





Workshop Manual Unimog 435

Volume 1

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Stand 5.1989 UKD 30 402 21 42 03 The present Workshop Manual contains the descriptions of all important assembly, adjusting, testing and repair work.

The entire contents of the Workshop Manual are subdivided according to the well-known group system. The group index serves to facilitate finding the individual groups, the list of contents of each group serves to find the individual jobs to be carried out.

The relevant data, settings, dimensions and tolerances as well as the special tools are compiled on the first pages of the respective groups. The contents are listed according to unit versions and further subdivided into chapters and sections.

The contents are subdivided to provide smaller, integrated sections. Each section begins with a new page 1 and is identified as follows (example):

		Removal and Installation of Steering Syste	m 46.1
	Title of chapter	MB mechanical recirculating ball steering sy	stem L 3,5 K
		Unit designation	
		Group	
		Unit version	
		Page reference:	
		Page	
		Section	
		Chapter	
			4 1/1
All references to this page See page 46.1-4.1/1.	e at any point throughou	It the Workshop Manual are expressed as follows	4.1/1 2
		ander Mariana anderen en anderen anderen en andere Anderen en anderen en a	، ، ، ۱۰۰۰ - ۲۰۰۰ - ۲۰۰۰ ۱۰۰۰ - ۲۰۰۰ - ۲۰۰۰

1

Introduction

The **unit versions** are consecutively numbered starting with 1; i.e. each version has a special code number. In addition, the unit designation is shown at the head of each page. A separating sheet and a detailed list of contents head each unit.

The sections valid for all unit versions are covered in version 0. The respective data (settings, tightening torques, machining dimensions etc.) and special tools are listed together at the start of each unit version.

The numerical values in SI units resulting from the introduction of the international unit system are converted and rounded-off values (in accordance with DIN 1335).

The pressure values specified in bar are positive.

Pressure in bar Previous Unit kp/cm² (Kiloponds per square centimeter)

2

1 bar = 1.019716 kp/cm² \sim 1.02 kp/cm² 1 kp/cm² = 0.980665 bar \sim 0.981 bar Power in kW (kilowatt) Previous unit HP (horsepower)

1 kW = 1.360 HP 1 HP = 0.735 kW

Torque in Nm (Newtonmeters) Previous unit kpm (kilopond meters)

1 Nm = 0.101972 kpm \sim 0.102 kpm 1 kpm = 9.80665 Nm \sim 9.81 Nm

The specified part numbers and the figure numbers in the exploded views are designed solely for identification purposes and improve differentiation between the individual versions. When ordering spare parts, always use the part numbers given in the valid microfiches.

The job descriptions provided in this Workshop Manual make allowance for special versions (see 00 - 1.6/1).

Special vehicles:

Type Condor Messrs Thyssen Henschel D-3500 Kassel

Type TN 170 Messrs Thyssen Maschinenbau GmbH D-5810 Witten 6

We shall endeavour to keep this Workshop Manual up-todate by supplying the relevant supplements when necessary.

Contents

1

Chapter	Page
· 사망하는 사람은 사망가 들었는 것은 것은 것은 사망가 들었다. 가 같은 것은 사망가 가 있는 것은 것은 것은 것이다. 가 가 있는 것은 것은 것은 것이다. 것이다. 같은 사망한 것은 사망가 바랍니다. 그는 것은	
1 General	
Installation survey	1.1/1
General view	1.1/5
Vehicle dimensions 435.115	1.2/1
Vehicle dimensions 435.111	1.2/2
Vehicle dimensions 435.115 (special vehicle with box-type body)	1.2/3
Maximum speeds 435.115/117	1.3/1
Maximum speeds 435.110/111	1.3/2
Weights and trailer loads	1.4/1
Service products, capacities	1.5/1
Special versions considered U 1300 L	1.6/1
물건 비행 것 같아요. 그는 것 같아요. 이는 것 같아요.	





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UR 00-0138

General view



435.113



435.113

General view



435.115 Front- with box-type body



435.115 Rear- with box-type body

1.1/8

Installation Survey

Vehicle	Model Sales designation	435.110 U 1700	435.111 U 1700 L	435.113 ¹³⁾ U 1700 L/38	435.115 U 13	435.115") 800 L	435.117 U 1300 L/37						
Engine	Model		353.959		353.961 oder	353.961	353.961 Or 353.9503						
	Sales designation		352 A. V/2 352 A. LII/1 ¹²¹	na de la composition Regional de la composition Regional de la composition Regional de la composition Regional de la composition	352. X/2 Or 352 A.V/2 352.A.LII/1"	352. X/1	352. X/2 Or 352. A.V/2 352 A.LII/1"						
	Installation		Series Series with Series Series Or SA 16 457/26 Or SA 36 019 ²⁰ SA 35 975 ¹⁰ SA 36 01										
Single	Model	l			* These tests of the								
clutch	Sales designation	F & S GFM 330 K replaced by F & S GMF 330											
	Installation			Se	ries	, test							
Double	Model	1	-	ago an an tagan a	_	ay at Talay							
clutch	Sales designation	DT 33	0/310 G	and the Transfer	DT 330/310 G	-:	DT 330/310 G						
	Installation	SA 3	35 741	· · · _	SA 35 741	-	SA 35 741						
Converter	Model	a sharan ay ay	Ta salaya a		-		~						
clutch	Sales designation	WS	K 310		WSK 310	-							
	Installation	SA 3	35 948	-	SA 35 948	-							
Main	Model	717.901	or 717.900		717.901, see Section and Section 1								
transmission	Sales designation	UG 3/40 -	13,01 GPA ⁹⁾	13,01 GPA	nise and a second								
h Marsa	Installation	Serie	s or SA	Se	ries a statem	with SA 35 977'	Series						
Auxiliary	Model	Working or	crawler gear		n en de ser de la construction en d es plant har de la								
transmission	Sales designation	NG 3/40	- 2/5, 76 10)	- Caraby Son	erey Syntaxian .								
	Installation	SA 3	35 736			- 1919-1949-19							
Power	Version	PTO shaft with pump connection											
fake-off	Ratio	na <u>hara na sana na kana na na sana i</u> a h abana na sana na sika na sana na sa											
Max	imum speed 1/min	2 800 Active and the second											
	Instalation	SA 35 925											
	Version	PTO shaft											
	Ratio	i = 0,71											
Max	imum speed 1/min	4 000											
	Installation			SA 3	5 925								
Hydrostatic	Manufacturer	Linde	e units			_							
system	Sales designation	Gr.	70/75			_							
	Installation	SA 3	36 036			<u></u>	1						
PTO shaft transmission	Version		Engine and trar	Ismission shaft 4		Transmission shaft ^{11 31}	Engine and transmission shaft						
	Ratio		i = 4,32 ⁵)/or	4,32 5)/2,46 7)		i = 4,32 ^{s.}	1 = 4,32 ⁶⁾ 2,46 ⁷⁾						
Max	imum speed 1/min		540/min/or 5	540/1000/min		540	540/1000/min.						
	Installation	<u> </u>	SA 3	5 737		SA 35 737							
	Version	Fas	st engine and tra	nsmission PTO	shaft	51							
	Ratio		i = (0,745			i = 0,745						
Max	imum speed 1/min		37	700		_	3 700						
· · · · · · · · · · · · · · · · · · ·	Installation		SA 3	5 926		– SA 35							

Installation Survey

法国际法 法法法法 法法法		e mengen en de de la g				· · · · · · · · · · · · · · · · · · ·					
Vehicle	Model Sales designation	435.110 U 1700	435.111 U 1700 L	435.113 ¹³⁾ U 1700 L/38	435.115 U 13	435.115" 00 L	435.117 U 1300 L/37				
Front axle	Model	73	7.200 ¹²) or 737.2	.01	737.111						
	Sales designation	بالمعادية والعبد	AU 3/1 S - 5,3		AU 2/14 S - 4,0						
	Installation	litera en la	Series or SA		Series with SA 35 973" Series						
Rear axle	Model	747.204	1 or 747.205 or 1	747.206	747.	747.117					
	Sales designation	HU 3/1 :	S - 5,3 or HU 3/	IS-6,8	HU 2/14	S - 4,0	HU 2/14 S-4,0				
	Installation		Series or SA		Series	with SA 35 974"	Series				
Steering	Model		65.601 or 765.30	5		765.601					
system	Sales designation	-1	.S 3 B or LS 7 F	:	LS 3 B _{AMAA}						
en en service. Esta de la companya d	Installation	Serie	es or with SA 35	776	Series with SA 35 976" Series						
Steering	Model		·. ·		· · ·		·				
pump	Sales designation	ZF	7672 or ZF 767	(36)	ZF 7	672	ZF 7673				
	Installation	Se	'6 ⁵⁾	Series Series Serie							
Drivers gap	Model	425.821/825		425.800/820/821	line e e	425.820	425.821/825				
	Sales designation						1. - 1. 1. 1				
	Installation	Sector SA Sector	and the second		with SA	SA					

Basic unit with SA fording ability
 Only valid for fire service vehicles
 Connection only for front PTO shaft
 Connection for front or front and area
 Fast engine or transmission PTO shaft
 From chassis end No. 072 513 i = 4.08
 From chassis end No. 072 513 i = 2,32
 Only in connection with steering system LS 7 F
 Or UG 3/40-8/9,35 GPA
 Or NG 3/40-3/55,87
 From engine end No. 691 150
 From chassis end No. 084 389 model 737.202
 From chassis end No. 084 389

Installation Survey

Vehicle	Model Sales designation	435.160 Attachment TM 170	435.170 Attachment Condor	
Engine	Model	353.959	353.977	······································
	Sales designation	352 A.LII/1	352 A.V/2	· .
	Installation	Series	•. •. •.	
Single	Model	na statistica je 👼		
clutch	Sales designation	GFM 330 K replaced	by GFM 330	
	Installation	Series		
Double	Model			an an an an tha an
clutch	Sales designation	<u>ere en la seconda de compositores a</u> la seconda de la s	ana ang ang ang ang ang ang ang ang ang	and the strength of the second second
	Installation	an T arta	ti a se se a	a Area a construction and
Converter	Model	ta a su su su ta su ta su ta su ta su su ta su	- Andrew States and	
clutch	Sales designation	, en		
	Installation	ling tanang karang karang tang tang tang tang tang tang tang t		
Main	Model	717.931	717.930	
transmission	Sales designation	UG 63/40-8/13,	01 GPA	the second s
	Installation	Series		
Auxiliary	Model	radi - rada a grada a s		
transmission	Sales designation	ana ana ana ana amin' amin	and a state of the second	
	Installation	as bigas i si a gri gi terras gal a Palas 🗖 😽	Welling the second	
Power	Version	Transmission PTO shaft wi	th pump connection	
take-off	Ratio	(i_1, i_2) the spectrum state (i_1, i_2) . Here, $i = 1$ is	salas ing salas s	
Max	imum speed 1/min	2800		
	Installation	Series	<u></u>	
	Version			
	Ratio		<u> </u>	a service and a service
Max	imum speed 1/min			
	Installation			<u>i i i i i i i i i i i i i i i i i i i </u>
Hydrostatic	Manufacturer			a second seco
unit	Sales designation			a de la companya de l
	Installation	-		
PTO shaft transmission	Version	a haan ang terpiku In		
	Ratio			
Max	imum speed 1/min			
	Installation			
	Ratio	· · · · · · · · · · · · · · · · · · ·		
	Version			· · · · · · · · · · · · · · · · · · ·
Max	imum speed 1/min	. 		
	Installation	-		

