# SALES MANUAL

## FORTERRA
## FORTERRA HSX


PERFORMANCE
ENDURANCE
TOTAL COST OF OWNERSHIP

Zetor is the tractor. Since 1946.

SINCE THE BEGINNING,
THE ZETOR BRAND HAS BEEN
CHARACTERIZED BY THE
FOLLOWING FEATURES:

**PERFORMANCE**
**ENDURANCE**
**TOTAL COST OF OWNERSHIP**

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F — Designation for Forterra model only

F HSX — Designation for Forterra HSX model only

F F HSX — Designation for both Forterra models

Zetor

# Zetor

# F FORTERRA
# F HSX FORTERRA HSX

**The most powerful and best equipped tractors in ZETOR's portfolio.**


## POWER MODIFICATIONS
### ACC. TO 2000/25/EC

| | |
|---|---|
| 100 | 71 kW |
| 110 | 79 kW |
| 120 | 86 kW |
| 130 | 93 kW |
| 140 | 100 kW |

## PERFORMANCE

Forterra tractors rank among the most powerful tractors in the ZETOR TRACTORS portfolio. Thanks to a combination of the powerful engine and the higher weight of the tractor, they deliver outstanding performance on any job.

## ENDURANCE

Emphasis in the Forterra models is placed on a simple, smart and functional design. The simple design also allows for easy maintenance.

## TOTAL COST OF OWNERSHIP

Thanks to our production of 16-valve engines, the Forterra models are extremely fuel efficient. Fuel efficiency along with affordable spare parts pricing make the Forterra series unbeatable in operating costs.

# WHAT'S NEW

- Cab roof with hatch
- Front driven axle with driving shaft connection in the axle centerline
- Wheel base extended by 100 mm
- Newly designed front driven axle drive with an oil-controlled multi-plate clutch
- Increased working pressure in the hydrostatic steering system to 17.5 MPa (2,550 psi)
- Brakes act on front axle by automatic engagement of FWD clutch when brake pedals are pushed
- Increased brake efficiency – five brake discs per wheel
- Two PTO styles are available: (1) Four-speed PTO without ground speed or (2) Two speed PTO with ground speed (available later in 2013)
- Electro-hydraulic PTO speed selection (540/1000) by a switch on the right cab column; Mechanical selection of 540E and 1000E speeds
- Engine stop by switching off the key switch
- Swing-mount front fenders – smaller turning radius
- Spring-suspended cab
- Rear three-point hitch of category III N
- Larger weight set for the front three-point hitch – 800 kg (1 800 lbs) (requires installation of optional engine side rails)
- External PTO switches on rear fenders for easier implement shaft connection
- Transmission controls error indication displayed on the dashboard
  - Forterra by an indicator light, Forterra HSX on LCD
- Indication of the tractor's electrical network overloading on the dashboard
  - Forterra by indicator light, Forterra HSX on LCD
- New location of the key switch

# ADVANTAGES

## F F HSX

- Longer wheel base by 100 mm (4 in) = **better stability**
- Electrohydraulic PTO speed shifting = **higher comfort**
- Two external hydraulic cylinders = **higher lifting capacity**
- Medium-pressure filter = **longer life of hydraulic system**
- New gear shift design = **easier gear shifting**

## F HSX

- LCD display = **better arranged indications and more information for operators and service technicians**
- CAN + notebook + diagnostic SW = **easier and faster maintenance**
- Power Shuttle and automatic Powershift = **higher comfort and better engine power utilization**
- Safety switch in the driver's seat = **safety operation**

# F FORTERRA – **MAIN SPECIFICATIONS**

| MODEL | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|
| **MOTOR – Stage III B** | | | | | |
| power (kW) | 71 | 79 | 86 | 93 | 100 |
| engine type | diesel, four-stroke with direct fuel injection, turbocharged, in-line, water-cooled | | | | |
| rated speed (rpm) | 2 200 | | | | |
| number of cylinders | 4 | | | | |
| engine charging | turbocharger | | | | |
| intercooling | air-to-air | | | | |
| bore/stroke (mm) | 105/120 | | | | |
| engine size ($cm^3$) | 4 156 | | | | |
| **GEARS** | | | | | |
| driving clutch | dry single-plate clutch | | | | |
| max. speed ($km \cdot h^{-1}$) | 40 | | | | |
| number of speeds | 24 + 18 | | | | |
| creeper | no | | | | |
| reverser | mechanically shifted, synchronized | | | | |
| transmission synchronization | full | | | | |
| torque multiplier | three-stage, electrohydraulically actuated | | | | |
| hydraulic circuit of transmission | transmission oil cooler, pump, distributor with electrohydraulic control, full-flow filtration 25 µm | | | | |
| transmission pump delivery (L) | 35 | | | | |
| transmission pump pressure (MPa) | 1,8 + 0,3 | | | | |
| **REAR POWER TAKEOFF – PTO** | | | | | |
| version | independent | | | | |
| clutch | wet disc clutch with conical brake | | | | |
| speed (rpm) | 540/1000/540E/1000E | | | | |
| end pieces | interchangeable 6 or 21 splines | | | | |
| **FRONT POWER TAKEOFF – PTO** | | | | | |
| speed (rpm) | 1,000 | | | | |
| direction of rotation | CCW or CW | | | | |
| end pieces | fixed 6 or 21 splines | | | | |
| **HYDRAULIC SYSTEM** | | | | | |
| type | electrohydraulic system Bosch with HitchTronic | | | | |
| three-point hitch | category II or III N | | | | |
| control | electronic | | | | |
| working pressure (MPa) | 20 | | | | |
| pump capacity (L/min) | 70 | | | | |
| remote outlets | 6+1 or 4+1 quick couplers, optional drip oil containment system | | | | |
| **HITCHES** | | | | | |
| rear three-point hitch – lifitng capacity in the whole lift range (kN) | 65 | | | | |
| rear three-point hitch – lifting capacity at the end of the lower links (kN) | 70 | | | | |
| front three-point hitch – lifting capacity (kN) | 35 | | | | |
| **WEIGHT** | | | | | |
| curb weight (kg) | 4 850 | | | | |
| max. ballast weights – front/rear (kg) | 800/472 | | | | |
| max. weight (kg) | 8 000 | | | | |

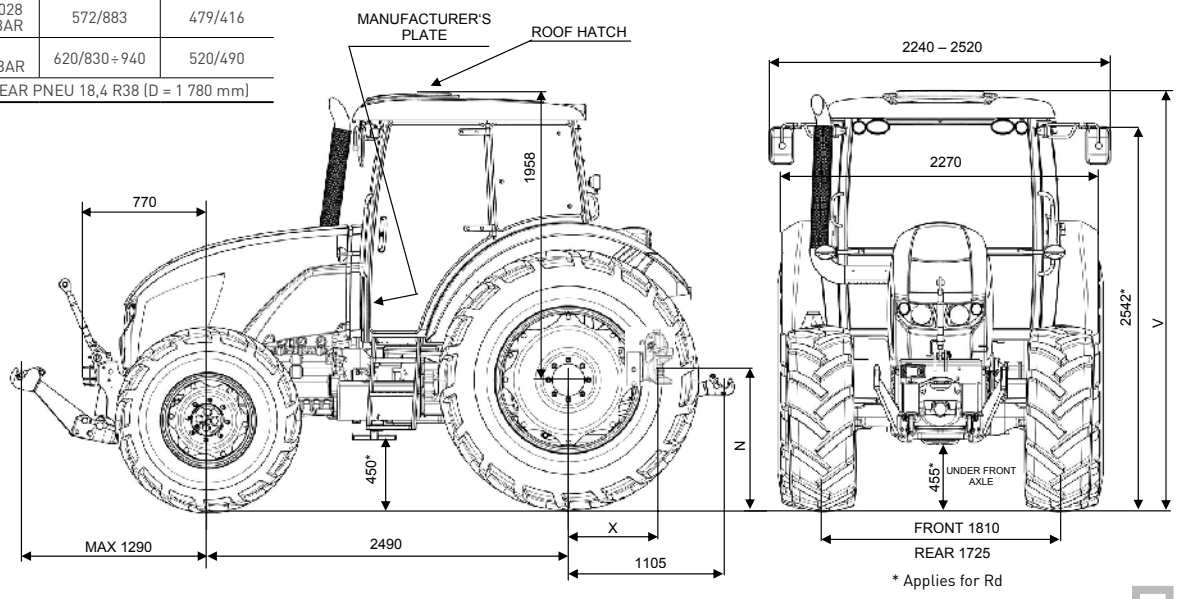
| MODEL | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|
| **FRONT DRIVEN AXLE** | | | | | |
| type | Carraro 20.19 with limited slip differential | | | | |
| brakes | by automatic FWD clutch engagement | | | | |
| **CAB** | | | | | |
| noise level at driver's place (dB) | max. 77 | | | | |
| heating | hot water heating with adjustable air recirculation | | | | |
| air-conditioning | manual | | | | |
| **OTHER PARAMETERS** | | | | | |
| driving system | 4WD | | | | |
| steering | hydrostatic | | | | |
| rear brakes | wet disc brakes | | | | |

| MAIN DIMENSIONS OF TRACTOR (mm) | | NOTE |
|---|---|---|
| front wheels | 14,9 R24 – disc | |
| rear wheels | 18,4 R38 – disc | |
| length with trailer hitch with lowered front three-point hitch | 5 000 | without additional ballast weights |
| length with trailer hitch without front three-point hitch | 4 440 | without additional ballast weights |
| width over rear fenders | 2 270 | |
| tractor height to the top of cab | 2 870 | |
| ground clearance under front axle support | 520 | |
| height of trailer hitch coupler in highest position (coupler center) | 1 005 | |
| wheel base | 2 490 | |

| TYPE OF HITCH | X (mm) | N (mm) |
|---|---|---|
| GTF 30026 | 532,5 | 450 ÷ 915 |
| OC.0011 | 685,5 | 450 ÷ 915 |
| OC.0012 | 670,5 | 450 ÷ 915 |
| GTF 30014 | 652,5 | 450 ÷ 915 |
| GTF 30015 | 652,5 | 450 ÷ 915 |
| GTB 30003 | 570; 880 | 418; 481 |
| GTS 80001 | 622,5 | 434,5 |
| CBM-AXLA 99028 HOOK/DRAWBAR | 572/883 | 479/416 |
| DROMONE HOOK/DRAWBAR | 620/830÷940 | 520/490 |
| APPLIES TO REAR PNEU 18,4 R38 (D = 1 780 mm) | | |

| PNEU | Rd (mm) | V (mm) |
|---|---|---|
| 16,9 R38 | 796 | 2 756 |
| 18,4 R38 | 832 | 2 792 |
| 520/70 R38 | 834 | 2 794 |
| 600/65 R38 | 829 | 2 789 |
| pneu Mitas | | |

**REAR TYRES:** 18,4 R 38; Rd = 832 mm
**FRONT TYRES:** 14,9 R 24; Rd = 588 mm



# F HSX FORTERRA HSX – **MAIN SPECIFICATIONS**

| MODEL | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|
| **MOTOR – Stage III B** | | | | | |
| power (kW) | 71 | 79 | 86 | 93 | 100 |
| engine type | diesel, four-stroke with direct fuel injection, turbocharged, in-line, water-cooled | | | | |
| rated speed (rpm) | 2 200 | | | | |
| number of cylinders | 4 | | | | |
| engine charging | turbocharger | | | | |
| intercooling | air-to-air | | | | |
| bore/stroke (mm) | 105/120 | | | | |
| engine size ($cm^3$) | 4 156 | | | | |
| objem ($cm^3$) | 4 156 | | | | |
| **GEARS** | | | | | |
| driving clutch | reversing wet dual clutch | | | | |
| max. speed ($km \cdot h^{-1}$) | 40 | | | | |
| number of speeds | 30 + 30 | | | | |
| lowest speed at rated rpm ($m \cdot h^{-1}$) | 1 750 | | | | |
| reverser | Power shuttle at speed up to 10 $km \cdot h^{-1}$ | | | | |
| transmission synchronization | full | | | | |
| torque multiplier | three-stage, electrohydraulically controlled with AMC function | | | | |
| hydraulic circuit of transmission | transmission oil cooler, pump, distributor with electrohydraulic control, full-flow filtration 10 µm | | | | |
| transmission pump capacity (L) | 35 | | | | |
| transmission pump pressure (MPa) | 1,8 + 0,3 | | | | |
| **REAR POWER TAKEOFF – PTO** | | | | | |
| version | independent | | | | |
| clutch | wet disc clutch with conical brake | | | | |
| PTO speed change | electrohydraulically | | | | |
| speed (rpm) | 540 /540E/1 000/1 000E | | | | |
| end pieces | inetrchangeable 6 or 21 splines | | | | |
| **FRONT POWER TAKEOFF – PTO** | | | | | |
| speed (rpm) | 1 000 | | | | |
| direction of rotation | CCW or CW | | | | |
| end pieces | fixed 6 or 21 splines | | | | |
| **HYDRAULIC SYSTEM** | | | | | |
| type | electrohydraulic system Bosch with HitchTronic | | | | |
| three-point hitch | category II, optional category III N | | | | |
| control | electronic | | | | |
| working pressure (MPa) | 20 | | | | |
| hydraulic pump capacity (L) | 70 | | | | |
| remote outlets | 6+1 or 4+1 quick couplers, optional drip oil containment system | | | | |
| **HITCHES** | | | | | |
| rear three-point hitch – lifting capacity in the whole lift range (kN) | 80 | | | | |
| rear three-point hitch – lifting capacity at the end of the lower links (kN) | 85 | | | | |
| front three-point hitch – lifting capacity (kN) | 35 | | | | |
| **WEIGHT** | | | | | |
| curb weight (kg) | 4 850 | | | | |
| max. ballast – front/rear (kg) | 800/472 | | | | |
| max. weight (kg) | 8 000 | | | | |

| MODEL | 100 | 110 | 120 | 130 | 140 |
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| **FRONT DRIVEN AXLE** | | | | | |
| type | Carraro 20.19 with limited slip differential | | | | |
| brakes | by automatic FWD engagement | | | | |
| **CAB** | | | | | |
| noise level at driver's place (dB) | max. 77 | | | | |
| heating | hot water heating with adjustable air reciculation | | | | |
| air-conditioning | manual | | | | |
| **OTHER PARAMETERS** | | | | | |
| driving system | 4WD | | | | |
| steering | hydrostatic | | | | |
| rear brakes | wet disc brakes | | | | |

| MAIN DIMENSIONS OF TRACTOR (mm) | | NOTE |
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| front wheels | 14,9 R24 – disc | |
| rear wheels | 18,4 R38 – disc | |
| length with trailer hitch with lowered front three-point hitch | 5 100 | without additional ballast weights |
| length with trailer hitch without front three-point hitch | 4 520 | without additional ballast weights |
| width over rear fenders | 2 270 | |
| tractor height to the top of cabin | 2 774 | |
| ground clearance under front axle support | 520 | |
| height of trailer hitch coupler in highest position (coupler center) | 915 | |
| wheel base | 2 590 | |

