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2020

Test 2228: John Deere 8RX 410

Nebraska Tractor Test Lab

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NEBRASKA OECD TRACTOR TEST 2228-SUMMARY 1175

JOHN DEERE 8RX 410 DIESEL

e23 TRANSMISSION

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Diesel Consumption		D.E.F. Consumption		Mean Atmospheric Conditions
		Gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.l/l)	Gal/hr (l/h)	
MAXIMUM POWER AND FUEL CONSUMPTION						
Rated Engine Speed—(PTO speed—1053 rpm)						
338.03 (252.07)	2101	17.33 (65.61)	0.358 (0.218)	19.50 (3.84)	0.48 (1.83)	Fuel used during active exhaust regeneration-0.83 gal (3.15 l) (see note 1, p.2)
Standard Power Take-off Speed(1000 rpm)						
368.86 (275.06)	1995	18.66 (70.65)	0.353 (0.215)	19.76 (3.89)	0.55 (2.09)	
Maximum Power (1 hour)						
381.53 (284.51)	1750	18.79 (71.12)	0.344 (0.209)	20.31 (4.00)	0.59 (2.23)	

VARYING POWER AND FUEL CONSUMPTION

338.03 (252.07)	2101	17.33 (65.61)	0.358 (0.218)	19.50 (3.84)	0.48 (1.83)	Air temperature
294.74 (219.78)	2155	15.34 (58.05)	0.363 (0.221)	19.22 (3.79)	0.42 (1.59)	73°F (23°C)
222.47 (165.90)	2167	12.02 (45.52)	0.377 (0.230)	18.50 (3.64)	0.33 (1.24)	Relative humidity
149.21 (111.27)	2179	8.95 (33.87)	0.419 (0.255)	16.67 (3.28)	0.25 (0.94)	30%
74.75 (55.74)	2190	6.23 (23.60)	0.583 (0.354)	11.99 (2.36)	0.11 (0.42)	Barometer
1.76 (1.31)	2200	4.48 (16.95)	17.749 (10.796)	0.39 (0.08)	0.10 (0.38)	28.88" Hg (97.79 kPa)

Maximum Torque - 1230 lb.-ft. (1667 Nm) at 1498 rpm

Maximum Torque Rise - 45.5%

Torque rise at 1680 engine rpm - 39%

Power increase at 1750 engine rpm - 12.9%

DRAWBAR PERFORMANCE

UNBALLASTED - FRONT DRIVE ENGAGED FUEL CONSUMPTION CHARACTERISTICS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing dry med bulb	Barom. inch Hg (kPa)
Power at Rated Engine Speed—11th Gear-Manual mode								
314.59 (234.59)	20184 (89.78)	5.85 (9.41)	2100	2.9	0.424 (0.258)	16.47 (3.24)	0.017 (0.010)	211 (99)
75% of Pull at Rated Engine Speed—11th Gear-Manual mode								
246.25 (183.63)	15160 (67.43)	6.09 (9.80)	2160	1.7	0.437 (0.266)	15.97 (3.15)	0.015 (0.009)	211 (99)
50% of Pull at Rated Engine Speed—11th Gear-Manual mode								
166.52 (124.17)	10116 (45.00)	6.17 (9.93)	2173	0.9	0.484 (0.294)	14.44 (2.84)	0.017 (0.010)	209 (98)
75% of Pull at Reduced Engine Speed—6.2 mph (10.0 km/h) Auto mode								
246.22 (183.60)	15045 (66.92)	6.14 (9.88)	1410	1.6	0.406 (0.247)	17.18 (3.38)	0.018 (0.011)	210 (99)
50% of Pull at Reduced Engine Speed—6.2 mph (10.0 km/h) Auto mode								
166.75 (124.34)	10118 (45.01)	6.18 (9.95)	1410	1.0	0.431 (0.262)	16.12 (3.19)	0.016 (0.010)	208 (98)

Location of tests: Nebraska Tractor Test Laboratory,
University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of tests: October 2 - 15, 2020

Manufacturer: John Deere Tractor Works, 3500
East Donald St., P.O. Box 270, Waterloo Ia,
50704-0270

CONSUMABLE Fluids, OIL and TIME: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F (15°/15°C)** 0.8386 **Fuel weight** 6.982 lbs/gal (0.837 kg/l) **Diesel Exhaust Fluid (DEF)** 32% aqueous urea solution **DEF weight** 9.071 lbs/gal (1.087 kg/l) **Oil** SAE 10W-30 **API service classification** CK-4 **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere Hy-Gard fluid **Total time engine was operated:** 22.5 hours