Installation Survey

Vehicle	Model Sales designation	435.160 435.170 Attachment Attachment TM 170 Condor
Front axle	Model	737.232
	Sales designation	AU 3/1 S-6,8
	Installation	and the provention of Series the second s
Rear axle	Model	747.231
	Sales designation	HU 3/1 S-6,8
	Installation	Series and a series and a series and a series of the serie
Steering	Model	765.305
system	sales designation	LS 7 F
	Installation	mit SA 35 776
Steering	Model	 A statistical statistic statistical statistical statistic Statistical statistical statist
pump	Sales designation	ZF 7673
	Installation	SA 35 776
Driver's cab	Model	a subsections of c ount of a subsection set of the set
	Sales designation	

1.1/4

General View



435.115



435.115

General View



435.111



435.111

Veniele dimensions 400.110				
		12,5 – 20	9,00 – 20	14,5 – 20
Tire sizes		12,5 R 20 ¹⁾	9,00 R 20	14,5 R 20
Wheelbase a second seco	mm	3 250	3 250	3 250
Track front and a strength and a strength and a	mm	1 860	1 860	1 860
Track rear sector Spread Spread Streams of Sectors Spread	mm	1 860	1 860	1 860
Track circle diameter size and based and second and and	mm	12 890	12 890	12 890
Turning circle diameter states and a second se	mm	13 800	13 800	13 800
Length without winch (2000) and the second sec	mm	5 540	5 540	5 540
Length with winch production with the state of the state	mm	5 870	5 870	5 870
Overall width (without rear-view mirror)	mm	2 300	2 300	2 300
Overall height (unladen) approx. approx.	mm	2 830	2 880	2 900
Height above cab, unladen and approx. approx.	mm	2 750 ²⁾	2 630	2 650
Ground clearance on a convex surface approx.	mm	470	465	495
Overhang front, without winch	0	46	46	46
Overhang front, with winch	0	40	40	40
Overhang rear states and approx.	•	51	51	51
Ground clearance, front axle (laden) approx.	mm	440	435	465
Ground clearance, rear axle (laden) approx.	mm	440	435	465
Wading depth approx.	mm	1 220	and a subsect	- 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945 - 1945
Permissible height of center of gravity above platform floor for 2000 kg payload, with stabilier at front	mm	800		
Height of trailer coupling (unladen)	mm	945	950	970

Vehicle dimensions 435,115

Loading space

Longth incide a Attack Street		· · · · · · · ·		2 150	2 1 50	0.150
		·	mm	3 150	3 150	3 150
Width inside	· * :	с. т. С. т.	mm	2 200	2 200	2 200
Height of side boards	1.		mm	500	500	500
Height beneath canopy top, min.			mm	1 370	1 370	1 370
Height beneath canopy top, max.			mm	1 480	1 480	1 480
Loading height above ground (unladen)	`		mm	1 290	1 285	1 315

special vehicle
 with camoflage net support



Vehicle dimensions 435.110/.111/.113

Loading space

Length inside	mm	4 050	3 150 ³⁾	3 150 ³⁾	3 150 ³⁾
Width inside	mm	2 350	2 200	2 200	2 200
Height of side boards	mm	500	500	500	500
Loading height above ground (unladen)	mm	1 500	1 480	1 460	1 500

1) 13.00 - 20 Pilote XL

2) 435.113

3) at 435.110 optional 2050, 2550, 3000





Maximum speeds 435.115/.117

Total axle ratio 6.53									Max at engine	cimur e rate	n spi id sp	eeds k eed 2	.m/h 800/n	nin					
				y. Yesh	Fo	rward	S			Reverse								Tires	
		1	2	3	4	5	6	7	8	1	2	3	4	511	6 ¹)	7 ¹)	8 ¹)		
ssion	Bars	6.0	8.7	13.2	17.9	26.4	38.1	57.7	78.5	6.2	9.0	13.6	18.5	27.2	39.2	59.4	80.9	18 - 20 12.5 - 20 ²⁾	
transmissi		6.3	9.1	13.7	18.6	27.5	39.7	60.1	81.7	6.5	9.3	14.1	19.3	28.4	40.8	61.9	84.2	12.5 R 20	
lain tr	Aain ge	6.3	9.1	13.8	18.8	27.8	40.0	60.6	82.5	6.5	9.4	14.3	19.4	28.6	41.2	62.5	85.0	14.5 - 20	
2		6.6	9,5	14.4	19,6	28.9	41.7	63.2	85.9	6.8	9.8	14.9	20.3	29.8	43.0	65.1	88.6	14.5 R 20	
		6.1	8.7	13.2	18.0	26.5	38.2	57.9	78.8	6.2	9.0	13.6	18.6	27.3	39.4	59.6	81.2	9.00 - 20	
		6.1	8.9	13.4	18.2	26.9	38.8	58.7	79.9	6.3	9.1	13.8	18.8	27,7	39.9	60.5	82.4	9.00 R 20	

1) Locked with SA 35 985

2) standard

Total axle atio 5.31									Ma at engi	aximu ne rat	m spe ed sp	eds k eed 2	(m/h 800/	min				
					Fo	warc	ls						Re	verse		-1	alu	Tires
1000 1000 1000		1 7.4	2 10.7	3 16.2	4 22.0	5 32.5	6 46.8	71.0	96.5	7.6	2	3 16.7	22.8	33.5	6 ⁻) 48.2	7-) 73.1	8") 99.5	18 - 20 12.5 - 20 ²⁾
nission		7.7	11.1	16.9	22,9	33.8	48.8	73.9	100.5	8.1	11.5	17.4	23.7	34.9	50.2	76.1	103,6	12.5 R 20
transı	gears	7.8	11.2	17.0	23.2	34.1	49.2	74.6	101.4	8.0	11.6	17.5	23.9	35.2	50.7	76.8	104.5	14.5 - 20
Main	Main	8.1	11.7	17.7	24.1	35.6	51.3	77.7	105.7	8.4	12.1	18.3	24.9	36.7	52.8	80.0	109.0	14,5 R 20
		7.4	10.7	16.2	22.1	32.6	47.0	71.2	96.8	7.7	11.1	16.8	22.8	33.6	48.4	73.3	99.8	9.00 - 20
		7.6	10.9	16.5	22.4	33.1	47.7	72.2	98,2	7.8	11.2	17.0	23.2	34.1	49.1	74,4	101.3	9.00 R 20

1) Locked with SA 35 985

2) standard

Maximum speeds 435.110/.111/.113

Total axle ratio 6.38								at	Ma engir	ximu ne rat	im spe ted sp	eeds k eed 2	:m/h 800/π	nin		 		t ta Salat Maria Maria Maria Maria Maria
i. i.					Forw	ards	rds						Tires					
		1	2	3	4	5	6	7	8	1	2	3	4.	5 ¹)	6 ¹)	7 ¹ 	8 ¹)	
		6.5	9,4	14,2	19,3	28.4	41.0	62,1	84,4	6.7	9.7	14,6	19.9	29.3	42,2	63,9	87.0	14.5 - 20 16/70 - 24
		6.8	9.8	14.8	20,1	29,6	42.7	64.7	88.0	7.0	10.1	15.2	20.7	30.5	44.0	66.6	90.7	12 R 22.5 ²⁾ 14.5 R 20
ission		7.4	10,6	16,1	21.9	32.3	46.6	70.6	96.0	7.6	11.0	16,6	22.6	33,3	48.0	72,7	99.0	14.5 R 24
ansm	ars	7.1	10.3	15.6	21.2	31.2	45.0	68.2	92.7	7.4	10.6	16.0	21.9	32.2	46.3	70.2	95.6	14.5 - 24
Main tr	Main ge	6.6	9.6	14,5	19.7	29.1	41.9	63.5	86.4	6.9	9.9	14.9	20.4	30.0	43.2	65.4	89.0	11.00 - 20 11.00 R 20
	Z	7.0	10,1	15.2	20,7	30,6	44.1	66.8	90.8	7.2	10.4	15.7	21.4	31.5	45.4	68.8	93.7	12,00 R 20 13 R 22,5 16/70 - 24 14,75/80 R 20
		6.0	9,9	15,0	20,4	30.1	43,3	65.6	89.3	7,1	10,2	15.4	21.1	31,0	44.6	67,6	92.0	12.00 - 20

1) Locked with SA 35 985

2) standard

Fota axle atio 5.40		Maximum speeds km/h at engine rated speed 2800/min																
			2	3	Fc 4	orwaro	ds 6	7	8	1	- 2	3	Rev 4	erse 5 ¹)	6 ¹)	7 ¹)	8 ¹)	Tires
		7.66	11,05	16,72	22.75	33.55	48.39	73,31	99.64	7.91	11.40	17.24	23.50	34.50	49.82	75.47	102.69	14.5 - 20 16/70 - 24
Ē		7,98	11.52	17.44	23,73	34,99	50.47	76.47	103.94	8.25	11.89	17.98	24,51	36.06	51.97	78,72	107.11	12.5 R 22.5 ²⁾ 14.5 R 20
nissio		8.71	12,56	19.02	25.87	38,15	55.03	83,37	113.32	8,99	12.96	19,61	26.72	39,35	56.66	85.82	116.78	14.5 R 24
transn	gears	8,41	12,14	18,38	25.00	36.87	53.18	80.57	109.51	8,69	12.53	18.95	25.82	38.03	54.76	82.94	112.85	14.5 - 24
Main	Main	7.84	11,31	17.11	23.79	34.33	49.53	75.03	101.99	8.09	11.67	17,65	24.05	35.42	50.99	77.24	105.10	11,00 - 20 11,00 R 20
		8.25	11.90	18.01	24.51	36.13	52.12	78.96	107.33	8,52	12.28	18.57	25.31	37.27	53.67	81,29	110.61	12.00 R 20 13 R 22.5 16/70 - 24 14.75/80 R 20
		8,11	16.69	17.70	24.08	35.51	31.22	77,59	105.47	8.37	12.07	18,25	24.87	36.63	52,73	79,88	108.69	12.00 - 20

1) Locked with SA 35 985

2) standard

Maximum speeds 435.110/111 (transmission model 717.901)

