

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F.  
Larsen

---

2019

## Nebraska Summary: S1178 Fendt 933

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

---

Nebraska Tractor Test Lab, "Nebraska Summary: S1178 Fendt 933" (2019). *Nebraska Tractor Tests*. 3424. <https://digitalcommons.unl.edu/tractormuseumlit/3424>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# SUMMARY OF OECD TEST 3197 - NEBRASKA SUMMARY 1178

## FENDT 933 GEN 6 DIESEL

### STEPLESS VARIODRIVE TRANSMISSION

#### POWER TAKE-OFF PERFORMANCE

| Power<br>HP<br>(kW)                             | Crank<br>shaft<br>speed<br>rpm | Diesel<br>Consumption |                       | D.E.F.<br>Consumption |                 | Mean Atmospheric<br>Conditions |
|---|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------|--------------------------------|
|   |                                | Gal/hr<br>(l/h)       | lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | Gal/hr<br>(l/h) |                                |
| <b>MAXIMUM POWER AND FUEL CONSUMPTION</b>       |                                |                       |                       |                       |                 |                                |
| <b>Rated Engine Speed—(PTO speed—1060 rpm)</b>  |                                |                       |                       |                       |                 |                                |
| 287.8<br>(214.6)                                | 1700                           | 14.53<br>(55.00)      | 0.354<br>(0.215)      | 19.80<br>(3.90)       | 1.45<br>(5.48)  |                                |
| <b>Standard Power Take-off Speed (1000 rpm)</b> |                                |                       |                       |                       |                 |                                |
| 290.5<br>(216.6)                                | 1604                           | 14.42<br>(54.60)      | 0.348<br>(0.212)      | 20.15<br>(3.97)       | 1.38<br>(5.24)  |                                |
| <b>Maximum Power (1 hour)</b>                   |                                |                       |                       |                       |                 |                                |
| 291.8<br>(217.6)                                | 1400                           | 14.17<br>(53.65)      | 0.340<br>(0.207)      | 20.60<br>(4.06)       | 1.39<br>(5.25)  |                                |

#### VARYING POWER AND FUEL CONSUMPTION

|                  |      |                  |                  |                 |                |                      |
|------------------|------|------------------|------------------|-----------------|----------------|----------------------|
| 287.8<br>(214.6) | 1700 | 14.53<br>(55.00) | 0.354<br>(0.215) | 19.80<br>(3.90) | 1.45<br>(5.48) | Air temperature      |
| 249.0<br>(185.7) | 1731 | 13.00<br>(49.20) | 0.366<br>(0.223) | 19.16<br>(3.78) | 1.23<br>(4.66) | 70°F (21°C)          |
| 189.4<br>(141.2) | 1754 | 10.57<br>(40.00) | 0.391<br>(0.238) | 17.92<br>(3.53) | 0.89<br>(3.38) | Relative humidity    |
| 127.7<br>(95.2)  | 1775 | 8.08<br>(30.60)  | 0.444<br>(0.270) | 15.79<br>(3.11) | 0.67<br>(2.54) | 29%                  |
| 64.2<br>(47.9)   | 1785 | 5.60<br>(21.20)  | 0.611<br>(0.372) | 11.47<br>(2.26) | 0.32<br>(1.23) | Barometer            |
| --               | 1796 | 3.33<br>(12.60)  | --               | --              | 0.18<br>(0.69) | 30.1" Hg (101.8 kPa) |

Maximum torque - 1106 lb.-ft. (1501 Nm) at 1300 rpm  
 Maximum torque rise - 24.5%  
 Torque rise at 1400 engine rpm - 23%  
 Power increase at 1400 engine rpm - 1.0%

