



SERVICE MANUAL

**TRACTOR
BM 35-36**

**SECTION 13
SPECIFICATIONS**

ARTIFABLAGET
BOLINDER-MUNKTELL

ESKILSTUNA • SVERIGE

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Important

N. B. To avoid beforehand any possible confusion which may arise regarding the points and commas in the decimal figures in this book, we wish to point out that the **CONTINENTAL** system is used and not the English and American, i.e.

and	0.1 = 1/10	0.00 = 1/100
	1.000 = One	1.000 = One thousand

However, with typical English measurements, such as inches, the **ENGLISH** system is used, i.e. .001" and not 0.001"

GENERAL INFORMATION

Weights

	DM 35	DM 36
Traction, standard, with rubber spurs	2620 kg (5780 lb.)	2660 kg (5862 lb.)
Traction, with steel weights (2 on the front, 3 at the rear) ..	2910 kg (6410 lb.)	2930 kg (6470 lb.)
Traction, with 75% liquid in tank	2970 kg (6547 lb.)	2990 kg (6595 lb.)
Traction, with 100% liquid in tank	3130 kg (6904 lb.)	3160 kg (6962 lb.)
Traction, with steel weights and 75% liquid in tank	3220 kg (7104 lb.)	3240 kg (7152 lb.)
Traction, with steel weights and 100% liquid in tank	3420 kg (7535 lb.)	3450 kg (7610 lb.)
Traction, fitted with a pulley and power takeoff will have an additional weight of	75 kg (165 lb.)	75 kg (165 lb.)
Traction, fitted with a hydraulic lift will have an additional weight of	130 kg (287 lb.)	135 kg (298 lb.)
Wheel weights, weight each, front	37 kg (81 1/2 lb.)	37 kg (81 1/2 lb.)
rear	30 kg (66 lb.)	30 kg (66 lb.)
Wheel type	2900 mm (77")	2910 mm (73")
Track, front (adjustable)	1560 mm (49 1/2")	1580 mm (50 1/2")
rear	1440 mm (47")	1460 mm (45 1/2")
Track, rear (adjustable)	1480 mm (47")	1500 mm (47 1/2")
1500 mm (49")	1520 mm (48")	1540 mm (49 1/2")
1560 mm (51")	1600 mm (50 1/2")	1620 mm (52")
1700 mm (55 1/2")	1640 mm (53 1/2")	1660 mm (55 1/2")
1800 mm (55 1/2")	1700 mm (55 1/2")	1720 mm (57 1/2")
1900 mm (59 1/2")	1800 mm (59 1/2")	1820 mm (61 1/2")
Running circle diam. (with narrowest front track)	7000 mm (231")	6900 mm (226")
Total length	10400 mm (341")	10300 mm (338")
Total width	1700 mm (55 1/2")	1700 mm (55 1/2")
Total height	2090 mm (68 1/2")	2110 mm (69 1/2")
Ground clearance, front axle	315 mm (12 1/2")	320 mm (12 1/2")
engine	330 mm (12 1/2")	330 mm (12 1/2")
tractor	420 mm (16 1/2")	420 mm (16 1/2")

ENGINE

General

Type designation	5025
Output at 1500 r.p.m.	40 h.p.
(Output (max.) at 1500 r.p.m.)	42 h.p.
Torque (max.) at 1100 r.p.m.	27 kgm (222 lb.-ft.)
Number of cylinders	3
Bore	70.4/77 mm (4 1/2")
Stroke	100 mm
Displacement	3.26 liters
Compression ratio	16.5:1
Compression pressure at 150—400 r.p.m.	40—50 kg/cm ² (527 p.s.i.)
Maximum engine speed	1700 r.p.m.
Idle speed	600—800 r.p.m.