Tota axle ratio 6,38	al 5 3	Maximum speeds km/h at engine rated speed 2800/min																
		Ant		l Na star	Forwa	ards					di di		Reve	rse				·····
ra Nari 1941 -		1	2	3	4	5	6	7	8	1	2	3	4	51)	611	71)	8 ¹⁾	Tires
Ę		6,5	9,4	14.2	19,3	28,4	41.0	62,1	84,4	6,7	9,7	14,6	19,9	29,3	42,2	63,9	87,0	14,5 20 16/70 - 24
missic	ars	6.8	9.8	14,8	20,1	29,6	42,7	64,7	88,0	7,0	: 10,1	15,2	20,7	30,5	44,0	66,6	90,7	12 R 22,5 ³⁾ 14,5 R 20
ans	n ge	7,4	10,6	16,1	21,9	32,3	46,6	70,6	96,0	7,6	11,0	16,6	22,6	33,3	48,0	72,7	99.U	14,5 R 24
n tr	mai	7,1	10,3	15,6	21,2	31,2	45,0	68,2	92,7	7,4	10,6	16,0	21,9	32,2	46,3	70,2	95,6	14,5 24
Mai		6,6	9,6	14,5	19.7	29,1	41,9	63,5	86,4	6,9	9,9	14,9	20,4	30,0	43,2	65,4	89,0	11,00 - 20 11,00 R 20
		7,0	10,1	15,2	20,7	30,6	44,1	66.8	90 8	7.2	10.4	15,7	21,4	31,5	45,4	68,8	93,7	12,00 R 20 13 R 22,5 14,75/80 R 20 ²)
		6,9	9,9	15,0	20,4	30,1	43,3	65.6	89,3	7,1	10,2	15,4	21,1	31,0	44,6	67,6	92.0	12,00 20
<u>.</u>	19										2	<u> </u>	:					
		1,13	1.62	2,46	3,35	4,93	7,11	10,77	14,65	1,16	1,68	2,54	3,46	5.09	7,33	11,10	15,11	14,5 20 16/70 – 24
		1,17	1,69	2,56	3.49	5,14	7,41	11,23	15,27	1,21	1,75	2,64	3,60	5,30	7,64	11,57	15,74	12 R 22,5 ³⁾ 14,5 R 20
	ars	1,28	1,85	2,80	3,80	5,61	8,09	12,25	16,66	1,32	1,91	2,88	3,93	5,79	8,33	12,62	17,18	14,5 R 24
	ge:	1,24	1,78	2,70	3,67	5,42	7,81	11,83	16,09	1,28	1,84	2,78	3,80	5,59	8,05	12,19	16,59	14,5 - 24
	orking	1,15	1,66	2,62	3,42	5,05	7,28	11.03	15,00	1,19	1,72	2,59	3,54	5,21	7,50	: 11,36	15.46	11,00 - 20 11,00 R 20
Xo	м.	1,21	1,75	2,65	3.60	5,31	7,66	11,60	15,77	1,25	1,81	2.73	3,72	5,48	7.89	11,95	16.26	12,00 R 20 13 R 22,5 14,75/80 R 20 ²⁾
l gear b		1,19 8 %	1,72	2,60	3,54	5,22	7,52	11,40	15,50	1,23	1,77	2,68	3,66	5,38	7,75	11,74	15,98	12,00 - 20
itiona	1. 1.	0,116	0,167	0,253	0,345	0,509	0,733	1,111	1,511	0,120	0,173	0,261	0,356	0,524	0,755	1,144	: 1,557	14,5 20 16/70 - 24
Add		0,121	0,175	0,264	0,359	0,530	0,764	1,157	1,574	0,125	0,180	0,272	0,371	0,547	0,787	1,193	1,623	12 R 22,5 ³⁾ 14,5 R 20
	ars	0,132	0,190	0,288	0,392	0,578	0,834	1,263	1,718	0,136	0,197	0,297	0,405	0,597	0,859	1,301	1,771	14,5 R 24
	r ge	0,128	0,184	0,278	0,379	0,559	0,805	1,220	1,659	0,132	0,190	0,287	0,391	0,576	0,830	1,257	1,710	14,5 - 24
	crawle	0,119	Ö,171	0,259	0,353	0,521	0,750	1,137	1,564	0,123	0,177	0,267	0,365	0,537	0,773	1,171	1,594	11,00 ~ 20 11,00 R 20
	5	0,125	0,180	0,273	0,371	0,547	0,789	1,196	1,626	0,129	0,186	0,281	0,383	0,585	0,813	1,232	1,676	12,00 R 20 13 R 22,5 14,75/80 R 20 ²³
	5.	0,123	0,177	0,268	0,365	0,538	0,776	1,175	1,598	0,127	0,183	0,276	0,377	0,555	0,799	1,210	1,647	12,00 - 20

1) Locked with SA 35 985 2) 13.00 - 20 Pilote XL 3) Standard

Tot axle ratio 6,38	al 2 3						at e	Maxi ngine	imum rated	speec speec	ls km 1 280	/h D/min			- -			
				F	orwa	ards							Reve	rse				
		1	2	3	4	5	6	7	8	. · 1	2	3	4	51	61) 61)	71)	81)	Tires
uo	1. A.	9,0	12,5	17.1	23,3	32,7	45,4	62,1	84,4	9,3	13,0	17,7	24,1	33,8	46,9	64,0	87,0	14,5 - 20 16/70 24
smissi	ars	9,4	13,1	17,9	24,3	34,1	47,3	64,7	88,0	9,7	13,5	18,4	25,1	35,2	48,9	66.7	90,7	12 R 22,5 31 14,5 R 20
ran	gea	10,3	14,3	19,5	26,5	37,2	51,6	70,6	96.0	10,6	14,7	20,1	27,4	38,4	53,4	72,8	99.0	14,5 R 24
ain t	nain	9,9	13,8	18,8	25,6	35,9	49,8	68,2	92,7	10,2	14,2	19,4	26.4	37,1	51,5	70,3	95,6	14,5 24
Ň	L	9,2	12,8	17,5	23,9	33,4	46,4	63,5	86,4	9,5	13,3	18,1	24,6	34,6	48,0	65,5	89,1	11,00 - 20 11,00 R 20
· · · · ·	a shekara	9,7	13,5	18,4	25,1	35,2	48,9	66,8	90,9	10,0	13,9	19,0	25,9	36,4	50,5	68,9	93,7 <u>_</u>	12,00 R 20 13 R 22,5 14,75/80 R 20 2)
		9.6	13,3	18,1	24.7	34,6	48.0	65,6	89,3	9,9	13,7	18,7	25,4	35,7	49.6	67,7	92,1	12,00 - 20
na ta Na t		1,57	2,18	2,97	4,05	5,68	7,88.	10,78	14,66	1,62	2,25	3,07	4,18	5,86	8,14	11,11	15,11	14,5 – 20 16/70 24
		1,63	2,27	3,10	4,22	5,92	8,21	11,23	15,28	1,69	2,34	3,20	4,35	6,11	8,49	11,57	15,75	12 R 22,5 3) 14,5 R 20
	sars	1,78	2,48	3,38	4,61	6,46	8,96	12,26	16,67	1,84	2,56	3,49	4,75	6,67	9,26	12.63	17,19	14,5 R 24
	16 BL	1,72	2,39	3,27	4,45	6,24	8,66	11,84	16,10	1,78	2,47	3,37	4,59	6,44	8,94	12,20	16,60	14,5 - 24
	vorkir	1,60	2,23	3.04	4,14	5,81	8,07	11,03	15.00	1,66	2,30	3,14	4,27	6,00	8,33	11,37	15,47	11,00 20 11,00 R 20
xoq	Λ	1.69	2,34	3.20	4,36	6,12	8,48	11,60	15,78	1,74	2,42	3,30	4,50	6,31	8,77	11,95	16,27	12,00 R 20 13 R 22,5 14,75/80 R 20 2)
al gear		1,66	2,30	3,15	4,28	6.01	8,34	11,40	15,51	1,71	2,38	3,24	4.42	6,20	8,61	11,75	15,98	12,00 – 20
dition	N AN	0,162	0,225	: 0,307	0,418	0,586	0,813	1,111	1,511	0,167	0,232	0,316	0,431	0,605	0,840	1,145	1,558	14,5 - 20 16/70 - 24
PA .		0,168	0,234	0,319	0,435	0,610	0,847	1,158	1,575	0,174	0,242	0,330	0,449	0,630	0,875	1,193	1,624	12 R 22.5 3) 14,5 R 20
	LS.	0,184	0,255	0,349	0,475	0,666	0,924	1,264	1,719	0,190	0,264	0,360	0,490	0,688	0,955	1,302	1,772	14,5 R 24
	gea	0,178	0,247	0,337	0,459	0,643	0,892	1,221	1,660	0,183	0,255	0,347	0,473	0 664	0,922	1,258	1,711	14,5 - 24
	awler	0,165	0,230	0,314	0,427	0,600	0,832	1,137	1,547	0,171	0,237	0,324	0.441	0,619	0,859	1,172	1,595	11,00 - 20 11,00 R 20
	ö	0,174	0,242	0,330	0,449	0,631	0,875	1,196	1,627	0,180	0,250	0,340	0,463	0,651	0,904	1,232	1,677	12,00 R 20 13 R 22,5 14,75/80 R 20 2)
		0,171	0,238	0,324	0,442	0,620	0,860	1,175	1,600	0,176	0,245	0,334	0,455	0,693	0,888	1 211	1,648	12,00 - 20

Maximum speeds 435.110/.111 (transmission model 717.900)

1) Locked with SA 35 985 2) 13.00 – 20 Pilote XL 3) Standard

Chassis	a a sa ang sa as a sa		Tires			Axle lo	ads	Weigh	ts voicht		
Viodel	l Sales	Version	Size	Type	I PB	FA	I BA	Chas-	with	Permissible	Total
	designation	1.111.111				tem	1 4 4 4 4 4 1 4 4 4 4 4 4 4 4 4 4 4 4 4	sis	platform	payload	weight
	11 1000 1	Carias	10 5 00	MDT	10	к <u>д</u>	Kg .	<u>к</u> g	kg	кд	7400
117	U 1300 L	Series	12,5-20	MPT	10	3960	3960			 	7400
	0 1000 0 07		14,5 R 20	MPT	10			1			
			12,5 - 20	MPT	12	1	1.111	3750	5252"	1)2)	7490 ³⁾
			12,5 H 20 14,5 H 20	MPT	14	4000	4000				
			9,0 - 20		14	1. E.					
115			9,0 1 20	MPT	12				6130		7490
.110	Special		12,5 20								1.00
	vehicle with										$(1^{n+1})^{n+1}$
) Varies depen	ding on equipment	<u>I</u>	2) Correspondi	ng to sp	ecificatio	ns of bod	ly manufac	turer	·		1
haceie m		<u></u>	Tiroc				ade	Weigh			
/100010 III.								Unlad	en weight		•
Viodel	Sales	Version	Size	Туре	PR	FA	RA	Chas-	with	Permissible	Permis-
	designation							SIS	platiorm	payload	total
						ka	ka	ka	40	ka	weight
35 111	1117001	Series	11 00-20	<u> </u>	16	<u>ry</u>	Kg :	<u>Ng</u>	ку	ку	rg
	1.55.551		11,00 R 20		16	-					
			12,00-20 12,00 B 20		18	5300	5300				
			12 R 22,5								
			13H22,5	MOT	10	l tennelter L	N. S. M.	4450	5600"	1)4)	9000
			14,5 R 20	MPT	18	5290	5290				
			14,5-24	MPT	16			1			
			14,5 R 24 16/70-24	MPT	16						
			14,75/80 R 20/			5300	5300				
			13,00-20- Pilot XL					19 A.			1
		Series	11,00-20		16						
걸음을 알고		with	11,00 R 20		16						
		35810	12,00 R 20		18	5300	5800	4450	5600"	1)2)	10 000
			14,75/80 R 20/								
			Pilot XL		1.1						
			12 R 22,5						-		
			13 R 22,5	AADT	10			-	1.		
			14,5-20 14,5 R 20	MPT	18	5290	5290				
			14,5-24	MPT	16	5300	5400]	an Nasar Nasar		
			16/70-24	MPT	14	5300	5800	l dige			
435.113	U 1700 L/ 38	with SA	13,5 R 22,5		1					• • • • • • • • • • • • • • • • • • •	1.0
	a sa je	35810	13,00–20– Pilot XL			5300*)	7000		7000	(61)	12000
35.115	U 1700 L	Fireser	11,00-20		16	1	1	1		····· , <u></u> -··· ·	
		with SA	11,00 R 20 12,00 - 20	1	16						
		35810	12,00 R 20	1	18	5300	6200	4450	5600"	1)2)	10 600
Sec. As a second	e Alexandra		14,75/80R 20/								
	$\sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{j=1}^{N-1} \sum_{i=1}^{N-1} \sum_{j=1}^{N-1} $	1 s	Pilot XL	1			1. 1. 1. 1.] .		e franciska s	la segurite.
			12R22,5 13R225		ľ						
			14.5-20	MPT	18			1			
			14,5 R 20	MPT	18	5300	5550	: ·			
			14,5-24	MPT	16	5300	5670				
	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	1	14,5 H 24	uvite I	110	1	1]]		1