| TYPE OF HITCH | X (mm) | N (mm) |
|---|---|---|
| GTF 30026 | 532,5 | 450 ÷ 915 |
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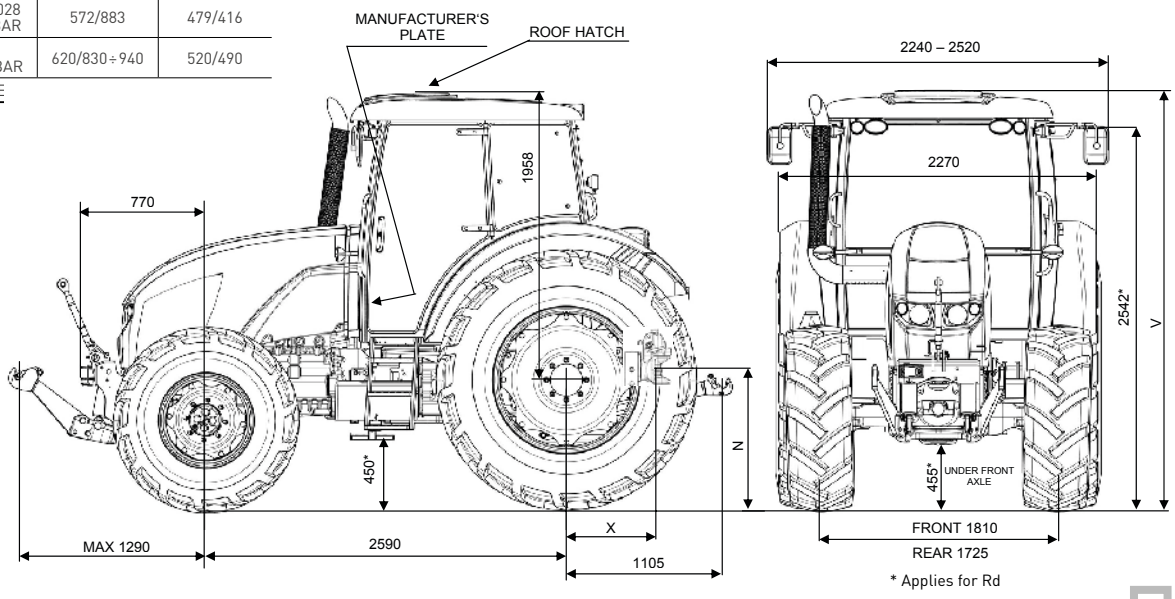
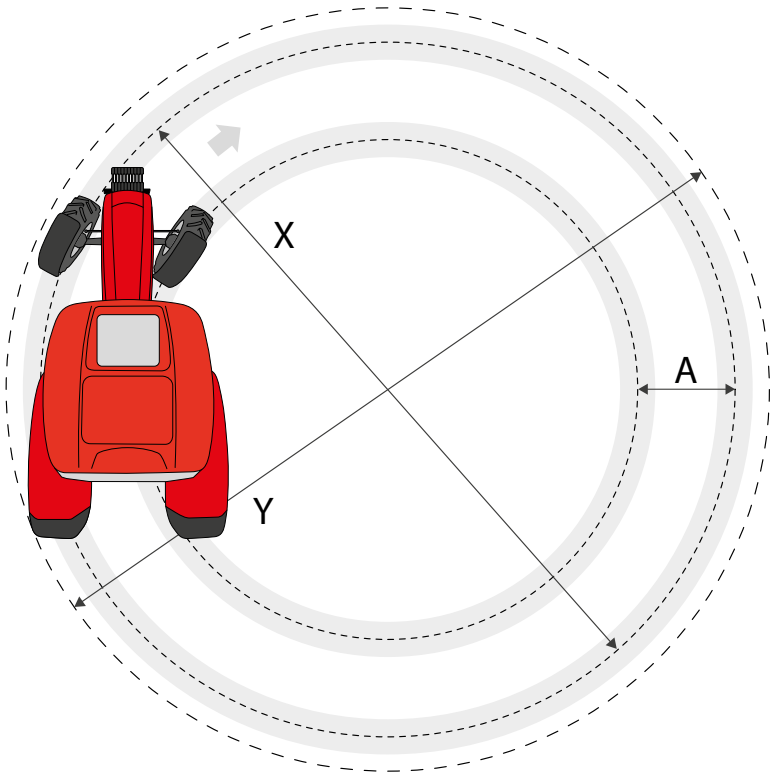


# F

| TURNING AND TRACK CIRCLE DIAMETER | | | | | WITHOUT FENDERS OR WITH TURNING FENDERS | | WITH FIXED FENDERS | |
|---|---|---|---|---|---|---|---|---|
| Wheel track (A) (mm) | front | 1 810 | Tire dimensions | front | 14,9 R24 | 480/65R24 | 14,9 R24 | 480/65R24 |
| | rear | 1 725 | | rear | 18,4 R38 | 600/65R38 | 18,4 R38 | 600/65R38 |
| Track circle diameter (X) (mm) | without engaged front driven axle | | | | 9 900 | 10 110 | 10 330 | 11 040 |
| | with engaged front driven axle | | | | 10 880 | 11 030 | 11 280 | 11 885 |
| Turning circle diameter (Y) (mm) | without engaged front driven axle | | | | 10 575 | 10 715 | 11 025 | 11 775 |
| | with engaged front driven axle | | | | 11 555 | 11 635 | 11 970 | 12 615 |

# F HSX

| TURNING AND TRACK CIRCLE DIAMETER | | | | | WITHOUT FENDERS OR WITH TURNING FENDERS | | WITH FIXED FENDERS | |
|---|---|---|---|---|---|---|---|---|
| Wheel track (A) (mm) | front | 1 810 | Tire dimensions | front | 14,9 R24 | 480/65R24 | 14,9 R24 | 480/65R24 |
| | rear | 1 725 | | rear | 18,4 R38 | 600/65R38 | 18,4 R38 | 600/65R38 |
| Track circle diameter (X) (mm) | without engaged front driven axle | | | | 9 990 | 10 200 | 10 425 | 11 140 |
| | with engaged front driven axle | | | | 10 980 | 11 130 | 11 380 | 11 990 |
| Turning circle diameter (Y) (mm) | without engaged front driven axle | | | | 10 670 | 10 810 | 11 125 | 11 880 |
| | with engaged front driven axle | | | | 11 660 | 11 740 | 12 080 | 12 730 |



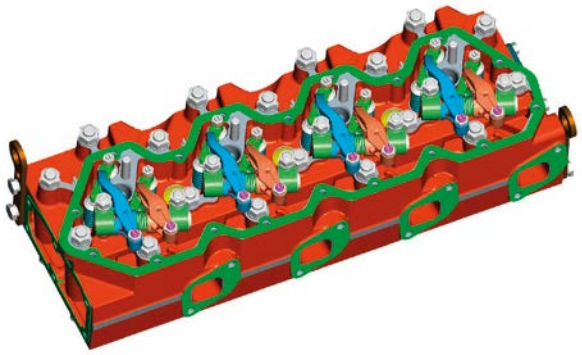
**THE 2013 TRACTOR MODELS USE A NEW FRONT DRIVEN AXLE WITH DRIVE IN THE CENTER PIN AXIS AND A NEW FRONT AXLE DRIVE CLUTCH SYSTEM.**

# F F HSX ENGINE

## All engines used are developed and manufactured by ZETOR TRACTORS a.s.

**NEW.** AS OF 2013, ALL FORTERRA AND FORTERRA HSX POWER SERIES USE AN ECONOMIC 16-VALVE ENGINE SERIES, MEETING STAGE III B EMISSION LIMITS. THE FOLLOWING RESULTS HAVE BEEN ACHIEVED BY COMBUSTION OPTIMIZATION:

- smooth running
- lower heat load
- lower fuel consumption
- higher torque and torque rise



## MAIN FEATURES

- diesel
- four-stroke
- in-line
- water-cooled
- turbocharged with air-to-air compressed air intercooler
- fuel system with direct injection and in-line, mechanically controlled injection pump
- overhead valve engine – OHV
- two balancers
- electronically controlled exhaust gas recirculation system (EGR)
- 16-valve cylinder head
- injection pump allowing to stop engine with switch key

THE XX06 ENGINE SERIES MEETS STAGE III B EMISSION STANDARD

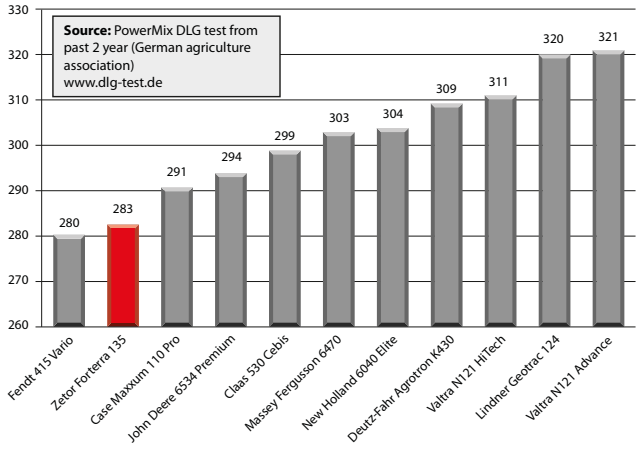
| MODEL | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|
| power (kW) | 71 | 79 | 86 | 93 | 100 |
| engine type - Stage III B | 1006 | 1306 | 1406 | 1506 | 1606 |

The engine for mounting the front power takeoff is equipped with a pulley on the crankshaft enabling power takeoff. The maximum front power takeoff is 60 kW.

## The engines can be equipped with cooling fans in these versions:

- Fixed fan
- Fan with visco-clutch which switches the fan drive depending on the cooling liquid and ambient temperatures and reduces fuel consumption by 3 – 5%

**[g/kW·hour] Fuel consumption in DLG test - PowerMix**



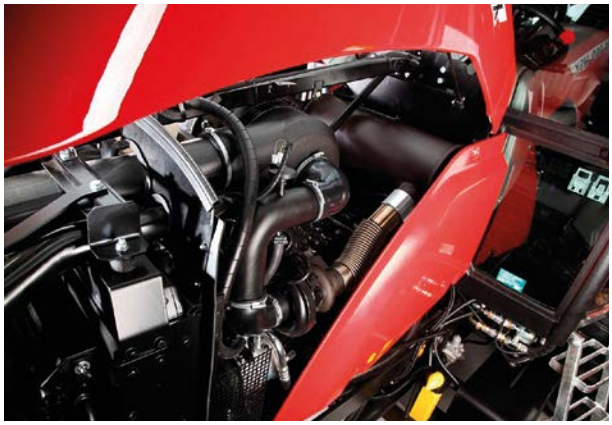

IN 2011, ENGINES WITH THE NEW 16-VALVE TECHNOLOGY WERE GIVEN ONE OF THE BEST EVALUATIONS IN A DEMANDING TEST BY THE GERMAN AGRICULTURAL ASSOCIATION (DLG). TRACTORS EQUIPPED WITH THESE ENGINES RANK AMONG THE MOST FUEL EFFICIENT ON THE MARKET.

## BENEFITS ZETOR ENGINES

- balancers in engine block **= vibration suppression**
- cooling of piston heads by pressure oil **= higher engine efficiency and life**
- use of glow plugs (direct preheating of combustion chamber) **= start ability at low temperatures**
- possibility to install a cooling liquid heater **= reducing the engine warm-up time – fuel saving**
- in-line mechanical injection pump **= reliability, long life**
- compressor as a standard
- air-to-air cooler

## PARTICULATE FILTER (DPF)

The xx06 series engines in Forterra tractors meeting Stage III B emission standard are equipped with a particulate filter which cleans exhaust gases. Solid particles (soot) produced by Diesel combustion are collected and burnt in the particulate filter.



The particulate filter operation is indicated by a pair of indicators (green and red) on the dashboard and by audible signal.

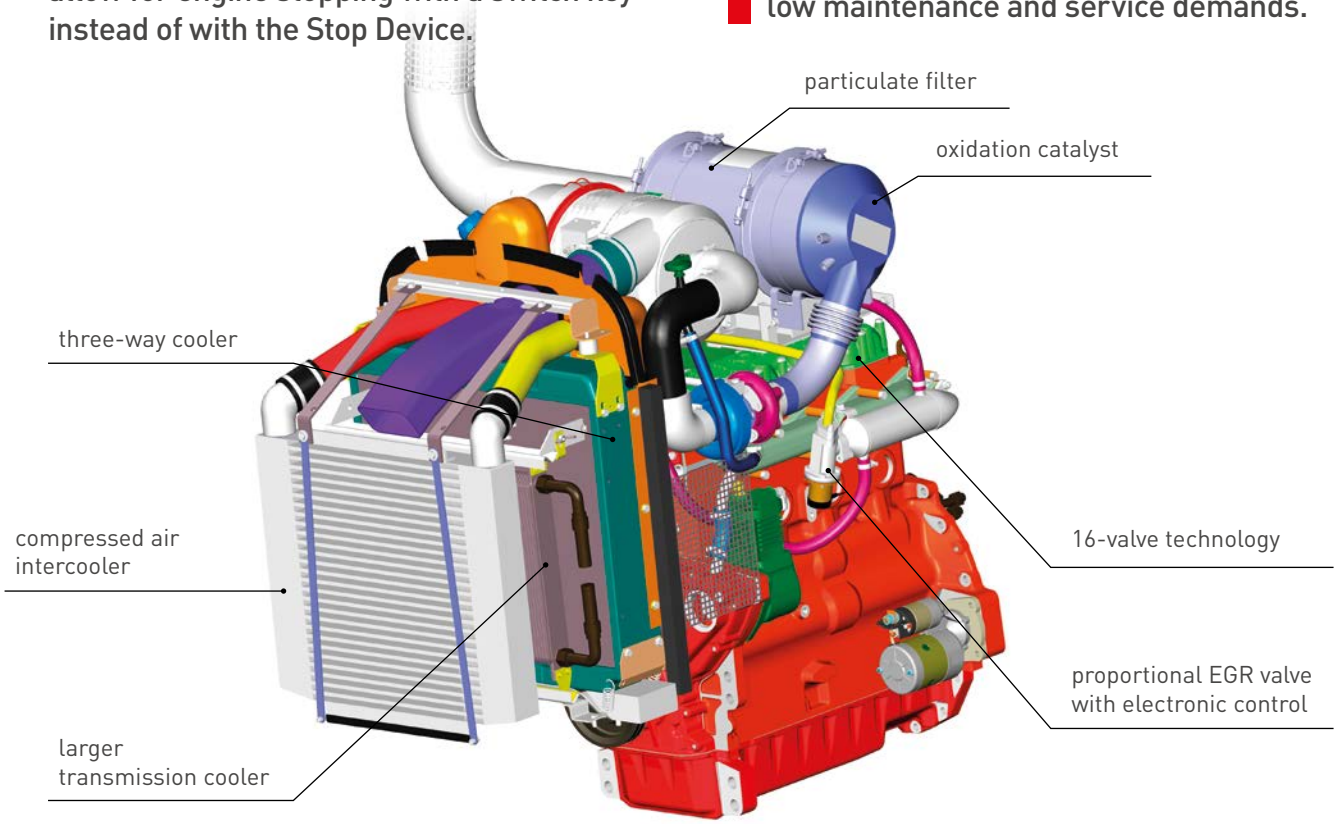
In those EU countries in which engines meeting Stage III B emission standard are not required the particulate filter can be replaced with a conventional exhaust.