Cylinder Block

Fitted with wet-type liners

Material Cast-iron

Cylinder liners

Replaceable wet-type liners

Material	Special alloy cast-iron
Bore	104.77 mm (4 1/8")
Wall, lower end	Roller rings
Number per cylinder	2
Diameter	114.9—115.7 mm
Thickness	3.2—4.2 mm

Pistons

Material	Alight alloy
Weight, Piston	1.080 gramme
Specialfield	1.080 gramme
Total height	145 mm
Height from center of gudgeon pin to top of piston	85.4—85.3 mm
Piston clearance, Piston	0.06—0.12 mm
Specialfield	0.11—0.12 mm

Piston rings

Compression rings

Chamber upper ring	
1 (chamber, lower chamber turned upwards) height	2.362—2.375 mm
Ring clearance in groove	0.009—0.017 mm
2 (marked "Up", this side faces upwards)	3.137—3.149 mm
Ring clearance in groove	0.004—0.002 mm
Ring gap clearance measured in ring opening	0.33—0.361 mm

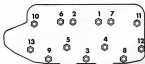
Oil control rings

1, height	6.715—6.731 mm
Ring clearance in groove	0.050—0.076 mm
Ring gap clearance measured in ring opening	0.33—0.361 mm

Gudgeon pins

Fully floating in both piston and connecting rod, circlip in piston at each of gudgeon pin.

Material	Case-hardened special steel
Fit in connecting rod (normal temperature — 10° ± 104° F)	Push fit
Fit in piston (piston heated to 80—100° C (176—212° F))	Push fit
Diameter, standard	10 mm



(IN PRESS)

Fig. 1. Order of tightening cylinder head nuts when fitting the cylinder head.

Cylinder head

Material	Alloy cast-iron
Height	100 mm
Tightening torque	See page 8

Crankshaft

Replaceable bearing shells in main and connecting rod bearings	
Number of main bearings	4
Crankshaft axial clearance	0.15—0.25 mm

Main bearing journals

Diameter, standard	60.528—60.530 mm
undersize $.01^{\circ}$	60.514—60.526 mm
" " $.02^{\circ}$	60.500—60.512 mm
" " $.03^{\circ}$	60.486—60.498 mm
" " $.04^{\circ}$	60.472—60.484 mm
" " $.05^{\circ}$	60.458—60.470 mm

Main bearing journal width (distance between webs)

Standard	51.915—50.925 mm
Oversize 0.1 mm (undersize shell, $.01^{\circ}$)	50.915—50.925 mm
0.2 mm " " " $.02^{\circ}$	50.915—50.925 mm
0.3 mm " " " $.03^{\circ}$	50.915—50.925 mm
0.4 mm " " " $.04^{\circ}$	50.915—50.925 mm
0.5 mm " " " $.05^{\circ}$	50.915—50.925 mm

Connecting rod bearing journals

Diameter, standard	49.831—49.830 mm
undersize $.01^{\circ}$	49.817—49.816 mm
" " $.02^{\circ}$	49.803—49.802 mm
" " $.03^{\circ}$	49.789—49.788 mm
" " $.04^{\circ}$	49.775—49.774 mm
" " $.05^{\circ}$	49.761—49.760 mm

Flywheel

Permissible axial flare at 170 mm ($6\frac{1}{2}$ ") radius	Max. 0.04 mm (.001")
Flywheel ring gear for starter motor	142 teeth

Flywheel housing

Permissible axial flare	Max. 0.08 mm (.003")
radial flare	Max. 1.25 mm (.050")

Connecting rods

Fitted with replaceable bearing shells	
Material	Special steel

Main and connecting rod bearings

Main bearing shells

Material	Steel, lead bronze lined shells
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Width, standard	2.905	2.905 mm
medium	2.902	2.902 mm
" 20"	2.878	2.878 mm
" 30"	2.860	2.860 mm
" 40"	2.833	2.833 mm
" 50"	2.806	2.806 mm
" 60"	2.779	2.779 mm
Width (lower, rolled element)	2.690	2.690 mm

Decorative red beading shell.

[illegible]

100

Camshaft		Drop-forged, quenched and tempered
Material	.....	5
Drive	.....	64, 76, 88, 100 mm
Number of bearings	.....	68, 80, 92, 104 mm
Forward bearing journal, diameter	.....	58, 70, 82, 94 mm
Forward bearing journal, diameter	.....	6,5 — 9,5 mm (0.254 — 0.375")
Rear bearing journal, diameter	.....	6,5 — 9,5 mm (0.254 — 0.375")
Acid diameter	.....	10,000 — 10,000 mm (0.3937 — 0.3937")
Radial clearance, forward bearing	.....	0,005 — 0,020 mm (0.0002 — 0.0008")
Radial clearance, rear bearing		0,005 — 0,020 mm (0.0002 — 0.0008")
.....		0,005 — 0,020 mm (0.0002 — 0.0008")
.....		0,005 — 0,020 mm (0.0002 — 0.0008")