2) For tractor unit - chassis, determined during acceptance 3) Special vehicle

5) Max. 4000 kg for cross-country applications

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Loads Chassis

			γ_{λ_i}
Mode	ŀ.	З,	

435.110

			Tires			Axle loa	ads	Weight	S s weighte		
- 14. 	I Sailes	Version	Size	Type	PR	FA	IRA	Chas-	in weights with	perm.	Total
	designation	11. E.				100	ka	sis	platform	payload	weight
		Series ²⁾	145 P 20	MDT	18	NY .	ng:	∿y ∷	ry	<u></u>	ng -
		Denes ·	14,5 - 20	MPT	18			ļ		. }	
		e distante.	14,5 R 24	MPT	16						
			16/70 - 24	MPT	14					х.	
			11,00 R 20		16	5300	5300	4450	5820	3180	9000
			11,00 - 20		10						
			13 R 22,5				N. AND				
			12,00 R 20	2	18		1 x -				
			14,75/80 R 20		10						
			13,00 - 20 -	n service Service		NG AL		1			
		Series?		ADT	10			<u>.</u>			
		with	14,5 - 20	MPT	18						
		SA 35.910	14,5 R 24	MPT	16	. .			1	n an trainn Mar tha tha	
		33010	16/70 - 24	MPT	14		н. Н				
			11,00 R 20		16	5300					10000
			11,00 - 20		16		5300	4450	5820	3440	10000
			13 R 22,5							1	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
			12,00 R 20		18					·.	
			14,75/80 R 20				andra I. Herdalar				
			13,00 - 20 -					1.34			
		with ³⁾	14 5 B 20	MPT	18	<u> </u>					
		SA	14,5 - 20	MPT	18	5300	5450			3600	
		35810	14,5 R 24	MPT	16						
		SA	16/70 - 24	MPT	14	5300	6140	4450	5820		
		35969	11.00 B 20		16						an an an a
			11.00 - 20		16						10000
			12 R 22,5 13 R 22.5			5300	6200		· · ·	4240	10600
	an 1987 - Area		12,00 R 20		18		$(a_{ij})^{1/2} \in \mathbb{R}$				
			12,00 - 20 14 75/80 B 20		10						
			13,00 - 20								
			Pilote XL			- 150	5 450		<u> </u>	· · · · · · · · · · · · · · · · · · ·	
		SA	14,5 H 20 14,5 - 20	MPT	18	5450	5450			3600	
		35776	14,5 R 24	MPT	16						an an an Arrana An Arrana
		SA	14,5-24	MPT	10	5000	6140	P .	- 4		
		35810	10/70 - 24		14	0000	0140	4450	5920		10,000
		SA	11,00 - 20		16				1020	18 M.	
		35968	12 R 22,5		:	5600	6200			4240	
· .		SA	12,00 R 20		18		0200			72-70	
		35969	12,00 - 20	н. На 1	18						
			14,75/80 H 20 13,00 - 20								
			Pilote XL		L				<u> </u>		

applicable only for tractive unit and equal weight distribution on the tractive unit chassis. Decided when body is agreed.
 and as tractive unit and tractive unit chassis
 tractive unit and tractive unit chassis

MPT = Multipurpose tire

Authorized towed weights

Trailers with brakes

Chassis	ing and Weiter Correct	in Assessment for the second	Trailer, gross weight	
Model	Sales designation	Gross weight of towing vehicle kg	with non-continuous brake (over-run brake) kg	with continuous brake
435.115	U 1300 L	7 490	7020 to 7500	10 480
435.111	U 1700 L	9 000 10 000 10 600	8 000	12 600 14 000 14 840

Trailers without brakes

Chassis	e van een een de sterre	•	Trailer
Model	Sales designation	Gross weight of towing vehicle	Gross weight
		kg	kg
435.115	U 1300 La 24	7 490	2 300
435.111	U 1700 L	9 000 10 000 10 600	2 000

Trailers with brakes

Chassis ⁴⁾	ee an te as		Trailer, gross weight	ena detake en a	Trailer
Model	Sales designation	Gross weight of towing vehicle kg	with non-continuous brake (over-run brake) kg	with coninuous brake kg	coupling ¹⁾
		9 000 10 000 ³⁾	8 000	29 000 28 000	all the second
435.110	U 1700	10 600 1) 3)	an an Arrente an Arrente an Arrente Arrente an Arrente an Arrente Arrente Arrente an Arrente an Arrente an	25 600	64 G 135 or 605
		10 600 2) 3)		27 400	225 G 110
.113	U 1700 L/38	12 000	_	12 000	64 G 135

1) see technical data 31.3 - 1.1/1

Trailers without brakes

Chassis ⁴⁾			Trailer	
Model	Sales designation	Gross weight of towing vehicle	Gross weight	
		kg	kg	
		9 000		
		10 000 ³⁾	2 000	
435.110	U 1700	10 600 ^{1) 3)}	The second se	
		10 600 2) 3)		
435.113	U 1700 L/38	12 000	2 500	······································

1) with reinforced rear axle

2) with reinforced rear- and front axle and steering LS 7 F, SA 35 968, SA 35 969, SA 35 776

3) exhaust brake SA 35 810

4) tractor and chassis tractor

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 $\begin{array}{l} \sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left(\sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left$





Filling capacities						
Assembly		Service product (page No. of MB specification for service products	SAE class	Season	Capacity 435.115 .117	(I) _{435.110} .111 .113
Engine	with oil filter	T			max.15	max.15
	proportion in oil filter	Engine oii (220-227.1)		121	min. 12 2 x 1.0 1.5	min. 12 2 x 1.0
Lock-up torque converter		Engine oil (226-227.1)	10 W 7)	all year round	1	7.5
Clutch operation	Control reservoir	Brake fluid ^s) (331.1 331.2)		all year round).2
Transmission	Main transmission	Engine oil 1) 6) (226-227.1)	- 10 W*	all year r.	1	0.5
	- with low ratio gears		80 9)	i se No serie	1	1.5
	- with crawler gears	Transmission oil (235.1)	80 W 51 80 W/	all year	1	2.5
	- with pto 1:1		85 W 9)	round		9.5
	- with pto 0.7 : 1		9010)		1	0.0
Hydrostat		Engine oil statistics to be a set	10 W ³⁾	all year	_	17.0
		Hydraulic oil		round	·.	
Pto shaft	540/1000/min	Transmission oil (235.1)	80	Salt Statistics	5	.75
drive		Engine oil 1) (226-227.1)	10	round		
	3 700/min	Transmission oil (235.1)	80		de de jou t	3.0
Pto shafts	Shaft bearings 8)	Transmission oil (235.1)	80	all year	0.1	0.1
		Engine oil 1) (226-227.1)	10 W	round		
Axles	Central housing the second		-		2.5	2.5
	Wheel hub drive	Hypoid gear oil (235)	90	all year r.	ea.0.3	ea.0.3
	Differential lock	Initial operation oil (225)	10 W		0.001	_
Steering		Engine oil (226, 227)	10 W 3)			0.05
	Hydraulic steering	or ATF (236.2)	-	ali year	2.25	2.25
		Hydraulic oil (226,227,236.2)		round		3.25 4
Braking circuit	Complete capacity	Brake fluid 5) (331.1)	-	all year r.	app.0.8	app.1.0
Compressed air brakes	with anti-freeze bottle	Ethyl alcohol (methylated spirits)	_	all year round	app.0.2	app.0.2
		Iso propyl alcohol 1)				
Grease nipples	Axle, chassis, cab	Lubricating grease (266)	1-	all year r.	as requi	red
Winch	at front	Transmission oil	80	all year r.	2.0	2.0

- Applicable for military vehicles
 Only those oils specified by Daimler-Benz may be used.
- b) Use oils specified by the vehicle owner. If he has not left any instructions, use the normal oils specified.
- 2) Listed oils may not be mixed with each other.
- Use SAE 5 W-20/30 in cold regions.
 Applicable for LS 7.

- 4) Applicable for LS 7.
 5) Change yearly (safety requirement).
 6) Only applicable for transmission model 717.901 without auxiliary transmission.
 7) In cold regions SAE 5 W-20/30
 (a) beta regions 0.45 20
- In hot regions SAE 30
- 8) Long-term filling
- 9) Optional
- 10) In hot zones
- 11) With turbocharged engines use only S3 grade engine oil





With a continuous external temperature above +30°C (86°F) SAE 40 can be used. .

Assembly		Service product (page No. of MB specification for service products	Season	Capacity 435.115 .117	(I) 435.110 .111 .113
Battery	- Terminals	Acid-resistant grease FT 40 VI (350) tech. vaseline 1)	all year	as require	d
	- Topping up	Distilled water	round	ter and a second	
Start pilot	Supply reservoir	Starter fuel a prevention	all year r.	0.05	0.05
Fuel system	Fuel tank	Diesel fuel DIN 51 601	all year r.	160	160
Cooling circuit	with heater	Coolant 7) (325)		20	20
	proportion of anti-freeze down to -25°C -13°F (standard filling)	Anti-freeze (325)	all year	8	8
	proportion of anti-freeze down to40°C 40°F	Anti-freeze (325)		10.2	10.2
	and corrosion inhibitor	Corrosion inhibitor (311)		0.2	0.2
Screen wash circuit	Screen wash bottle	MB screen wash additive	all year round	9.5	7

 Applicable for military vehicles

 a) Only those oils specified by Daimler-Benz may be used.

 b) Use oils specified by the vehicle owner. If he has not left any instructions, use the normal oils specified.

7) Consisting of water, anti-freeze and corrosion inhibitor.

