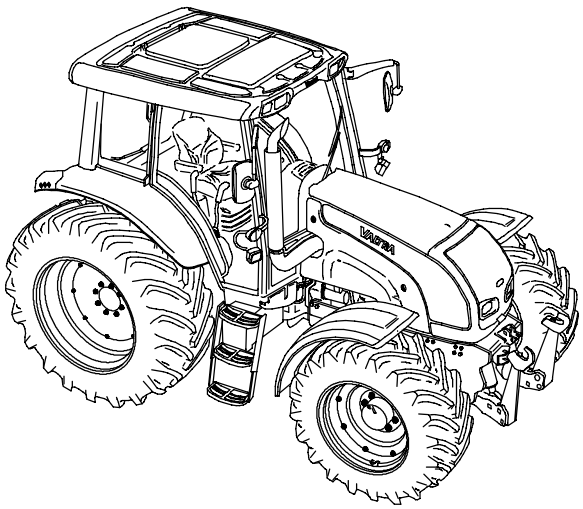
VALTRA

N82h – N92h
N91c – N111c
N91h – N141h
$N121_{LS}$, $N141_{LS}$



Service Manual

Tractors

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Order no 39 225 212
ENGLISH

10. General

To the reader

The Service Manual is intended to be a practical reference source to be used in workshop. The repair instructions in the manual are based on methods which have been worked out in practice during normal workshop conditions and which are based on the use of special tools from the manufacturer when stated in the instructions. The manual also contains descriptions of the design and function of the components.

Detailed maintenance instructions can be found in Operator's Manual.

The Service Manual will be continually updated with new revised pages which should be inserted in the manual. Alterations and additions will first appear as service bulletins.

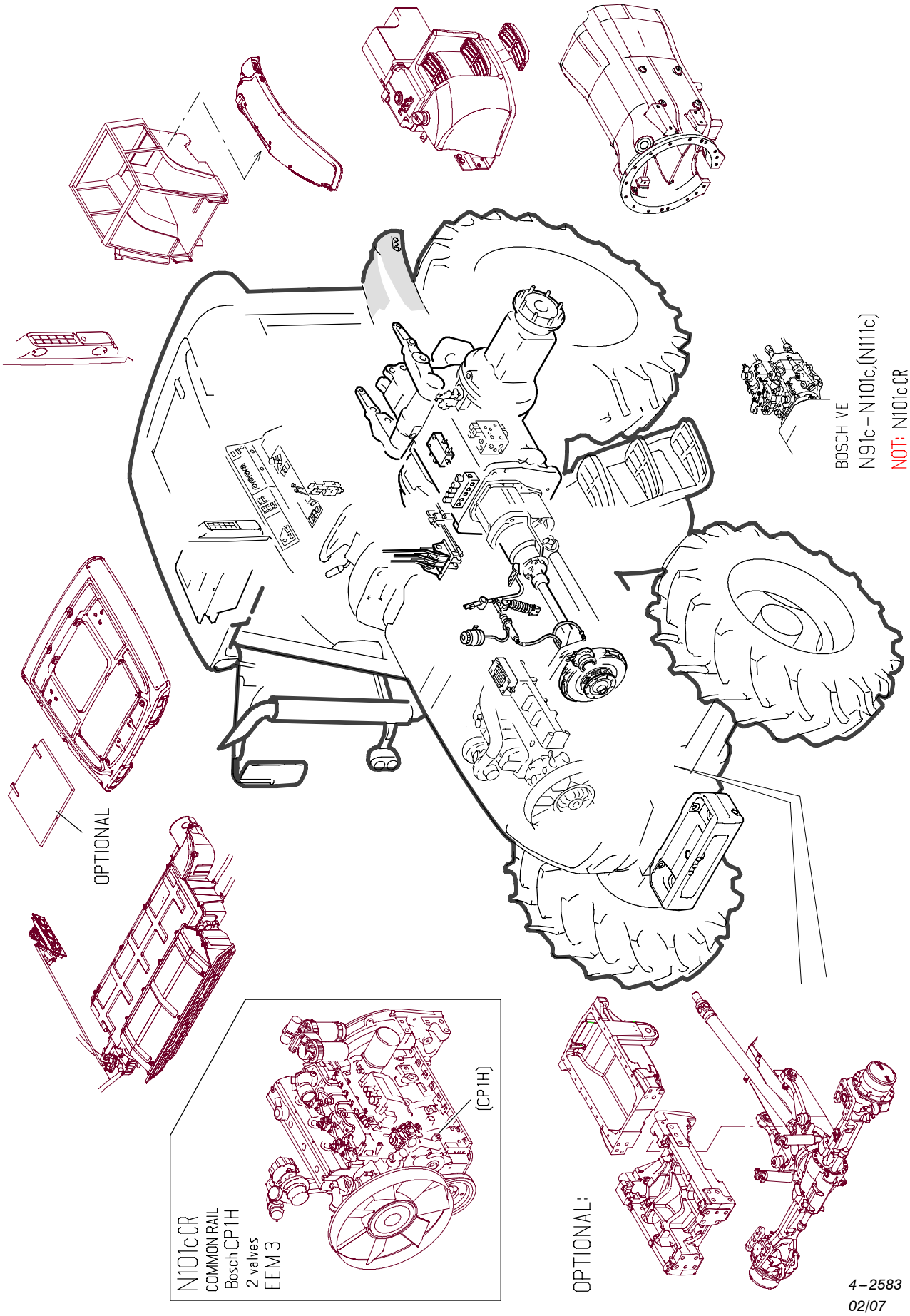
Only genuine Valtra spare parts should be used to ensure the best possible function of the machine. Certain operations should be carried out with the aid of special tools designed by Valtra.

Valtra Inc.
Tractor Service

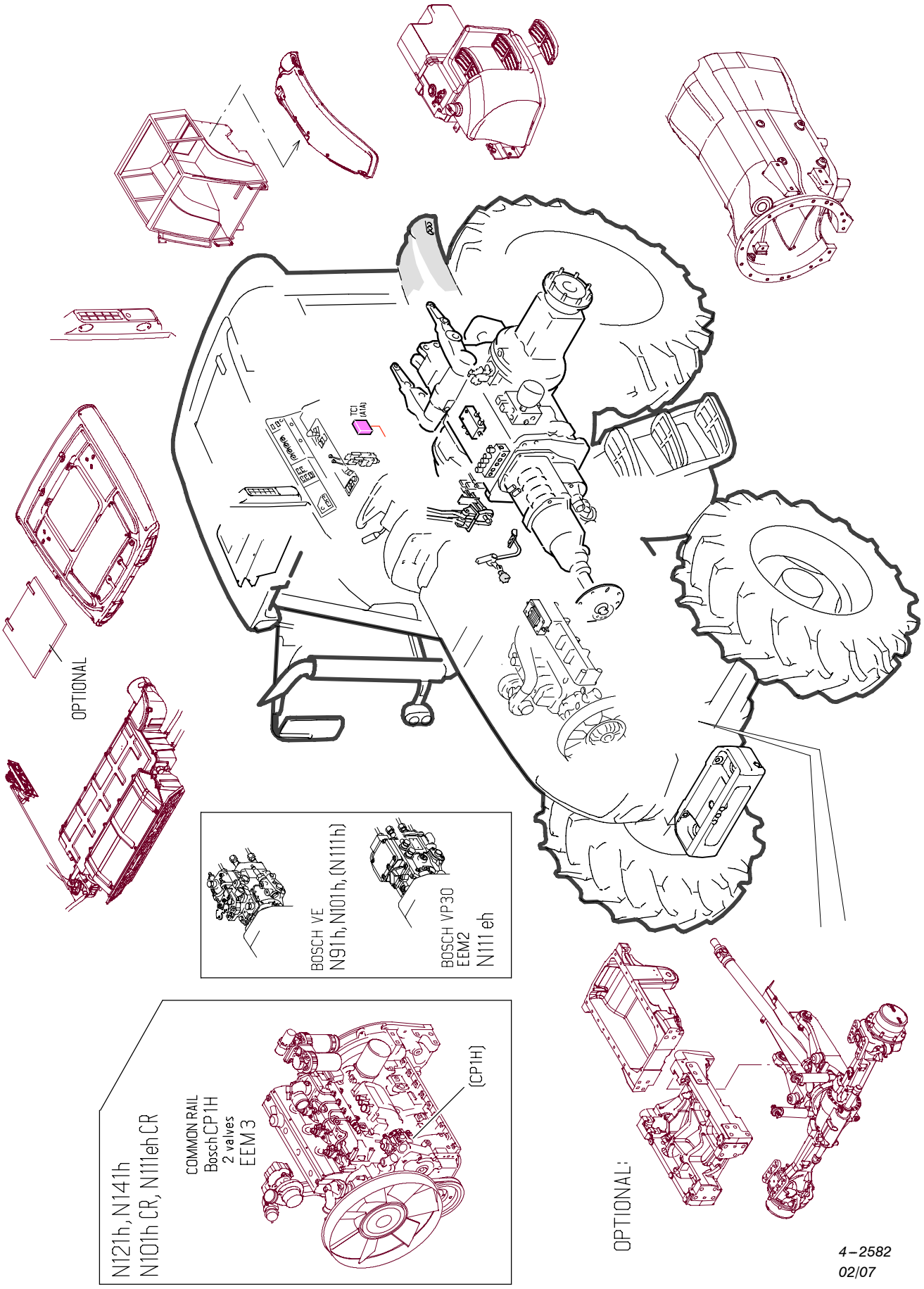
Contents

General

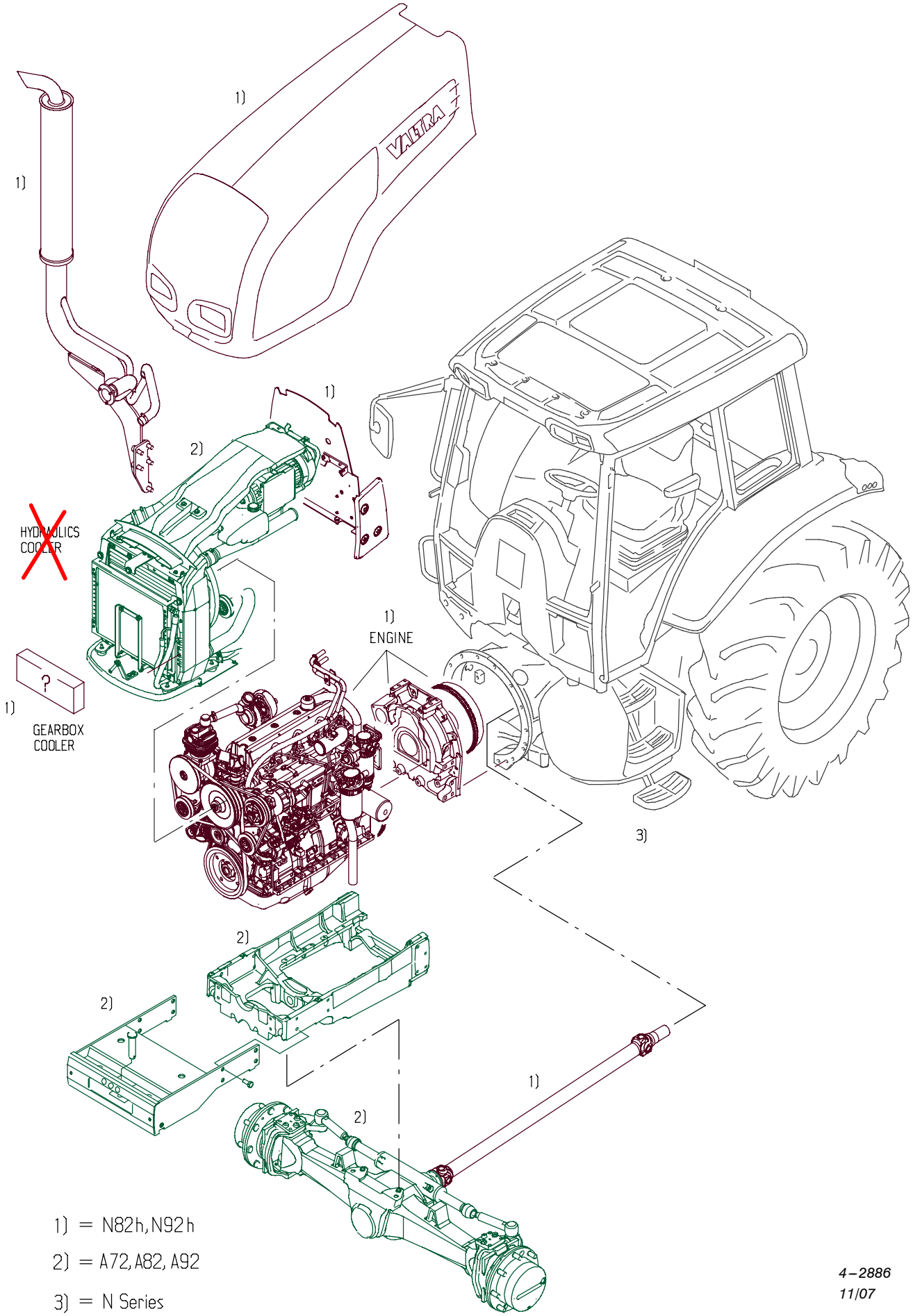
N series tractor (c–model)