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Bearings are replaceable		
Material		Steel with ball bearings
Forward bearing, diameter		64,102-64,791 mm
Caster bearing, diameter	.....	66,296-66,779 mm
Rear bearing, diameter	.....	70,896-70,911 mm

Timeline 2016

Timing gears	
Crankshaft gear	37 teeth
Camshaft gear	74 teeth
Camshaft gear for fuel injection pump	42 teeth
Drive gear, fuel injection pump	42 teeth
Drive gear, lubricating oil pump	26 teeth

Twisted Shank dimensions	
Camshaft gear — lubricating oil pump gear	0.30—0.50 mm (0.012—0.020)
Crankshaft gear — camshaft gear	0.10—0.15 mm (0.004—0.006)
Camshaft gear — drive gear, fuel injection pump	0.10—0.20 mm (0.004—0.008)
Rotation for fuel injection pump shaft	Full turning

Valve system

Valves

Clearance between valve plate and cylinder head level 0.4—0.7 mm (.015"—.025")

Inlet valve

Material Special steel
 Plate diameter 41 mm
 Stem diameter 10.575—11.000 mm
 Valve seat angle 45.2°
 Seat angle in cylinder head 45°
 Seat width in cylinder head 1.5 mm (.059")
 Clearance, valve stem—guide 0.022—0.080 mm
 (.0009"—.0031")

Clearance for inspection of camshaft setting (cold engine):

Inlet valve should open R.T.B.C. at check clearance 18°/8.7 mm (.01")
 Valve clearance, warm engine 0.40 mm (.016")

Exhaust valve

Material Special steel with stainless-steel seat and stem end.
 Plate diameter 35 mm
 Stem diameter 10.575—10.984 mm
 Valve seat angle 45.2°
 Valve seat angle in cylinder head 45°
 Seat width in cylinder head 1.5 mm (.059")
 Clearance, valve stem—guide 0.040—0.102 mm
 (.0016"—.004")
 (.0009"—.0031")
 Valve clearance (warm engine) 0.41 mm (.016")

Valve seats

Valve seat for inlet valve

Diameter, standard (measurement A) 41.843—41.909 mm
 .01" oversize 41.917—41.943 mm
 Height (measurement B) 3.30—4.00 mm

Position for valve seat, inlet valve:

Diameter, standard (measurement C) 41.987—41.913 mm
 .01" oversize 41.944—41.967 mm
 Height (measurement D) 2.3—3.4 mm

Valve seat for exhaust valve:

Diameter, standard (measurement A) 41.843—41.909 mm
 .01" oversize 41.917—41.943 mm
 .02" " " 41.971—41.997 mm
 .03" " " 41.875—41.851 mm
 Height (measurement B) 12.815—12.112 mm

Position for valve seat, exhaust valve:

Diameter, standard (measurement C) 41.987—41.913 mm
 .01" oversize 41.944—41.967 mm
 .02" " " 41.491—41.473 mm
 .03" " " 41.159—41.173 mm
 Height (measurement D) 12.15—12.25 mm
 Bottom radius of position (measurement E) 0.8 mm (.03")



Fig. 1. Diagram of valve seat and position for valve seat.

Valve guides

Length, inlet valve guide	84 mm
valvetrain valve guide	92 mm
Inner diameter	11.938—11.959 mm
Height over cylinder head spring level	35 mm

Valve springs

Tightly wound at one end. This end faces downwards.

Length, unloaded	about 70 mm (2.76")
loaded with 14.0±0.2 kg (31±0.5 lb.) 45±0.2 kg (100±0.50 lb.)	51 mm (2.00") 57 mm (2.25")
Rockers arm shaft, diameter	20.038—20.062 mm
locking, cranked to	Push fit
Push rods to be straight, within	0.4 mm (.00")

Lubricating system

Type	Pressure lubrication
Lubricating oil pump, type (driven by crankshaft)	Gear
machined flank clearance	0.10—0.15 mm (.004"—.01")
number of teeth on drive gear	25
Relief valve spring	
Length, unloaded	about 32 mm (2.04")
loaded with 4.0±0.2 kg (9±0.5 lb.)	24 mm (0.95")
oil pressure	5—4 kg (40—37 p.s.i.)
Lubricating oil, type	Shell engine oil, Service (S)
viscosity, summer	SAE 20 or 30 W
winter	SAE 15 or 10 W

Early production, (up to engine No. 11500—1000)

Lubricating oil filter	Auto-Clean X 290 B20
oil capacity	6 litres (1 1/2 Imp. galts.)