-

Special versions U 1300 L considered:

the second s	المتكلية فتعقدون والمراجع	and the second secon		<u>a a la casa da casa da</u>
Engine:	16.457/26	18.638/03	39.975/01	83.036/01
	35.737/04	35.738/02	35.949/02	35.977/01
Clutch:	35.741		a a station	
Transmission:	35.737/04	35.738/02	35.949/02	35.977/01
35.985/01				1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -
Frame:	35.014/17	35.149/04	35.238/03	35,460/09
	35.780/01	35.817/08	35.851/02	35.951/01
	35.951/02	35.976/01		a an
Suspension:	35.633/02	35.772/04		
Axie.	35.973/01	35.974/01		
Brake:	35.734/10	35.822/01	35.823/02	35.966/01
	35.981/01	35.988/01	35.992/01	35.997/01
	35.998/01		generation of the	
Steering.	35.987/01		· · · · · · · · · · · ·	
Fuel system:	35.778/02	35.921/01		
Electrical equipment:	35.496/05	35.647/03	35.775/03	35.769/05
	35.769/10	35.769/11	35.827/01	35.827/02
	35.828/01	35.831/01	35.912/05	35.942/01
	35.965/02	35.979/01	35.980/01	35.986/01
	35.993/01	53.482/01	82.509/54	82.983/24
Cab:	35.765/10	35.928/09	53.472/01	53.473/02
	53.474/03	53.477/02	53.478/02	53.479/03
a da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti-arresta da anti-arresta da anti-arresta da anti-arresta da anti-	53.480/03	53.483/07	53.484/02	53.485/02
	53.486/01	53.489/02	53.491/06	53.492/01
	53.495/01	53.497/01	53.950/01	53.951/01
	53.962/01	53.977/01	53.977/02	53.978/01
	53.980/01	53.982/02	53.983/01	an an the growth that the
Platform:	435.611	35.017/10	35.074/03	35.149/04
a a substantia da substant A substantia da substantia d A substantia da substantia d	35.270/09	35.270/14	35.534/07	35.761/01
a da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti-arresta da anti- arresta da anti-arresta da anti- arresta da anti-arresta da anti- arresta	35.762/02	35.763/02	35.764/01	35.766/02
	35.767/01	35.768/01	35.777/01	35.825/01
, al an	35.982/01	70.071/01		
Special parts:	35.847/02	35.951/02		

If a particular unit incorporates only one or two special versions (SA's), these will be indicated beneath the heading.

The job descriptions may differ for vehicles which do not feature corresponding special versions (SA's).

Special versions U 1700 L/38 considered:

Engine: And Andrews	16.074	18.631	18.638	35.810
	35.975	81.408	82.773	82.928
	83.017	83.036	83.069	
Clutch:	35.741	lag agé Alula		
Transmission:	35.737	35.738	35.749	35.970
	35.977	35.985	1 NATE VIEW	
Frame: pay a superior	35.872	35.999	· 2003年3月1日	
Suspension:	35.301	35.772	1. M. & MELTA	
Axle:	36.140	e pre primi a tata di con	a na manant	
Wheels:	36.103	and the second	analas an	
Brake:	35.643	35.810	35.966	35.976
an a	36.043	36.089 st		
Steering:	35.776		and a second	
Fuel system:	35.270	35.778	35.921	
Electrical equipment:	35.098	35.647	35.693	35,703
المراجع (1997) - محمد محمد المراجع المراجع (1997) - مراجع المراجع (1997) - مراجع (1997)	35.769	35.827	35.965	35.979
an an an an an an Arland an Arland an Arland an Arland. Ar an Arland an Arland Ar an Arland	35.980	35.986	35.992	35.993
	36.017	36.089	36.139	53.482
n general yn de ferste de fers Ferste de ferste de f Ferste de ferste de f	53.484	53.496	53.957	53.985
a na shekara na shekara na shekara na shekara Mashekara na kasara na shekara na shekara na shekara Mashekara na shekara na shekara na shekara na shekara na sh	82.509	82.983		
Cab:	35.847	36.048	53.472	53.473
en en ling i son de finite d'un de la companya de Companya de la companya de la company Reference de la companya de la compa	53.474	53 . 475	53.480	53.482
	53.483	53.484	53.485	53.489
	53.491	53.493	53.499	53.950
	53.951	53.955	53.958	53.978
	53.980	53.982	53.984	53.985
	53.991	a Na guna seconda da seco		
Platform:	35.074	35.270	35.437	35.460
	35.503	35.534	35.559	35.761
	35.762	35.763	35.764	35.768
	35.777	35.825	36.105	36.133
	36.137	39.725	39.729	

Where only one or two special versions (SA) of a unit are fitted, this/these is/are listed in the heading.

The description of jobs may differ in the case of vehicles without corresponding special versions (SA).

가 있는 것은	352/ 352 A
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Chapter in the second	Page
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Installation survey	1.1/1
Section drawing	1.1/2
- 동안 : : : : : : : : : : : : : : : : : :	
Performance diagram	1.1/4
Technical data	1.2/1
Special tools	1.3/1
	12/2
Filing capacities, is strictly and the second strictly	1.3/2
Necessary materials	1.3/2
Tightening torques	1.4/1
	15/1
cxplored view	1.571
Cylinder bores diagnosis	1.6/1
2 Reconditioning engine	
Removal and installation of engine	2.1/1
Removal and installation of engine parts	2.3/1
3 Removal and installation of cylinder head cover	3.1/1
4 Removal and installation of cylinder head	4.1/1
도 한 것 같은 것	
5 Disassembly and assembly of cylinder head	5.1/1
6 Reconditioning of cylinder head	
Checking, exchanging valve guides	6.1/1
	6.0/1
Refacing valve seats with valve seat cutter	0.2/1
Refacing valve seats with hand cutter	6.3/1
Removal and installation of valve seat rings	6.4/1
Remachining hasic hore for value seat rings	6 F/1
	0.371
7 Checking compression pressures	71/1
	7 • F / F



General 01.8

352/352 A

Installation Survey

Chassis Model	Sales designation	Series Chassis end No.	Engine Model	Sales designation	Series/SA Engine end No.
435.110	U 1700	from 002 230		N	Series from 577 967
	U 1700 L"	from 000 008	353.959	352 A. V/2	Series from 413 968
.113	U 1700 L/38	from 084 642		352 A. LII/151	Series from 693 577
.115	U 1300 L ¹	from 000 019	Altan Altana	352.X/2	Series from 482 095
		from 000 061 ²⁾	353.961	352.X/1 ²⁾	SA 16 457/26 ² SA 35 975 ² SA 83 036 ² from 509 465
		from PB ³¹	353.959	352 A. V/2 352 A.LII/15	SA 36 0194) from PB3)
.117	U 1300 L/37	from PB ³⁾	353.961	352.X/2	Series from PB ³¹
		from 071 796	353.959	352 A. V/2 352 A. LII/15	SA 36 019 ⁴⁾ from 627 976
.160	Attachment TM 170	from PB ³⁾	353.959	352 A.LII/1	from PB ³⁾
.170	Attachment Condor	from PB ³	353.977	352 A.V/2	Series from 575 178

L = Truck
 Special vehicle BW
 PB = Start of production
 Valid only for fire service vehicles
 From engine end No. 691 150

01.8 General

352/352 A

General View



Engine 353.961



Engine 353.959

352 A

General view



Engine 353.977

UKD 30 402 21 42-02

: /.

352/352 A

Performance diagram



Engine 353.961


General 01.8

352/352 A

Performance Diagram



Engine 353.959 from engine end No. 691 150







Technical Data

Mercedos Benz type		[352		-	352 4	
Medel			252.061				E9 077
Combustion system			Four-stroke diesel with direct Fc		Four-stro	-our-stroke diesel with direct	
Number of cylinders Cylinder arra	ngement			6, vertic	al in-line		
Bore ø Stroke		mm mm cm ³		97 128 5657			
Compression ratio	A A A A A A A A A A A A A A A A A A A	1.548.643	17		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	16	
Compression at starting speed		bar	22 up to 24 min. 20			ang b	
Continuous output		kW (HP) 1/min	96 (130) 2800			124 (168) 2800	۲۰ ۲۰۰۰ ۲۰۰۰ و ۲۰
Maximum torque at speed		Nm 1/min	363 1700		491 ³⁾ 1600	530 ²⁾ 1600	491 1600
Idle speed		a 1/min	700				
Start of delivery before TDC	······································	٥	18		21"	19 ²⁾	21
Injection sequence			1	- 5 - 3 -	- 6 - 2 - 4	a seteta	
Valve clearance, cold	Inlet	mm	0,20)		0,252	0,20
	Exhaust		0,30) .		0,402)	0,30
Opening pressure	new	bar	and a second	200	+ 10		and Mari
of injection nozzles	used	bar	and the second second	min.	180 .	a basel par	AN ARA
Operating temperature	a ta ta ta ta	°C	95.		NE DAN		
Oil pressure	normal	bar	2 to 5 min. 0.6				
	at idle speed	bar					
Weight, dry		kg	460 480				

To end engine No. 691 149.
 From end engine No. 691 150.

01.8 General

352/352 A

Crankcase

Engine Type			352	352 A
Overall height of crankc (Production size)	ase	mm	359 359	9,10 9,00
Repair stage I ¹⁾	na generation Maria Maria agus	mm	<u>358</u> 358	3,80 3,70
Repair stage II ¹⁾		mm	<u>358</u> 358	3,50 3,40
Repair stage III 9	n an	mm	<u>350</u> 350	3,20 3,10
Permissible unevenness	Crosswise b	mm	0,0	017
of mating surface	Lengthwise c	mm	0,	03
Peak-to-valley height of upper mating surface	aya Anazarta	mm	0,008 up	to 0,016
Permissible parallel miss of upper to lower mating in lengthwise direction	alignment surface d	mm	ана, 1911 г. – Саларана С 1912 г. – Саларана С	,1 5,5,7,1
Pressure test in water	a falsa a sa sa sa	bar	2	,5
Piston may recede		mm	0,	07
Piston may project	= +	mm	0,	30

1) If mating surface is remachined to next repair stage, pistons of reduced compression height must be installed.

Cylinder Bores (e)

Normal	Normal I mm	Normal II	Repair stage I	Repair stage II	Repair stage III mm	
97.010	97.085	97.135	97,510 '	¹⁾ 98.010 ¹⁾	98.510 "	
96,990	97,065	97,115	97,490	97,990	98,490	
<u>97,010 ²⁾ </u>				<u>97,010</u> ²⁾ 96,990		
Permissible ovality			mm	0.01		
Permissible conicity	y		mm	0,0	1	
Permissible deviation of cylinder bores perpendicular to crankshaft axis, relative to 200 mm length			th mm	0,0	4	
Peak-to-valley heig	ht of the cylinder b	ores	mm	0,003 up	0,003 up to 0,005	
Waviness of cylinder bores			mm	max. 50% of peak	max. 50% of peak-to-valley height	
at top reversal point Wear in liner of 1st piston ring			mm	max.	0,12	
in centre of liner			mm	max. 0.05		
Bore depth for machining to the repair stages				min. 250		

Not engine 353.959/ 977.
 Possible repair- crankcase with dry cylinder liners may be installed. If necessary, the scope of work can be requested.