#### DRAWBAR PERFORMANCE UNBALLASTED - FRONT DRIVE ENGAGED FUEL CONSUMPTION CHARACTERISTICS

| Power<br>Hp<br>(kW)   | Drawbar<br>pull<br>lbs<br>(kN) | Speed<br>mph<br>(km/h) | Crank-<br>shaft<br>speed<br>rpm | Slip<br>% | Fuel Consumption<br>lb/hp.hr<br>(kg/kW.h) | D.E.F.<br>Consumption<br>lb/hp.hr<br>(kg/kW.h) | Temp. °F(°C)<br>cool-<br>ing<br>dry<br>med<br>bulb | Barom.<br>inch<br>Hg<br>(kPa) |
|---|--------------------------------|------------------------|---------------------------------|-----------|---|--|--|-------------------------------|
| <b>Power at Rated Engine Speed—Speed setting 9</b>          |                                |                        |                                 |           |   |  |  |                               |
| 250.5<br>(186.8)  | 16525<br>(73.50)               | 5.69<br>(9.15)         | 1693                            | 1.7       | 0.410<br>(0.250)                          | 17.14<br>(3.37)                                | 0.048<br>(0.029)                                   | 163<br>(73)                   |
| <b>75% of Pull at Rated Engine Speed—Speed setting 9</b>    |                                |                        |                                 |           |   |  |  |                               |
| 194.4<br>(145.0)  | 12375<br>(55.05)               | 5.89<br>(9.48)         | 1738                            | 1.4       | 0.440<br>(0.268)                          | 15.94<br>(3.14)                                | 0.049<br>(0.030)                                   | 169<br>(76)                   |
| <b>50% of Pull at Rated Engine Speed—Speed setting 9</b>    |                                |                        |                                 |           |   |  |  |                               |
| 129.3<br>(96.4)   | 8210<br>(36.53)                | 5.90<br>(9.50)         | 1764                            | 1.0       | 0.513<br>(0.312)                          | 13.65<br>(2.69)                                | 0.054<br>(0.033)                                   | 165<br>(74)                   |
| <b>75% of Pull at Reduced Engine Speed—Speed setting 11</b> |                                |                        |                                 |           |   |  |  |                               |
| 193.9<br>(144.6)  | 12375<br>(55.04)               | 5.88<br>(9.46)         | 1455                            | 1.4       | 0.416<br>(0.253)                          | 16.85<br>(3.32)                                | 0.043<br>(0.026)                                   | 167<br>(75)                   |
| <b>50% of Pull at Reduced Engine Speed—Speed setting 11</b> |                                |                        |                                 |           |   |  |  |                               |
| 130.5<br>(97.3)   | 8220<br>(36.57)                | 5.95<br>(9.58)         | 1464                            | 1.0       | 0.457<br>(0.278)                          | 15.33<br>(3.02)                                | 0.051<br>(0.031)                                   | 165<br>(74)                   |

**Location of tests:** DLG TestService, GmbH, Max-Eyth-Weg 1, D-64823 Gross-Umstadt, Germany

**Dates of tests:** September to December 2019

**Manufacturer:** AGCO GmbH Johann Georg Fendt Str 4 D 87616 Marktobberdorf Germany

**CONSUMABLE Fluids:** Fuel No. 2 Diesel  
**Specific gravity converted to 60°/60°F (15°/15°C)** 0.8408  
**Fuel weight** 7.01 lbs/gal (0.840 kg/l)  
**Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution  
**DEF weight** 9.071 lbs/gal (1.087 kg/l)  
**Oil SAE 5W-30 API service classification CK-4 Transmission and hydraulic lubricant** AGCO Permantran 821 XL fluid  
**Front axle lubricant** AGCO Permatran 821 XL fluid

**ENGINE: Make** MAN Diesel **Type** six cylinder vertical with turbocharger, air to air intercooler and D.E.F. (diesel exhaust fluid) exhaust treatment  
**Serial No.** 42254301225417 **Crankshaft** lengthwise  
**Rated engine speed** 1700 **Bore and stroke** 4.528 x 5.709" (115.0 mm x 145.0 mm) **Compression ratio** 20.0 to 1 **Displacement** 551 cu in (9037 ml)  
**Starting system** 24 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prestrainer **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst)/DPF (diesel particulate filter) System and SCR (selective catalyst reduction) with a vertical muffler **Cooling medium temperature control** thermostat

**CHASSIS: Type** front wheel assist with independent drive to each axle **Serial No.** WAM96123T00F01032 **Tread width** rear 74.8" (1900 mm) to 88.6" (2250 mm) front 78.7" (2000 mm) to 88.6" (2250 mm) **Wheelbase** 124.0" (3150 mm)  
**Hydraulic control system** direct engine drive **Transmission** CVT. A combination of mechanical and hydrostatic sections allow an infinite speed adjustment. **Nominal travel speeds mph (km/h)** forward: 0-37 (0-60), reverse: 0-21 (0-33) **Clutch** a foot pedal controls the hydrostatic oil flow **Brakes** wet multiple disc hydraulically operated by foot pedal **Steering** hydrostatic **Power take-off** 1000 rpm at 1604 engine rpm **Unladen tractor mass** 28210 lb (12795 kg)