Late production (engine No. 11500—1000 onwards)

Lubricating oil filter	Fleet Full Flow F100A002
oil capacity	5.5 litres (1 Imp. galts.)

Fuel system

Fuel tank, capacity	45 litres (10 1/2 Imp. galts.)
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Fuel injection equipment

Early production (up to and including Engine No. 11500—1000)

Fuel injection pump	Injector P100R0120
Direction of rotation (viewed from coupling)	Clockwise
Order of injection	1-2-4
Setting	20° B.T.D.C. *
Coupling	Injector KO 4 01
Pump plungers, diameter	6 mm
Amount of fuel injected at 1100 r.p.m. and full load (litres)	55/61 mm ³ /stroke
Control/governor	Injector P100R0102
Fuel feed pump	Injector PM 10
Fuel feed pressure	1.5—2.8 kg/cm ² (21 1/2—20 1/2 p.s.i.)
Overhaul valve	Injector PL 15C Y050
Opening pressure	1.0—1.5 kg/cm ² (14—19 1/2 p.s.i.)

* Engine No. 11500—1000 onwards — 20° B.T.D.C.

Fuel filters

1st filter, type	Injector FL 3.5
2nd filter, (double), type	Boach FJ100 2.5
Nozzle holders	Injector SP 40 1.5 100
Nozzles	Injector SL 3 1.5 10
Injector opening pressure	130—140 kg/cm ² (1850—2000 p.s.i.)
Permissible fall of pressure when testing (125—140 kg/cm ² [1787—1912 p.s.i.])	25 kg/cm ² (350 p.s.i.) in 2—20 seconds

Late production (Engine No. 11500—4001 onwards)

Fuel injection pump	Boach PSCB047000S 1002 15
Direction of rotation (viewed from coupling)	Clockwise
Order of injection	1—2—3
Setting	30° B.T.D.C.
Coupling	Boach 20K 76 10 24/34
Pump plunger, diameter	8 mm
Amount of fuel injected at 1500 r.p.m. and full load (range)	45—47 mm ³ /stroke
Centrifugal governor	Boach 8025 500—500 B 100
Fuel feed pump	Boach 870K 23 B 161/2
Fuel feed pressure	1.5—2.0 kg/cm ² (21½—29½ p.s.i.)
Overflow valve	Boach 827K 178 8 1 Z
Opening pressure	1.0—1.5 kg/cm ² (14—19½ p.s.i.)

Fuel filters

1st filter, type	Boach FJ100K 11/3
2nd filter, (double), type	Boach FJ100 2.5
Nozzle holders	Boach K81 165 5 15/15
Nozzles	Boach 881A 150 5 40
Injector opening pressure	130—140 kg/cm ² (1850—2000 p.s.i.)
Permissible fall of pressure when testing (125—140 kg/cm ² [1787—1912 p.s.i.])	25 kg/cm ² (350 p.s.i.) in 2—20 seconds

Cooling system

Type	Pressure system
Capacity	about 15 litres (3½ imp. galls.)
Pressure cap starts to open at	0.38—0.45 kg/cm ² (5.4—6.4 p.s.i.)
Thermostat marked	165
type	Balanced (does not open for water pump pressure)
starts to open at	55° C (131° F)
fully open at	85° C (185° F)
Radiator hose, upper	1½" × 150 mm
lower	1½" × 65 mm

Wear tolerances

Cylinders

Cylinder liners, pistons and piston rings should be replaced at 0.30—0.40 mm (.0118"—.0157") wear or when out-of-round to a degree of about 0.09 mm (.0035").

Crankshaft

Main bearing journals, permissible out-of-roundness	0.075 mm (.0030")
taper	0.05 mm (.0020")
Connecting rod bearing journals, permissible out-of-roundness	0.075 mm (.0030")
Connecting rod bearing journals, permissible taper	0.05 mm (.0020")
Maximum axial clearance in crankshaft	0.25 mm (.010")

Valves	0.82 mm (.032")
Valve stem, permissible wear	
Permissible clearance between valve stem and valve guide	
Intake valve	0.10 mm (.004")
Exhaust valve	0.17 mm (.007")
Valve plate edge should be at least	1.8 mm (.071")
Camshafts	
Timing journals, permissible axial clearance with new bushings	0.82 mm (.032")
Bushings, permissible wear	0.82 mm (.032")

Tightening torques

Main bearing	18 kgm (137 lb. ft.)
Crankshaft bearing	12 kgm (94 lb. ft.)
Flywheel	37 kgm (278 lb. ft.)
Cylinder head	17.5 kgm (125 lb. ft.)

