University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

1987

Nebraska Summary: S035-S036 Massey Ferguson 398

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: S035-S036 Massey Ferguson 398" (1987). *Nebraska Tractor Tests*. 2695.
https://digitalcommons.unl.edu/tractormuseumlit/2695

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 TESTS 1109 & 1110—NEBRASKA SUMMARY 035/036
MASSEY FERGUSON 398 DIESEL (2WD & FWA)
12 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Fuel Consumption Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION (540 RPM SHAFT)					
Rated Engine Speed—(PTO speed—627 rpm)					
80.3 *(59.9)*	2200	4.89 *(18.49)*	0.424 *(0.258)*	16.42 *(3.23)*	
Standard Power Take-off Speed (540 rpm)					
76.4 *(57.0)*	1893	4.44 *(16.80)*	0.404 *(0.246)*	17.21 *(3.39)*	Air temperature
VARYING POWER AND FUEL CONSUMPTION					75°F *(24°C)*
80.3 *(59.9)*	2200	4.89 *(18.49)*	0.424 *(0.258)*	16.42 *(3.23)*	
69.2 *(51.6)*	2226	4.52 *(17.10)*	0.455 *(0.277)*	15.30 *(3.01)*	Relative humidity
52.7 *(39.3)*	2261	3.78 *(14.31)*	0.500 *(0.304)*	13.96 *(2.75)*	78%
35.5 *(26.5)*	2286	3.15 *(11.92)*	0.616 *(0.375)*	11.29 *(2.23)*	Barometer
18.2 *(13.6)*	2327	2.49 *(9.42)*	0.950 *(0.578)*	7.31 *(1.44)*	29.9″ Hg *(101.4 kPa)*
....	2370	1.85 *(7.00)*	....	....	

Maximum Torque 239.0 lb. ft *(324.0 Nm)* at 1280 RPM
Maximum Torque Rise 25%

MAXIMUM POWER AND FUEL CONSUMPTION (1000 RPM SHAFT)				
Rated Engine Speed—(PTO speed—1158 rpm)				
82.5 *(61.5)*	2200	5.02 *(18.98)*	0.424 *(0.258)*	16.42 *(3.23)*
Standard Power Take-off Speed (1000 rpm)				
78.6 *(58.6)*	1900	4.46 *(16.87)*	0.395 *(0.240)*	17.61 *(3.47)*

Maximum Torque 237.6 lb. ft *(322.2 Nm)* at 1290 RPM
Maximum Torque Rise 21%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—9th (2HL) Gear									
66.8 *(49.8)*	3485 *(15.5)*	7.19 *(11.57)*	2200	6.1	0.516 *(0.314)*	13.50 *(2.66)*	180 *(82)*	75 *(24)*	29.9 *(101.3)*
75% of Pull at Maximum Power—9th (2HL) Gear									
51.9 *(38.7)*	2610 *(11.6)*	7.46 *(12.01)*	2244	4.6	0.561 *(0.341)*	12.44 *(2.45)*	178 *(81)*	75 *(24)*	29.9 *(101.3)*
50% of Pull at Maximum Power—9th (2HL) Gear									
36.1 *(26.9)*	1755 *(7.8)*	7.72 *(12.42)*	2285	3.5	0.671 *(0.408)*	10.41 *(2.05)*	176 *(80)*	75 *(24)*	29.9 *(101.3)*
75% of Pull at Reduced Engine Speed—10th (2HH) Gear									
51.9 *(38.7)*	2610 *(11.6)*	7.46 *(12.01)*	1763	4.6	0.482 *(0.293)*	14.47 *(2.85)*	178 *(81)*	73 *(23)*	29.9 *(101.3)*
50% of Pull at Reduced Engine Speed—10th (2HH) Gear									
36.1 *(26.9)*	1755 *(7.8)*	7.72 *(12.42)*	1772	3.5	0.531 *(0.323)*	13.10 *(2.58)*	176 *(80)*	73 *(23)*	29.9 *(101.3)*

Location of Test: AFRC Institute of Engineering Research, Wrest Park, Silsoe, Bedford, England MK45 4HS

Dates of Test: July to August, 1987

Manufacturer: MASSEY FERGUSON MANUFACTURING LIMITED, Banner Lane, Coventry, Warwickshire, England CV4 9GF

FUEL AND OIL: Fuel No. 2 Diesel **Cetane No.** 53.5 **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.8345 **Fuel weight** 6.94 lbs/gal *(0.832 kg/l)* **Oil SAE** 15W30 **Oil consumption for 10 hours** NA **Transmission and hydraulic lubricant** SAE 15W30 **Front Axle lubricant** SAE 15W30.

ENGINE: Make Perkins Diesel **Type** four cylinder vertical with turbocharger **Serial No.** LS31142 U062081M **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 3.878″ × 5.0″ *(98.5 mm × 127.0 mm)* **Compression ratio** 15.5 to 1 **Displacement** 236 cu in *(3870 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** oil bath and centifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** radiator for power steering oil **Fuel filter** two paper elements and sediment bowl **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat.