Camshaft Bearings

Basic bores in crankcase	mm	60,030
		60,000

General 01.8

352/352 A

Valve tappet bores

A set of the set of	An an Arthress and the second s		and the second
Normal	Repair stage 1	Repair stage II mm	Repair stage III mm
<u>28,033</u> 28,000	<u>28,233</u> 28,200	<u>28,533</u> 28,500	<u>28,783</u> 28,750

동생은 동생은 중요즘 것을 가 같은 것을 만들었다. 이 것이다.

Cylinder head

Overall height of cylinder head	an Afrika sa	mm .	<u>92,10</u> 91,90
Permissible material allowance		mm	1,00
	lengthwise	mm	0,05
Permissible roughness of mating surface	crosswise	mm	0,015
Permissible parallel misalignment of upper to lower mating surface	lengthwise	mm	0,10
Pressure test in water as a statistic statistic statistic statistics and statisti		bar	2.5
Nozzle projection relative to lower edge of cylinder head		mm	1.8 to 2.5
Peak-to-valley height of lower mating surface	. Sectors	mm	0,008 up to 0,016





			 A second s
Valve seat ring diameter a	inlet	mm	42 ± 0,01
tor new rings	Exhaust	mm	34 ± 0,01
	Inlet	mm	1,6 up to 2,0 as a set
Width	Exhaust	пm	2,0 up to 2,5
	Inlet	mm	2,8 + 0,2
Reference dimension	Exhaust	mm	2,6 + 0,2
Permissible runout of valve seat		mm	0,03
Distance between cylinder head	Inlet	mm	0,7 + 0,5
	Exhaust	mm	0,7 + 0,5
Valve seat angle	Inlet and exhaust	o	45° - 10′ - 20′
	Inside Inlet	•	60°
· 전 · 도 등 상황 관계 가장 가장 가지 않는 것이 가 있는 것이다. · 가장 관계 	Exhaust	Þ	75°
	Outside Inlet and exhaust	•	30°

Valve seat rings must be renewed if the machining limit is exceeded when remachining the valve seat.

01.8 General

352/352 A

Valve Seat Rings





		1		
			Exhaust A	Inlet B
Outside diameter valve seat ring c and d	Normal	៣៣	<u>38,080</u> 38,070	45,080 45,880 45,070 45,870
	Repair stage I	mm	<u>38,380</u> 38,370	45,380 46,180 45,370 46,170
	Repair stage II	mm	<u>38,580</u> 38,570	<u>45,580</u> 45,570
Bore diameter in cylinder head c 1	Normal	mm	<u>38,025</u> 38,000	45,025 45,825 45,000 45,800
and d 1	Repair stage I	mm	<u>38,325</u> 38,300	45,325 46,125 45,300 46,100
	Repair stage II	mm	<u>38.525</u> 38,500 -	<u>45,525</u> 45,500
Installation depth in cylinder head	e	mm	11	, <u>20</u> ,10
Distance between cylinder head face and valve seat ring	b1	mm	2,6 + 0,2	2,8 + 0,2
Basic bore in cylinder head		mm	38,000 + 0,025	45,000 + 0,025
Height of valve seat rings	serve and a a	mm	25 Mar. 8,5 - 0,1 Mar.	8,3 - 0,1
Valve seat ring overlap in cylinder head		mm	0,045 t	o 0,080

Valve Guides

				1. A second sec second second sec	
Distance between valve guide		Exhaust	Inlet	1	: : :
valve spring seat	mm	24 -	- 0,5		
Inside diameter	mm	<u>10,022</u> 10,000	<u>9,022</u> 9,000		
	mm	73	78		
	Normal	Re sta m	pair ge I m	Repair stage II mm	Repair stage III mm
Outside diameter	<u>15.046</u> 15,028	<u>15,</u> 15,	<u>146</u> 128	<u>15,246</u> 15,228	<u>15,546</u> 15,528
Bore in cylinder head	<u>15,018</u> 15,000	<u>15,</u> 15,	<u>118</u> 100	<u>15,218</u> 15,200	<u>15,518</u> 15,500
Overlap	. mm	· · · ·		+ 0,010 to + 0,046	

1) Engine model 353.959 from engine end No. 549 882.

General 01.8

352/352 A

Special Tools

ons. o.	Tool	Tool No.	Tool Set
1,	Ring wrench for injection lines	000 589 07 03 00	A
2	Pliers for connecting nipple of rocker shafts	312 589 01 37 00	A
3	Claw wrench for protective sleeve in cylinder head	346 589 00 07 00	В
4	30 mm socket for pressure screw in nozzle holder	000 589 75 09 00	B B B B B B B B B B B B B B B B B B B
5	Extractor for nozzle holder	352 589 00 33 00	В
6	Centering drift	425 589 00 61 00	В
7	Drift for removing inlet valve guide	110 589 02 15 00	С
8 ^{.11}	Drift for removing exhaust valve guide	615 589 01 15 00	С
9	Fitting drift for valve seat rings	346 589 03 15 00	C
0	Installer for valve guide	352 589 00 43 00	с
1	Reamer, 9 mm diameter for inlet valve guide	000 589 10 53 00	С
2	Reamer, 10 mm diameter for exhaust valve guide	000 589 11 53 00	с
3	Reamer for valve guide sleever bore in cylinder head	000 589 18 53 00	С
4	Hand cutter for valve seat rings	000 589 12 66 00	c
5	Special wrench to retighten injection lines	000 589 68 03 00	D
6	Limit plug gauge dia. 9 mm inlet valve guide	116 589 08 21 00	D
7	Connection piece for compression test	352 589 00 21 00	D
8	Limit plug gauge, 10 mm dia. for exhaust valve guide	617 589 05 23 00	D
9	Handle for cylinder head (2 necessary)	312 589 01 31 00	D
0	Rud special lifting chane	435 589 00 62 00	D

01.8 General

352/352 A

Capacities

Assembly		Service product (page No. of MB service product specification)	SAE- grade	Capac 352 ³⁾	tities (I) 352 ²⁾ 352 A
Engine	With oil filter max.	Engine oil	1)	14,5	15,0
	n se se de la construcción de la co	(224,226)		11,5	12,0
	Proportion in oil filter	(227.0, 227.1)5)		1,5	2 x 1,0
Cooling system	With heater	Coolant ⁴⁾ (325)			20
	Antifreeze proportion down to -25°C -13°F (Standart filling)	Antifreeze (325)	an sy tao Ng singga Titon tao		8
	Antifreeze proportion down to -40°C -40°F	Antifreeze (325)			10,2
	And corrosion protection	Anticorrosion oil (311)			0,2

1) Viscosity grades



SAE 40 may be used if outdoor temperatures are permanently above + 30°C (86°C F).
To engine end No. 502 247
From engine end No. 502 248
Consisting of water, antifreeze and anticorrosion oil
For supercharged engines, only use engine oil of "S 3" quality.

Necessary material

Cons. No.	Designation	Part No.
1	Loctite Nr. 241	002 989 70 71
2	Loctite Nr. 573	001 989 45 20
3	Curil T	001 989 37 20
4	Curil K 2	commercially available
5	Loctite Nr. 221	002 989 69 71

Tightening Torques

Designation		Thread	Nm	Torquing angle
Cylinder head cover	M 8	25		
Push rod cover to crankcase	M8	4 to 6		
Timing gear case cover C	asting	M 6	8	
statistica sector s	heetmetal	M 6	8	
Cylinder head (tightened in 3 stages according	g to tightening diagram)			
	st step	M 12	. 60	
	nd step	M 12	90	
31	rd step	M 12	110	
Oil pan (sheet steel)		M 6	8	
	·	M 8	9	
Oil drain plug to oil pan		M 26	80 + 10	
Protective sleeve for nozzle holder in cylinder	head	M 14	60	
Nozzle holder in cylinder head, thrust screw		M 34	60 to 70	
Tapered plug in cylinder head		M 30	100 to 200	
	a di seri	M 24	70 to 150	
Coolant line on top of cylinder head		M 8	25	
Flywheel housing to crankcase		M 12	80	
Timing gear case to crankcase		M 10	65	
Screw plug for oil passage in crankcase		M 20	100 ± 10	
Screw plug for oil duct, front and rear		M 16	40 + 5	
Flywheel to crankshaft In	itial torque	M 12	30 + 10	
ан ал ан	M 12	- ''	90°+ 20°	
Rocker arm brackets assembly to cylinder hea	ad	M 12	100 up to 110	
Leakage fuel line to injection nozzle		M 8	15 up to 20	
Union nut of injection line to	injection pump	M 12	25	
to	nozzie holder	M 14	25	
Air compressor bracket to engine mount			75	
Exhaust manifold to cylinder head	M 10	30		
Exhaust manifold to cylinder head, 2-hole met	M 10	25		
Flanged manifold to exhaust pipe	M 10	45		
Front engine mounting to frame	M 14	140 ±,20		
Rear engine mounting to frame	M 14	140 ±,20		
Front engine support to crankcase	M 14	170 ±,20		
Left engine support arm to flywheel housing	M 12	110 ±,20		

. 1997 - Starley Maria, Mariana 1997 - Starley Angelo



General 01.8

352/352 A

Exploded view



Engine housing

15	Crankcase	95E	Screw plug	186	Timing gear case cover
18	Screw plug	95F	Sealing ring	190	Gasket
21	Sealing ring	97	Camshaft bearing No. 1	193	Shaft seal
23	Screw plug	100	Camshaft bearing Nos. 2.3.4	196	Lock washer
25	Sleeve	118	Guide tube	197	Bolt
27	Sleeve	121	Cap nut	201	Spacing ring
30	Straight pin	130	Bracket	205	Bolt
33	Sealing ring	133	Flange	208	Pointer
36	Screw plug	137	Bolt	211	Gasket
45	Sealing ring	140	Gasket	214	Cover
45	Screw plug	145	Oil dipstick	221	Pushrod cover
48D	Sealing ring	148	Sealing ring	224	Gasket
48E	Screw plug	151	Flange	227	Sealing ring
49C	Sealing ring	154	Sealing ring	231	Bolt
49D	Screw plug	157	Union	237	Oil pan
56	Straight pin	160	Gasket	240	Sealing ring
61	Straight pin	164	Timing gear case	244	Screw plug
62	Fabric sealing ring	167	Straight pin	260	Repair set
67	Bolt	170	Straight pin	274	Bolt
70	Cover	176	Lock washer	280	Washer
72	Gasket	179	Bolt	284	Bolt
89	Guide tube	183	Bolt		

UKD 30 402 21 42-01



Exploded view

352



Cylinder head

61	Engine breather fil	ter
62	Nut	(1, 1)
287	Cylinder head	
290	Screw plug	
296	Stopper	1.15
299	Screw plug	2.1
303	Intake valve guide	
308	Exhaust valve guid	e

320	Valve seat ring
325	Sealing ring
328	Protective bushing
330	Cylinder head gasket
332	Gasket set
337	Cylinder head cover
339	End cover
342	Sealing ring

1.5/2

Cylinder bore diagnosis



Owner



 Cyl. 1–3
 Piston skirt has seized. Honing pattern destroyed. Engine has to be removed.