**NEW . Tractors of the 2013 model series allow for engine stopping with a switch key instead of with the Stop Device.**

**The particulate filter with passive regeneration used in Zetor tractors is not controlled and it does not require a special injection of Diesel into the filter or adding additives to the fuel tank; the filter always regenerates when the inner temperature reaches 250 °C.**

The exhaust gas cleaning system reduces the contents of both solid particles in exhaust gases of Diesel engines (PM) and gaseous harmful substances such as carbon monoxide (CO) and hydrocarbons (HC). Exhaust gases are first filtered in a monolith and, by contact with the surface layer of the monolith, they are transformed catalytically along with gaseous substances to harmless substances (carbon dioxide $CO_2$ and water $H_2O$). The filtration of particles takes place when exhaust gases flow through the porous channel walls ("Wall-Flow") of the monolith. The inlet channels are always closed at the end, so the exhaust gas flows through the layer on the channel surface and through thin intermediate walls (ca. 0.4 mm thick). The large number of individual channels creates a large filtration surface and subsequently a high intercepting ability for exhaust particulates.

**The extraordinary popularity of Zetor engines is because of their low fuel consumption, high reliability, and simple construction, which brings customers not only low acquisition costs, but also low operating costs, high reliability and low maintenance and service demands.**



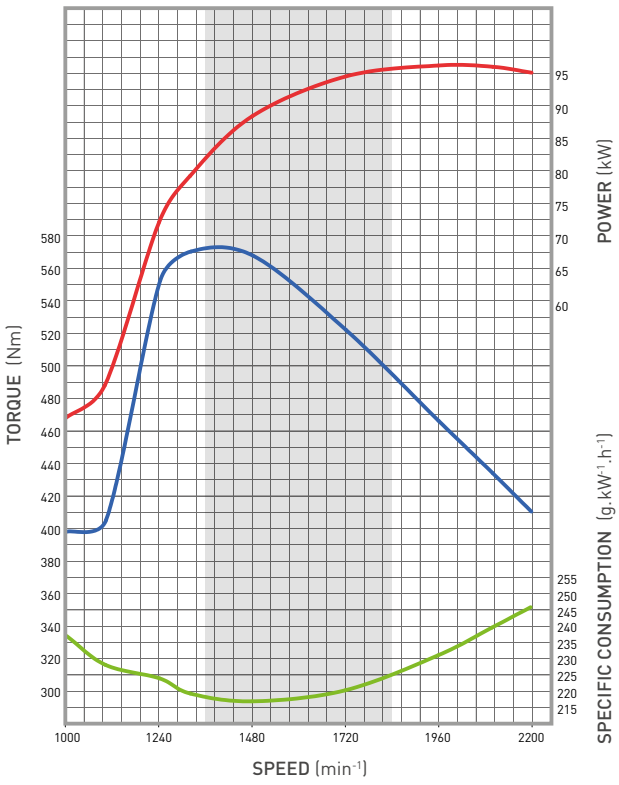
# TECHNICAL DATA OF ENGINES

| MODEL | Units | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|---|
| ENGINE – Stage III B | | | | | | |
| engine type | | 1006 | 1306 | 1406 | 1506 | 1606 |
| number of cylinders | | | | 4 | | |
| engine size | $cm^3$ | | | 4 156 | | |
| bore x stroke | mm | | | 105×120 | | |
| rated speed | rpm | | | 2 200 | | |
| injection sequence | | | | 1-3-4-2 | | |
| compression ratio | | | | 17 | | |
| maximum high idle | rpm | | | 2 460 | | |
| low idle | rpm | | | 800±25 | | |
| net power at rated speed acc. to 2000/25/EC | (kW) | 71 | 79 | 86 | 93 | 100 |
| fuel consumption at engine rated speed (2 200 rpm) | $g{\cdot}kW^{-1}{\cdot}h^{-1}$ | 240 | 238 | 238 | 239 | 240 |
| maximum torque (1 480 rpm) | Nm | 428 | 461 | 493 | 551 | 581 |
| torque rise | % | | | 38 | | |
| fuel consumption at max. torque (1 480 rpm) | $g{\cdot}kW^{-1}{\cdot}h^{-1}$ | 213 | 212 | 211 | 211 | 212 |

## ADVANTAGES OF 16V AGAINST 8V

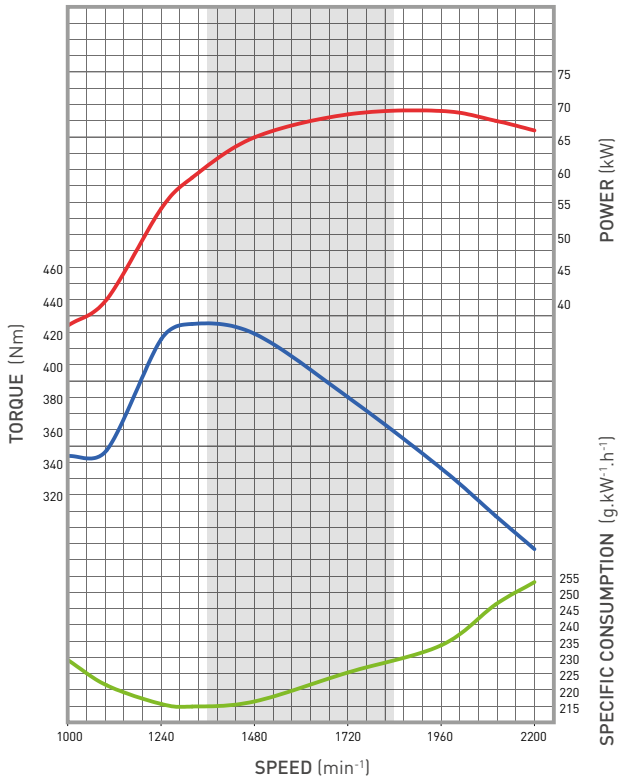
- fuel saving up to 2.9 $Lh^{-1}$ or 22 g/kWh (at 100 % load)
- low oil consumption
- higher maximum power (in the range of 2 000 rpm)
- higher maximum torque
- steep torque increase (410 Nm) already at 1 000 rpm (+36 %)
- maximum power ca. 100 kW (+8 %)
- wider range of maximum torque
- torque rise by 35 % (+2 %)

ENGINE **1606**

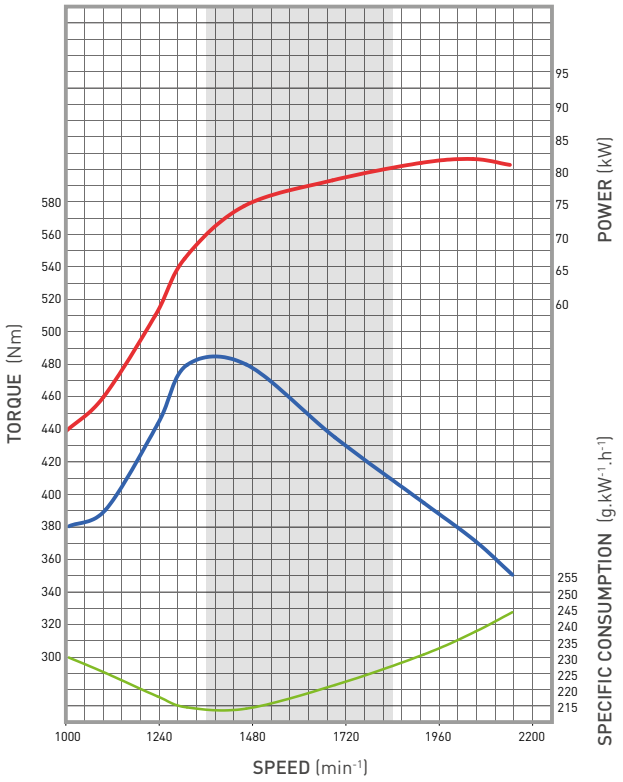


# ENGINE CHARACTERISTICS

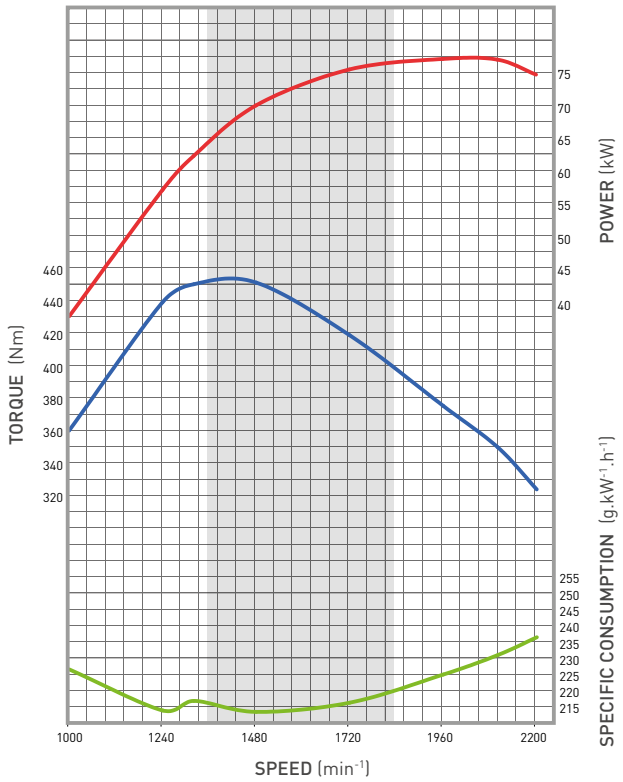
## ENGINE **1006**



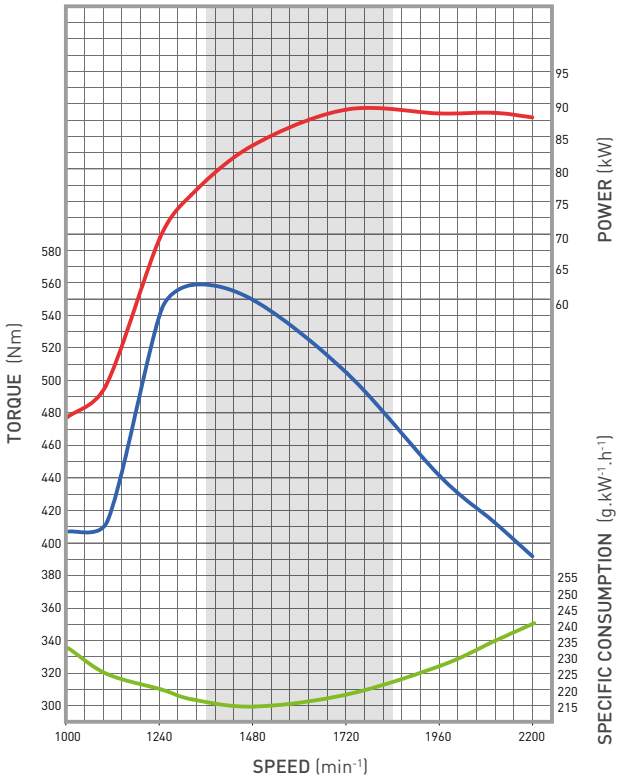

## ENGINE **1406**




## ENGINE **1306**




## ENGINE **1506**



# F FORTERRA GEARS

## BASIC TRANSMISSION

The basic four-speed synchronized transmission is shifted mechanically by a gear shift lever, on the head of which, there are control buttons for the three-stage torque multiplier.

The transmission is equipped with mechanical reverser (forward and reverse driving), a three-stage torque multiplier, four gears shifted by synchromesh clutches, and two reduction gears (road and field ranges).

**All gear sets of the transmission have helical gearings in constant mesh, which allows a higher load of gears and also it reduces the noise level of the transmission.**

## REVERSER

The reverser is synchronized, shifted mechanically by a reverser shift lever.

## REDUCTION TRANSMISSION

Reduction gears are also shifted mechanically by a lever.

## THREE-STAGE TORQUE MULTIPLIER

The three-stage torque multiplier is controlled electrohydraulically. The pressure in the electrohydraulic circuit is 18+3 bar.

The shifting of individual stages of the three-stage multiplier is controlled by two buttons on the head of the main gear shift lever. It is done without depressing the driving clutch pedal (under load).

**F HSX** As a standard, the three-stage torque multiplier is equipped with an automatic multiplier shifting system (to middle position).

## TORQUE MULTIPLIER PRESELECTOR SWITCH

The torque multiplier preselector switch is controlled by a button on the dashboard. The preselector switch position **ON** is indicated by the lit symbol on the switch.

If the preselector switch is on, the middle multiplier stage **M** is shifted automatically when the clutch pedal is depressed - one indicator lamp with a turtle symbol lights on the dashboard. When the clutch pedal is released, the multiplier can be controlled by the buttons on the gear shift lever.

## MULTIPLIER FUNCTION INDICATION

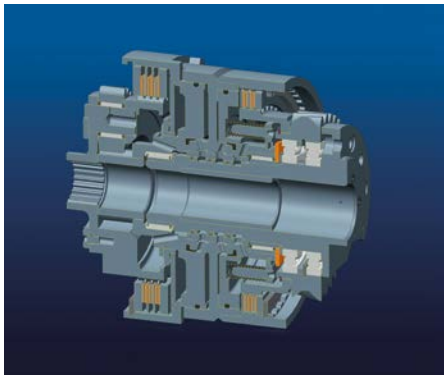
Individual shifted stages of the multiplier (**H, M, L**) are indicated by indicator lamps with turtle symbols on the dashboard.

- **H** – lamps off
- **M** – TURTLE I symbol on
- **L** – TURTLE I and TURTLE II symbol on

When the tractor engine is started or stopped, stage **H** is always shifted automatically.