N series tractor (h–model)

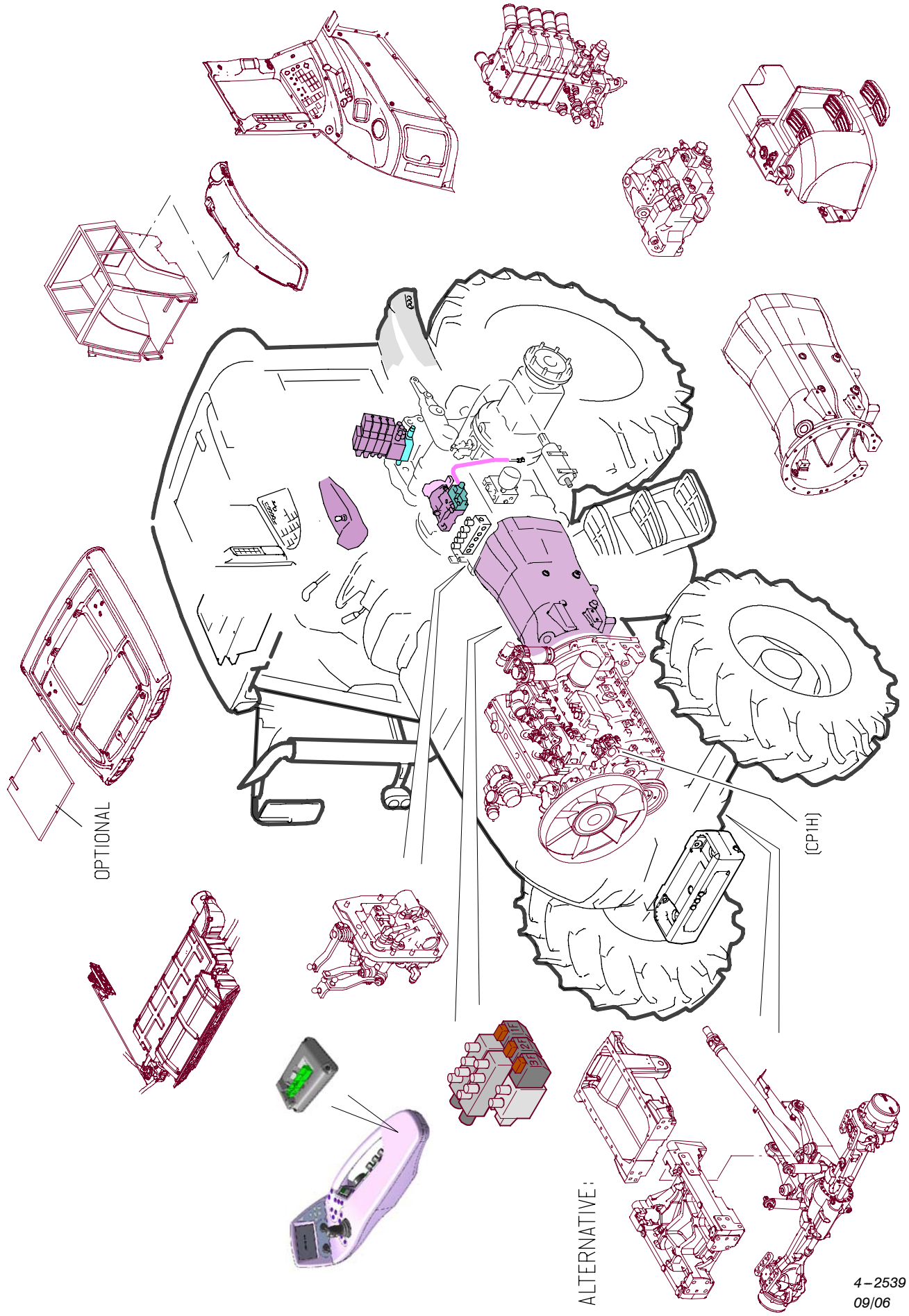


N series tractor (N82h, N92h)

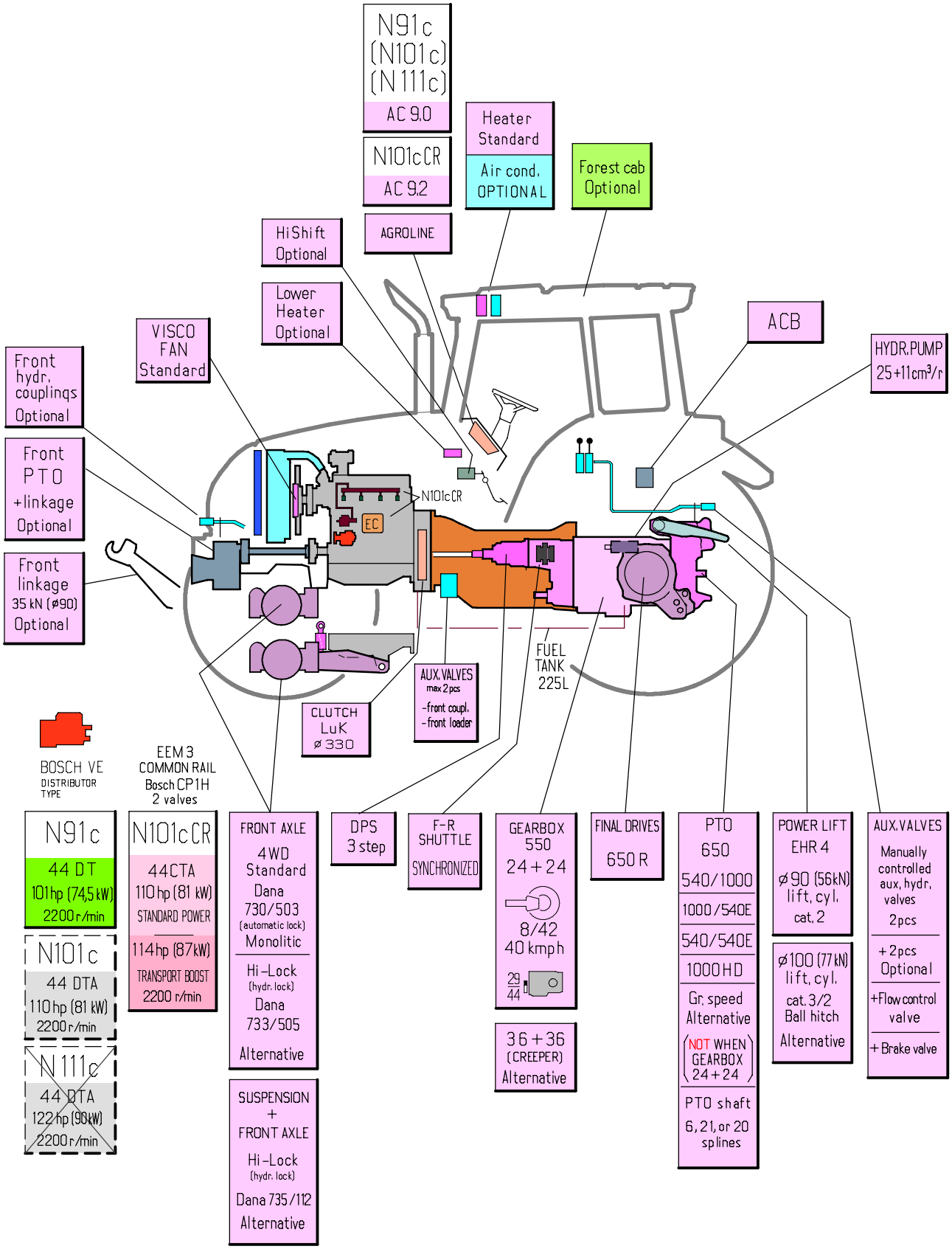


4–2886
11/07

N–series tractor (LS)