CLUTCH

Type	Single-plate dry disc
Number of clutch springs	26
Length of clutch springs	
Delivered	about 56.2 mm (2.213")
Loaded with 49.4 N kg (112.1 lb./in. lb.)	92 mm (3.62")
Distance between clutch lever contact surfaces for thrust washer and flywheel	52 mm (2.05")
Clutch levers to be adjusted to the above-mentioned measurement (52 mm) with 1.5 mm (.06") and with one another within 0.25 mm (.010").	
Clutch pedal free-play	about 52 mm (2")
Mass for spacer, thickness	282" (9.4506 mm)
.....	283" (9.4576 mm)
.....	284" (9.4646 mm)
.....	285" (9.4716 mm)
.....	286" (9.4786 mm)
.....	287" (9.4856 mm)
.....	288" (9.4926 mm)
Clutch plate, outer diameter	18"
friction surface	about 620 cm ² (71 sq. in.)
thickness in assembled condition	9 mm (.315")
Rivets for clutch lining	
Number of rivets	26
Size	5/16" (7/32") (2.07/1.94 mm)

GEARBOX WITH REAR AXLE GEARS

Gearbox

Type	2 speeds and reverse
Construction	
1st speed	4.40:1
2nd speed	4.22:1
3rd speed	3.83:1
4th speed	3.43:1
5th speed (direct)	1:1
Reverse	4.78:1
Number of teeth on the various gears	
Main drive pinion	23

Countershaft:	
Drive gear	40
Gear for 1st speed	21
2nd speed	39
3rd speed	26
4th speed	46
Main shaft:	
Gear for 1st speed	50
2nd speed	44
3rd speed	37
4th speed	37
Rear axle:	
Gear for spur reduction gears	21 and 27
Lubricating oil, type	Gearless oil
viscosity, summer and winter	SAE 90
Oil capacity (including rear axle gear)	about 35 liters (17½ Imp. pints)

Rear axle gear

Type	Bevel gear, the pinion is fixed with the centre of the crown wheel
Number of teeth, pinion	9
Number of teeth, crown wheel	32
Gear ratio	3.55:1 (76.3%)
Tooth clearance, pinion—crown wheel	0.25—0.25 (0.009" — 0.01")
Addendum of crown wheel at 200 mm diameter	0.04 mm (0.0015")
Thin for bearing shims, thickness	0.10, 0.25 and 1.0 mm (0.0039", 0.0098" and 0.039")
Tightening torque:	
Bolts for crown wheel and differential housing	7 kgm (65 lb. ft.)

Spur reduction gears for rear wheels

Type	Cylindrical gear
Gear ratio	5.00:1 (96.1%)
Tooth flank clearance	0.25—0.25 mm (0.01" — 0.01")
Lubricating oil, type	Gearless oil
viscosity, summer and winter	SAE 90
Oil capacity	2.15 litres (5 Imp. pints)

Total ratio

1st speed	198:1
2nd speed	56:1
3rd speed	31.2:1
4th speed	29.5:1
5th speed	16:1
Reverse	35:1

Speeds

Speed at 1500 r.p.m. (with hand throttle fully open)

	100 cc	125 cc
1st speed	2.6 kmph. (1.6 mph.)	3.7 kmph. (2.3 mph.)
2nd speed	4.9 kmph. (3.0 mph.)	5.5 kmph. (3.4 mph.)
3rd speed	7.2 kmph. (4.5 mph.)	7.8 kmph. (4.8 mph.)
4th speed	12.8 kmph. (7.9 mph.)	13.6 kmph. (8.4 mph.)
5th speed	20.5 kmph. (12.7 mph.)	22.2 kmph. (13.8 mph.)
Reverse	4.4 kmph. (2.7 mph.)	4.7 kmph. (2.9 mph.)