## GEAR RATIOS OF THREE-STAGE TORQUE MULTIPLIER

- **H** – gear ratio 1.00 (the highest stage)
- **M** – gear ratio 1.16 (middle stage)
- **L** – gear ratio 1.34 (the lowest stage)



# SPEED CHART OF ZETOR **FORTERRA**

AT ENGINE SPEED 2 200 RPM AND REAR WHEEL DIMENSIONS (km·h$^{-1}$)

ROAD SPEEDS

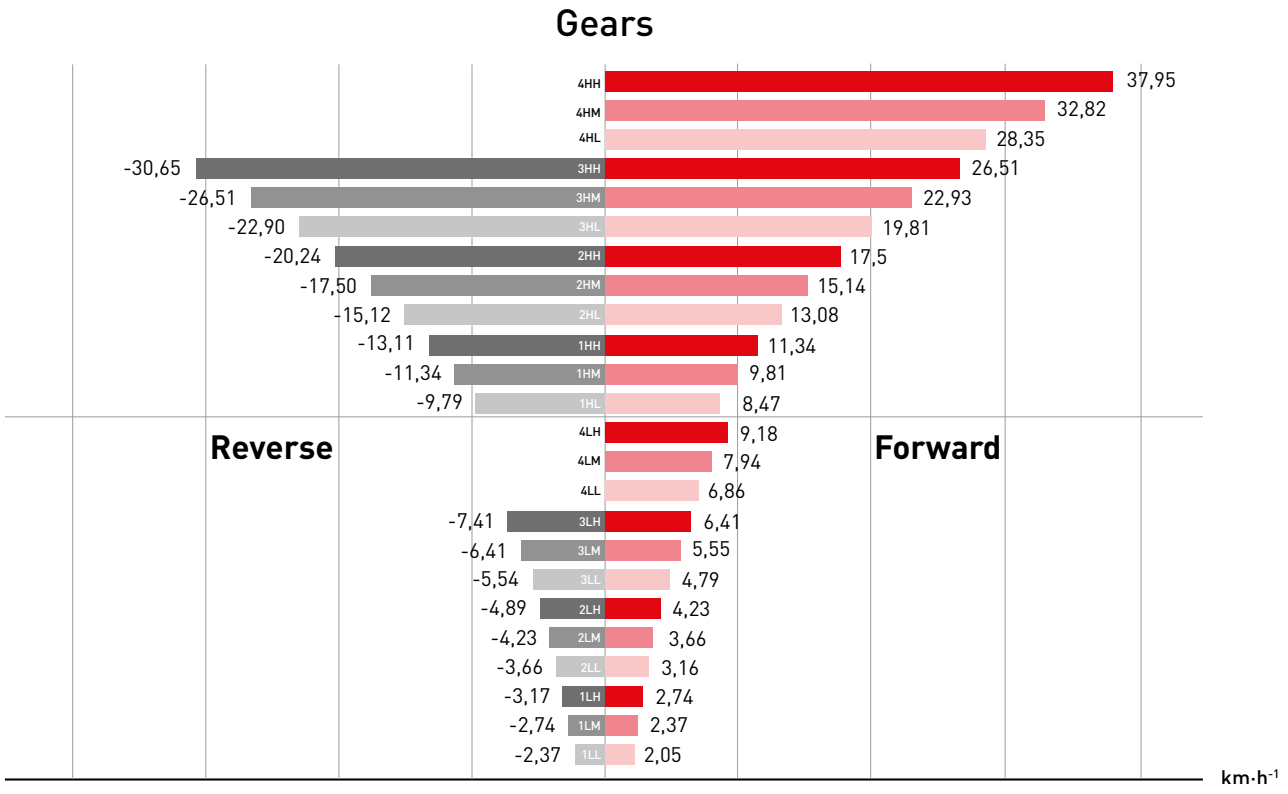
| | | FORWARD | | REVERSE | |
|---|---|---|---|---|---|
| speed gear | multiplier stage | 16,9 – 38 | 18,4 – 38 | 16,9 – 38 | 18,4 – 38 |
| 4 | H | 36,8 | 37,9 | | |
| | M | 31,8 | 32,8 | | |
| | L | 27,5 | 28,3 | | |
| 3 | H | 25,7 | 26,5 | 29,7 | 30,6 |
| | M | 22,2 | 22,9 | 25,7 | 26,5 |
| | L | 19,2 | 19,8 | 22,2 | 22,9 |
| 2 | H | 17,0 | 17,5 | 19,6 | 20,2 |
| | M | 14,7 | 15,1 | 17,0 | 17,5 |
| | L | 12,7 | 13,1 | 14,7 | 15,1 |
| 1 | H | 11,0 | 11,3 | 12,7 | 13,1 |
| | M | 9,5 | 9,8 | 11,0 | 11,3 |
| | L | 8,2 | 8,5 | 9,49 | 9,79 |

REDUCED SPEEDS

| | | FORWARD | | REVERSE | |
|---|---|---|---|---|---|
| speed gear | multiplier stage | 16,9 – 38 | 18,4 – 38 | 16,9 – 38 | 18,4 – 38 |
| 4 | H | 8,9 | 9,2 | | |
| | M | 7,7 | 7,9 | | |
| | L | 6,6 | 6,8 | | |
| 3 | H | 6,2 | 6,4 | 7,2 | 7,4 |
| | M | 5,4 | 5,5 | 6,2 | 6,4 |
| | L | 4,6 | 4,8 | 5,4 | 5,5 |
| 2 | H | 4,1 | 4,2 | 4,7 | 4,9 |
| | M | 3,5 | 3,6 | 4,1 | 4,2 |
| | L | 3,0 | 3,1 | 3,5 | 3,7 |
| 1 | H | 2,6 | 2,7 | 3,0 | 3,2 |
| | M | 2,3 | 2,4 | 2,6 | 2,7 |
| | L | 1,9 | 2,0 | 2,3 | 2,3 |

# DIAGRAM OF DRIVING SPEEDS OF ZETOR **FORTERRA**

AT ENGINE SPEED 2 200 RPM AND REAR WHEEL DIMENSIONS (km·h$^{-1}$)



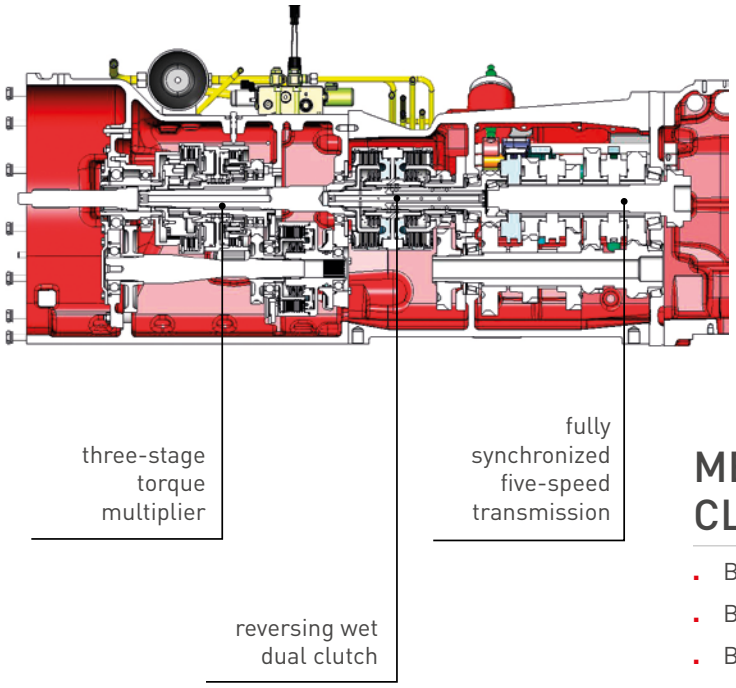
# F HSX FORTERRA HSX GEARS

## BASIC TRANSMISSION

The Forterra HSX tractors are equipped with a reversing five--speed fully synchronized transmission with a three-stage torque multiplier and a two-speed reduction transmission.

**All gear sets of the transmission have helical gearings in constant mesh, which allows a higher load of gears and also it reduces the noise level of the transmission.**

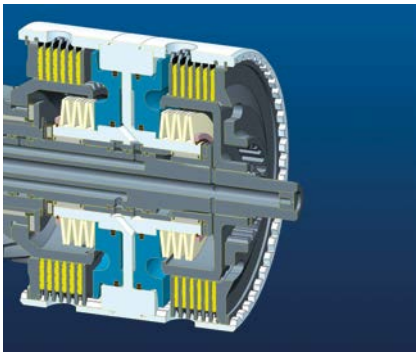
THE NUMBER OF SPEED GEARS IS
30 FORWARD AND 30 REVERSE




## REVERSING WET DUAL CLUTCH

The tractor is equipped with two independent driving clutches, one for forward driving and one for reverse driving.

The driving direction, and thus a particular driving clutch, is selected by moving the reversing lever under the steering wheel from the neutral position to the forward or reverse position. The driving clutches are controlled electrohydraulically.



## METHODS OF DRIVING CLUTCH CONTROL

- By reversing shift lever
- By clutch control button on gear shift lever head
- By clutch pedal

## ADVANTAGES

- designed for higher torques
  = larger diameter
- reinforced metal plates
  = larger heat dissipation ability
- overall more robust construction
  = larger heat dissipation ability
- inter-plate bellows springs
  = lower drag

⚠

The automatic start function is more sensitive to driving clutches than the driving clutch control by clutch pedal. Therefore, use the driving clutch with automatic start function for normal tractor operation when starting, shifting gears or changing the driving direction.

## Control of driving clutch by reversing shift lever

THIS CONTROL METHOD HAS AN AUTOMATIC START FUNCTION.

- When the reversing lever is moved to neutral, the driving clutch will be disengaged.
- When the reversing lever is moved to forward or reverse position, the driving clutch will engage and the tractor will start smoothly in the direction determined by the reversing lever.

**The driving clutch engagement speed and start smoothness are controlled by the electronic control unit based on the information saved during calibration and the operator cannot affect them.**

## Control of driving clutch by pedal

- When the clutch pedal is depressed, the driving clutch will be disengaged.
- When the clutch pedal is being released, the driving clutch will be engaged.

The driving clutch engagement speed depends on the clutch pedal release speed.

**The clutch pedal does not provide the automatic start function and the operator controls the start speed and smoothness.**

**For inching, for example when coupling implements or handling the tractor in tight spaces, use the clutch pedal.**

## WARNING

It is not allowed to control the tractor speed by partly depressing the clutch pedal at engine speed higher than 1 200 rpm.

Do not use the clutch pedal as a foot support – there is a risk of life reduction or a failure of driving clutches.

## Driving clutch control by button on gear shift lever head

THIS CONTROL METHOD HAS AN AUTOMATIC DRIVING CLUTCH ENGAGEMENT FUNCTION.

- When the clutch control button on the gear shift lever head is pressed, the driving clutch will be disengaged.
- When the red clutch control button on the gear shift lever head is released, the driving clutch will be engaged.

**The driving clutch engagement speed is controlled by the electronic control unit based on the information saved during calibration and the operator cannot affect it.**

## AUTOMATIC MULTIPLIER SHIFTING


The automatic multiplier shifting system is switched on by the multiplier preselector switch on the dashboard. If the multiplier preselector switch is on (the indicator lamp on the switch lights), the multiplier stages are shifted automatically without the driver's intervention depending on the engine speed according to the previously saved values.

The automatic multiplier shifting system does not depend on the engaged gear. If the multiplier preselector switch is on, the engine can be both stopped and started and the saved values (engine speed) are not changed.

The values for the automatic multiplier shifting are always loaded when the preselector switch is off, when the tractor travels at engine speed higher than 700 rpm, at the tractor driving speed higher than 2 $km \cdot h^{-1}$.

At the tractor travel, when the multiplier preselector switch on the dashboard is off, the automatic multiplier shifting system keeps loading the values (engine speed) every time the **H** or **L** button on the gear shift lever is used. When the multiplier preselector switch is on, the automatic multiplier shifting system will use the last loaded values (engine speed), i.e. the values loaded when the **H** and **L** buttons on the gear shift lever were used last with the multiplier preselector switch off.

If the engine speed is higher than 1 200 rpm when tractor is set in motion, the **L** stage of the multiplier is shifted automatically and regardless of whether the multiplier preselector switch on the dashboard is on or off.

If the multiplier preselector switch on the dashboard is on at the tractor start, the L stage of the multiplier is shifted automatically and independently of the engine speed (i.e. even if the engine speed is higher than 1 200 rpm).

## THREE-STAGE TORQUE MULTIPLIER

The three-stage torque multiplier is controlled electrohydraulically. The pressure in the electrohydraulic circuit is 18+3 bar.

The shifting of individual stages of the three-stage multiplier is controlled by two buttons on the head of the main gear shift lever. It is done without depressing the driving clutch pedal (under load).

The three-stage torque multiplier is equipped with an automatic multiplier shifting system depending on tractor load.

### EXAMPLE OF USE

You are driving the tractor with the multiplier preselector switch off and with the multiplier shifted on stage **M** at the engine speed of 1 600 rpm, press the **L** button on the gear shift lever to shift the torque multiplier to stage **L**; now increase the engine speed to 1 900 rpm and press the **H** button on the gear shift lever to shift the torque multiplier back to stage **M**. Continue driving the tractor. Now switch on the multiplier preselector switch on the dashboard. From now on, the automatic multiplier shifting system shifts, without an intervention by the driver, the torque multiplier stages as follows:

**A**

When the engine speed drops below 1 600 rpm, the multiplier shifts automatically to the lower stage (travelling speed reduction)

**B**

When the engine speed rises above 1 900 rpm, the multiplier shifts automatically to the higher stage (travelling speed increase)

# SPEED CHART OF ZETOR **FORTERRA HSX**

AT ENGINE SPEED 2 200 RPM AND REAR WHEEL DIMENSIONS (km·h$^{-1}$)