Nc models, construction



-- = NO MORE IN PRODUCTION

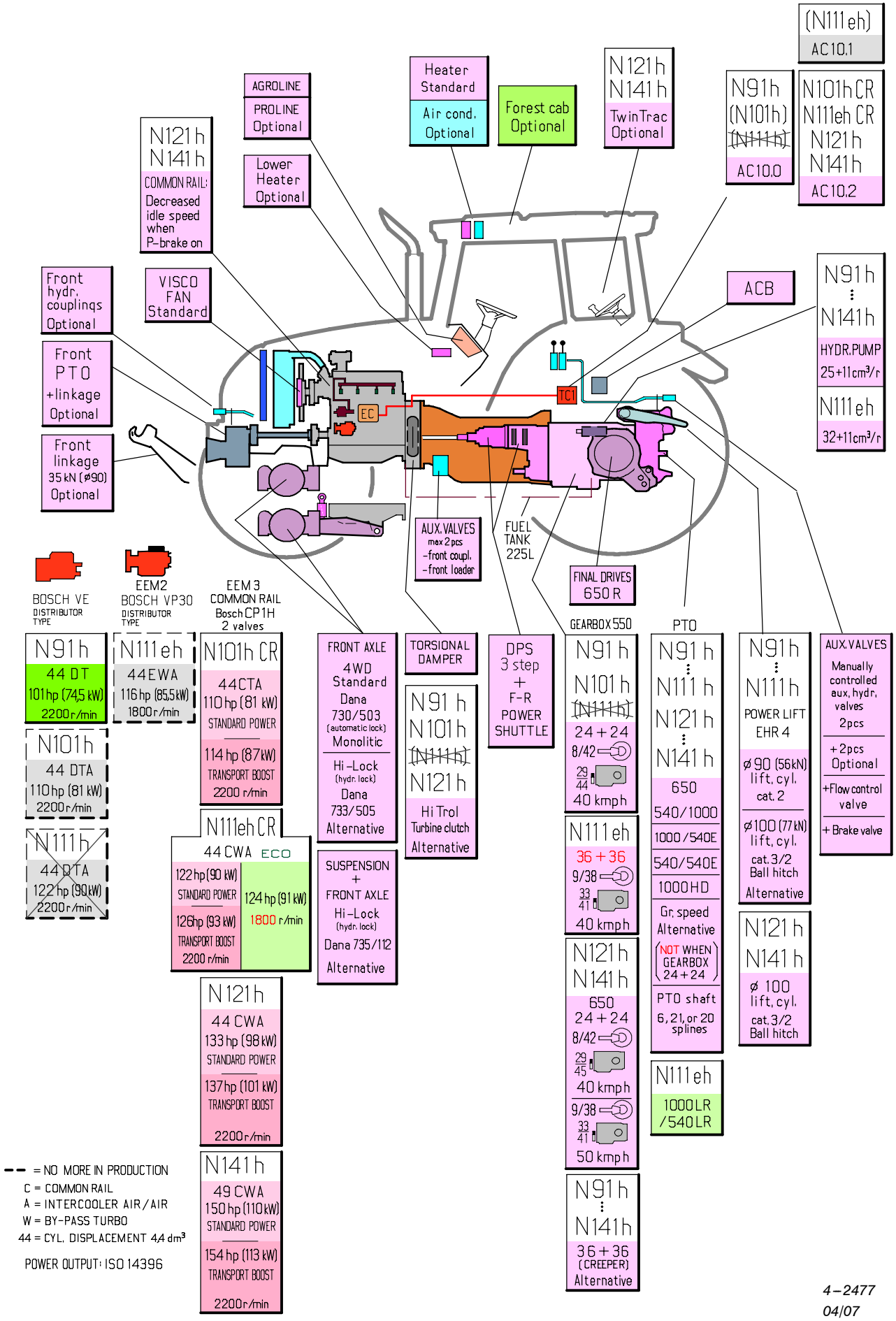
A = INTERCOOLER AIR/AIR

44 = CYL. DISPLACEMENT 4,4 dm³

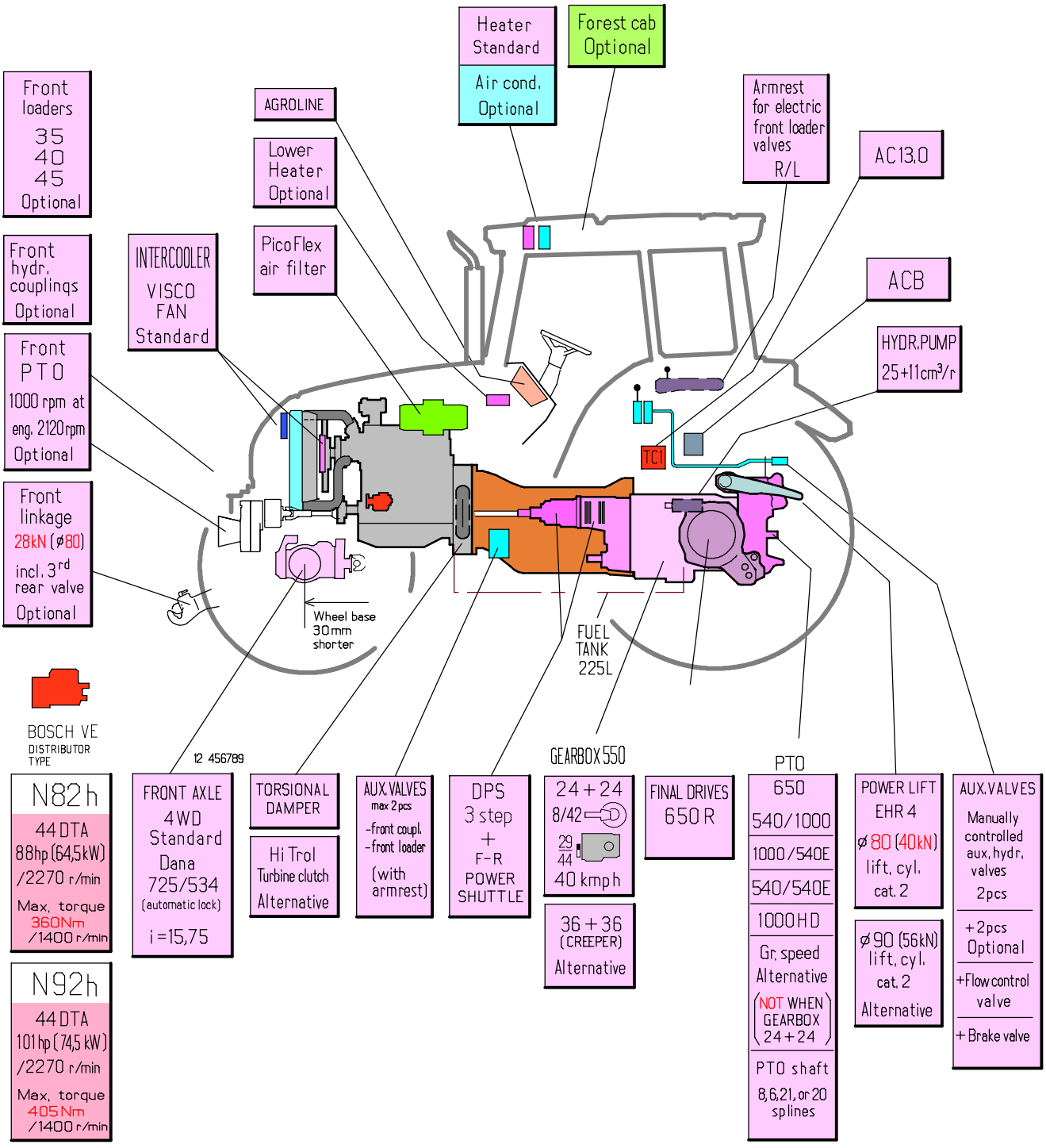
POWER OUTPUT: ISO 14396

4–2476
04/07

Nh models, construction



N82h and N92h, construction

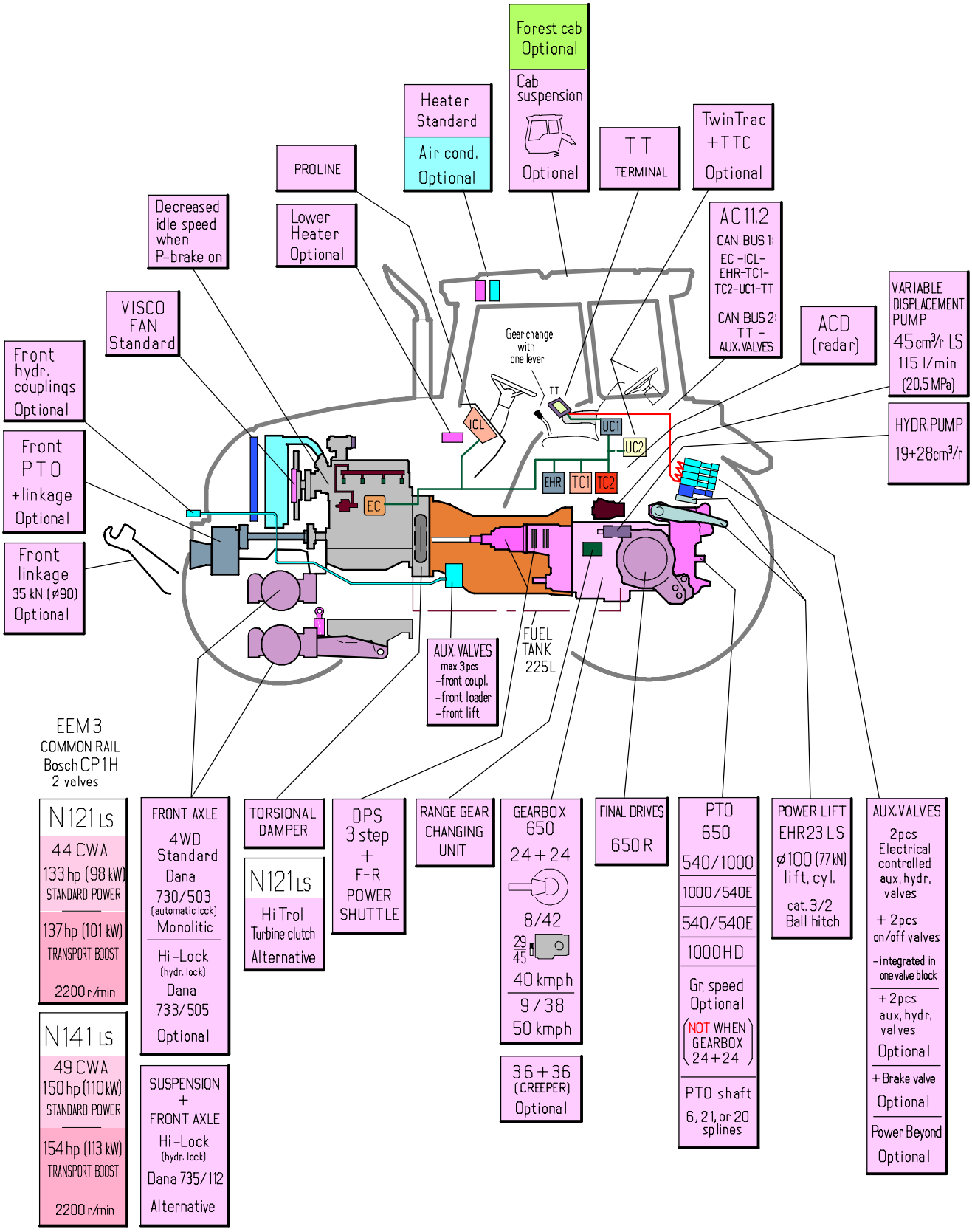


T = TURBO
A = INTERCOOLER AIR/AIR
44 = CYL. DISPLACEMENT 4,4 dm³

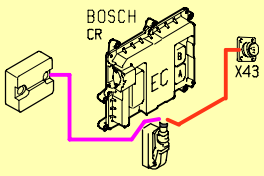
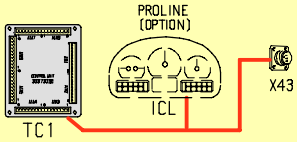
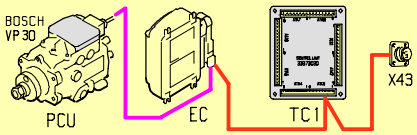
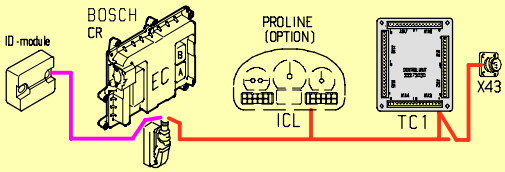
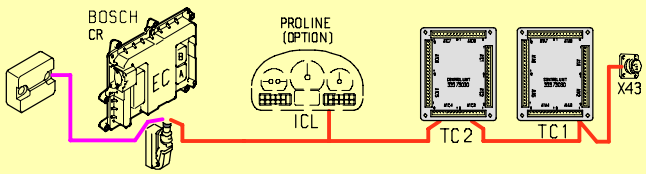
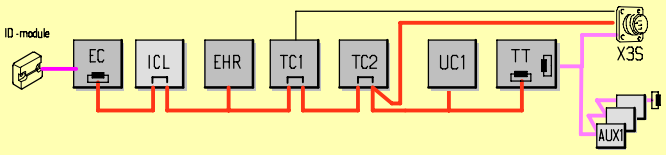
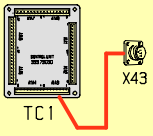
POWER OUTPUT: ISO 14396