ENGINE: Make John Deere **Diesel Type** six cylinder vertical with two turbochargers, air to air aftercooler and D.E.F (diesel exhaust fluid) exhaust treatment **Serial No.** *RG6090U089803* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** 4.661" x 5.354" (118.4 mm x 136.0 mm) **Compression ratio** 16.0 to 1 **Displacement** 548 cu in (8984 ml) **Starting system** 12 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 water separator **Fuel cooler** radiator for pump return fuel **Exhaust** DOC (diesel oxidation catalyst), SCR (selective catalyst reduction) and regenerative DPF (diesel particulate filter) integrated within a vertical muffler **Cooling medium temperature control** thermostat and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: Stationary PTO operations (370 engine hp) 117.1 - 126.6 lb/h (53.1 - 57.4 kg/h) Drawbar operations (410 engine hp) 129.8 - 140.7 lb/h (58.9 - 63.8 kg/h) **High idle:** 2190 - 2210 rpm **Turbo boost:** nominal 29.0 - 33.4 psi (200 - 230 kPa) as measured 31.2 psi (215 kPa)

CHASSIS: Type front wheel assist with rubber tracks **Serial No.** *1RW8410DEL801228* **Tread width** rear 88.0" (2235 mm) front 88.0" (2235 mm) **Wheelbase** 127.4" (3235 mm) **Length of track on ground** front 58.8" (1490 mm), rear 71.5" (1815 mm) **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range power shift **Nominal travel speeds mph (km/h)** first 1.38 (2.22) second 1.60 (2.58) third 1.85 (2.98) fourth 2.15 (3.46) fifth 2.49 (4.01) sixth 2.89 (4.65) seventh 3.31 (5.34) eighth 3.86 (6.21) ninth 4.46 (7.18) tenth 5.16 (8.31) eleventh 6.00 (9.65)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 2100 ENGINE RPM
DRAWBAR POWER AT SELECTED TRAVEL SPEED SETTINGS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)	
					6th Gear					
246.73 (183.99)	36247 (161.23)	2.56 (4.11)	2155	14.5	0.478 (0.291)	14.62 (2.88)	0.015 (0.009)	211 (99)	53 (12)	28.73 (97.29)
					7th Gear					
273.24 (203.75)	33530 (149.15)	3.06 (4.92)	2152	10.7	0.462 (0.281)	15.11 (2.98)	0.015 (0.009)	213 (101)	53 (12)	28.73 (97.29)
					8th Gear					
300.12 (223.80)	32088 (142.73)	3.51 (5.65)	2099	9.4	0.449 (0.273)	15.56 (3.06)	0.016 (0.009)	213 (100)	55 (13)	28.73 (97.29)
					9th Gear					
308.23 (229.84)	27505 (122.35)	4.20 (6.76)	2100	6.2	0.435 (0.264)	16.06 (3.16)	0.016 (0.010)	212 (100)	58 (14)	28.97 (98.10)
					10th Gear					
313.18 (233.53)	23653 (105.21)	4.97 (7.99)	2099	4.2	0.427 (0.260)	16.34 (3.22)	0.015 (0.009)	212 (100)	59 (15)	28.95 (98.04)
					11th Gear					
314.59 (234.59)	20184 (89.78)	5.85 (9.41)	2100	2.9	0.424 (0.258)	16.47 (3.24)	0.017 (0.010)	211 (99)	49 (9)	28.99 (98.17)
					12th Gear					
317.64 (236.86)	17465 (77.69)	6.82 (10.98)	2100	2.1	0.421 (0.256)	16.58 (3.27)	0.016 (0.010)	211 (99)	53 (12)	28.99 (98.17)
					13th Gear					
313.48 (233.76)	14737 (65.55)	7.98 (12.83)	2100	1.5	0.427 (0.260)	16.35 (3.22)	0.017 (0.010)	212 (100)	56 (13)	28.98 (98.14)
					14th Gear					
309.08 (230.48)	12621 (56.14)	9.18 (14.77)	2100	1.1	0.432 (0.263)	16.18 (3.19)	0.017 (0.010)	212 (100)	56 (13)	28.98 (98.14)

twelfth 6.94 (11.17) thirteenth 8.06 (12.97) fourteenth 9.25 (14.89) fifteenth 10.74 (17.29) sixteenth 12.24 (19.70) seventeenth 14.21 (22.87) eighteenth 16.47 (26.50) nineteenth 19.11 (30.76) twentieth 22.12 (35.60) twenty-first 25.68 (41.33) twenty-second 26.10 (42.00) twenty-third 26.10 (42.00) electronically limited reverse 1.66 (2.67), 2.23 (3.59), 3.00 (4.82), 4.00 (6.43), 4.62 (7.44), 6.21 (10.00), 8.35 (13.44), 11.14 (17.92), 14.73 (23.71), 18.64 (30.00), 18.64 (30.00) electronically limited **Clutch** wet multiple disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 1000 rpm at 1995 engine rpm **Unladen tractor mass** 42330 lb (19200 kg)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE 1: The manufacturer declares that the average time between active regenerations is 40 hours. A 1% power decrease was observed during the active regeneration.