ROAD SPEEDS

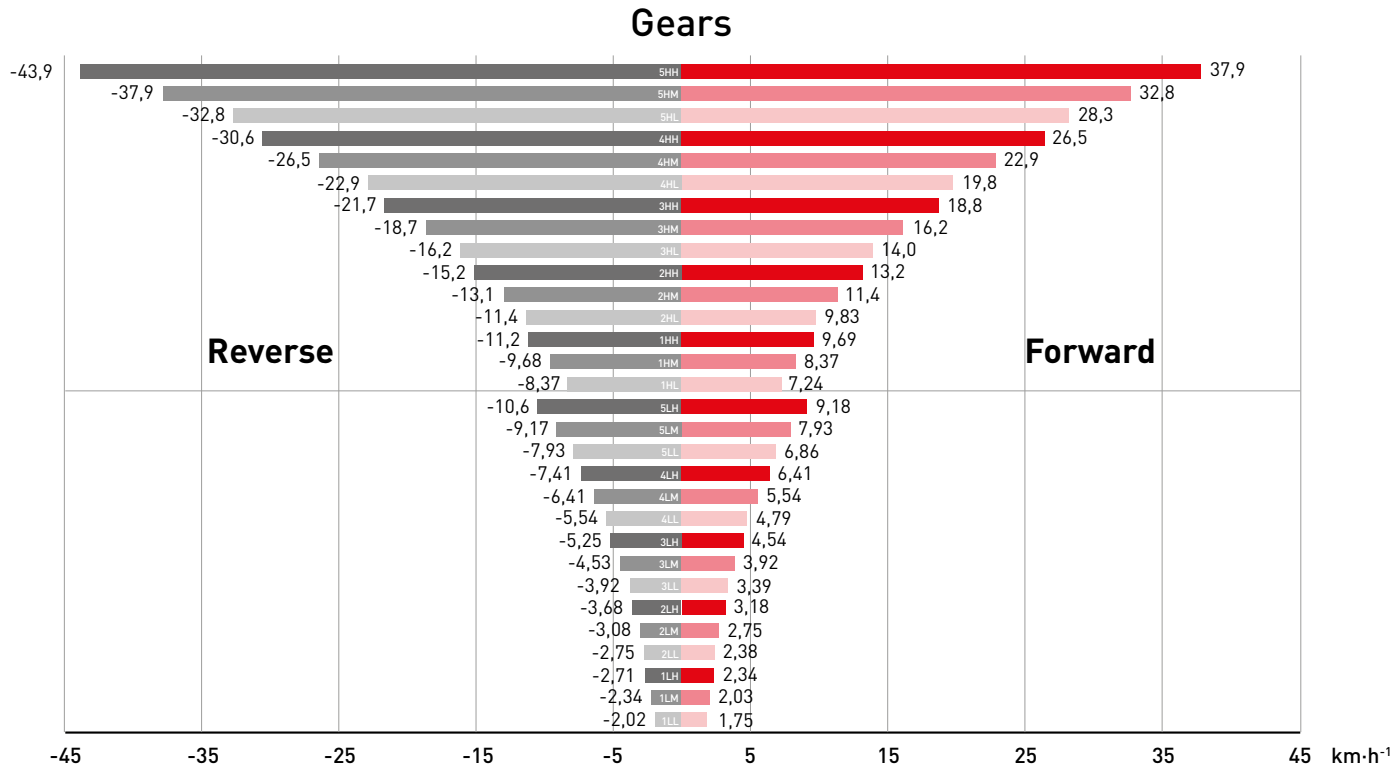
| | | FORWARD | | REVERSE | |
|---|---|---|---|---|---|
| speed multiplier | multiplier stage | 16,9 – 38 | 18,4 – 38 | 16,9 – 38 | 18,4 – 38 |
| 5 | H | 36,8 | 37,9 | 42,5 | 43,9 |
| | M | 31,8 | 32,8 | 36,8 | 37,9 |
| | L | 27,5 | 28,3 | 31,8 | 32,8 |
| 4 | H | 25,7 | 26,5 | 29,7 | 30,6 |
| | M | 22,2 | 22,9 | 25,7 | 26,5 |
| | L | 19,2 | 19,8 | 22,2 | 22,9 |
| 3 | H | 17,0 | 17,5 | 19,6 | 20,2 |
| | M | 14,7 | 15,1 | 16,9 | 17,5 |
| | L | 12,7 | 13,1 | 14,7 | 15,1 |
| 2 | H | 11,8 | 12,2 | 13,7 | 14,1 |
| | M | 10,2 | 10,6 | 11,8 | 12,2 |
| | L | 8,85 | 9,13 | 10,2 | 10,6 |
| 1 | H | 8,66 | 8,93 | 10,0 | 10,3 |
| | M | 7,48 | 7,72 | 8,65 | 8,92 |
| | L | 6,47 | 6,67 | 7,48 | 7,71 |

REDUCED SPEEDS

| | | FORWARD | | REVERSE | |
|---|---|---|---|---|---|
| speed multiplier | multiplier stage | 16,9 – 38 | 18,4 – 38 | 16,9 – 38 | 18,4 – 38 |
| 5 | H | 8,9 | 9,2 | 10,3 | 10,6 |
| | M | 7,7 | 7,9 | 8,9 | 9,2 |
| | L | 6,7 | 6,9 | 7,7 | 7,9 |
| 4 | H | 6,2 | 6,4 | 7,2 | 7,4 |
| | M | 5,4 | 5,5 | 6,2 | 6,4 |
| | L | 4,6 | 4,8 | 5,4 | 5,5 |
| 3 | H | 4,1 | 4,2 | 4,7 | 4,9 |
| | M | 3,5 | 3,6 | 4,1 | 4,2 |
| | L | 3,0 | 3,2 | 3,5 | 3,7 |
| 2 | H | 2,9 | 3,0 | 3,3 | 3,4 |
| | M | 2,5 | 2,5 | 2,8 | 2,9 |
| | L | 2,1 | 2,2 | 2,4 | 2,5 |
| 1 | H | 2,0 | 2,1 | 2,4 | 2,5 |
| | M | 1,8 | 1,9 | 2,0 | 2,1 |
| | L | 1,6 | 1,6 | 1,8 | 1,9 |

# DIAGRAM OF DRIVING SPEEDS OF ZETOR **FORTERRA HSX**

AT ENGINE SPEED 2 200 RPM AND REAR WHEEL DIMENSIONS (km·h$^{-1}$)




# ADVANTAGES

- a higher number of usable gears for speeds 6 – 12 km·h$^{-1}$ at plowing, fertilizing, mowing, pre-sowing preparation, and sowing
- a higher number of usable gears in the full range of transport speed
- more comfortable and productive work with a front-end loader

# F F HSX FRONT DRIVEN AXLE

THE FRONT DRIVEN AXLE CARRARO IS SWINGING AROUND CENTER PIN

**It is equipped with an automatic LIMITED SLIP LOCK.**

## NEW . The 2013 tractor models use a new front driven axle with drive in the center pin axis and a new front axle drive clutch system.

The front driven axle is engaged by pressing the button on the dashboard.

When tractor is parked (engine stopped, switch key off) the front driven axle is disengaged.

## NEW . New FWD clutch design

**The original front driven axle engagement system was with a jaw clutch. Now it has been replaced with a wet disc clutch (nine-plate clutch) controlled electrohydraulically. Engagement is smoother producing less stress to the axle driveline. Also reliability and life have been increased.**

## Front driven axle engagement/disengagement

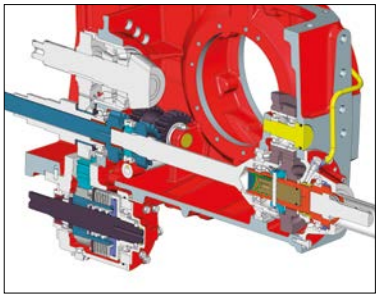
! **Pressing and holding the button (ca. 3 sec) = continuous engagement of front driven axle for the entire period of tractor travel. By bringing the tractor to a stop, the front driven axle is disengaged automatically.**

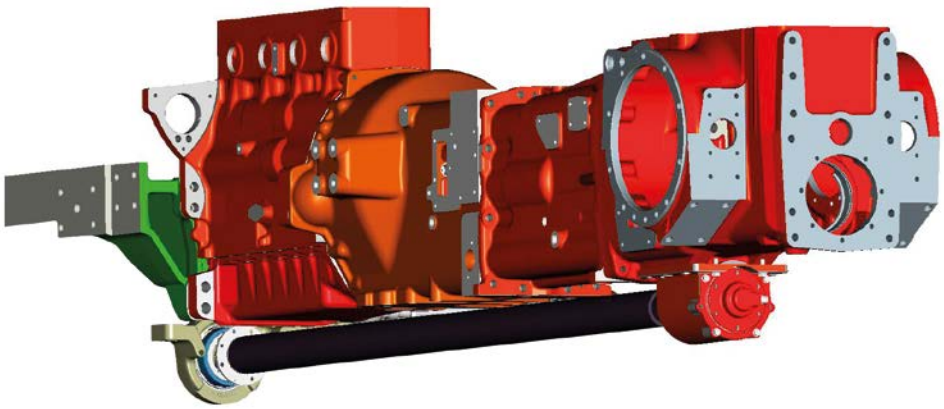
**Pressing = the automatic system acts as follows:**

F HSX When the driving speed of 15 km·h$^{-1}$ is exceeded, the front driven axle drive is disengaged automatically. The automatic disengagement of the drive is indicated by the blinking indicator lamp in the switch. When the blinking indicator lamp goes out, the front axle drive is disengaged automatically.

When the driving speed drops below 15 km·h$^{-1}$, the front driven axle drive can be engaged by pressing the button again.

At speeds higher than 15 km·h$^{-1}$, the front driven axle drive can be engaged by long pressing the blinking button again.





## MAX. ADMISSIBLE LOADS OF FRONT AXLE CARRARO 20.19 (kg)

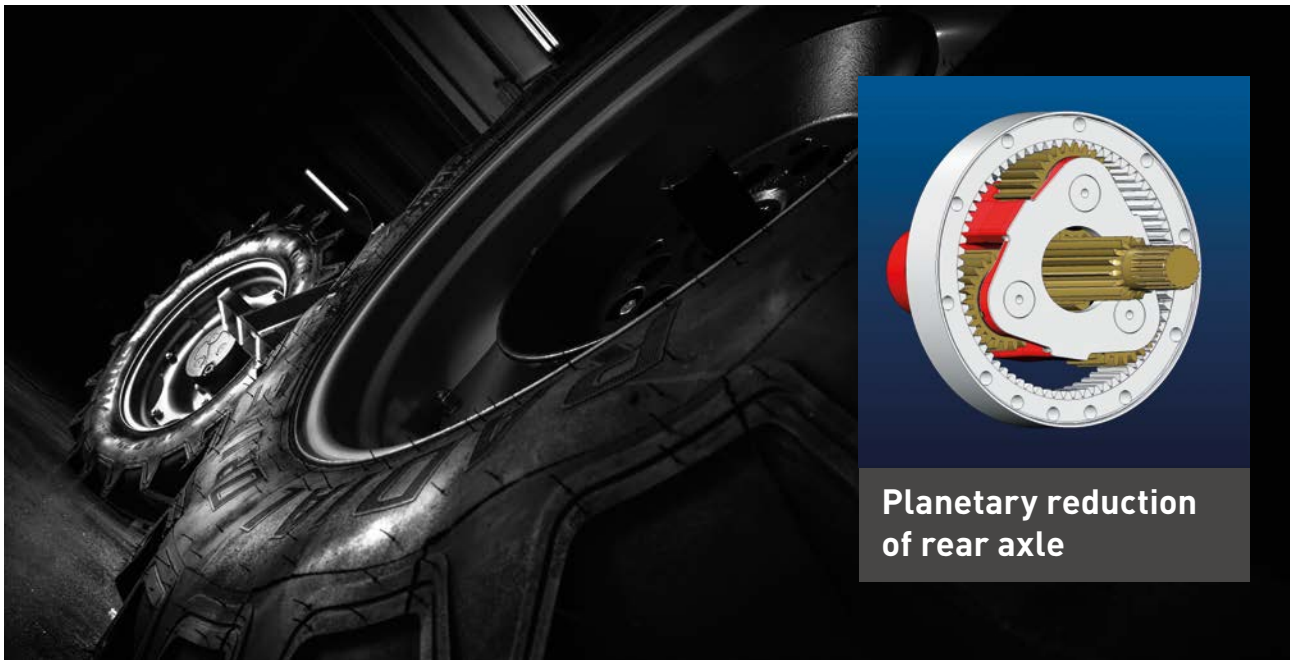
| | Wheel track (mm) | | | | |
|---|---|---|---|---|---|
| Driving speed (km.h$^{-1}$) | 1 590 – 1 655 | 1 730 – 1 740 | 1 800 – 1 880 | 1 890 – 1 955 | 2 030 – 2 040 |
| 8 | 5 600 | 5 100 | 4 400 | 4 100 | 3 800 |
| 20 | 4 300 | 3 900 | 3 380 | 3 150 | 2 900 |
| 30 | 4 300 | 3 900 | 3 380 | 3 150 | 2 900 |
| 40 | 4 300 | 3 900 | 3 380 | 3 150 | 2 900 |

Load limits listed are for the axle, not tires.

# REAR AXLE

F F HSX The rear axle is fixed with planetary reducers in semi-axles, and a differential lock controlled electropneumatically by the button on the dashboard.

F HSX **When brake pedals are depressed or at a driving speed higher than 15 km·h$^{-1}$, the differential lock is automatically disengaged.**




## MAX. ADMISSIBLE LOADS OF REAR AXLE (kg)

| | Wheel track (mm) | | | | |
|---|---|---|---|---|---|
| Driving speed (km.h$^{-1}$) | 1 500 | 1 575 | 1 650 | 1 725 | 1 800 |
| 8 | 7 500 | 7 500 | 7 300 | 6 800 | 6 500 |
| 20 | 6 000 | 6 000 | 5 900 | 5 500 | 5 150 |
| 30 | 6 000 | 6 000 | 5 900 | 5 500 | 5 150 |
| 40 | 5 500 | 5 500 | 5 500 | 5 500 | 5 150 |

Load limits listed are for the axle, not tires.

# REAR POWER TAKE OFF – PTO

The rear power takeoff is in the version with independent speed, which means that the number of revolutions of the rear power takeoff is dependent on the engine speed. The tractor is equipped with combinations of rear power takeoff speeds 540/540E/1 000/1 000E.

The rear power takeoff is equipped with a 6- or 21-spline removable power takeoff end piece.

The tractor is equipped with a wet PTO clutch controlled electrohydraulically by the switch on the right hand column of the cab, which switches the PTO.

! **Forterra is equipped with five-plate PTO clutch. Forterra HSX is eight-plate PTO clutch.**

FOUR-SPEEDS PTO VERSION IS NOT EQUIPPED WITH GROUND SPEED PTO.

OPTIONAL . DURING 2013, OPTIONAL TWO-SPEED PTO WITH GROUND SPEED WILL BE INTRODUCED.

# SPEED SHIFTING OF REAR PTO

- By the lever in the right hand corner of the cab, select the standard or economic mode of the rear power takeoff speed.
- By the switch on the right hand column of the cab, select the PTO speed of the rear power takeoff.

If the mode selector lever is in the **standard speed** position, it is possible to select speed 540 or 1 000; if the mode selector lever is in the **economic speed** position, it is possible to select speed 540E or 1 000E.

THE OPERATION OF COUPLED IMPLEMENTS AT THE OPTIMUM MODE OF ENGINE HAS A GREAT INFLUENCE ON FUEL CONSUMPTION. STARTS AT LOWER ENGINE SPEEDS WILL ALSO AFFECT THE LIFE OF THE DRIVING CLUTCH.

# INDEPENDENT REAR PTO SPEEDS

| PTO SPEED | SHAFT/ENGINE SPEED | |
|---|---|---|
| 540 | 540/1 913 | 621/2 200 |
| 540E | 540/1 595 | 745/2 200 |
| 1 000 | 1 000/1 950 | 1 128/2 200 |
| 1 000E | 1 000/1 626 | 1 353/2 200 |

# REAR PTO POWER

POWER ON POWER TAKEOFF (KW±2%) AT ENGINE RATED SPEED AND SHIFTED SPEED 1 000 RPM OF POWER TAKEOFF

| | 100 | 110 | 120 | 130 | 140 |
|---|---|---|---|---|---|
| FORTERRA | 58,5 | 63,5 | 71 | 78,6 | 84 |
| FORTERRA HSX | 59 | 67 | 74 | 82 | 87 |

F HSX The tractor is equipped with a wet eight-disc PTO clutch controlled electrohydraulically by the switch on the right hand column of the cab.