4–2878
06/08

NLS models, construction

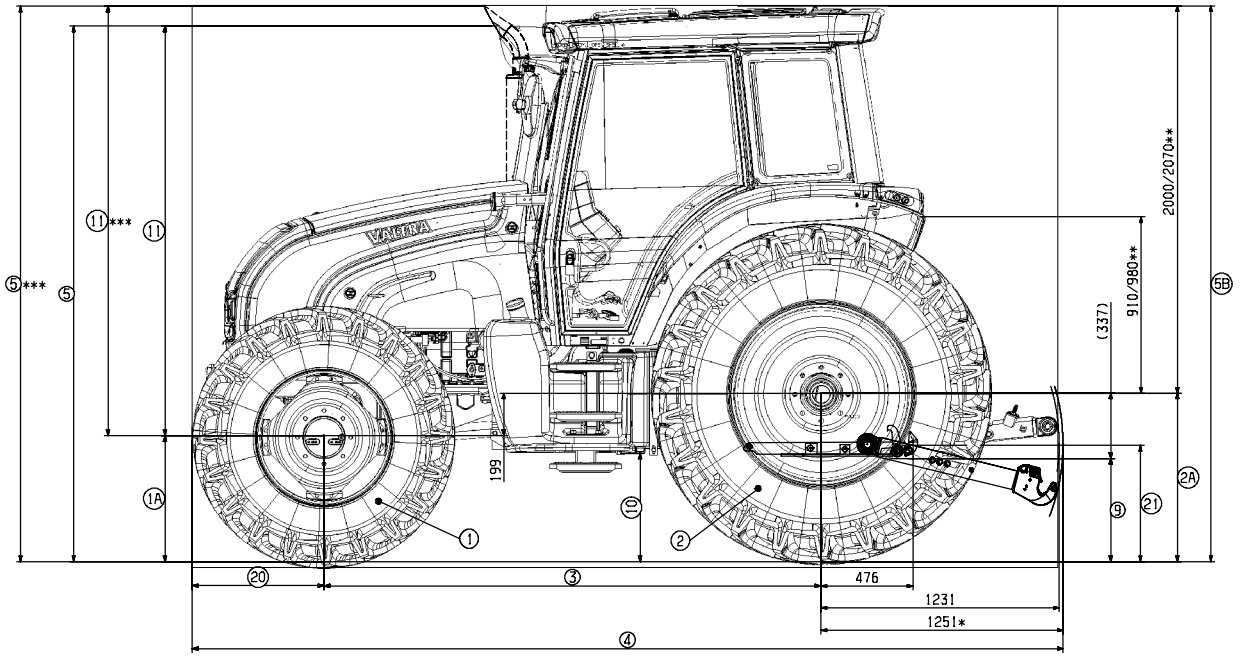


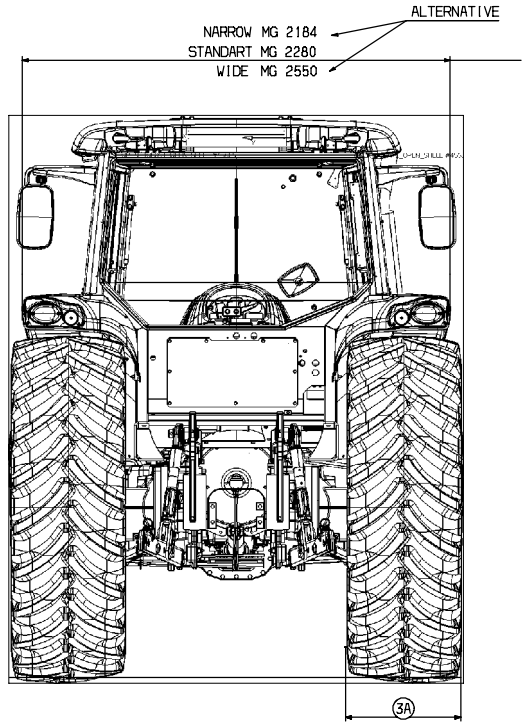
AC electric systems

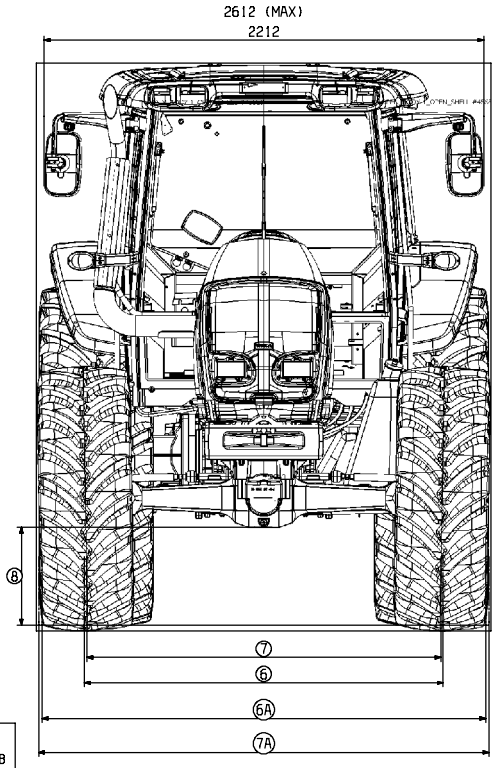
MODEL	AC SYSTEM	CONTROL UNITS	CAN ID
N91c (N101c,N111c)	~~AC9,0~~	—	–
N101c CR T121c, T131c T161c, T171c	AC9,2		EC=0
N91h (N101h,N111h)	~~AC10,0~~		TC1=3
(N111eh)	~~AC10,1~~		TC1=3 EC=0
N101h CR N111eh CR N121h, N141h T121h, T131h, T151eh T161h, T171h	AC10,2		TC1=3 EC=0 ICL=23
T191h	AC10,21		EC = 0 ICL = 23 TC1 = 3 TC2 = 4
N121LS, N141LS T151eLS, T161LS T171LS, T191LS	AC11,2		EC = 0 ICL = 23 EHR = 35 TC1 = 3 TC2 = 4 UC1 = 5 TT = 40 AUX1 = 129 AUX2 = 130 AUX3 = 131 AUX4 = 132 AUX5 = 133 AUX1F = 135 AUX2F = 136 AUX3F = 137
N82h,N92h	AC13,0		TC1=3

4–2754
04/08

N series, dimensions







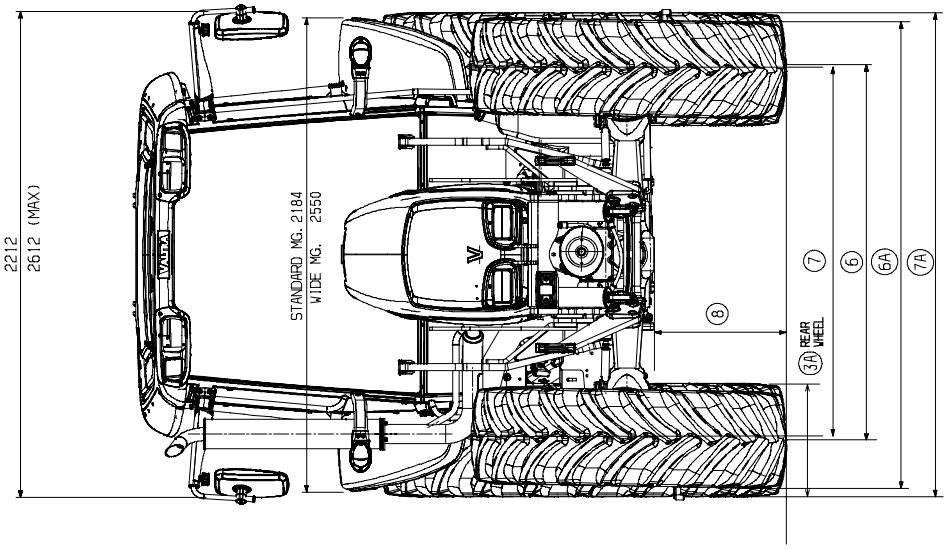
MODEL	1 FRONT WHEELS	1A	2 REAR WHEELS	2A	3 WHEEL BASE	3A	4 MAX. LENGTH	5 HEIGHT	5B HEIGHT OF CAB
N91	14.9R28	650	18.4R38	825	2565	467	4479 / 4499*	2759	2825
N101	14.9R28	650	18.4R38	825	2565	467	4479 / 4499*	2759	2825
N111	14.9R28	650	18.4R38	825	2565	467	4479 / 4499*	2759	2825
N111e	16.9R28	675	20.8R38	875	2565	528	4514 / 4534*	2784	2875
N121	16.9R28	675	20.8R38	875	2565	528	4514 / 4534*	2784	2875
N141	16.9R28	675	20.8R38	875	2565	528	4514 / 4534*	2850	2875
N121 LS	16.9R28	675	20.8R38	875	2565	528	4514 / 4534*	2784	2945
N141 LS	16.9R28	675	20.8R38	875	2565	528	4514 / 4534*	2850	2945

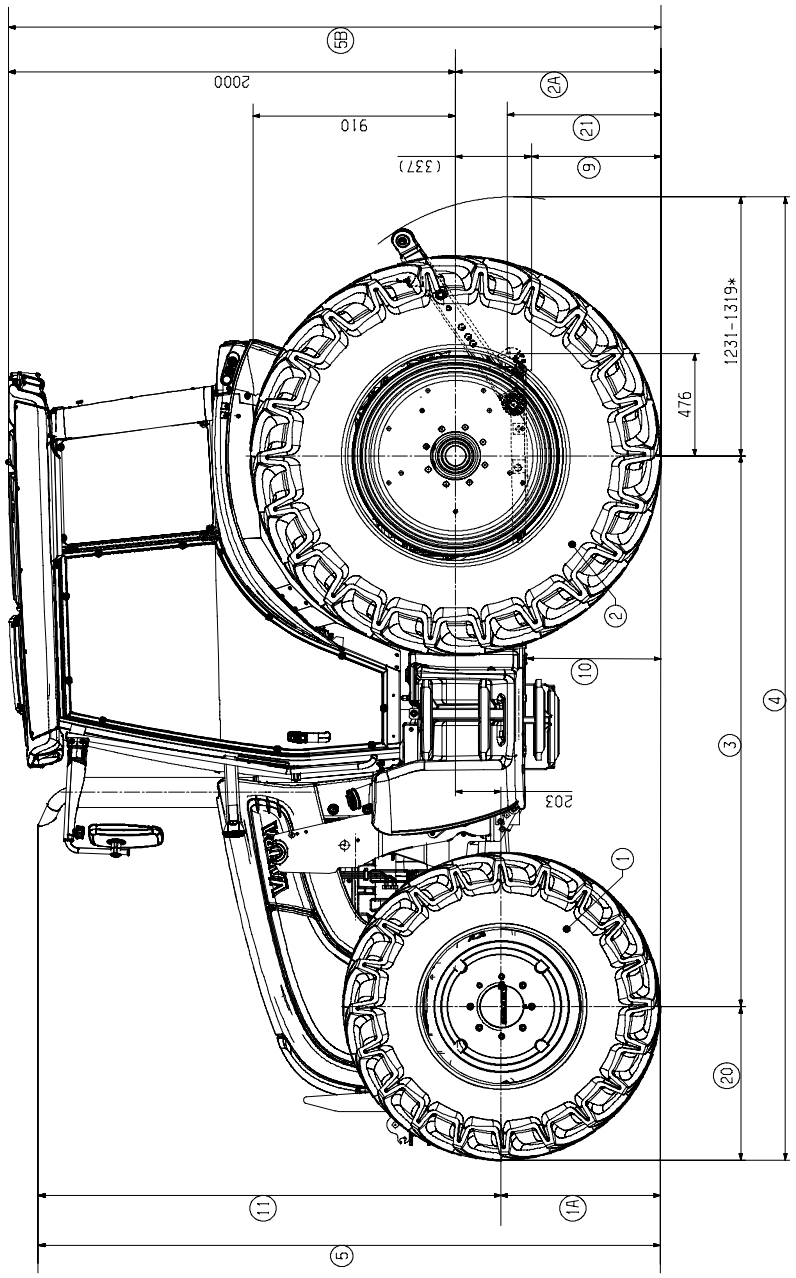
* ALTERNATIVE
** LS-MODEL
*** N141/N141LS