NOTE 2: In stationary PTO operation, this model operates in a derated power mode.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. 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 and correct report of official Tractor Test No. **2228**, Nebraska Summary 1175, May 25, 2021.

Roger M. Hoy
Director

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

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive	
	Engaged dB(A)	Disengaged dB(A)
At no load in 9th gear	65.9	65.9
Transport speed-no load- 21st gear		68.6
Bystander in 21st gear		86.7

Horizontal distance of drawbar hitch point behind rear wheel axis - 56.8"(1442 mm)

TRACKS AND WEIGHT

Rear tracks - no & size
Front tracks - no & size
Height of drawbar
Static weight with operator- Rear
- Front
- Total

Tested Without Ballast

2 x 18.0 in (457 mm)
2 x 18.0 in (457 mm)
22.5 in (570 mm)
24615 lb (11165 kg)
17890 lb (8115 kg)
42505 lb (19280 kg)

DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED - AUTO MODE
(Loads based on 2100 engine rpm manual mode performance runs)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
3.9 mph (6.2 km/h)										
298.69 (222.73)	31920 (141.99)	3.51 (5.65)	1815	9.5	0.436 (0.265)	16.00 (3.15)	0.015 (0.009)	212 (100)	56 (13)	28.73 (97.29)
4.5 mph (7.2 km/h)										
308.65 (230.16)	27484 (122.25)	4.21 (6.78)	1818	6.3	0.429 (0.261)	16.29 (3.21)	0.015 (0.009)	212 (100)	59 (15)	28.95 (98.04)
5.2 mph (8.4 km/hr)										
313.21 (233.56)	23382 (104.01)	5.03 (8.09)	1827	4.2	0.418 (0.254)	16.72 (3.29)	0.015 (0.009)	212 (100)	61 (16)	28.95 (98.04)
6.0 mph (9.6 km/h)										
314.27 (234.35)	20269 (90.16)	5.82 (9.36)	1805	2.9	0.412 (0.250)	16.96 (3.34)	0.016 (0.010)	211 (99)	53 (11)	28.99 (98.17)
7.0 mph (11.2 km/h)										
316.17 (235.77)	17325 (77.06)	6.85 (11.02)	1814	2.1	0.409 (0.249)	17.09 (3.37)	0.015 (0.009)	210 (99)	54 (12)	28.99 (98.15)
8.1 mph (13.0 km/h)										
313.16 (233.52)	14697 (65.38)	7.99 (12.86)	1833	1.5	0.415 (0.252)	16.84 (3.32)	0.016 (0.010)	212 (100)	56 (13)	28.98 (98.14)
9.2 mph (14.8 km/h)										
308.71 (230.20)	12686 (56.43)	9.13 (14.69)	1798	1.2	0.412 (0.251)	16.94 (3.34)	0.016 (0.010)	210 (99)	57 (14)	28.98 (98.14)

**DRAWBAR PERFORMANCE
UNBALLASTED - FRONT DRIVE ENGAGED
MANUAL MODE - 1850 ENGINE RPM**

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank- shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Consumption Hp.hr/gal (kW.h/l)	D.E.F. Consumption lb/hp.hr (kg/kW.h)	Temp. °F(°C) cool- ing med	Air dry bulb	Barom. inch Hg (kPa)
					6th Gear					
246.26 (183.64)	36106 (160.61)	2.56 (4.12)	2156	14.3	0.477 (0.290)	14.65 (2.89)	0.015 (0.009)	211 (99)	53 (12)	28.73 (97.29)
					7th Gear					
273.77 (204.15)	33592 (149.42)	3.06 (4.92)	2152	10.7	0.459 (0.279)	15.20 (2.99)	0.015 (0.009)	213 (100)	53 (12)	28.73 (97.29)
					8th Gear					
300.77 (224.28)	32162 (143.06)	3.51 (5.65)	2097	9.4	0.448 (0.272)	15.60 (3.07)	0.015 (0.009)	213 (100)	55 (13)	28.73 (97.29)
					9th Gear					
320.69 (239.14)	30390 (135.18)	3.96 (6.37)	2022	8.3	0.439 (0.267)	15.90 (3.13)	0.014 (0.008)	213 (100)	60 (16)	28.71 (97.22)
					10th Gear					
328.96 (245.30)	29148 (129.65)	4.24 (6.82)	1852	7.5	0.443 (0.269)	15.77 (3.11)	0.012 (0.008)	215 (101)	62 (17)	28.71 (97.22)
					11th Gear					
341.13 (254.38)	25403 (113.00)	5.04 (8.10)	1850	5.1	0.426 (0.259)	16.38 (3.23)	0.012 (0.007)	214 (101)	62 (17)	28.70 (97.19)
					12th Gear					
343.03 (255.80)	21729 (96.66)	5.92 (9.53)	1850	3.6	0.422 (0.257)	16.55 (3.26)	0.012 (0.007)	214 (101)	63 (17)	28.70 (97.17)
					13th Gear					
346.79 (258.60)	18728 (83.31)	6.94 (11.17)	1850	2.6	0.416 (0.253)	16.77 (3.30)	0.012 (0.007)	214 (101)	64 (18)	28.70 (97.19)
					14th Gear					
341.32 (254.52)	15934 (70.88)	8.03 (12.92)	1851	1.9	0.423 (0.257)	16.51 (3.25)	0.011 (0.007)	215 (102)	65 (18)	28.70 (97.17)