Speed at 1000 r.p.m. (with foot throttle fully open)

	BMW 33	BMW 36
1st speed	4.7 kmph. (2.9 mph.)	4.8 kmph. (2.7 mph.)
2nd speed	5.9 kmph. (3.6 mph.)	6.0 kmph. (3.7 mph.)
3rd speed	8.6 kmph. (5.3 mph.)	9.0 kmph. (5.6 mph.)
4th speed	12.1 kmph. (7.5 mph.)	14.5 kmph. (9.0 mph.)
5th speed	19.6 kmph. (12.2 mph.)	26.7 kmph. (16.6 mph.)
Reverse	3.3 kmph. (2.0 mph.)	3.6 kmph. (2.2 mph.)

Power take-off (Extra equipment)

Shaft diameter	1 7/8" 5 splines
Rev. at 1500 engine r.p.m.	2.60 r.p.m.

Fulley gear (Extra equipment)

Fulley output at 1500 engine r.p.m. (fully open hand throttle)	23 b.h.p.
Fulley speed at 1500 engine r.p.m.	1000 r.p.m.
Roll speed at 1500 engine r.p.m.	13.2 m/sec. (29 ft. 10 in./second)
Fulley diameter	230" mm (9.01")
width	(60" mm (2.3"))
Number of teeth, drive gear	20
pulley drive gear	24
Lubricating oil type	Castrol oil
viscosity, summer and winter	SAE 90
Oil capacity	1.2 litres (2 1/2 Imp. pints)

Towing hook

Towing hook power	about 20 b.h.p.
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FRONT AXLE AND STEERING GEAR

Front axle

Type	Tubular shaft
Front wheel alignment:	
Center	2"
Camber	1° to 2.5°
Kingpin inclination	7°
Toe-in	9-13 mm (3/8"-1/2")
Toe-out:	

When the inner wheel is turned 20°, the outer wheel should be turned 30° 20'

Steering gear

Type	Cam and lever
Number of steering wheel turns from lock to lock	2 1/2
Gear ratio, neutral position	1 to 10
outer position	1 to 10
Stress for steering bearing bearing	9.85, 9.00 and 6.25 mm (.392", .354" and .248")
Lubricating oil type	Castrol oil
viscosity	SAE 90
Oil capacity	8.72 litres (1 1/2 Imp. pints)

BRAKES

Mechanical, with two pedals for obtaining steering braking

Brake drum diameter 200 mm

Brake lining

Type

Friction

Size

57 x 226 x 222 mm

Brake for brake lining

Number of shoes

32

Size

5/8" x 13.7 mm

Field free-pipe

10—12 mm (about 5/16")

The handbrake operates on the left-hand steering brake

WHEELS AND TYRES

Wheels

	194-20	194-20
Front wheels, type	Disc wheels	Disc wheels
size	1400—18"	1400—18"
cast-aluminium, max.	3.2 mm (5/16")	3.2 mm (5/16")
side flange, max.	3.2 mm (5/16")	3.2 mm (5/16")
Rear wheels, type	Disc wheels	Disc wheels
size	1700—20"	1700—20"
cast-aluminium, max.	4.0 mm (5/16")	4.0 mm (5/16")
side flange, max.	4.0 mm (5/16")	4.0 mm (5/16")
Number of wheel revolutions per km (miles)	242 (144)	222 (140)

Tyres

Size, front	4.00—18"	4.00—18"
rear	11—20"	11—20"

Tyre pressure

	Front	Rear
With standard equipment	1.2 kg/cm ² (21.4 psia)	0.8 kg/cm ² (11.4 psia)
With wheel weights	1.0 kg/cm ² (14.7 psia)	0.6 kg/cm ² (8.7 psia)
With wheel weights and 21% liquid in tyres	0.8 kg/cm ² (11.4 psia)	0.4 kg/cm ² (5.7 psia)
With wheel weights and 50% liquid in tyres	1.0 kg/cm ² (14.7 psia)	0.6 kg/cm ² (8.7 psia)
Tractors, fitted with a hydraulic lift, pulley and power take-off, increase tyre pressure by	0.2 kg/cm ² (2.9 psia)	0.2 kg/cm ² (2.9 psia)

Anti-freeze

The quantity of water and calcium chloride which is required to obtain an anti-freeze mixture suitable for temperatures down to —32° C (—24° F)

	Tyres, mm	Water	Calcium chloride	Weight (metric per ton)
21% full	4.00—18"	10.5 litres (27% imp. galts)	4.5 kg (10 lb.)	11 kg (24 lb.)
	11—20"	14.0 litres (37 imp. galts)	6.0 kg (13 lb.)	20.4 kg (45 lb.)
	11—20"	15.0 litres (39% imp. galts)	6.0 kg (13 lb.)	20.9 kg (46 lb.)
50% full	4.00—18"	11.0 litres (29% imp. galts)	4.5 kg (10 lb.)	15.5 kg (34 lb.)
	11—20"	15.0 litres (39% imp. galts)	7.0 kg (15 lb.)	22.0 kg (48 lb.)
	11—20"	22.0 litres (58% imp. galts)	9.0 kg (20 lb.)	31.0 kg (68 lb.)