MODEL	6 TRACK W. FRONT TYRE, MIN/MAX	6A MIN/MAX	7 TRACK W. REAR TYRE, MIN/MAX	7A MIN/MAX	8 GR. CLEARANCE FR.	9 GR. CLEARANCE R.	10 GR. CLEARENCE MID.	11	20	21
N91	14.9R28, 1645/2045	2023/2423	18.4R38, 1610/2010	2077/2477	500	500	520	2109	683	542
N101	14.9R28, 1645/2045	2023/2423	18.4R38, 1610/2010	2077/2477	500	500	520	2109	683	542
N111	14.9R28, 1645/2045	2023/2423	18.4R38, 1610/2010	2077/2477	500	500	520	2109	683	542
N111e	16.9R28, 1735/1930	2165/2360	20.8R38, 1710/2010	2238/2538	525	550	563	2109	718	592
N121	16.9R28, 1735/1930	2165/2360	20.8R38, 1710/2010	2238/2538	525	550	563	2109	718	592
N141	16.9R28, 1735/1930	2165/2360	20.8R38, 1710/2010	2238/2538	525	550	563	2175	718	592
N121 LS	16.9R28, 1735/1930	2165/2360	20.8R38, 1710/2010	2238/2538	525	550	563	2109	718	592
N141 LS	16.9R28, 1735/1930	2165/2360	20.8R38, 1710/2010	2238/2538	525	550	563	2175	718	592

4–2592
11/06

N82h and N92h, dimensions





MODEL	1 FRONT WHEELS	1A	2 REAR WHEELS	2A	3 WHEEL BASE	4 MAX. LENGHT	5 HEIGHT	5B HEIGHT OF THE CAB	9 GR. CLEARANCE R.	10 GROUND CLEARANCE MID.	11	20	21
N82/N92	13.6R28	625	16.9R38	800	2535	4414	2698	2800	460	480	2073	648	502

6 TRACK W. FRONT TYRE, MIN/MAX	6A MIN/MAX	7 TRACK W. REAR TYRE, MIN/MAX	7A MIN/MAX	8 GR. CLEARANCE FR.	3A
13.6R28, 1515-1915	1860-2260	16.9R38, 1510-2110	1939-2539	503	429

Track widths (LS models)

Rear (7.)	Track width
420/85R38	1610, 1715, 1810, 1910, 2010, 2115
18.4R38, 460/85R38	1610, 1715, 1810, 1910, 2010
20.8R38, 520/70R38, 520/85R38, 480/80R42	1715, 1810, 1910, 2010
540/65R38, 580/70R38, 600/65R38	1715, 1810, 1910
650/60R38, 650/65R38	1810, 1910
270/95R48	1500, 1520, 1600, 1620, 1900, 1920, 2000, 2020
18.4–34	1650, 1880
18.4–38, 480/80R38	1650, 1875
540/80R38	1675, 1850
600/65R38	1850

Front (6.)	Track width
340/85R28, 380/85R28, 14.9R28,	1440, 1530, 1645, 1735, 1840, 1930, 2045, 2135
16.9R28, 420/70R28, 420/85R28, 440/65R28, 480/65R28, 480/70R28,	1440, 1530, 1645, 1735, 1840, 1930, 2045
520/60R28,	1435, 1530, 1640, 1735, 1835, 1930
540/65R28	1440, 1530, 1645, 1735, 1840, 1930
230/95R36	1505, 1580, 1600, 1700, 1880, 1980, 2000, 2100
14.9–24	1840, 1740
14.9–28, 400/80R28, 440/80R28, 500/65R28	1840, 1745

Measured between middle of tyres.

The front axle with suspension, the track widhts in front are 40 mm narrower.

The standard track widths are underlined. **When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of front axle on both sides. When adjusting the rear axle track widths, check that the wheels rotate freely. Check also when using chains that the distance from the cab to the tyres does not go below 80 mm. Check further that the distance from parking lights to the outer sides of the tyres does not exceed 400 mm.**

Fixed rims.

At the rear, the distance between the mudguards is 1090 mm. When using the narrow track widths for the rear axle, check that the lower links do not touch the tyres. When required lock the side regulators.

IMPORTANT: According to EU directives, the smallest allowable gap between tyre and cab is 50 mm.

Track widths (N82 and N92 models)

Rear (7.)	Track width
18.4R30	1614, 1706, 1810, 1904, 2014
16.9R34, 420/85R34	1610, 1708, 1810, 1908, 2010, 2108
460/85R34, 480/70R34, 18.4R34	1610, 1708, 1810, 1908, 2010
520/70R34, 540/65R34	1708, 1810, 1908, 2010
13.6R38, 340/85R38, 14.9R38	1509, 1610, 1709, 1810, 1909, 2010, 2109
16.9R38	1612, 1714, 1808, 1910, 2012, 2114
230/95R48	1500, 1520, 1600, 1620, 1900, 1920, 2000, 2020
16.9–34, 18.4–34, 440/80R34, 480/80R34	1650, 1880

Front (6.)	Track width
13.6R24, 340/85R24, 380/70R24, 380/85R24, 14.9R24, 420/70R24, 440/65R24	1420, 1510, 1515, 1620, 1625, 1715, 1825
12.4R28, 13.6R28	1425, 1515, 1620, 1710, 1825, 1915
230/95R32	1404, 1474, 1496, 1642, 1664, 1734, 1756
13.6–24, 14.9–24, 360/80R24, 400/80R24	1430, 1710

Measured between middle of tyres.

The front axle with suspension, the track widhts in front are 40 mm narrower.

The standard track widths are underlined. **When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of front axle on both sides. When adjusting the rear axle track widths, check that the wheels rotate freely. Check also when using chains that the distance from the cab to the tyres does not go below 80 mm. Check further that the distance from parking lights to the outer sides of the tyres does not exceed 400 mm.**

Fixed rims.

At the rear, the distance between the mudguards is 1090 mm. When using the narrow track widths for the rear axle, check that the lower links do not touch the tyres. When required lock the side regulators.

IMPORTANT: According to EU directives, the smallest allowable gap between tyre and cab is 50 mm.

Track widths (other models)

Rear (7.)	Track width
16.9R34, 420/85R34	1610, 1710, 1810, 1910, 2010, 2110
460/85R34, 480/70R34, 18.4R34	1610, 1710, 1810, 1910, 2010
520/70R34, 540/65R34	1710, 1810, 1910, 2010
600/65R34	1710, 1810, 1910
13.6R38, 340/85R38	1510, 1610, 1710, 1810, 1910, 2010, 2110
420/85R38	1610, 1715, 1810, 1910, 2010, 2115
16.9R38, 18.4R38, 460/85R38, 480/80R42	1610, 1715, 1810, 1910, 2010
20.8R38, 520/70R38, 520/85R38	1715, 1810, 1910, 2010
540/65R38, 580/70R38, 600/65R38	1715, 1810, 1910
650/60R38, 650/65R38	1810, 1910
230/95R48, 270/95R48	1500, 1520, 1600, 1620, 1900, 1920, 2000, 2020
18.4–34	1650, 1880
480/80R34	1740, 1790
18.4–38, 480/80R38	1650, 1875
540/80R38	1675, 1850
600/65R38	1850

Front (6.)	Track width
13.6R24, 340/85R24, 380/70R24, 380/85R24, 14.9R24, 420/70R24, 440/65R24, 480/65R24	1530, 1640, 1730, 1735, 1840, 1845, 1935, 2045
340/85R28, 380/85R28, 14.9R28,	1440, 1530, 1645, 1735, 1840, 1930, 2045, 2135
16.9R28, 420/70R28, 420/85R28, 440/65R28, 480/65R28, 480/70R28,	1440, 1530, 1645, 1735, 1840, 1930, 2045
540/65R28	1440, 1530, 1645, 1735, 1840, 1930
520/60R28,	1435, 1530, 1640, 1735, 1835, 1930
230/95R32	1520, 1655, 1660, 1780, 1800, 1915, 1920, 2060
230/95R36	1505, 1580, 1600, 1700, 1880, 1980, 2000, 2100
14.9–24, 400/80R24, 440/80R24	1840, 1740
14.9–28, 400/80R28, 440/80R28, 500/65R28	1840, 1745

Measured between middle of tyres.

The front axle with suspension, the track widhts in front are 40 mm narrower.

The standard track widths are underlined. **When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of front axle on both sides. When adjusting the rear axle track widths, check that the wheels rotate freely. Check also when using chains that the distance from the cab to the tyres does not go below 80 mm. Check further that the distance from parking lights to the outer sides of the tyres does not exceed 400 mm.**

Fixed rims.

At the rear, the distance between the mudguards is 1090 mm. When using the narrow track widths for the rear axle, check that the lower links do not touch the tyres. When required lock the side regulators.

IMPORTANT: According to EU directives, the smallest allowable gap between tyre and cab is 50 mm.

Weight

Weights kg	N91c–N111c	N91h–N111eh	N121, N141	N82h, N92h
With tyres	18.4R34	18.9R34	18.4R38	13.6R28,16.9R38
Total weight (with full fuel tank and without ballast weights)	4860	4900	4950 / 5000	4700
Front axle weight (%)	1945 (40)	1960 (40)	1980 (40)	1750 (37)
Rear axle weight (%)	2915 (60)	2940 (60)	2970 (60) / 3020 (60)	2950 (63)

Maximum permissible front-- and rear axle loadings

Regardless of any limitations due to the tyres, with standard track widths max. speed.

Front 4WD	max 40 km/h	4000 kg
	max 8 km/h	5500 kg
Rear, max 40 km/h		8000 kg
Total weight, max 40 km/h		9000 kg

Maximum permissible front-- and rear axle loadings, N82h and N92h

Regardless of any limitations due to the tyres, with standard track widths max. speed.

Front	max 40 km/h	3100
	max 8 km/h	3500
Rear, max 40 km/h		6000
Total weight, max 40 km/h		8000

Tyres

Rear (2.)	Speed Radius Index (SRI)	Front (1.)	N121LS, N141LS	Fixed disc
420/85R38	800	340/85R28	X	
460/85R38	825	380/85R28	X	
18.4R38	825	14.9R28	X	
18.4R38	825	14.9R28	X	X
520/70R38	825	420/70R28	X	
520/85R38	875	420/85R28	X	
520/85R38	875	420/85R28	X	X
20.8R38	875	16.9R28	X	
20.8R38	875	16.9R28	X	X
540/65R38	800	440/65R28	X	
580/70R38	875	480/70R28	X	
600/65R38	825	480/65R28	X	
600/65R38 E1	825	480/65R28	X	
650/60R38	825	520/60R28	X	
650/65R38	875	540/65R28	X	
480/80R42	875	16.9R28	X	
270/95R48	825	230/95R36	X	
480/80R38 IND	825	400/80R28 IND	X	X
540/80R38 IND	825	440/80R28 IND	X	X
18.4–34/ 14 FOR	775	14.9–24/14 FOR	X	X
18.4–38/14 FOR	825	14.9–28/14 FOR	X	X
600/65R38 FOR	825	500/65R28 FOR	X	X

Speed Radius Index (dynamic rolling radius): It is used only when calculating the theoretical tractor speed according to the ECE/EC–classification.

Always contact your dealer to ensure the right ratio is used. When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of the front axle on both sides.

IMPORTANT: With cab suspension (extra equipment) and with larger tyres the gap between the tyre and the mudguard can become too small (less than 25 mm) when the cab sinks down. This must be taken into account especially when using chains. Adjust the mudguards wide enough.

IMPORTANT: On the traffic tractors 50 km/h the tyre loadings are smaller. Check from the tyre manufacturer's catalogue/catalog.