Lugging ability in 12th gear

Crankshaft speed rpm	2100	2000	1899	1850	1700	1499	1302	1099
Pull-lbs (kN)	17298 (76.95)	19460 (86.56)	21086 (93.79)	21720 (96.62)	23266 (103.49)	24065 (107.05)	22192 (98.71)	20088 (89.36)
Increase in pull %	0	12	22	26	34	39	28	16
Power-Hp (kW)	314.66 (234.64)	335.11 (249.89)	342.77 (255.60)	343.06 (255.82)	335.20 (249.96)	304.35 (226.95)	245.85 (183.33)	189.34 (141.19)
Speed-mpH (km/h)	6.82 (10.98)	6.46 (10.39)	6.10 (9.81)	5.93 (9.54)	5.41 (8.70)	4.75 (7.64)	4.16 (6.69)	3.54 (5.69)
Slip %		2.1	2.7	3.2	3.5	4.3	4.7	3.9

HYDRAULIC PERFORMANCE

CATEGORY: IVN
Quick Attach: Yes
OECD Static test

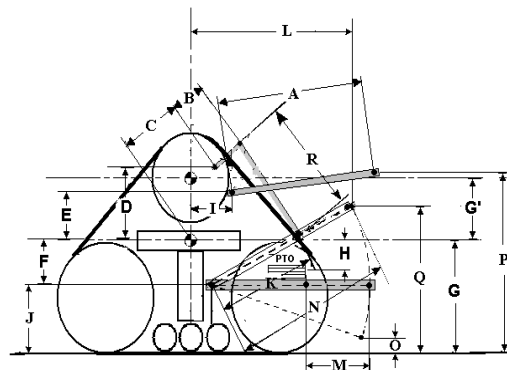
Maximum force exerted through whole range: Lift cylinders
20235 lbs (90.0 kN) 2x115 mm
15248 lbs (67.8 kN) 2x100 mm

	<u>85 cc pump</u>	<u>85 cc and 35cc pumps combined</u>
i) Sustained pressure at compensator cutoff:	2910 psi (201 bar)	2941 psi (203 bar)
three outlet sets combined		
ii) Pump delivery rate at minimum pressure and rated engine speed:	61.0 GPM (230.8 l/min)	84.2 GPM (318.7 l/min)
iii) Pump delivery rate at maximum hydraulic power:	60.7 GPM (229.6 l/min)	80.0 GPM (302.9 l/min)
Delivery pressure:	2471 psi (170 bar)	2114 psi (146 bar)
Power:	87.4 HP (59.4 kW)	98.7 HP (73.6 kW)
single outlet set		
ii) Pump delivery rate at minimum pressure and rated engine speed:	<u>1/2" couplers</u> 36.6 GPM (138.7 l/min)	<u>3/4" couplers</u> 42.9 GPM (162.5 l/min)
iii) Pump delivery rate at maximum hydraulic power:	35.2 GPM (133.3 l/min)	41.5 GPM (157.2 l/min)
Delivery pressure:	2308 psi (159 bar)	2301 psi (159 bar)
Power:	47.4 HP (35.4 kW)	55.8 HP (41.6 kW)

HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	mm
A	27.4	695
B	20.5	520
C	33.3	847
D	28.8	732
E	21.4	544
F	4.5	113
G	29.2	741
*G'	16.4	417
*H	2.0	52
I	31.3	796
J	24.7	628
K	28.9	735
L	59.8	1520
*L'	66.5	1690
M	25.9	657
N	42.9	1090
O	9.1	230
P	51.7	1313
Q	43.3	1100
R	46.3	1175

*G' to undercarriage pivot point
*H PTO is above undercarriage pivot point
*L' to Quick Attach ends



RECOMMENDED CITATION FORMAT:

NTTL.(2021). Nebraska OECD tractor test 2228 for John Deere 8RX 410 e23 Diesel. Lincoln, NE:Nebraska Tractor Test Laboratory. Retrieved from <http://tractortestlab.unl.edu>



JOHN DEERE 8RX 410 DIESEL