## DRAWBAR PERFORMANCE

### UNBALLASTED - FRONT DRIVE ENGAGED - 1400 ENGINE RPM MAXIMUM POWER AT SELECTED TRAVEL SPEEDS

| Power<br>Hp<br>(kW) | Drawbar<br>pull<br>lbs<br>(kN) | Speed<br>mph<br>(km/h) | Crank-<br>shaft<br>speed<br>rpm | Slip<br>% | Fuel Consumption<br>lb/hp.hr<br>(kg/kW.h) | Hp.hr/gal<br>(kW.h/l) | D.E.F.<br>Consumption<br>lb/hp.hr<br>(kg/kW.h) | Temp. °F(°C)<br>cool-<br>ing<br>med | Air<br>dry<br>bulb | Barom.<br>inch<br>Hg<br>(kPa) |
|---------------------|--------------------------------|------------------------|---------------------------------|-----------|---|-----------------------|--|-------------------------------------|--------------------|-------------------------------|
| Speed setting 6     |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 221.0<br>(164.8)    | 29510<br>(131.27)              | 2.81<br>(4.52)         | 1441                            | 13.1      | 0.453<br>(0.275)                          | 15.43<br>(3.04)       | 0.054<br>(0.033)                               | 194<br>(90)                         | 63<br>(17)         | 28.9<br>(97.8)                |
| Speed setting 7.5   |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 250.9<br>(187.1)    | 24830<br>(110.45)              | 3.79<br>(6.10)         | 1399                            | 3.9       | 0.401<br>(0.244)                          | 17.41<br>(3.43)       | 0.044<br>(0.027)                               | 183<br>(84)                         | 61<br>(16)         | 28.9<br>(97.8)                |
| Speed setting 9     |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 254.8<br>(190.0)    | 20515<br>(91.26)               | 4.66<br>(7.50)         | 1398                            | 2.7       | 0.393<br>(0.239)                          | 17.77<br>(3.50)       | 0.043<br>(0.026)                               | 181<br>(83)                         | 63<br>(17)         | 28.9<br>(97.8)                |
| Speed setting 11    |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 254.9<br>(190.1)    | 17155<br>(76.32)               | 5.57<br>(8.97)         | 1401                            | 1.9       | 0.393<br>(0.239)                          | 17.82<br>(3.51)       | 0.048<br>(0.029)                               | 185<br>(85)                         | 61<br>(16)         | 28.9<br>(97.8)                |
| Speed setting 13    |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 256.0<br>(190.9)    | 13965<br>(62.11)               | 6.87<br>(11.06)        | 1402                            | 1.7       | 0.392<br>(0.238)                          | 17.83<br>(3.51)       | 0.048<br>(0.029)                               | 196<br>(91)                         | 63<br>(17)         | 28.9<br>(97.8)                |
| Speed setting 15    |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 254.0<br>(189.4)    | 12470<br>(55.48)               | 7.64<br>(12.29)        | 1402                            | 1.5       | 0.394<br>(0.239)                          | 17.74<br>(3.49)       | 0.048<br>(0.029)                               | 198<br>(92)                         | 61<br>(16)         | 28.9<br>(97.8)                |
| Speed setting 17    |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 252.9<br>(188.6)    | 10915<br>(48.55)               | 8.69<br>(13.98)        | 1405                            | 1.3       | 0.395<br>(0.240)                          | 17.72<br>(3.49)       | 0.049<br>(0.030)                               | 194<br>(90)                         | 59<br>(15)         | 28.9<br>(97.8)                |
| Speed setting 19    |                                |                        |                                 |           |   |                       |  |                                     |                    |                               |
| 250.1<br>(186.5)    | 9930<br>(44.17)                | 9.44<br>(15.20)        | 1406                            | 1.2       | 0.400<br>(0.243)                          | 17.51<br>(3.45)       | 0.049<br>(0.030)                               | 190<br>(88)                         | 59<br>(15)         | 28.9<br>(97.8)                |

**REPAIRS AND ADJUSTMENTS:** No repairs or adjustments.

**NOTE:** The performance figures on this report are the result of replacing the electronic engine control module of the Fendt 942 Gen 6 Vario with the Fendt 933 Gen 6 Vario module.