Tyres

Rear (2.)	Speed Radius Index (SRI)	Front (1.)	N91c–N111c N91h–N111h	N111eh, N121h, N141h	Fixed disc
16.9R34	750	13.6R24	X		
420/85R34	750	340/85R24	X		
460/85R34	775	380/85R24	X		
480/70R34	750	380/70R24	X		
18.4R34	775	14.9R24	X		
520/70R34	775	420/70R24	X		
540/65R34	750	440/65R24	X		
600/65R34	775	480/65R24	X		
13.6R38	750	13.6R24	X		
340/85R38	750	340/85R24	X		
14.9R38	775	14.9R24	X		
16.9R38	800	14.9R24	X		
420/85R38	800	340/85R28	X	X	
460/85R38	825	380/85R28	X	X	
18.4R38	825	14.9R28	X	X	
18.4R38	825	14.9R28	X	X	X
520/70R38	825	420/70R28	X	X	
520/85R38	875	420/85R28	X	X	
520/85R38	875	420/85R28	X	X	X
20.8R38	875	16.9R28		X	
20.8R38	875	16.9R28		X	X
540/65R38	800	440/65R28	X	X	
580/70R38	875	480/70R28		X	
600/65R38	825	480/65R28	X	X	
600/65R38 E1	825	480/65R28	X	X	
650/60R38	825	520/60R28	X	X	
650/65R38	875	540/65R28		X	
480/80R42	875	16.9R28		X	
230/95R48	800	230/95R32	X		
270/95R48	825	230/95R36		X	
480/80R34 IND	775	400/80R24 IND	X		X
480/80R38 IND	825	400/80R28 IND		X	X
480/80R38 IND	825	440/80R24 IND	X		X
540/80R38 IND	825	440/80R28 IND		X	X
18.4–34/ 14 FOR	775	14.9–24/14 FOR	X	X	X
18.4–38/14 FOR	825	14.9–28/14 FOR		X	X
600/65R38 FOR	825	500/65R28 FOR	X	X	X

Speed Radius Index (dynamic rolling radius): It is used only when calculating the theoretical tractor speed according to the ECE/EC–classification.

Always contact your dealer to ensure the right ratio is used. When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of the front axle on both sides.

IMPORTANT: With larger tyres and the suspended cab (extra equipment), the space between the mudguard and the tyre may become too small (under 25 mm) when the cab moves down. Note this especially when using the chains. Then adjust the mudguards to suit.

IMPORTANT: On the traffic tractors 50 km/h the tyre loadings are smaller. Check from the tyre manufacturer's catalogue.

Tyres

Rear (2.)	Speed Radius Index (SRI)	Front (1.)	N82h, N92h	Fixed disc
18.4R30	725	13.6R24	X	
16.9R34	750	13.6R24	X	
420/85R34	750	340/85R24	X	
460/85R34	775	380/85R24	X	
480/70R34	750	380/70R24	X	
18.4R34	775	14.9R24	X	
520/70R34	775	420/70R24	X	
540/65R34	750	440/65R24	X	
13.6R38	750	13.6R24	X	
340/85R38	750	340/85R24	X	
14.9R38	775	12.4R28	X	
230/95R48	800	230/95R32	X	
16.9R38	800	13.6R28	X	
440/80R34 IND	750	360/80R24 IND	X	X
480/80R34 IND	775	400/80R24 IND	X	X
16.9–34/14 FOR	750	13.6–24/14 FOR	X	X
18.4–34/14 FOR	775	14.9–24/14 FOR	X	X

Speed Radius Index (dynamic rolling radius): It is used only when calculating the theoretical tractor speed according to the ECE/EC–classification.

Always contact your dealer to ensure the right ratio is used. When track widths are adjusted or larger tyres fitted, the turning angles have to be checked/adjusted with max turning angle of the front axle on both sides.

IMPORTANT: With larger tyres and the suspended cab (extra equipment), the space between the mudguard and the tyre may become too small (under 25 mm) when the cab moves down. Note this especially when using the chains. Then adjust the mudguards to suit.

IMPORTANT: On the traffic tractors 50 km/h the tyre loadings are smaller. Check from the tyre manufacturer's catalogue.

General information of N series tractor

	N91c/h	N101c/h	N111c/h	N111eh	N121h	N141h	N121LS	N141LS	N82h	N92h
Engine type	44DT	44DTA	44DTA	44 EWA	44 CWA	49 CWA	44 CWA	49 CWA	44DTA	44DTA
Engine power (kW/hp) at 2200 r/min	74,5/101	81/110	90/122	85,5/116 [1]	101/137	112/152	101/137	112/152	81/110	81/110
Compression pressure (MPa)	16,5:1	16,5:1	16,5:1	16,5:1	16,5:1	17,5:1	16,5:1	17,5:1	16,5:1	16,5:1
Oil pressure, normal (kPa)	250–400	250–400	250–400	250–400	250–400	250–400	250–400	250–400	250–400	250–400
Oil pressure, min. (kPa)	100	100	100	100	100	100	100	100	100	100
Injector opening pressure (MPa)	27	27	27	27	–	–	–	–	27	27
Injector setting pressure (MPa)	27,8	27,8	27,8	27,8	110	110	110	110	27,8	27,8
Fitting position º BTDC (static)	5º	5º	5º	30º	–	–	–	–	5º	5º
Engine speed, idle (rpm)	850	850	850	850	850	850	850	850	850	850
Engine max. speed (rpm)	2400	2400	2400	2000	2400	2400	2400	2400	2400	2400
Battery voltage (V)	12	12	12	12	12	12	12	12	12	12
Capacity (Ah)	174	174	174	174	174	174	174	174	174	174
PTO output at 1000 rpm/min. (kW)	54 [2]	59 [2]	68 [2]	60 [3]	80 [2]	88 [2]	80 [2]	88 [2]	45 [2]	45 [2]
Ratio, front axle/rear axle, 40km/h)	1,353	1,353	1,353	1,329	1,323	1,323	1,323	1,323	1,343	1,343
Ratio, front axle/rear axle, 50km/h)	–	–	–	–	1,329	1,329	1,329	1,329	–	–
Max. working pressure (steering, MPa)	14	14	14	14	14	14	14	14	14	14
Low pressure circuit max. pressure (MPa)	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8
Low pressure circuit pump capacity at max. engine speed (l/min.)	30	30	30	30	30	30	81	81	30	30
High pressure circuit max. pressure (MPa)	19,6	19,6	19,6	19,6	19,6	19,6	20,5	20,5	19,6	19,6
Shock valve opening pressure of pump (MPa)	23	23	23	23	23	23	25	25	23	23
High pressure circuit pump capacity at max. engine speed (l/min.)	73 [4]	73 [4]	73 [4]	76 [5]	76 [4]	76 [4]	119 [6]	119 [6]	73 [4]	73 [4]
Hydraulic linkage max. lifting force (kN)	56 [7] / 72 [8]	56 [7] / 72 [8]	56 [7] / 72 [8]	56 [7] / 72 [8]	56 [7] / 72 [8]	56 [7] / 72 [8]	72 [8]	72 [8]	44 [9]	44 [9]

[1]) Engine 1800 r/min

[2]) Engine 2000 r/min
[3]) Engine 1750 r/min

[4]) double pump **25**+**11** cm^3/r , i=1,32, lifting cylinder Ø 90mm, 2200 r/min engine revs with free flow pressure
[5]) double pump **32**+**11** cm^3/r , i=1,32, lifting cylinder Ø 90mm, 1800 r/min engine revs with free flow pressure
[6]) double pump **19**+**28** cm^3/r , i=1,32, lifting cylinder Ø 90mm or lifting cylinder Ø 100mm, 2200 r/min engine revs with free flow pressure (load sensing)

[7]) Lifting cylinder Ø 90mm
[8]) Lifting cylinder Ø 100mm
[9]) Lifting cylinder Ø 80mm

	N91c/h	N101c/h	N111c/h	N111eh	N121h	N141h	N121LS	N141LS	N82h	N92h
Capacities										
Engine (l)	4,4	4,4	4,4	4,4	4,4	4,9	4,4	4,9	4,4	4,4
Cooling system (l)	22	22	22	22	22	22	22	22	12	12
Air conditioning (kg)	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6
Transmission (l)	55–65	55–65	55–65	55–65	55–65	55–65	55–65	55–65	55–65	55–65
Fillings (l)										
Differential	8	8	8	8	8	8	8	8	6.5	6.5
Poles	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x1	2x0.8	2x0.8
Fuel tank	225	225	225	225	225	225	225	225	225	225
Filters service (change) intervals (h)										
Oil filter	500	500	500	500	500	500	500	500	500	500
Pressure filters	500	500	500	500	500	500	500	500	500	500
Return oil filter	500	500	500	500	500	500	500	500	500	500
Fuel filter	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Air filter	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Safety filter	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Prefilter	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Recirculation filter	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Transmission housing breather	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

Contents

Layout

The following editions and supplements have been published for the Valtra N series Service Manual

	Ordering number	Date	Content
Service Manual	39 225 211	1.8.2005	First edition
Service Manual supplement	39 264 211	1.5.2006	New – Electrical system 10.2 diagrams (code 355) – Powered front axle Dana 735/112 work instructions (code 655) – Fuel tank removal / installation (code 70) Changes in sections 10, 50, 60, 70 and 80
Service Manual supplement	39 264 212	1.9.2006	New – AC11.2 wiring diagram added (code 360) – CAN bus code 380 and safety instructions code 390 – Semi–automatic range gear (code 420) – Sensors of Agroline instrument (code 820) – LS hydraulics (codes 910 and 920) Updates in sections 10, 20, 30, 40, 80 and 90
Service Manual supplement	39 264 213	1.6.2008	New – Relevant images and data for N82h and N92h added (entire document) – AC9.2 and AC13.0 wiring diagrams added (code 360) – Bosch VE injection pump work instructions updated (code 225) – Added starting control diagrams (code 220) – Gearbox work instructions updated (code 425.2 – Powershift gear reconditioning instructions updated (code 445.1) – Shuttle gear reconditioning instructions updated (code 445.2) – 4WD clutch work instructions updated (code 445.3) Updates in sections 10, 20, 30, 40, 50, 60, 70, 80 and 90
Service Manual	39 225 212	1.7.2008	Second edition Includes Service Manual 39225211 and supplements 39264211, 39264212 and 39264213

Layout of Service Manual

Division into groups

The manual is divided into groups (10–100) which are based on the make–up of the tractor. The groups are listed on the first index leaf.

Example. 10. General
20. Engine, fuel and cooling systems
30. Electrical system
40. Power transmission
a.s.o.

The number designation for each group is given in the top left box of the respective pages (and the first figure in the code designation).