# AUTOMATIC DISENGAGEMENT OF PTO

F HSX The automatic PTO clutch disengagement function means that after lifting the arms of the rear three-point hitch, the rear power takeoff clutch will be disengaged automatically and the PTO will stop; when the arms of the rear three-point hitch are then lowered, the rear power takeoff clutch will be engaged automatically and the shaft will start rotating provided that the driving direction is shifted by the reversing lever and the tractor has a minimum driving speed of 0,3 km·h$^{-1}$.

F F HSX IF THE PTO SWITCH IS ON AND THE PTO END PIECE IS NOT ROTATING, THE PTO INDICATOR LAMP BLINKS (1 HZ).

THE POSITION OF THE REAR THREE-POINT HITCH ARMS AT WHICH THE PTO CLUTCH WILL DISENGAGE AND ENGAGE CAN BE SET BY USER USING THE DISPLAY ON THE DASHBOARD.

This function can be used when turning the tractor with a coupled implement driven by the rear PTO.

# PRESELECTION OF THE REAR PTO STARTUP MODE

F HSX The three-position switch on the right hand column of the cab enables you to select three starting modes of the rear PTO clutch. These modes differ from one another by the length of delay between switching on the rear power takeoff switch and full engagement of the rear PTO clutch.


3 **(the upper part of switch is fully pressed)** this stage has the longest starting time of the rear power takeoff (PTO). Use this mode for starting light implements with a low power takeoff coupled to the rear power takeoff (PTO) such as hay turners or rakes.

2 **(switch in middle position)** this stage has the middle starting time of the rear power takeoff (PTO).

Use this mode for starting light implements with a medium power takeoff coupled to the rear power takeoff (PTO) such as disc mowers.

1 **(the lower part of switch is fully pressed)** this stage has the shortest starting time of the rear power takeoff (PTO). Use this mode for starting heavy implements with a high power takeoff coupled to the rear power takeoff.

# PTO SPEED DISPLAY

F Press the button marked with an arrow to display the power takeoff symbol in the left side of the display and the selected PTO speed in the right side of the display.

Gradually press the button to display the power takeoff number of revolutions for individual stages of the power takeoff speed.

**The numbers of presses will display:**

- **1x** – 1 000 rpm
- **2x** – 540 rpm
- **3x** – 540E rpm
- **4x** – 1 000E rpm


THE BUTTON ONLY SERVES FOR DISPLAYING DATA

F HSX The speed of the rear PTO is shown on the dashboard display.

## EASY IMPLEMENT SHAFT CONNECTION

SWITCHING ON THE PTO FROM THE FENDER IS ONLY POSSIBLE WHEN THE TRACTOR IS NOT MOVING.

The button located on rear fenders can be used to facilitate coupling of the implement drive shaft to the tractor's rear PTO.

With the engine running, the rear PTO switched off, the shift lever of independent and ground speed PTO in the independent speed position, the rear power takeoff will start rotating when the button is pressed. When the button is released, the power takeoff will stop rotating.

## FRONT POWER TAKEOFF

The front power takeoff is controlled electrohydraulically by the switch on the right hand column of the cab.

The speed of the front power takeoff is shown on the dashboard display.

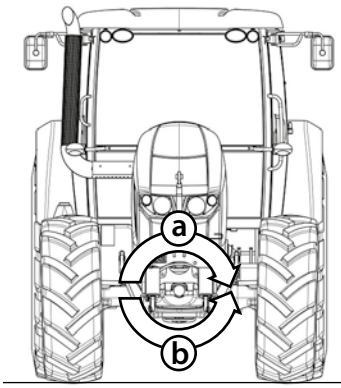
The transmitted power of the front power takeoff is limited to 60 kW.

The front power takeoff is equipped with a fixed 6- or 21-spline end piece and is in the version of only 1 000 rpm.

## THE TRACTOR CAN BE EQUIPPED WITH THE FRONT POWER TAKEOFF WITH DIFFERENT DIRECTIONS OF ROTATION:

**This means that there are four types of front power takeoff depending on the direction of rotation and the end piece used:**

- **a** – with a 6-spline end piece
- **a** – with a 21-spline end piece
- **b** – with a 6-spline end piece
- **b** – with a 21-spline end piece




### ADVANTAGES

- higher comfort
- higher productivity
- higher work safety

- **a** – clockwise rotation
- **b** – counter-clockwise rotation

| DIRECTION OF ROTATION | POWER TAKEOFF/ENGINE SPEED | |
|---|---|---|
| CW | 1 000 / 1 920 | 1 146 / 2 200 |
| CCW | 1 000 / 2 000 | 1 100 / 2 200 |

# F F HSX HYDRAULIC SYSTEM

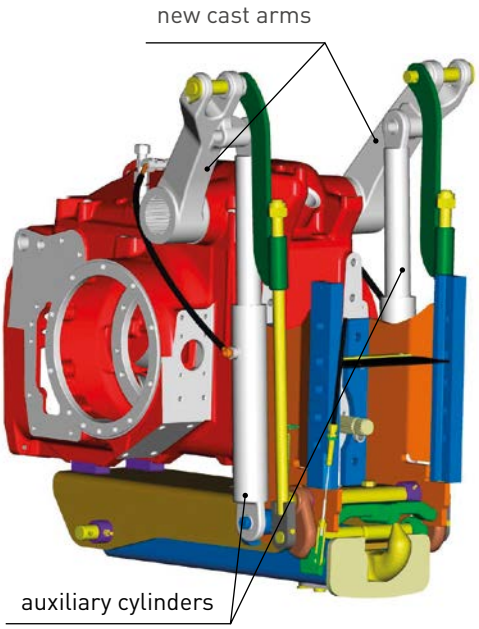
## REMOTE HYDRAULIC OUTLETS

**Supplie pressure oil for hydraulic appliances connected to the remote outlets of the hydraulic system.**

## INTERNAL HYDRAULIC CIRCUIT

**Serves for controlling the rear three-point hitch.**

The internal hydraulic circuit is controlled electrohydraulically by **electrohydraulic system Bosch**.



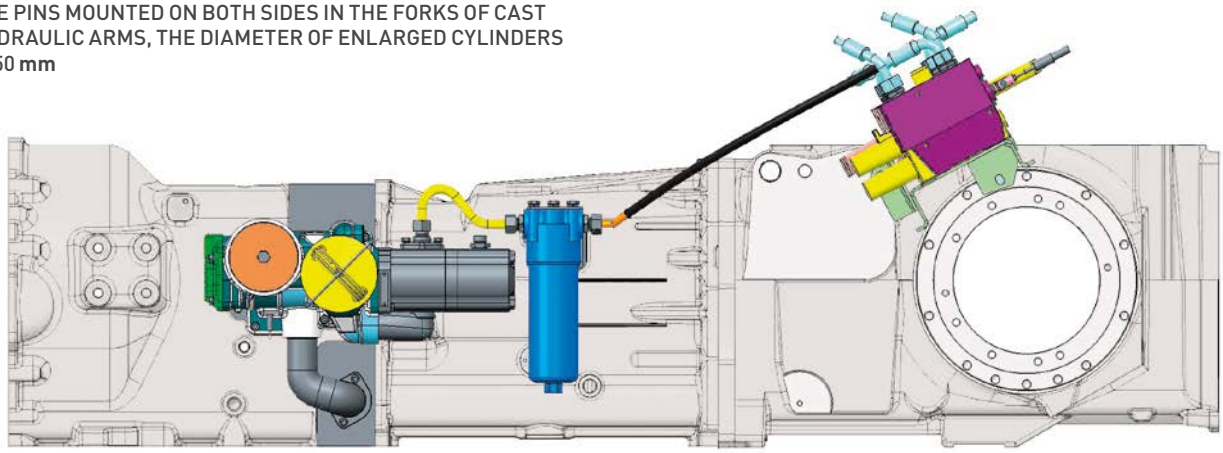

## HYDRAULIC SYSTEM SPECIFICATIONS

| | |
|---|---|
| type | electrohydraulic system Bosch with HitchTronic |
| three-point hitch | cat. II, (cat. III N optional) |
| control | electrohydraulic |
| working pressure (MPa) | 20 |
| hydroelectric pump capacity (L) | 70 |
| remote outlets | 6+1 or 4+1 quick couplers (optional drip system) |

### Brief description of the system

The hydraulic pump supplies oil to the electrohydraulic distributor of the hydraulic system which controls the individual cylinders of the lifting arms of hydraulics. The main actuating cylinder is internal, located under the hydraulics cover, and two auxiliary cylinders are external, connected to the hydraulic arms. The arms are connected with the lower links of the three-point hitch in which an implement is coupled and it is lifted, lowered or held in certain position in relation to the tractor position. The electronic control unit receives signals electrically from dynamometric pins located on the lower links of the rear three-point hitch and they are compared to the required value set on the control panel. The final control deviation is produced by comparing the required and actual values and it is transmitted to the electrohydraulic distributor. This is switched using two proportional electromagnets. Lifting and lowering are independent of the load.

THE PINS MOUNTED ON BOTH SIDES IN THE FORKS OF CAST HYDRAULIC ARMS, THE DIAMETER OF ENLARGED CYLINDERS IS 50 mm



## AUTOMATIC CONTROL OF REAR THREE-POINT HITCH HITCHTRONIC

The Bosch electrohydraulic system is newly equipped with the HitchTronic function, which is a unique system of automatic control of the rear three-point hitch.

When using this system, it is not necessary to set the types of control and their mixing. Only the working depth of an implement is to be set. When the implement coupled in the rear three-point hitch reaches the set depth, the control system will measure the resistance of soil and this value is used as default for the automatic control of the rear three-point hitch.

# OVERALL ADVANTAGES OF HYDRAULIC SYSTEM

- the possibility of using heavier implements owing to a higher lifting capacity of the hydraulic system

| | |
|---|---|
| F | 7 000 kg |
| F HSX | 8 500 kg |

- higher productivity when using the HitchTronic automatic control of three-point hitch


## HITCHTRONIC WAS AWARDED WITH A GOLD MEDAL AT AGROTECH 2012 KIELCE IN POLAND


## ADVANTAGES

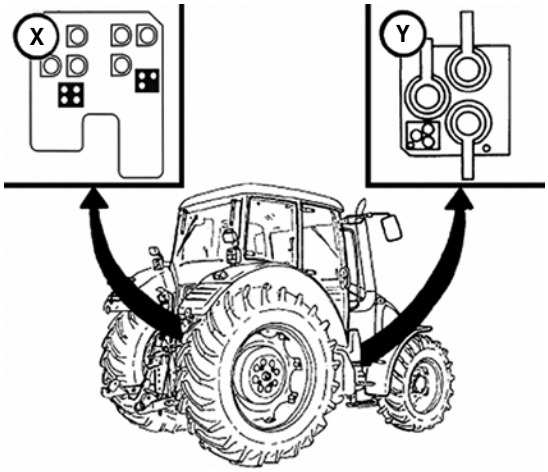
- HitchTronic facilitates setting EHR and makes tractor driver's work easier by optimally adjusting mixed control depending on the current conditions
- HitchTronic offers a wider possibilities of work result optimization in relation to the tractor power, coupled implements and soil quality
- HitchTronic increases labor productivity and reduces fuel consumption per worked area unit by ca. 5–7%.

# REMOTE OUTLETS

It supplies pressure oil for hydraulic appliances connected to the remote outlets of the hydraulic system terminated with quick couplers.

## The following can be installed on the tractor:

- **A – three-section distributor**
  – three pairs of quick couplers
- **B – two-section distributor**
  – two pairs of quick couplers




The quick couplers are located on the rear panel (X); optionally, one pair of quick couplers can be on the panel in front of the tractor cab (Y). The front panel version (Y) is only possible when the three-section distributor is installed.


Optionally, it is possible to install a drip containment system on the quick couplers for collecting residual oil.

In the tractor version not equipped with the front outlets or front three-point hitch and equipped with:

- **C – three-section distributor**, the rear outlets use quick couplers **1** to **6**
- **D – two-section distributor**, the rear outlets use quick couplers **1** to **4**

The quick coupler designated (0) is connected directly to the transmission housing and is designed for return oil from external hydraulic appliances (mainly rotary hydraulic motors).


The control levers of sections are located in the cab on the right fender.

The first (right) distributor section is provided with detent in pressure positions with hydraulic protection (kick-out).

In two-section and three-section distributors it is the section controlling quick couplers **1** and **2**.

In addition, outlets **4** in the two-section and **4** and **6** in the three-section distributor, are provided with check valves - to be used for connecting an implement with high tightness demand

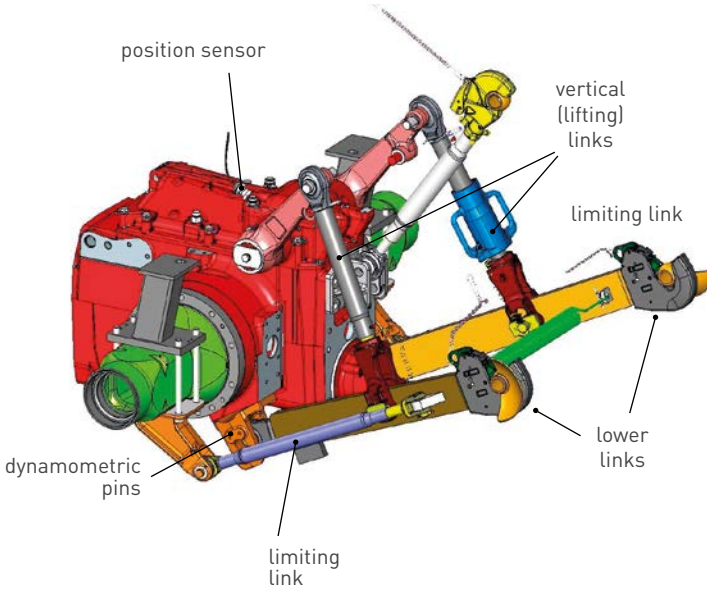
– minimal lowering of the implement, for example during transport.

If the tractor is equipped with a front three-point hitch, the F|3|4|N lever is used to control it. The quick couplers must not be coupled while the front three-point hitch is in use, because they are pressurized together with the front three-point hitch!

After finishing work with the front three-point hitch, to further use the section with quick couplers **3** and **4** with coupling the front three-point hitch, it is necessary to lift the arms of the front three-point hitch to transport position and to move the cock lever of the front three-point hitch to the "closed" position.