CHASSIS: Type 2WD, FWA **Serial No.** 5010U01010 **Tread width** rear 59.1″ *(1500 mm)* to 83.1″ *(2112 mm)* front 2WD - 53.7″ *(1365 mm)* to 77.8″ *(1977 mm)*, FWA - 68.0″ *(1726 mm)* to 82.4″ *(2094 mm)* **Wheel base** 2WD - 90.0″ *(2286 mm)*, FWA - 92.5″ *(2350 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Nominal travel speeds mph *(km/h)*** first 1.27 *(2.05)* second 1.62 *(2.61)* third 1.91 *(3.07)* fourth 2.43 *(3.91)* fifth 3.50 *(5.64)* sixth 4.46 *(7.17)* seventh 5.21 *(8.39)* eighth 6.63 *(10.67)* ninth 7.82 *(12.58)* tenth 9.94 *(16.00)* eleventh 14.33 *(23.06)* twelfth 18.23 *(29.34)* reverse 1.91 *(3.07)*, 2.43 *(3.91)*, 7.82 *(12.58)*, 9.94 *(16.00)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1893 engine rpm and 1000 rpm at 1900 engine rpm **Unladen tractor mass** 2WD - 7230 lb *(3280 kg)*, FWA - 7765 lb *(3521 kg)*.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. The performance figures on this summary are taken from a test conducted under the OECD restricted standard test code procedure.

MAXIMUM POWER IN SELECTED GEARS

				6th (3LH) Gear					
55.8	5530	3.78	2224	15.0	0.570	12.18	180	75	29.9
(41.6)	*(24.6)*	*(6.09)*			*(0.347)*	*(2.40)*	*(82)*	*(24)*	*(101.3)*
				7th (1HL) Gear					
63.3	5240	4.53	2200	12.3	0.544	12.79	178	75	29.9
(47.2)	*(23.3)*	*(7.29)*			*(0.331)*	*(2.52)*	*(81)*	*(24)*	*(101.3)*
				8th (1HH) Gear					
65.8	4115	6.00	2200	7.7	0.526	13.25	180	77	29.9
(49.1)	*(18.3)*	*(9.66)*			*(0.320)*	*(2.61)*	*(82)*	*(25)*	*(101.3)*
				9th (2HL) Gear					
66.8	3485	7.19	2200	6.1	0.516	13.50	180	75	29.9
(49.8)	*(15.5)*	*(11.57)*			*(0.314)*	*(2.66)*	*(82)*	*(24)*	*(101.3)*
				10th (2HH) Gear					
66.2	2655	9.36	2200	4.7	0.521	13.35	180	73	29.9
(49.4)	*(11.8)*	*(15.07)*			*(0.317)*	*(2.63)*	*(82)*	*(23)*	*(101.3)*

TRACTOR SOUND LEVEL WITHOUT CAB	**dB(A)**
Maximum sound level in 6th (3LH) gear	98.0
Bystander in 12th (3HH) gear	88.0

CENTER OF GRAVITY

Horizontal distance forward from centerline of rear wheels	33.6" *(854 mm)*
Vertical distance above roadway	31.3" *(794 mm)*
Horizontal distance from center of rear wheel tread 0" *(0 mm)* to the right/left	

The following performance figures apply to the tractor equipped with a Front Drive Axle.

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
				Maximum Power—7th (1HL) Gear					
64.9	5030	4.84	2200	5.8	0.534	13.05	185	81	29.8
(48.4)	*(22.4)*	*(7.79)*			*(0.325)*	*(2.57)*	*(85)*	*(27)*	*(101.0)*
				75% of Pull at Maximum Power—7th (1HL) Gear					
51.1	3775	5.07	2251	4.4	0.559	12.44	181	77	29.8
(38.1)	*(16.8)*	*(8.16)*			*(0.340)*	*(2.45)*	*(83)*	*(25)*	*(101.0)*
				50% of Pull at Maximum Power—7th (1HL) Gear					
34.7	2520	5.18	2271	3.4	0.684	10.20	180	77	29.8
(25.9)	*(11.2)*	*(8.33)*			*(0.416)*	*(2.01)*	*(82)*	*(25)*	*(101.0)*
				75% of Pull at Reduced Engine Speed—9th (2HL) Gear					
51.1	3775	5.07	1499	4.4	0.450	15.48	180	77	29.8
(38.1)	*(16.8)*	*(8.16)*			*(0.274)*	*(3.05)*	*(82)*	*(25)*	*(101.0)*
				50% of Pull at Reduced Engine Speed—9th (2HL) Gear					
34.5	2520	5.13	1519	3.4	0.500	13.96	178	77	29.8
(25.7)	*(11.2)*	*(8.26)*			*(0.304)*	*(2.75)*	*(81)*	*(25)*	*(101.0)*
				MAXIMUM POWER IN SELECTED GEARS					
				5th (3LL) Gear					
60.5	7575	3.00	2218	15.0	0.554	12.59	183	79	29.8
(45.1)	*(33.7)*	*(4.82)*			*(0.337)*	*(2.48)*	*(84)*	*(26)*	*(101.0)*
				6th (3LH) Gear					
64.2	5915	4.08	2200	7.7	0.534	13.05	181	79	29.8
(47.9)	*(26.3)*	*(6.56)*			*(0.325)*	*(2.57)*	*(83)*	*(26)*	*(101.0)*
				7th (1HL) Gear					
64.9	5030	4.84	2200	5.8	0.534	13.05	185	81	29.8
(48.4)	*(22.4)*	*(7.79)*			*(0.325)*	*(2.57)*	*(85)*	*(27)*	*(101.0)*
				8th (1HH) Gear					
65.7	3910	6.30	2200	4.5	0.524	13.30	187	81	29.8
(49.0)	*(17.4)*	*(10.14)*			*(0.319)*	*(2.62)*	*(86)*	*(27)*	*(101.0)*
				9th (2HL) Gear					
65.3	3260	7.51	2200	3.9	0.531	13.10	181	79	29.8
(48.7)	*(14.5)*	*(12.09)*			*(0.323)*	*(2.58)*	*(83)*	*(26)*	*(101.0)*

