinders and air cocks
Lubrication		Oil splashing
AXLE FINAL DRIVE :		
Kind		two-sided, double-acting, bevel gears and planetary wheel reduction gears
Axle final drive ratio		2.714
Transmission ratio in wheel reduction gears		2.333
Lubrication		Oil splashing
DRIVER´ S CABIN :		
Kind		forward control, middle, low, all-metal, two-seat, two-door, with a roof manhole, forward tilting cab
Cab's tilting mechanism		Hydraulic, manual
Seat :	- driver	sprung pneumatically, adjustable (seat cushion and backrest),
	- co-driver	sprung pneumatically, adjustable (seat cushion and backrest),
	- auxiliary	for two persons fitted with the lap seat belts
Heating		electronically controlled dependent engine oil heater and independent heater
FRAME :		
Kind		central, backbone frame
AXLES :		
N°of axles		3
Kind of axles:	1st axle	Swinging, steered, all-wheel drive on/off
	2nd axle	Swinging, driven
	3rd axle	Swinging, driven
AXLES SUSPENSION :		
Front axle		torsion bars, fluid telescopic shock absorbers
Rear axles		flat springs

Tab. 0.6 Vehicle main assemblies and systems technical specifications - continued

Data	Unit	BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T - /51T**
VEHICLE WHEELS :		
Kind		Disc wheels
Rim size (split)		11.25 - 21
Tyres designation		15.00 - 21 MP 913/12PR, TUBE TYPE
Number of wheels		6 + 1
Wheel weight	kg	220
STEERING :		
Kind		RHD, mechanical, power-assisted steering with fluid working cylinder
Type of working cylinder		RV 78.3
Type of pump		UC 16 S.04
Nominal pump overpressure	MPa	7 (70 kg/sq.cm)
Maximum pump overpressure	MPa	11 (110 kg/sq.cm)
Adjustment of relief valve	Mpa	9.8 - 10.5 (98 - 105 kg/sq.cm)
Total number of steering wheel turns to achieve a full lock		5 + 2/3
Steering wheel diameter	mm	500
Maximum steering backlash	(°)	15
BRAKE SYSTEM :		
Number of brake systems		four brake systems independent on each other
Service brake		two-circuit, foot-operated, pneumatic, with single-hose indirect acting or two-hose direct acting brake control of connected vehicles
Emergency brake		spring-type, controlled by hand-operated brake valve, acting on wheels of both rear axles, with linkage to the trailer brake system
Parking brake		spring-type, controlled by the manual brake valve, acting on wheels of both rear axles
Engine brake		exhaust-type, controlled electro-magnetically
Diameter of front axle brake cylinders	mm	100
Diameter of rear axle brake cylinders		115/4 spring-type
Diameter of brake drums	mm	420
Width of brake lining	mm	160
Brake system operating pressure	MPa	0.83 ± 0.02 (8.3 ± 0.2 kg/sq.cm)

Tab. 0.7 Vehicle main assemblies and systems technical specifications - continued

Data	Unit	BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T - /51T**
ELECTRICAL SYSTEM :		
Nominal network voltage	(V)	24
Grounding		" - " (negative) pole
Interference suppression		ES 55012
Accumulators		2 x 12 V 180Ahrs (177 Ahrs)
Alternator		28 V/55 A
Motor starter		24 V/6,6 kW
HITCHES :		
Rear hitch coupling		65 t, non-automatic, rotary, sprung with pin dia.65 mm and one insert
Front hitches		65 t, non-automatic, rotary, non-sprung with pin dia.38 mm and two inserts
The pin dia.76 mm is placed in the vehicle equipment - this may be used for both hitch couplings		
Auxiliary hitch coupling		on cover of 2nd rear axle, permitted pulling capacity in the straight-ahead direction 40 kN
CARGO PLATFORM		
Platform length	mm	5,360
Platform width	mm	min. 2.410
WINCH		
Maximum towing force of winch when unwinding 25 mof cable	kN	117.7
Cable length (working)	m	83
Cable diameter	mm	23.6
Friction coupling adjusted to towing force	kN	117.7

0.5 Vehicle Lubrication and Working Fluids

The intervals for the oil change and lubrication chart are mentioned in the “Service Manual”. Recommended oils and lubricants for all assemblies are mentioned in the “Operation Manual”.