# REAR THREE-POINT HITCH

It serves for the coupling of mounted or semi-mounted farm machines and implements with hitch points of category II or III N (optional) according to ISO.




| ISO CATEGORY | 2 | III N |
|---|---|---|
| 1 Hitch axis length [mm] | 870 | |
| ∅ of holes of coupling balls in lower links acc. to ISO (mm) | 28 | 37 |
| ∅ of hole of upper link (mm) | 25 | 32 |
| Maximum lifting capacity guaranteed in full lift range (kN) | 80 | |

Balls of categories 2 and 3 are supplied to rear three-point hitches of category III N.

The vertical links of the rear three-point hitch connect the hydraulic arms and lower links of the rear three-point hitch.

They are adjustable in length and can be set to a fixed or floating position.

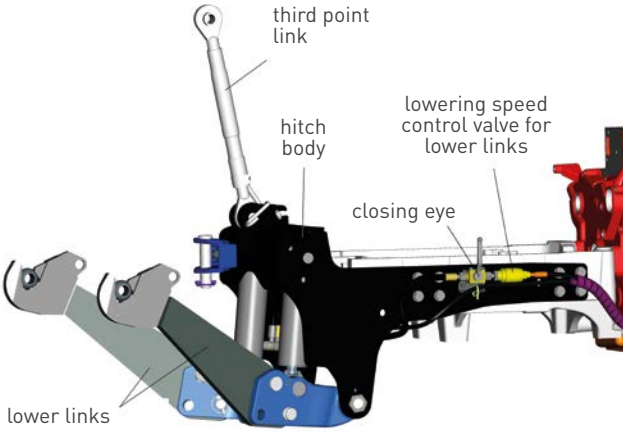
The floating position allows free coupling of the tractor and an implement. In this case, both link ends can move freely in height one against the other.

### The lower links of the rear three-point hitch are offered in three versions:

- **A** – telescopic lower link ends, cat. II
- **B** – links with hooks and balls, cat. II
- **C** – links with hooks and balls, cat. II and cat. III N

# FRONT THREE-POINT HITCH

The front three-point hitch is designed for the coupling of front mounted farm machines and implements according to ISO 8759-2.




| | |
|---|---|
| lifting capacity at lower link ends of front three-point hitch | 35 kN |

The front three-point hitch is provided with two single-acting hydraulic cylinders supplied from the hydraulic system distributor.

The front three-point hitch is equipped with adjustable lowering speed and with hydraulic lock controlled by the lever on the left side of the front three-point hitch.

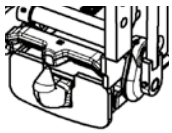
# TRAILER AND SEMI-TRAILER HITCHES

## SINGLE-AXLE TRAILER HITCH

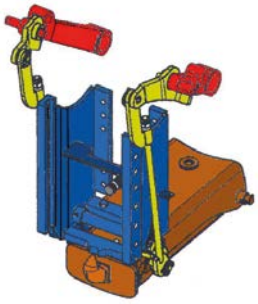
It serves for the coupling of both heavy and light single-axle trailers.

The single-axle trailer hitch is hinged, controlled by a lever inside of the cab. The tractor hydraulic system is used for lifting the hitch.

The single-axle trailer hitch can be equipped with a hook or link provided with the tractor.

| HITCH TYPE | PERMISSIBLE VERTICAL STATIC LOAD | ∅ OF PIN (HOOK) OF HITCH |
|---|---|---|
|  | 3 000 kg | 47 mm |
|  | 1 200 kg | 31 mm |

## HITCH VERSION TYPES



- **Version A**

  with bracket for trailer hitches

- **Version B**

  (for HSX only)

  without bracket for trailer hitches

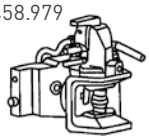
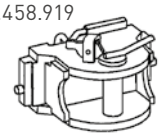
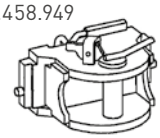
  This version does not allow using trailer hitches.

## TRAILER HITCH

It serves for the coupling of two-axle or light single-axle trailers. The hitch coupler is height adjustable without using a tool. When working with various farm machines it is necessary to height adjust the hitch as necessary, or to dismantle it.

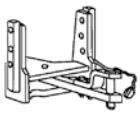
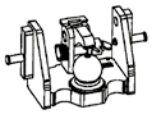
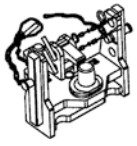
If the tractor is not equipped with a single-axle trailer hitch with a bracket for trailer hitches, it can be equipped with a bracket for trailer hitches.

If the tractor is equipped with a single-axle trailer hitch or a bracket for trailer hitches, it can be equipped with several types of hitch couplers.

| HITCH TYPE | PERMISSIBLE VERTICAL STATIC LOAD | ∅ OF HITCH PIN (HOOK) |
|---|---|---|
| 54.458.969  | 2 000 kg | 31 mm |
| 54.458.979  | 2 000 kg | 38 mm (31 mm) |
| 15.458.919  | 2 000 kg | 43 mm |
| 15.458.949  | 2 000 kg | 50 mm |

## MODULAR BRACKETS

If the tractor is equipped with bracket for trailer hitches, then it can be equipped with several types of modular brackets.

| HITCH TYPE | MODULE | PERMISSIBLE VERTICAL STATIC LOAD | ∅ OF HITCH PIN (HOOK) |
|---|---|---|---|
|  | module of swinging link bracket + swinging link | 736 kg | 31 mm |
|  | module of bracket with ball ∅ 80 mm | 2 000 kg | 80 mm |
|  | module of swinging link bracket with fixed pin (piton fix) + swinging | 2 000 kg + 736 kg | 44,5 mm + 31 mm |

## DRAWBAR

The lower arms of the three-point hitch can be provided with a drawbar.

# F F HSX CAB

## THREE CAB VERSIONS ARE INSTALLED ON THE TRACTORS ACCORDING TO EQUIPMENT LEVEL BASIC, CLASSIC AND LUX.

**All cab versions are provided with smoked glass.**

## NEW . CAB SPRINGING

Optionally, the cab can be provided with shock absorption. Spring units are installed instead of rear rubber blocks.

## NEW. CAB ROOF

The cabs of the 2013 tractor models are equipped with new cab roofs. In the front side of the roof, there is a new transparent hatch, which opening hatch, which facilitates work with front loaders.


| EQUIPMENT | BASIC | CLASIC | LUX |
|---|---|---|---|
| hot water heating | • | | |
| hot water heating and air-conditioning | | • | • |
| heated rear window | | • | • |
| radio | | | • |
| driver's seat with mechanical suspension | • | • | |
| driver's seat with pneumatic suspension | | | • |
| heated rear-view mirrors | | • | • |
| installed car radio antenna | | • | • |

## AIR-CONDITIONING

The optional manual air-conditioning version has been updated.

## AIR FILTER

For working with sprays, standard filters can be replaced with charcoal filters.

## DRIVER'S SEAT

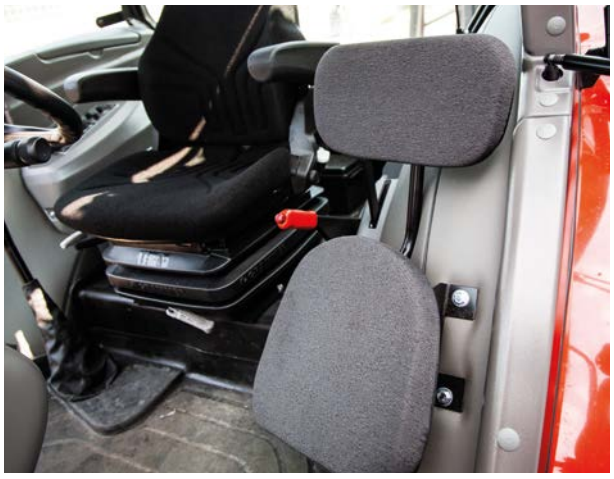
The driver's seat can be equipped with either a static or retractable seat belt.

**F HSX The seat is always equipped with a safety sensor.**

| EQUIPMENT | MECHANICAL SUSPENSION | PNEUMATIC SUSPENSION |
|---|---|---|
| seat suspension according to driver's weight | • | |
| horizontal seat adjustment | • | • |
| shock absorber | • | • |
| angular seat adjustment | • | • |
| foldable arm rest | • | • |
| pneumatic seat suspension | | • |

## INSTRUCTIONAL SEAT WITH SAFETY BELT

The cab can be equipped with an optional instructional tilting seat.



## HYDRAULIC FILTER RESTRICTION INDICATOR

The medium-pressure filter restriction indicator is another new feature of Forterra HSX. This function has its indicator lamp in the cluster. If the pressure drop of the system is detected as high, i.e. the filter is clogged, the indicator lamp indicates it without opening bypass, thus protecting the system and its components.

## LIGHTING

The tractor is equipped with a pair of main headlamps and a pair of worklights in the hood mask. Another pair of work lights is located under the cab roof at the front.

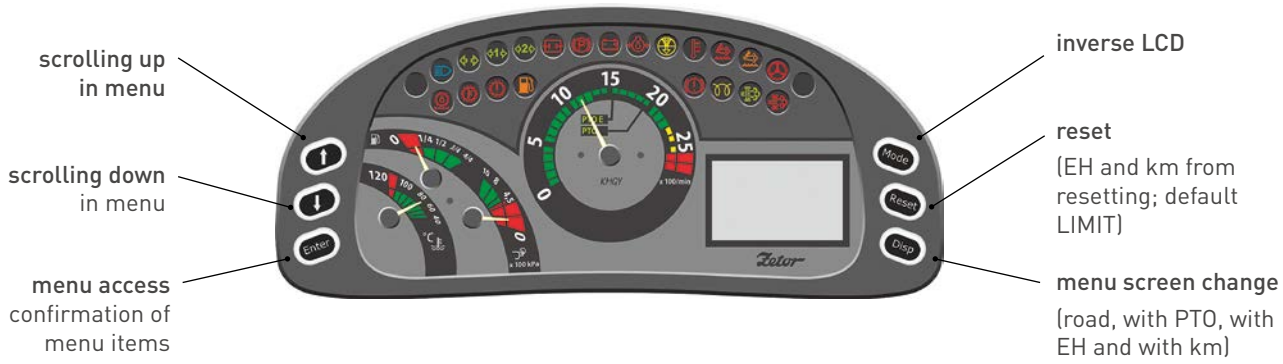
**The tractor can be additionally equipped with other working lights:**

- a pair of working lights located under the cab roof at the front
- a pair of working lights located under the cab roof at the back
- a pair of working lights located under the cab roof at the back and one working headlamp above the right tail lamp
- a pair of working lights located under the cab roof at the back and two working headlamps above the tail lamps
- a pair of working lights located under the cab roof at the back and one beacon
- a pair of working lights located under the cab roof at the back and two beacons
- a mutual combination of working lights according to the items above

**If legally allowed in a territory, the front work lights in the roof can be connected so they can be used together with front lights in the mask.**

# F HSX DASHBOARD

The tractor is equipped with a new dashboard with an information LCD display.




## DISPLAY DESCRIPTION

**The following values are displayed on the basic display:**

① shifted stage of the torque multiplier; depending on the shifted stage **L**, **M** or **H** is displayed

② switching-on of the torque multiplier selector switch

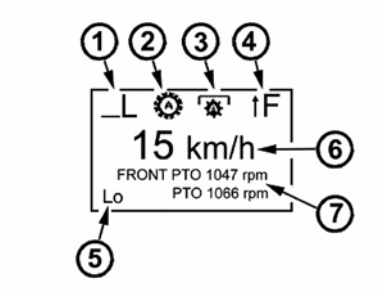
③ switching-on of the automatic function of rear power takeoff disengagement

④ gear shift, reversing lever position **F** forward, **N** neutral, **R** reverse

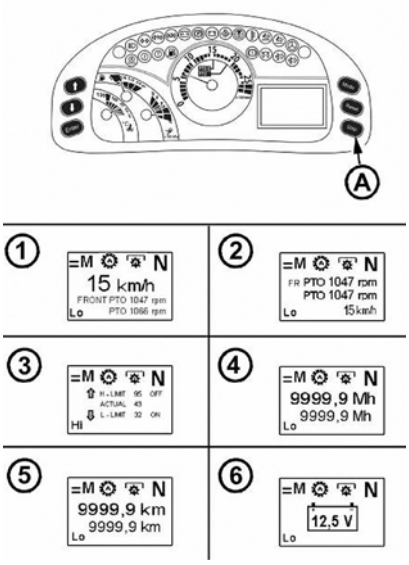
⑤ lever position of road and reduced speeds shifting, **Lo** reduced speeds, **Hi** neutral or road speeds

⑥ primary viewport

⑦ secondary viewport




Change in the display appearance from display (1) to display (2) can be made by pressing the button (A).




## DISPLAYS – CHANGE IN DISPLAYS

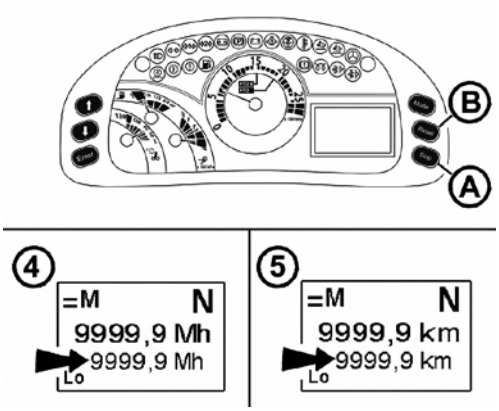
**By repeatedly pressing the button (A) it is possible to change displaying individual data:**

- **primary field** – tractor speed, secondary field - power takeoff speed, if engaged
- **primary field** – power takeoff speed, if engaged, **secondary field** – tractor speed in tenths (0.0 $km.h^{-1}$]
- automatic rear power takeoff disengagement, more in the chapter Rear Power Takeoff – page 20.
- **primary field** – total engine hours, **secondary field** - engine hours from the last data reset
- **primary field** – total kilometers covered, **secondary field** – kilometers covered from the last data reset
- battery voltage

## DISPLAY – DATA RESETTING

Resetting of data marked with an arrow can be done on displays (4) and (5).

Press the button (A) to select display (3) or (4) and by longer pressing of the button (B) reset the data marked with an arrow.




## DISPLAY – ERROR MESSAGES

**Major system errors (1)**

In the case of major errors, the display shows STOP and error number (1).

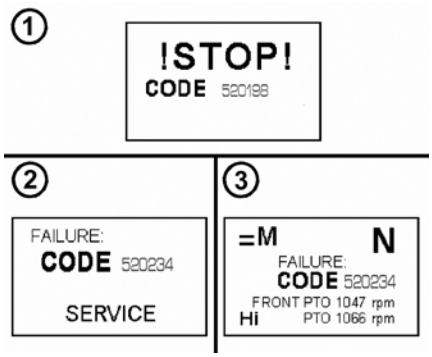
**If this situation occurs, shut down the tractor and contact the service shop.**

**Minor system errors (2) and (3)**

In the case of minor errors, the display shows the error number for a period of about five seconds.