ELECTRICAL SYSTEM

Voltage	12 volts
Accumulator	
Type	Bosch GAD6C or equivalent
Number of accumulators	1
Negative pole	Earth
Voltage	12 volts
Accumulator capacity, standard	100 amp-hours
Electrolyte specific gravity, fully charged accumulator	1.275—1.285
Electrolyte specific gravity, when recharging is necessary	1.250

Dynamo with charging control

Negative pole, method	
Dynamo, type	Bosch 95C 120/12 622 B 203
Charging control, type	Bosch 95C 120—100/122
Voltage	12 volts
Output	120 watts
Carbon brush, designation	168, 292
number	2
contact surface pressure	0.6—0.7 kg (1.3—1.5 lb.)

Electrical test values

Control voltage when idling	14.0—15.5 volts
Cable speed	780±50 rpm.
Loading and engine speed with:	
Cold dynamo	120 watts, 870 rpm.
Warm dynamo	120 watts 840 rpm.
Control current to be adjusted to	12.1 amps.
Resistance in field coil	6—6.4 ohms.

Starter motor

Type	Bosch 0790 4/12 CR 205
Voltage	12 volts
Output	4 kilop.
Number of teeth on drive gear	9
Carbon brush, designation	415K1 L1
number	4
contact surface pressure	1.2—1.5 kg (2.6—3.3 lb.)

Mechanical test values

Drive gear axial clearance	0.5—0.5 mm (0.002—.001")
idling torque	7.5—10.5 kgms
Overload protection	15—16 kgms
Armature shaft movement	10.5—26.0 mm
Armature shaft movement, before release of yoke lever	11.2—12.0 mm
Tension of armature shaft return spring	5.5 kg (11½ lb.)
Distance between gear and ring gear	3—4 mm (1/16"—1/8")

Electrical test values

Starter motor when idling:	
Voltage	11.5 volts
Amperage	100—120 amps.
Speed	5000—4500 rpm.

Starter motor when loaded:

Voltage	8.1 volts
Amperage	650—750 amps.
Speed	1450—1550 r.p.m.

Starter motor short-circuited (locked armature shaft):

Voltage	4.7 volts
Amperage	1250—1300 amps.

Fuses**Fuse box fitted on instrument cluster**

Number of fuses	5
Fuses, rated amperage	15 amps.

Bulbs

	Watts	Socket
Headlights	35/55	BA 20-d
Rear lights	5	BA
Charging control lamp	1.5	BA 9+
Instrument lighting	1.5	BA 9+

Headlight alignment

The beams are adjusted on a wall at a distance of 10 m (32 ft.)

Vertical adjustment	75 mm (3") below the headlight horizontal centre line
Horizontal adjustment	20 mm (3") outwards from the headlight vertical centre line

LUBRICATION**Engine**

Lubricating oil, type	Shellomarine oil ("ServiceOil")
Viscosity, summer	SAE 20 or 30 W
winter	SAE 10 or 10 W

Oil capacity, including oil filter:

Up to and including Engine No. 11580—12499	11 litres (1 1/2 imp. galts.)
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Oil capacity, including oil filter:

Engine No. 11580—12499 onwards	9.5 litres (2 imp. galts.)
Fuel injection pump	Same oil as in engine
Air filter	Used engine oil

Gears, rear axle gears and pulley gear

Lubricating oil, type	Gearbox oil
Viscosity, summer and winter	SGL 90
Oil capacity, gearbox	about 14 litres (3 1/2 imp. galts.)
rear wheel gears, each side	2.75 litres (3 imp. pints)
	per side
pulley gear	1.5 litres (2 1/2 imp. pints)

Steering gear

Lubricating oil, type	Gearbox oil
Viscosity, summer and winter	SGL 90
Oil capacity	about 8.75 litres (1 1/2 imp. pints)