 Cyl. 4
 Piston skirt and oil scraper ring have seized. Honing pattern destroyed. Engine has to be removed.

 Cyl. 5–6
 Piston skirt cracked. Honing pattern still complete. Engine can continue working.



Ring has seized at land side, approx. 30 mm wide. Step due to oil ring is quite evident. Honing pattern destroyed. Engine has to be removed. Oil ring seizure has extended across entire cylinder half. Honing pattern destroyed. Engine has to be removed.

Semi-severe oil ring seizure. Honing pattern is still quite evident. Engine can continue working.

01.8 Cylinder bore diagnosis

352/352 A



Diagnosis chart OF 650 09 057 00 a - 167 - Daimler-Benz AG, Stuttgart-Untertürkheim, Zentralkundendienst

Removal and Installation of Engine 01.8

352 / 352 A

Removal

Note: Engine removal is similar for both engines No. 353.959 and 353.961.

- 1 Raise driver's cab, see 60.5-2.1/1 or 60.5-2.2/1.
- 2 Disconnect battery.

Note: Firstly disconnect (-) then (+) terminal.

3 Drain coolant.

4 Remove V-belt from intermediate fan shaft.

5 Detach exhaust pipe from exhaust manifold. Note: For engine model 353.959, detach exhaust pipe at turbocharger.



01.8 Removal and Installation of Engine

352 / 352 A



6 Disconnect electrical lines and ground strap from starter.

7 Mark and detach alternator wiring harness at oil cooler and electrical lines at the alternator.

8 Detach electrical line at oil pressure pickup and coolant temperature pickup.

9 Remove fuel intake line (1) and return lines (2).

Note: The bleeding facility on the fuel filter is no longer fitted from chassis end No. 086 284.



10 Detach intake line at air compressor.

11 Detach delivery line at air compressor.

12 Detach coolant hose at thermostat body and





13 Detach heater hoses.

coolant venting hose at radiator.







14 Detach coolant pipe at coolant pump and reservoir.

15 Detach venting line between timing gear case and steering fluid reservoir.

16 Detach hydraulic pump and bracket from engine support. Do not remove lines.

17 Detach propeller shaft from input flange.

Removal and Installation of Engine 01.8

352 / 352 A









19 Detach starter wiring harness and venting line from clutch housing. Also remove fuel line, leakage oil line, cold starting line and control cable for idling if SA 35 989 installed.

18 Remove clutch slave cylinder, do not detach line.

20 Remove fastening bolts for rear engine mounts.

21 Remove fastening bolt at front engine mount. Detach cover.

01.8 Removal and Installation of Engine

352 / 352 A









22 Detach engine breather filter.

Note: Renew engine breather filter without the code marking "E" every two years. A damaged engine breather filter must always be renewed immediately.

23 Drain engine oil as required.

24 Lift out engine using special tool No. 19.

25 Clean all parts, check and replace if necessary.

Installation

Note: Engine installation is similar for both engine models No. 353.959 and 353.961.

1 Slide engine into position using special tool No. 19.

2 Fit cover and fastening bolt to front engine mount and tighten bolt. Tightening torques, see 1.4/1.

3 Locate and tighten fastening bolts of rear engine mounts. See 1.4/1 for tightening torque.

Lower engine and remove special tool No. 19. 4 Attach engine breather filter with sealant No. 2.

5 Remove starter wiring loom and venting line from clutch housing. Also remove fuel line, leak-off line, cold start line and idling control cable as fitted to special version 35 989.

Adjust idling setting, see 30.4-2.1/1.

6 Attach clutch slave cylinder after coating sealing surface with sealant No. 2.

7 Attach propeller shaft to input flange.









UKD 30 402 21 42-01



8 Attach hydraulic pump and bracket to engine support.

9 Attach venting line to timing gear case.

10 Attach coolant pipe to coolant pump and reservoir.

11 Attach electric line to coolant temperature pickup.

Removal and Installation of Engine 01.8

352 / 352 A

12 Connect heater hose.

13 Attach coolant hose to thermostat housing and coolant venting hose to radiator.









14 Connect delivery line to compressor.

15 Attach intake line to compressor.

01.8 Removal and Installation of Engine

352 / 352 A



16 Attach fuel intake (1) and return lines (2).

Note: The vent on the fuel filter is no longer fitted from chassis end No. 086 284.

17 Connect electrical line to oil pressure pickup.



18 Referring to marks, attach electrical lines to generator and wiring harness to oil cooler.

19 Attach electrical lines and ground strap to starter.

20 Attach exhaust pipe to exhaust manifold. See 1.4/1 for tightening torque.

Note: For engine model 353.959, attach exhaust pipe to turbocharger.

21 Attach V-belt for intermediate fan shaft.

22 Connect battery.

23 Lower cab, referring to 60.5–2.1/1 or 60.5–2.2/1.



25 Vent fuel system, referring to 07.8-6.1/1.

26 Fill with coolant. Check cooling system for leakage, referring to 20.8-5.1/1. See 1.3/2 for quantity.

Note: The reservoir ought to be 2 thirds full.

27 Carry out trial run.









0154

352/352 A

Removal

- 1 Remove engine, referring to 2.1/1.
- 2 Drain coolant at crankcase,

Detach clutch casing and input shaft.

Detach and remove clutch.

3

4







Detach flywheel.

5

2.2/1

01.8 Removal and installation of engine parts

352/352 A



6 Detach flywheel housing.

7 Unscrew air compressor at bracket.

8 Detach air compressor lube lines and front engine support.

Detach generator.

9



11 Attach assembling fixture to front end of crankcase. Position engine in trestle.

12 Detach coolant reservoir.

Installation

1

Attach and tighten coolant reservoir.

2 Attach engine to special tool No. 19 and remove assembling fixture at front and rear.

3 Attach generator.

4 Attach and tighten front engine support, referring to 1.4/1.





01.8 Removal and installation of engine parts

352/352 A



5 Attach lube lines to air compressor and air compressor to bracket. Tighten with reference to 1.4/1 for tightening torque.

6 Coat flywheel housing with sealant No. 3 apply sealant No. 4 to bolts and then tighten. See 1.4/1 for tightening torque.

7 Attach and tighten flywheel, referring to 1.4/1 for tightening torque.

8 Using special tool No. 6 attach and tighten clutch.

See 25.10-1.4/1 for tightening torque.

9 Coat clutch housing with sealant No. 2, apply locking fluid No. 1 to bolts and then tighten. See 25.10-1.4/1 for tightening torque.

10 Install engine, referring to 2.1/1.

Removal and Installation of Cylinder Head Cover 01.8

352 / 352 A

Removal

Note: Removal is similar for both engine models No. 353.959 and 353.961.

1 Unscrew engine hood at inside.

2 Unscrew injection line at cold start nozzle.



3 Detach engine hood and remove intake hose.

Note: For engine model 353.959, detach connection for manifold pressure compensator at cylinder head cover, intake hose at engine breather filter as well as the connection to the turbocharger.

4 Unscrew and remove cylinder head cover.

5 Clean sealing surface on cylinder head and cylinder head cover.

6 Install in reverse order, using new gasket. Tightening torques, see 1.4/1.

Note: The fastening bolts of the cylinder head cover must be fully screwed in so that the head of the bolt makes contact with the cover while ensuring that the bracket for the coolant equalization tank is secured with a long bolt.

7 Start engine and check for leaks.





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Removal

Note: Make sure that engine is cold. Removal is similar for both engine model No. 353.959 and No. 353.961.

1 Prop up cab and clean upper parts of engine. See 60.5-2.1/1, or 60.5-2.2/1.

2 Detach intake pipe.

3 Drain coolant.

4

5

Detach coolant reservoir and bracket.

Detach heater hoses.









01.8 Removal and installation of cylinder head

352/352 A



6 Using special tool No.14, detach injection lines at injection pump.

7 Detach cold starting reservoir (1) and double fuel filter (2).

8 Detach cold starting line, leak-off line and bracket for fuel lines at cylinder head. Tie up at one side.

9 Detach exhaust pipe from exhaust manifold.



10 Disconnect coolant temperature pickup and detach coolant pipe at coolant thermostat body.









11 Remove cylinder head cover.

12 Remove bolts holding rocker arm brackets.

13 Remove rocker arm brackets with rocker shafts, connecting nipples and rocker arms.

UKD 30 402 21 42-02



14 Carefully withdraw pushrods.

Note: To avoid withdrawing the tappets from their guides, the tappets must previously be loosened by a short, sharp up and down movement of the pushrods.



15 Undo all the cylinder head nuts or cylinder head bolts in the reverse order to the tightening chart.



16 Remove studs.

Note: The studs and cylinder head nuts fitted previously were replaced as from engine end No. 678 155 by cylinder head bolts which can be exchanged in reverse.

17 Using special tool No. 18, lift up cylinder head and remove gasket.

Important!

Deposit cylinder head so that no damage is done to injection nozzles.
Removal and Installation of Cylinder Head 01.8

352 / 352 A

18 Clean cylinder head and crankcase parting surfaces

Important!

Blind holes in the crankcase must not show any signs of dirt or oil.









See table on page 1.2/3 for permissible uneveness.

19 Check parting surfaces with straight edge.

Note: Distorted or damaged parting surfaces should be refaced to the necessary peak-.o-valley height. See table on page 1.2/2 and 1.2/3 for permissible peak-to-valley height.

Installation

1 Position new cylinder gasket on crankcase with lettering facing upwards

2 Using special tool No. 18, position cylinder head on crankcase.

Note: For engine model No. 353.959, a modified cylinder head marked with "O" has been installed from engine end No. 691 150. The modified cylinder head **cannot** be retrolitted on previous models.

01.8 Removal and Installation of Cylinder Head

352 / 352 A





To Engine End No. 678 154

3 Oil threads of stud bolts and screw in.

Important! Do not pour oil into the threaded holes.

4 Fit cylinder head nuts and tighten referring to tightening diagram.

- 1st tightening stage 60 Nm
- 2nd tightening stage 90 Nm
- 3rd tightening stage 110 Nm

Note: Tighten cylinder head nuts for the first time to 120 Nm at the 3rd tigthening stage.

From Engine End No. 678 155

5 Oil cylinder head bolts at the thread and at the head contact surface and screw in,

Important! Do not pour oil into the threaded holes.

Note: Only cylinder head bolts are stocked in the spare parts store. The cylinder head bolts can be installed in engines with a lower engine end number.





- 1st tightening stage 60 Nm 2nd tightening stage 90 Nm
- 3rd tightening stage 110 Nm

Note: Tighten cylinder head bolts for the first time to 120 Nm at the 3rd tightening stage.



7 Install push rods.

8 Attach rocker arm brackets together with rocker arm shafts and rocker arms. Turn back valve adjusting screws and tighten rocker arm brackets. Tightening torques see 1.4/1.

Removal and Installation of Cylinder Head 01.8



9 Using special tool No. 2, install connecting nipple and spring.

Note: Install the connecting nipple with the small inside diameter in the direction of driving. Ensure it is correctly seated.