Then the error display minimizes to the primary field (3).

**If this situation occurs, finish your work and contact the service shop**.




# SERVICE BRAKES

## FOR TRACTOR

The tractor is equipped with wet disc hydraulically controlled, two-pedal brakes with an automatic pressure equalizer acting on rear wheels.

Brakes also act on the front axle by automatic engagement of FWD clutch when the coupled brake pedals are depressed.

In the 2013 tractor models, the rear wheel brake power was increased by increasing the number of brake plates from four to five per wheel.

## FOR TRAILER

**The tractor can be equipped with:**

- Air single- and two-hose brakes for trailer. They are brought to the rear panel with three couplers. The black coupler serves for connecting air brakes of trailers with a single-hose brake system, the yellow and red couplers serve for connecting air brakes of trailers with a two-hose brake system.
- Hydraulic brakes of trailer. They are brought to the rear panel by a quick coupler. They are operated by pressure oil from the hydraulic pump.
- Combination of both systems.

## REAR DIFFERENTIAL LOCK

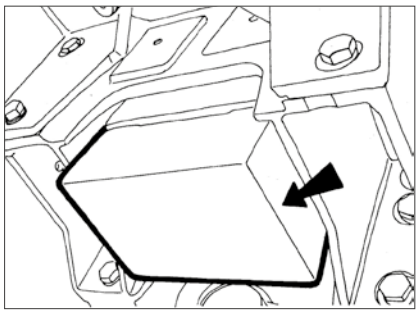
The rear differential lock is engaged by pressing the button which returns to initial position when released.

The differential lock engagement is indicated by the lit symbol on the button.

The rear differential lock is disengaged by pressing the button again.

# ADDITIONAL BALLAST WEIGHTS

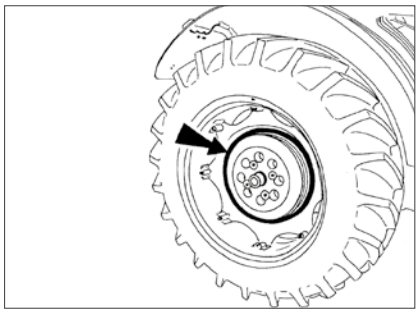
## LOWER BALLAST



Ballast weight 2 × 34 kg

If the tractor is not equipped with the front power take-off, it is installed into the frame tray casting cavity with screws.

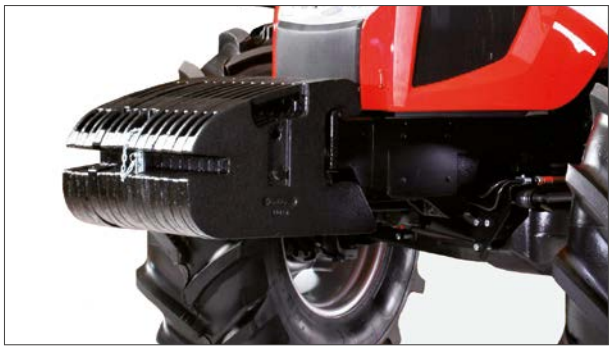
## REAR WHEEL BALLAST WEIGHTS



| | BALLAST COMBINATION | WEIGHT (kg) | |
|---|---|---|---|
| FORTERRA | 2 + 4 | 2 × 25 + 4 × 30 | 170 |
| | 2 + 6 | 2 × 25 + 6 × 30 | 230 |
| | 2 + 10 | 2 × 25 + 10 × 30 | 350 |

| | BALLAST COMBINATION | WEIGHT (kg) | |
|---|---|---|---|
| FORTERRA HSX | 2 + 6 | 2 × 25 + 6 × 30 | 230 |
| | 2 + 10 | 2 × 25 + 10 × 30 | 350 |
| | 2 + 14 | 2 × 25 + 14 × 30 | 472 |

## FRONT BALLAST



The front canister-type ballast weight is suspended into the ballast carrier. It is secured against side movement by a pin inserted between the middle ballast weights. The other ballast weights are fixed to the middle one with two fasteners.

| | BALLAST COMBINATION | WEIGHT (kg) | |
|---|---|---|---|
| FORTERRA | 2 + 2 | 4 × 50 | 200 |
| | 3 + 3 | 6 × 50 | 300 |
| | 5 + 5 | 10 × 50 | 500 |

| | BALLAST COMBINATION | WEIGHT (kg) | |
|---|---|---|---|
| FORTERRA HSX | 3 + 3 | 4 × 50 | 200 |
| | 5 + 5 | 6 × 50 | 300 |
| | 7 + 7 | 14 × 50 | 700 |

## FRONT THREE-POINT HITCH BALLAST WEIGHT

| MATERIAL | WEIGHT (kg) |
|---|---|
| [new] concrete | 800 |
| cast iron | 472 |

# WHEELS

## FRONT WHEELS

**The front wheels are of two versions:**

- with adjustable track width – the disc and rim are connected with bolts, their mutual position is changed within a track width range of 1 590 – 2 030 mm
- with disc wheel – the disc and rim are welded. This version is for heavy loads

| DIMENSION | ADJUSTABLE TRACK WIDTH | DISC WHEEL | DISC WHEEL |
|---|---|---|---|
| | | FORTERRA | FORTERRA HSX |
| 12,4 -24 | • | | |
| 12,4 R24 | • | | |
| 13,6 R24 | • | | |
| 14,9 -24 | • | • | • |
| 14,9 R24 | • | • | • |
| 12,4 -28 | • | | |
| 380/70 R24 | • | • | • |
| 420/70 R24 | • | • | • |
| 480/65 R24 | • | • | • |

## FRONT FENDERS

The front driven axle can be equipped with front fenders of two versions.

A - fixed brackets turning together with the front wheel

B - turning brackets of front fenders. It is a version of front fenders allowing to increase the turning circle of the front axle and to reduce the turning radius of the tractor

The 2013 tractor models have the pressure in the hydrostatic steering increased to 17,5 MPa.

## REAR WHEELS

**The rear wheels are of two versions:**

- with adjustable track width – the disc and rim are connected with bolts, their mutual position is changed within a track width range of 1 575 – 1 800 mm
- with disc wheel – the disc and rim are welded. This version is for heavy loads

| DIMENSION | ADJUSTABLE TRACK WIDTH | DISC WHEEL |
|---|---|---|
| 16,9 R38 | • | |
| 480/70 R38 | • | • |
| 18,4 -38 | • | • |
| 18,4 R38 | • | • |
| 520/70 R38 | • | • |
| 600/65 R38 | | • |

## REAR FENDER EXTENSION

Rear fenders can be optionally equipped with a plastic extension 100 mm in width.

## ADMISSIBLE COMBINATIONS OF FRONT AND REAR WHEELS

| | DIMENSION | 12,4-24 | 12,4 R24 | 13,6 R24 | 14,9-24 | 14,9 R24 | 12,4-28 | 380/70 R24 | 420/70 R24 | 480/65 R24 |
|---|---|---|---|---|---|---|---|---|---|---|
| FORTERRA | 16,9 R38 | • | • | • | • | • | • | • | • | |
| FORTERRA HSX | 480/70 R38 | • | • | • | • | • | • | • | • | |
| | 18,4-38 | | | • | • | • | • | • | • | • |
| | 18,4 R38 | | | • | • | • | • | • | • | • |
| | 520/70 R38 | | | • | • | • | • | • | • | • |
| | 600/65 R38 | | | • | • | • | • | • | • | • |

CAUTION! Depending on the combination of the front and rear tire sizes, different gears are used in FWD driveline to accomplish the correct gear ratio.

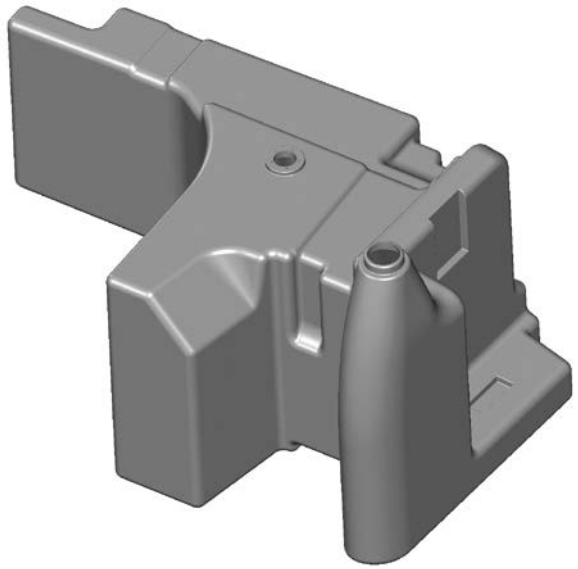
# FUEL TANK

### AS A STANDARD, A PLASTIC TANK IS INSTALLED IN ALL TYPES OF TRACTORS, WITH THE FOLLOWING CAPACITY:

F 180 l

F HSX 220 l

Optionally, the tractor can be equipped with a sheet metal cover of the tank protecting the fuel tank from underneath.



# TRACTOR MAINTENANCE

The tractor maintenance is carried out by a system of service checks. The first check of a new tractor is after the first 100 EH (engine hours), the next service checks are always after 500 EH.

### OILS FOR ZETOR ENGINES NOT EQUIPPED WITH PARTICULATE FILTERS

| CLASSIFICATION ACEA | VISCOSITY GRADE SAE | POWER CATEGORY API |
|---|---|---|
| E9/E7 | 15W-40 | API CJ-4/SM |

### RECOMMENDED OILS FOR ZETOR ENGINES EQUIPPED WITH PARTICULATE FILTERS

| DESIGNATION | VISCOSITY GRADE SAE | POWER CATEGORY API |
|---|---|---|
| MOGUL DIESEL L-SAPS 15W-40 | 15W-40 | API CJ-4/SM |

### STOU-TYPE OILS FOR ZETOR FORTERRA HSX TRANSMISSIONS

| CLASSIFICATION ACEA | VISCOSITY GRADE SAE | POWER CATEGORY API |
|---|---|---|
| E2 | 10W-30 | API CF/CF -4/SF<br>API GL-4 |

# AGGREGATION

## TILLAGE

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **PLOUGH ATTACHED, ROTARY 4 × 4**<br>(number of plow bodies = 4) | • | •<br>**PLOUGH ATTACHED, ROTARY**<br>The front TBZ concrete weight at about 800 kg will be available on HSX Forterra starting Model 2013. Used mainly in aggregating with multiple blade plow (5×5), 3m seeding combinations, including active harrows, mounted sprayer/ spreader.)<br>**5 × 5**<br>(number of plow bodies = 5) | . wheel base 2 490 mm (better unit stability)<br>. increased mass of rear weight (better traction properties)<br>. greater number of usable speed gears for speed 6 – 12 km·h$^{-1}$<br>. upper cast arms of hydraulic motors with end fork, including two auxiliary hydro motors ∅ 50 mm (greater lifting force, suspension is more resistant to uneven lateral loading) |
| **PLOUGH UH SEMI-MOUNTED, ROTARY**<br>**5 × 5 or 6 × 6**<br>(number of plow bodies = 5 až 6) | • | • | |

## PRE-SOWING PREPARATION

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **CULTIVATOR ATTACHED/SEMI-MOUNTED**<br>catch = 5 m<br>mass = 2 000 kg | • | •<br>**PLOUGH ATTACHED, ROTARY**<br>The front TBZ concrete weight at about 800 kg will be available on HSX Forterra starting Model 2013. Used mainly in aggregating with multiple blade plow (5x5), 3m seeding combinations, including active harrows, mounted sprayer/ spreader.<br>**5 × 5**<br>(number of plow bodies = 5) | . wheel base 2 490 mm (better unit stability)<br>. Increased mass of rear weight (better traction properties)<br>. greater number of usable speed gears for speeds of 6 – 12 km·h$^{-1}$<br>. upper cast arms of hydraulic motors with end fork, including two auxiliary hydro motors ∅ 50 mm (greater lifting force, the suspension is more resistant to uneven lateral loading) |

## SOWING

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **SOWING UNIT ATTACHED**<br>catch = 5 m<br>mass = 2 000 kg | • | • | . wheel base 2 490 mm (better unit stability)<br>. increased mass of rear weight (better traction properties)<br>. greater number of usable speed gears for speeds of 6 – 12 km·h$^{-1}$<br>. upper cast arms of hydraulic motors with end fork, including two auxiliary hydro motors ∅ 50 mm (greater lifting force, the suspension is more resistant to uneven lateral loading) |

# TRANSPORTATION

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **TRAILER**<br>(braked)<br>mass = 21 000 kg | • | • | . greater wheel base (better unit stability)<br>. increased mass of rear weight (better traction properties)<br>. greater number of usable speed gears within the whole range of transport speeds |

# FERTILIZATION

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **DISTRIBUTOR SPREADER/ SPRAYER**<br>(attached)<br>mass = 2 000 kg | • | • | . wheel base 2 490 mm (better unit stability)<br>. increased mass of rear weight (better traction properties).<br>. greater number of usable speed gears for speeds of 6 –12 km·h$^{-1}$. |
| **DISTRIBUTOR SPREADER/ SPRAYER SEMI-MOUNTED**<br>(braked)<br>hmotnost = 21 000 kg | • | • | |

# FORAGE CROPS MOWING

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **MOWER UNIT**<br>catch 5 m | • | • | . greater wheel base (better unit stability)<br>. greater number of usable speed gears for speeds of 6 –12 km·h$^{-1}$<br>. upper cast arms of hydraulic motors with end fork, including two auxiliary hydro motors ∅ 50 mm (greater lifting force, suspension is more resistant to uneven lateral loading). |
| **HAY TEDDER/ SIDE DELIVERY RAKE**<br>catch 10 m | • | • | |

# TRANSPORTATION

| TOOLS | FORTERRA | FORTERRA HSX | FORTERRA HSX ADVANTAGES |
|---|---|---|---|
| **FRONT-END LOADER**<br>load = 1 200 kg | • | • | . greater wheel base (better unit stability)<br>. greater number of usable speed gears for speeds of 6 – 12 km·h$^{-1}$.<br>. reversing transmission shifted under load Power Shuttle.<br>. increased mass of rear weights (better traction properties; usable also for counterweight) |

# ZETOR SYSTEM

## FRONT-END LOADERS

- for all tractor model series – country of origin: CZ

## TRAILERS AND PLATFORM-TRAILERS

## GREEN PROGRAMME

- front-end or rear mower, with optional conditioner on request
- hay tedders
- side delivery rakes
- presses for round bales

## HYDRAULIC ARM

- from 3 000 kg to 18 000 kg - country of origin: CZ

## WINTER AND SUMMER MAINTENANCE

- snow plows (front-end, rear)
- sweepers (front-end, rear, mounted on front-end loader) – optional sprayer – country of origin: CZ

**For more information on extended offer of aggregation and auxiliary equipment, please go to www.zetor.com or zetorsystem@zetor.com.**

# NOTES

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