We, the undersigned, certify that this is a true summary of data from OECD Reports No. **1109 & 1110,** Nebraska Summary 035/036, August 14, 1992.

LOUIS I. LEVITICUS
Engineer-in-Charge

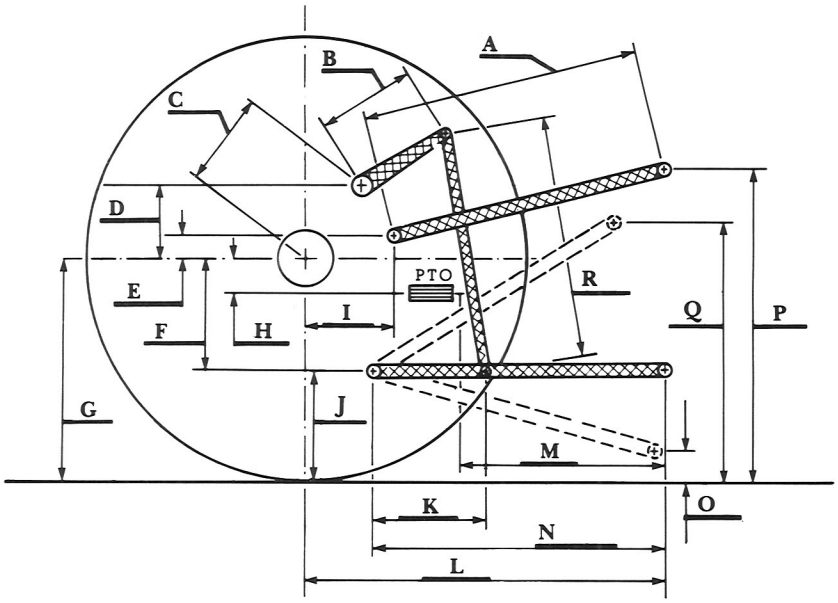
L. L. BASHFORD
R. D. GRISSO
K. VON BARGEN
Board of Tractor Test Engineers

TIRES AND WEIGHT		Tested Without Ballast Front Wheel Assist	2WD
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 8; 12 *(83)*	Two 18.4-34; 8; 12 *(83)*
Front Tires	—No., size, ply & psi *(kPa)*	Two 14.9-24; 6; 12 *(83)*	Two 10.0-16; 8; 26 *(179)*
Height of Drawbar		14.2 in *(360 mm)*	20.1 in *(510 mm)*
Static Weight	—Rear	4510 lb *(2045 kg)*	4490 lb *(2037 kg)*
	—Front	3255 lb *(1476 kg)*	2740 lb *(1243 kg)*
	—Total	7765 lb *(3521 kg)*	7230 lb *(3280 kg)*

THREE POINT HITCH PERFORMANCE (OECD STATIC TEST)

CATEGORY: II
Quick Attach: None

Maximum Force Exerted Through Whole Range:	4585 lbs *(20.4 kN)*
i) Opening pressure of relief valve:	NA
Sustained pressure of the open relief valve:	3480 psi *(240 bar)*
ii) Pump delivery rate at minimum pressure:	8.5 GPM *(32.3 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	8.1 GPM *(30.6 l/min)*
Delivery pressure:	3045 psi *(210 bar)*
Power:	14.3 Hp *(10.7 kW)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	*mm*
A	31.4	*797*
B	10.5	*267*
C	12.0	*304*
D	9.2	*233*
E	8.1	*205*
F	8.3	*212*
G	30.3	*770*
H	5.0	*128*
I	7.3	*186*
J	22.0	*558*
K	22.4	*568*
L	38.5	*978*
M	26.9	*682*
N	39.8	*1010*
O	7.9	*200*
P	42.1	*1068*
Q	34.8	*883*
R	28.5	*725*