**REMARKS:** All test results were determined from observed data obtained in accordance with official OECD test procedures. This tractor fell 9.9% short of meeting the manufacturer's 3 point lift capacity claim of 21500 lb (9750 kg) at ball ends. This tractor fell 8.3% short of meeting the manufacturer's hydraulic pump flow claim of 113.5 GPM (430 l/min) with 2 pumps. The performance figures on this summary were taken from a test conducted under the OECD Code 2 test procedure.

We, the undersigned, certify that this is a true summary of data from OECD Report No. **3197**, Nebraska Summary 1178, December 14, 2020.

Roger M. Hoy  
Director

M.F. Kocher  
P.J. Jasa  
J.D. Luck  
Board of Tractor Test Engineers

### TRACTOR SOUND LEVEL WITH CAB

**dB(A)**

|  |      |
|--|------|
| At no load at speed setting 4.7 mph (7.5 km/h) | 69.5 |
| Transport at speed setting 37 mph (60 km/h)    | 73.5 |
| Bystander                                      | --   |

Horizontal distances of drawbar hitch point behind rear wheel axis - 38.2 in (970 mm), 40.2 in (1020 mm), 44.1 in (1120 mm), 46.5 in (1180 mm)

### TIRES AND WEIGHT

**Rear Tires** - No., size, ply & psi (kPa)  
**Front Tires** - No., size, ply & psi (kPa)  
**Height of Drawbar**  
**Static Weight with operator** - Rear  
- Front  
- Total

### Tested Without Ballast

Two 900/65R42;\*\*\*;12(80)  
Two 710/60R34;\*\*\*;12(80)  
25.6 in (630 mm)  
15995 lb (7255 kg)  
12380 lb (5615 kg)  
28375 lb (12870 kg)

## HYDRAULIC PERFORMANCE

CATEGORY: 3

Quick Attach: No, Walterscheid quick couplers

Maximum force exerted through whole range: 18635 lbs (82.9 kN) (at 24" (610 mm) behind hitch points)  
19380 lbs (86.2 kN) at ball ends

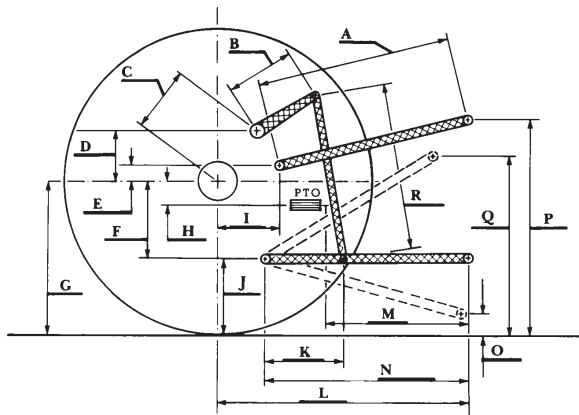
i) Sustained pressure at compensator cutoff: 2870 psi (198 bar)  
**three outlet sets combined**

ii) Pump delivery rate at minimum pressure: 104.1 GPM (394.0 l/min)

iii) Pump delivery rate at maximum  
hydraulic power: 97.3 GPM (368.2 l/min)  
Delivery pressure: 2325 psi (160 bar)  
Power: 131.9 HP (98.3 kW)

ii) Pump delivery rate at minimum pressure: 46.2 GPM (175.0 l/min)  
**single outlet set**

iii) Pump delivery rate at maximum  
hydraulic power: 44.6 GPM (168.8 l/min)  
Delivery pressure: 2220 psi (153 bar)  
Power: 57.8 HP (43.1 kW)



HITCH DIMENSIONS AS TESTED—NO LOAD

|   | inch | mm   |
|---|------|------|
| A | 33.3 | 845  |
| B | 15.0 | 380  |
| C | 18.6 | 476  |
| D | 15.3 | 388  |
| E | 7.7  | 195  |
| F | 14.3 | 362  |
| G | 40.4 | 1025 |
| H | 2.4  | 60   |
| I | 21.3 | 540  |
| J | 26.1 | 663  |
| K | 24.8 | 630  |
| L | 54.0 | 1372 |
| M | 29.7 | 755  |
| N | 43.0 | 1093 |
| O | 9.1  | 230  |
| P | 53.1 | 1348 |
| Q | 43.9 | 1116 |
| R | 36.6 | 930  |

## RECOMMENDED CITATION FORMAT:

NTTL.(2020). OECD tractor test 3197 for Fendt 933 Gen 6 Diesel.

Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>