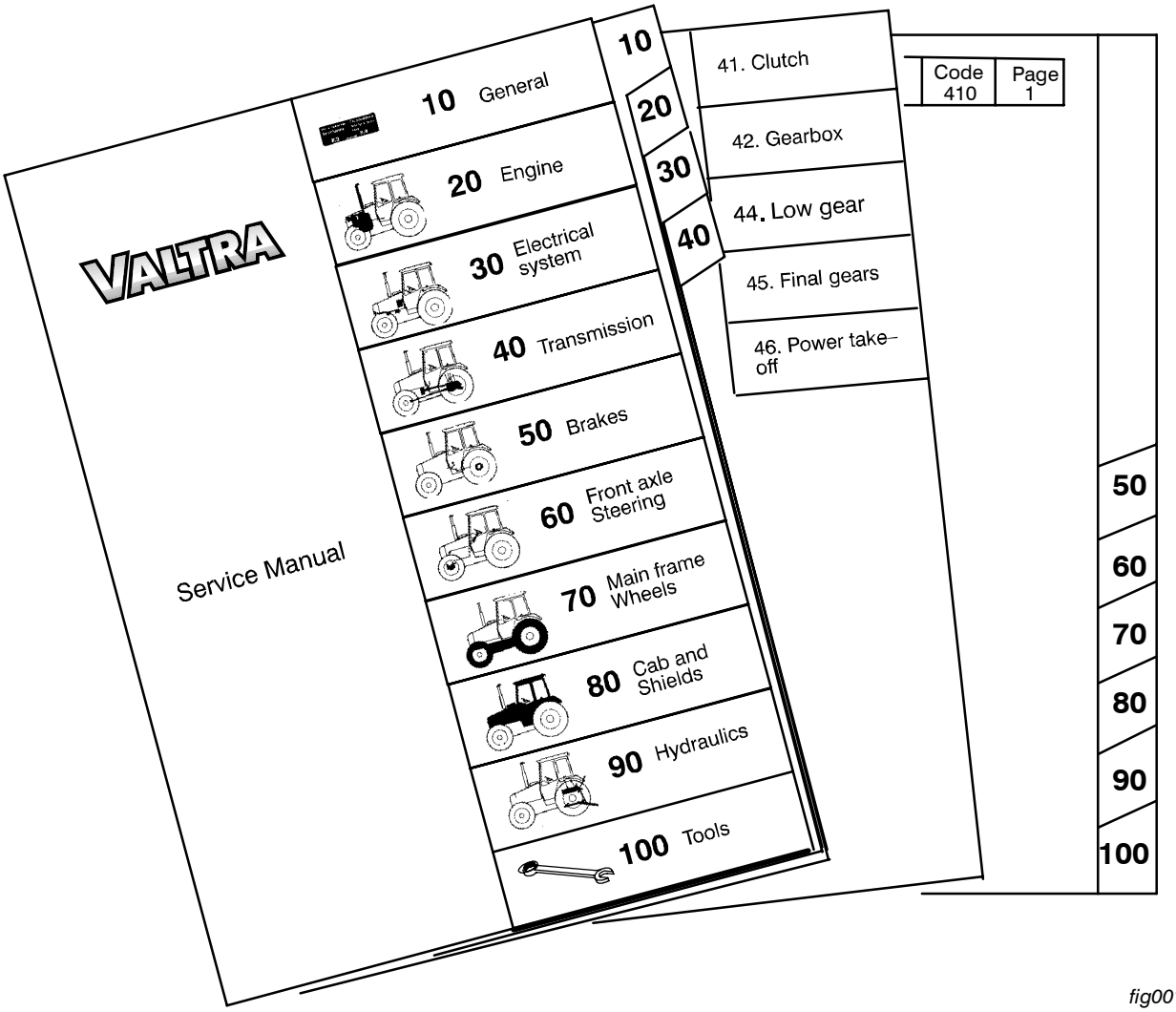


fig001c

Division into components or sub–groups

Each group is further divided into components or sub–groups. The number and the name of each component is given in the top left box on each page (and comprise the two first figures in the code designation).

Example. 41. Clutch
42. Gearbox
44. Low gear
45. Final drives etc.

10. General

11. General
12. Layout
13. Repairs
14. Maintenance

20 Engine

21. Engine
22. Fuel system and electrical components
23. Cooling system

30 Electrical system

31. General
32. Electric system AC9.0
33. Electric system AC10.0
34. Electric system AC10.1
35. Electric system AC10.2
38. CAN–bus

40 Power transmission

41. Clutch
42. Gearbox
44. Quick shift gear, power shuttle and 4WD clutch
45. Final drives
46. Power take–off

50 Brake system

51. Brake system
52. Parking brake
53. Trailer braking system

60. Steering system and front axle

61. Steering system
64. Powered front axle (Dana 733/505 &730/524)
65. Powered front axle (Dana 735/112)
68. TwinTrac

70 Frame and wheels

71. Frame
72. Wheels

80 Cab and shields

81. Cab
82. Instruments
83. Air conditioner

90 Hydraulics

91. Hydraulics
92. Working hydraulics
93. Electro–hydraulic power lift
940 ACHT

100 Special tools

101 Special tools ETV
102 Locally prepared tools ET

Header

Tractor model

At the top of each page it is indicated for which tractor the page is valid.

Code designation

Three–digit code designations are used to separate the different document groups for the respective components. The same code is also used in the Time list as a reference to the text in this manual. The code designation numbers appear in the box at the top of the page and also in the headings.

More detailed information about code designation in the next page.

Page numbers

The instructions for all components are numbered in consecutive order in the right–hand box at the top of the page. The page numbers begin with page 1 for each component.

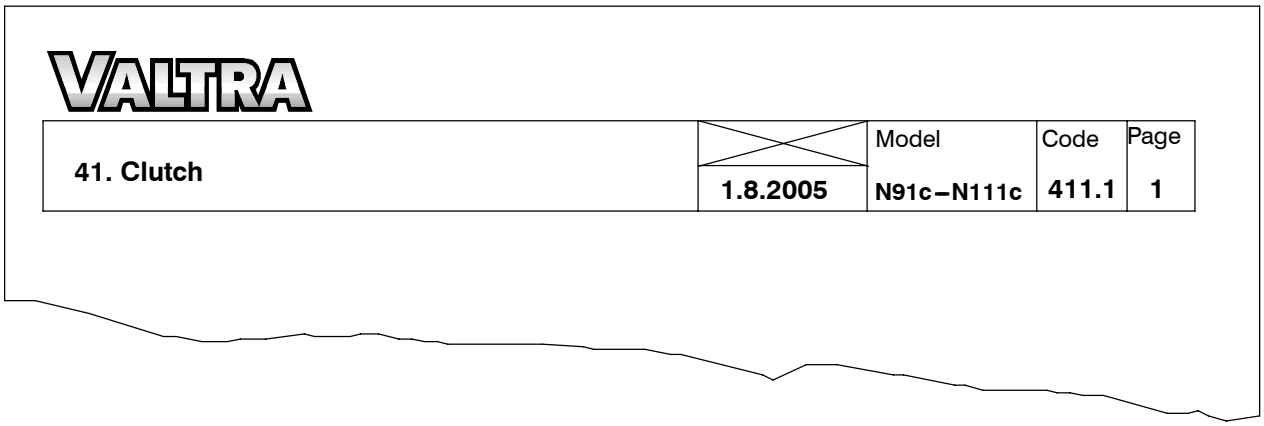


fig002c

Date

At the top of each page there are two boxes for dates. In a case of revised issue, the date of the earlier issue is printed in the crossed–over box and and the date of the current issue is printed in the proper date box.

Additions and amendments of the service manual

New and up–dated pages will be continuously added to the service manual. The new pages should be inserted as indicated by the code:
– the first digit (also the first digit on the index leaf) indicates the group:
– the two first digits indicate the component or sub–group.
– the third digit indicates the document group for the respective components
– the page number indicates the definite position of the page within the service manual.

If there are two pages with the same code and page number, it is the page with the later date in the date box and the old date in the crossed–over box which is valid or which is the current page.

When an entirely new set of repair instructions is issued, it will be accompanied by instructions on where the pages should be inserted in the file.

Code designition in the service manual

The code designition in the service manual (N Series) has been changed

Nowdays the basic structure for the subgroup is divided according to subject matter.

XX1	Technical data, technical specifications, training material
XX2	Maintenance
XX3	Fault finding
XX4	Special tools
XX5	Work instructions

Every subject matter contain sub components (max. quontity 99)

XXX.1
XXX.2
...
XXX.99

Example (Engine, fuel system)

22 Fuel system
- 221. Technical data, , technical specifications, training material
  - 221.1 Technical data
  - 221.2 Bosch VE pump
  - 221.3 Bosch VP30 pump
  - 221.4 Injector
  - 221.5 EC (AC 5.6)
- 222. Maintenance
- 223. Fault finding
  - 223.1 Bosch VE pump
  - 223.2 Bosch VP30 pump
  - 223.3 Measuring the fuel feed pressure
  - 223.4 Engine control unit sensors
  - 223.5 Starter motor
  - 223.6 Starting control AC 5.6
- 224. Special tools
- 225. Work instructions
  - 225.1 Bosch VE pump
  - 225.2 Bosch VP30 pump
  - 225.3 Injector
  - 225.4 Delivery pipes
  - 225.5 Changing the EC unit

Pictures include index numbers (for example *fig001*). Numbering helps to find certain picture. All groups has an own index numbering and pictures are indexed starting at 001. Index numbers may not go in order.

Reason for change

Electrical functions and electrical components have been divided into their function based subgroubs to improve fault finding and function based structure

In order to understand entire function, it’s easier to find all necessary information from one place.

Technical data and training material leads into understanding of the function, thereby it is easier to do fault finding. When the fault has been located service can be made.

How to find electrical components in the service manual

Because the structure of service manual häs been changed the electrical components has been divided to their function based.

See code **323.1** fo N91c and code **333.1** N91h. Code is for equipment list of the wiring diagram. Equipment list includes symbol, description, page and position, locations and code.

Symbol

Drawing symbol in the wiring diagram.

Description

Description of the component.

Page and position

Wiring diagram page and position on the page.

Location

Location of the component in tractor.

Code

The service manual code where the component can be found.

Symbol	Description	Page and position	Location	Code
–A1M	EC unit	/1.B4	Engine	221.5
–B1Q	Temperature sensor, outside	/13.A7	Roof	831.2
–S1Da1	Switch, 1 valve block, lowering	/11.B5	Cab	921.2

Contents

Repair

General instructions for repairs

Outer oil seals
The Service Manual contains instructions for changing all outer oil seals, (e.g. oil seals on the PTO shaft end, on the output shaft to the front wheel drive and on the pinion shaft on the powered front axle, and so on).

TSealing compound and glue
If sealing compounds or glue are required for the repair work, the instructions will specify a sealing compound or glue which is readily available through specialist dealers. Some seals should be greased before fitting and the space between the lips of the seal should be filled with universal grease. If the seal is to be pushed over splines or sharp edges the seal should be protected with for example a thin plastic foil.

Tightening torques and setting values
All necessary tightening torques and setting values for each repair operation are given at the beginning of each repair section under the heading Technical Data. The most important values can also be found in the repair instructions.

Table (on page **131.2)** gives the tightening torques in order of dimension, quality and surface treatment. The values given in the table should be used if the tightening torque is not given in the repair instructions.

Safety

Always bear safety in mind when repairing or servicing the tractor. Use tools and lifting devices in the correct way . When you are removing tractor components or splitting the tractor, every tractor part must be supported in such a way, that no risk of accident exists. Avoid working under the supported tractor part if it is not absolutely necessary. When supporting the tractor the centre of gravity of the frame part must always be checked. For instance the wedges must always be fitted between front axle and engine to prevent axle oscillation when splitting the front frame of the tractor.

Trouble–shooting

The following procedure, combined with the information contained in the workshop manual will be helpful in tracing faults accurately. It consists of following a number of logical steps to locate and correct the problem.

a) Determine the problem
b) List possible causes
c) Differentiate the causes
d) Conduct checks in logical order to determine the exact cause
e) Consider approximate remaining service life against cost of parts and labour.
f) Make any necessary repairs.
g) Recheck the parts and functions for correct operation

Handling of heavy components

Unless otherwise specified, all removals should be accomplished using adjustable lifting equipment. All supporting slings must be parallel to each other and as near vertical as possible in relation to the object being lifted. However, where slings are of a far greater capacity than the weight of the load to be fitted, a triangular lifting arrangement may be used. When removing a component at an angle, remember that the capacity of an eyebolt is reduced when the angle between the supporting members and the object becomes less than 90˚.

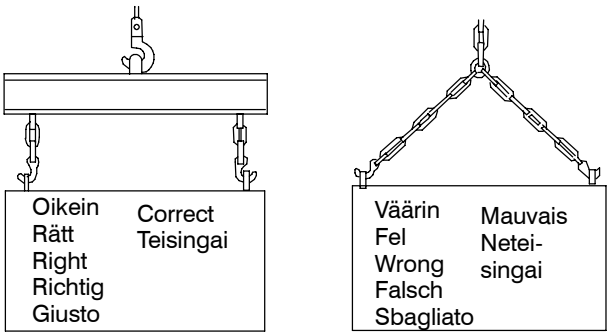


fig001c

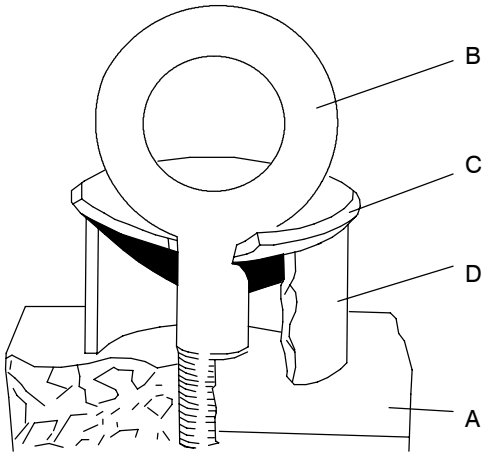


fig002c

Forged eyebolt support

A. Load
B. Lifting shackle
C. Shackle retaining plate (3 mm thick)
D. Sleeve

When necessary the forged eyebolt can be supported in the way shown in figure above. Sleeve D may or may not be welded to plate.

Warning! If a part resists removal, check that all nuts and bolts have been removed and that there is no interference from adjacent parts.

Cleanliness

To ensure long life of a machine, it is important to keep dirt and foreign material out of its vital working components. Precautions must be taken to safeguard against this. Enclosed compartments, seals and filters have been provided to keep the supply of air, fuel and lubricant clean. These protective devices must not be removed.

Whenever hydraulic, fuel, lubricating oil or lines are disconnected, clean the point of disconnection and the surrounding area. As soon as a line has been disconnected, cap, plug or tape the line or opening to prevent the ingress of foreign material.

The same cleaning and covering precautions should be taken when access covers or inspection plates are removed.

Clean and inspect all parts. Make sure that all passages and holes are clear. Cover all parts to keep them clean. Make sure parts are clean when they are reassembled. Leave new parts in their wrapping until they are actually needed for reassembly

Assembly

When reassembling a machine, complete each step in sequence. never partially assemble one part then start to assemble another. Make all recommended adjustments. Always check the job on completion to ensure that nothing has been overlooked. Recheck the various adjustments before putting the machine back into service.

Note! Before fitting new parts, remove rust preventative compound from all machined surfaces (usually ”peel–off substances).

Lubrication

Where applicable, fill the compartments of repaired or renewed components with the quantity, type and grade of clean lubricant recommended in the routine maintenance section of the Operator’s Manual.

Shims

When shims are removed, tie them together and identify their location. Keep shims clean and take care not to bend them before refitting them.

Gaskets

Make sure that the holes in gaskets line up with lubricating oil passages in the mating parts. If gaskets have to be made, use material of the correct type and thickness. Make sure that holes are punched in the right places. Incorrectly punched gaskets can cause serious damage.

Lip type rubber seals

Lubricate the lips of lip–type rubber seals with oil before fitment. Do not use grease on seals, except for grease seals.

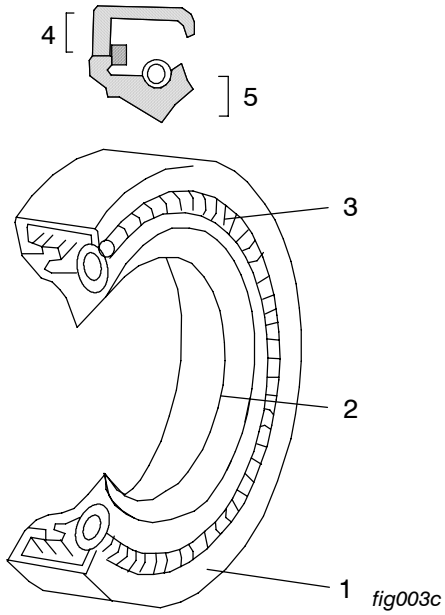


fig003c

The main parts of lip–type seal:
1. Case
2. Sealing element
3. Ring spring

The figure above shows the construction of a simple lip–type seal. The cross section shows the heel (4) and the toe (5), used to identify the sides of a single element seal. With a few exceptions, the toe of a single–lip is located on the lubricant side. Some seals have a second auxiliary lip which has no spring.

Cables and wires

When removing or disconnecting a group of cables or wires, label each one to ensure correct refitment.

Locking devices

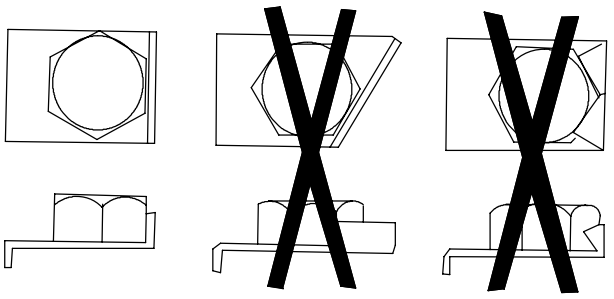


fig004c

Correct and incorrect use of retainers

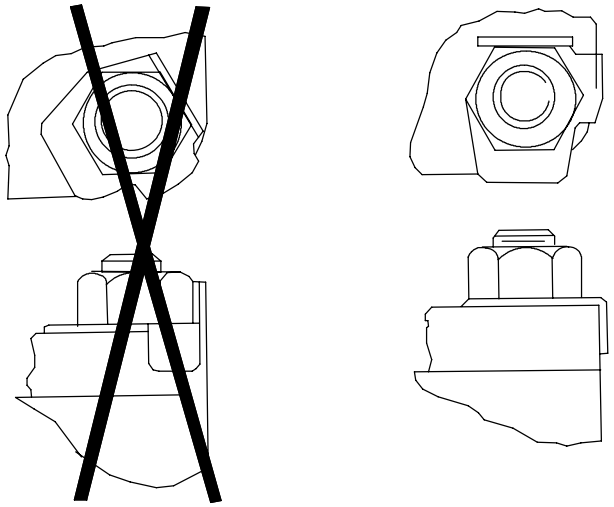


fig005c

Correct and incorrect method of fitting and bending locking tabs.

Slackening of nuts and bolts is prevented by mechanical means such as lockwashers, tab washers and cotter pins, or by Loctite–type locking agents.

Flat retainers must be installed properly to be effective. Bend one end of the retainer against the edge of the part. Bend the other end against one of the nut or bolt head.Always fit new retainers in compartments which house moving parts. When fitting lockwashers on aluminium housings, place a flat washer between the lockwasher and the housing.

Note!
1) Never fit a lockwasher (Grower, fan, spring, etc.) under a nut or bolt to which a specified torque has to be applied.
2) Always thoroughly degrease components before applying Loctite type locking agents.

Bushes and press fits

Do not fit bushes with a hammer alone. Use a suitable fitting tool and a hammer or, better still, a press if possible.

When using a press, ensure that pressure is applied directly in line with the bore. If the ring has an oil hole, take care to align it with the oil hole in the mating part. When press fitting a part into another part, lubricate the mating surfaces. Tapered parts should be assembled dry. Before assembly, check that the tapers are dry and free from burrs.

Fitting bolts in blind holes

Use bolts of the correct length. A bolt which is too long may ”bottom” before the head comes into contact with the part it is to hold: this will cause damage to the threads. If a bolt is too short, there may not be enough threads engaged to hold the part securely.

Tightening torques

Tightening torques, metric standard thread (ISO).

Dim.	Tightening torques Nm[1])									
	Quality, surface treatment, material and so on									
	8.8 lubr.	tol.±	8.8 Zne[2])	tol±	8.8 Znk[3])	tol±	10.9 lubr.	tol±	12.9 lubr.	tol±
M4	–		–		–		–		–	
M5	6,4	0,6	5,7	0,5	–		9	1	11	1
M6	11	1	10	1	12	1,2	15	1,5	18	2
M8	25	2	23	2	30	3	35	4	45	5
M10	50	5	45	5	60	5	70	7	90	10
M12	90	10	80	8	100	10	125	10	151	15
M14	140	15	125	10	160	15	200	20	240	20
M16	220	20	195	20	250	25	300	30	370	40
M18	300	30	270	30	350	35	430	40	510	50
M20	430	40	380	40	480	50	600	60	720	70
M22	570	60	500	50	650	65	800	80	970	100
M24	740	70	660	70	830	80	1030	100	1250	120
M27	1100	100	950	100	1200	120	1500	150	1800	180
M30	1500	150	1300	130	1600	160	2040	200	2500	250

If the bolts differs from the standard range the values in the table must not be used.

[1]) 1 Nm=0,102 kpm
[2]) Zne=zinc electroplating
[3]) Znk=hot galvanized

Contents

Maintenance

Valtra service

Maintenance

Correct maintenance at the right time is essential for reliable operation of the tractor. Maintenance costs are small compared with repair costs resulting from lack of maintenance. The most important measures are those which you carry out yourself which include lubrication and various checks and adjustments. The service intervals shown apply for normal operating conditions but in more severe conditions servicing should be carried out more frequently.

Carrying out the maintenance

Other points:
- Lubricate according to chart
- Road test tractor. Check during the road test all the functions of the controls and instruments. After the road test, check for oil leaks, check the coolant and fuel system.
- Always stop the engine before starting work.
- Apply the parking brake to ensure the tractor cannot move. If the ground is uneven the wheels should be blocked.
- Wash down the tractor first so that the work can be done easily and quicker. **NOTE: Do not let the water get to the electrical equipment when washing the machine.**
- Always observe the utmost cleanliness in all maintenance work. Thoroughly wipe off filler caps and plugs as well as surrounding parts of the tractor before filling up with fuel or oil. Large amounts of dirt (e.g. heavily clogged filters) can point to a fault which could cause extensive and costly repairs if not corrected in time.
- When carrying out checks the tractor should stand on level ground.
- Levels should be checked in the morning when the oil is cold and has had time to run down to the bottom of the unit concerned.
- When changing the oil, bear in mind that the oil can be very hot when it drains from the tractor. Waste oil and oil filters should be handled carefully and disposed of properly.
- Avoid touching the exhaust manifold, turbocharger and other hot parts of the engine.
- Keep the engine surfaces clean in order to avoid the risk of fire.
- The fuel, lubricating oil and coolant cause irritation to skin if in contact for long periods.
- After completion of service work replace all safety covers etc.

Greasing lubricating points fitted with grease nipples

- Always clean the grease nipples before applying the grease gun.
- Apply grease through the nipples until clean grease oozes out (unless otherwise instructed).
- Wipe away superfluous grease which has been pressed out at the lubricating point.
- Preferably carry out lubrication with bearing points and joints unloaded and with the bearings in different positions.

Scheduled maintenance

The maintenance schedule begins with the running hour meter reading 0. This means that maintenance scheduled at 500 h intervals is performed at meter readings 500 h, 1000 h etc., even if the same procedures were carried out at the 50 h maintenance. At the 1000 h maintenance, for example, the daily, weekly and 500 hour maintenance procedures must also be undertaken.

Service inspection (after 100 hours)

Your dealer gives a cost–free service inspection (excluding oil and filter costs) to all new tractors after 100 hours running.

The service procedure is as follows:
20 Engine:
- Change engine oil and filter
- Change prefilter, fuel system
- Change fuel filter

40 Power transmission:
- Change pressure filters and hydraulic return filter

60 Front axle and steering system:
- Change oil in differential
- Change oil in hubs