10 Adjust valve clearance, refer to 05.8 - 2.1/1.

11 Install cylinder head cover. For tightening torques, see 1.4/1.

12 Attach coolant pipe, with new gasket on coolant regulator housing, connect coolant temperature sensor cable.

For tightening torques, see 1.4/1.

13 Attach exhaust pipe with gasket to exhaust manifold. For tightening torques, see 1.4/1.









UKD 30 402 21 42 - 04

01.8 Removal and Installation of Cylinder Head

352/352 A



14 Attach cold starting line, leakage fuel line and brackets for fuel lines to cylinder head.

15 Install cold start reservoir (1) and double fuel filter (2).

16 Using special tool No. 1, connect injection lines to injection pump and tighten with special tool No. 15. For tightening torques, see 1.4/1.

17 Attach heater hoses.

Removal and Installation of Cylinder Head 01.8

352 / 352 A

18 Attach coolant equalization tank with bracket.

20 Lower driver's cab, see 60.5-2.1/1 or 60.5-2.2/1.

21 Fill with coolant, check cooling system for leaks.

Note: The equalization tank should be two-thirds fill.

19 Attach intake pipe.

For capacities see 1.3/2.





Important!

Upon completion of the installation, warm up engine, loosen each nut individually in sequence shown in the tightening diagram and then finally tighten to a torque of 110 Nm. On no account must all nuts be loosened simultaneously before final torque is applied. Readjust valve clearance. After 500 km, retighten the cylinder head nuts and readjust the valves.



UKD 30 402 21 42-03

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Disassembly

1 N Remove cylinder head, see 4,1/1. And Scherker

2 Lay cylinder head on a support.

Important!

The cylinder head must not rest on the injector nozzles.

3 Remove exhaust manifold and coolant rail from cylinder head.

4 Remove injector pipes from injectors with special tool No. 1.

5 Release injector pipes from cylinder head and remove. Do not bend injector pipes.









6 Remove leak-off pipes.

7 Remove thrust screw for nozzle holder with special tool No. 4.

01.8 Disassembly and assembly of cylinder head

352/352 A





- Remove nozzle holder with special tool No. 5.
- Remove valves, see 05.8-2.2/1.

8

9

10 Remove protective sleeve with special tool No. 3.

11 Clean all parts, check and change if necessary.

12 Check valve guides and change if necessary, see 6.1/1.

13 Check valve seats and reface or renew if necessary. See 6.2/1 or 6.3/1.

14 Check injector nozzles, see 07.8-4.2/1.

Assembly

 $1, \ldots, Insert new sealing ring for the protective sleeve into cylinder head.$

2 Insert protective sleeve and tighten with special tool No. 3.

Tightening torque, see 1.4/1.

3 Insert new sealing ring into the protective sleeve

4 Fit nozzle holder with nozzle into cylinder head observing lock on the nozzle holder (1) and groove (2) in the cylinder head.

Important! Do not knock nozzle,

5 Fit valves, see 05.8-2.2/1.

6 Tighten thrust screw for injector nozzle with special tool No. 4. Tightening torque, see 1.4/1.

7 Fit leak-off pipes with new sealing pieces.
Tightening torque, see 1.4/1.
Note: Fit locking bolt (24 mm) with sealant No. 5.

8 Fit injector pipes, fit locking bolt (24 mm) with sealant No. 5, renew rubber seals at the bushings and tighten locking bolt (17 mm).

9 Tighten without tensioning the injector pipes using special tool No. 15. Tightening torque, see 1.4/1.

10 Fit exhaust manifold and coolant rail with new gaskets. Tightening torque, see 1.4/1.

Install cylinder head, referring to 4.1/1.



UR01-0093

11





1 Disassemble cylinder head, referring to 5.1/1.

2 Clean valve guide, removing carbon deposits with special tool No. 11 or No. 12,

3 Check bore using special tool No. 16 or No. 18.



Exchanging

1 Drive out valve guide using special tool No. 7 or No. 8.

2 Clean and check basic bore in cylinder head. See 1.2/4 for table.



ted, spe-

3 If "repair stage" valve guides are to be fitted, ream basic bore to next higher repair stage, using special tool No.13. See 1.2/4 for repair stages.

UKD 30 402 21 42-01

01.8 Checking, exchanging valve guides

352/352 A







4 Select value guide so that overlap specification is met.

See table on page 1.2/4.

5

Heat cylinder head.

6 Coat new valve guide with graphite oil and position in cylinder head bore.

7 Slip spacing sleeve of special tool No. 10 over valve guide.

8 Knock valve guide into position, using special tool No. 10.

9 Check valve guide for firm fit, either by knocking with hammer or by applying test pressure. Loose valve guides are to be knocked out again and replaced by valve guides of larger outside diameter.

10 Ream inside diameter of valve guide, using special tool No. 11 or No. 12.

11. Check inside diameter of valve guide, using special tool No. 16 or No. 18.

12 Re-assemble cylinder head, referring to 5.1/1.

01.8

Refacing and the second s

1 Disassemble cylinder head, referring to 5.1/1.

2 Check valve guides and exchange if necessary, referring to 6.1/1.

3 Clamp cylinder head in jig.

4 Check valve seat.

Note: If valve seats show only slight traces of wear, they can be refaced without necessitating replacement of valve seat rings, provided they are not machined below their bottom limit.

See 1.2/4 for repair size. assumed to the sectors

5 Introduce pilot into valve guide so that stop of slotted rod rests on valve guide. If necessary, press slotted rod downwards using screwdriver, and tighten pilot.



Note: Make sure that cutting tool is positioned correctly on slide rest. Release coupling nut to stop free slide rest. Attach crank handle to arm marked 45°.

7 Release coupling nut (2), slip cutter over pilot and turn screw (1) until cutting tool is positioned in center of valve seat.

8 Press pilot support (1) downward onto pilot, and clamp with screw (2), making sure that knurled ring (3) is screwed down and locking screw (4) is tight

UKD 30 402 21 42-01









6.2/1



9 Turning hand crank, move steady bar to correct position. Floating guide is to be locked horizontally in roughly the center of the guide with the aid of steady clamp. Cutter must turn just as smoothly as before.

10 Turning the quick-action adjuster sets cutting tool to inner seat edge. Tighten coupling nut now, but do not start chip feed yet.

11 Turn crank while holding feed screw. Cutting is normally irregular at this position. After turning once release coupling nut of quick-action adjuster and move tool back to inner setting.

12 Release locking screw (1) and turn knurled collar (2) anti-clockwise by about 1/2 to 2 divisions (1 division = 0.1 mm). Retighten locking screw (1) and coupling nut, then beginning to turn again.

13. Hold feed screw and turn crank until cutting tip has reached outer position.

14 Chip feed is to be continued until seat is fully refaced (do not go below machining limit). Then turn once again without chip feed. Newly fitted valve seat rings must show values given in table. See 1.2/4 for repair sizes.

15 Re-assemble cylinder head, referring to 5.1/1.

Refacing

1

3

4

5

seat diameter.

See table on page 1.2/3.

Disassemble cylinder head, referring to 5.1/1.

2 Check valve guides and exchange if necessary, referring to 6.1/1.

Check valve seat.

Note: If valve seats show only slight traces of wear, they can be refaced without necessitating replacement of valve seat rings, provided they are not machined below their bottom limit. See 1.2/4 for repair size.

Introduce special tool No. 14 into valve guide.

Position special tool No. 14 and adjust cutter to

Note: For valve seats with 45° seat angles the 45° side of the cutter head is for cutting the seat whereas the 30° side is for the clearing cut. For valve seats with 30° angles, the two sides are to be reversed.





UR01-0152

6 Reface valve seat, applying gentle pressure.

7 Measure valve seat runout. See table on page 1.2/3.

Important:

Check directly after finishing the valve seat. The guide drift must not be released or withdrawn beforehand.

8 Measure valve seat width; if necessary, correct to 70^{0} at top and bottom. See table on page 1.2/3.

9 Re-assembly cylinder head, referring to 5.1/1.



UKD 30 402 21 42-01

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Removal and installation of valve seat rings 01.8

352/352 A

Removal

1 Disassemble cylinder head, referring to 5.1/1.

2 Check valve guides and renew if necessary, referring to 6.1/1.

3 Clamp cylinder head in jig.

4 Introduce pilot into valve guide until stop on slotted rod rests on valve guide. If necessary, force slotted rod downwards using screwdriver. Tighten with drift, inserting into pilot from above and below.

5 Clamp groove cutter in slide rest.

6 Release lock-nut (2). Moisten pilot with oil, slip cutter over pilot, turn screw (1, quick-action adjustment) until tool contacts pilot and then slide cutter downwards until tool is located in center of valve seat ring.

7 Hold cutter at this position. Release locking screw (1) of pilot support, and press pilot support (2) downwards until it contacts pilot. Retighten locking screw (1).

8 Turning hand crank, move steady bar to suitable position relative to work. Lock floating guide horizontally in roughly center of guide with aid of steady clamp. Cutter must now turn just as smoothly as be fore.





UKD 30 402 21 42-02



9 Slacken screw of quick-action adjuster (1) until tool has reached, yet does not yet touch valve seat ring. Tighten lock-nut (2). Turn horizontal stop screw (3) fully home against body and then slacken by 2 to 3 mm. Tighten clamping screw (4) beneath.

10 Adjust tool height so that about 1 mm metal is left on valve seat ring at bottom after machining.

Note: Hold knurled collar (2) and turn cutter crank clockwise, so moving tool downwards. Turning anticlockwise serves to raise tool.

11 Turn tool and simultaneously hold knurled collar (2) which has to be briefly released as torsion increases slightly. This serves to turn groove in valve seat ring to depth of about 2 to 3 mm.

Note: Avoid coarse cuts. Cutter must always turn easily, this being achieved by briefly releasing knurled collar (2).

12 Remove cutter.

13 Fit internal remover in annular groove, tighten nut and draw out using counter-support.

Note: Place copper strips beneath counter-support to avoid damaging cylinder head face.

14 Adjust internal measuring instrument using micrometer.

15 Measure bores for valve seat rings in cylinder head, using internal measuring instrument.

Note: Holes are to be bored to next step should table values not be reached. See 1.2/4 for repair stages.

16 Remachine basic bore, referring to 6.5/1.

Installation

1 Place valve seat rings in container full of liquid oxygen, allowing rings to shrink for about 20 to 30 minutes.

2 Heat cylinder head to 80°C.

3 Take valve seat rings out of liquid oxygen and place on bore of heated cylinder head.

4 Knock valve seat rings into position, using special tool No. 9.

Note: Do not delay in fitting the valve seat rings. Do not touch liquid oxygen or come into contact with freezing valve seat ring.





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Remachining basic bore

1 Clamp tool in slide rest.

2 Introduce pilot into valve guide until stop on slotted rod rests on valve guide. If necessary, force slotted rod downwards using screwdriver. Tighten with drift, introducing into pilot from above and below.

3 Release lock-nut (1), moisten pilot with oil, slip cutter over pilot, turn quick-action adjusting screw (2) until tool moves horizontally beyond bore, and then slide cutter downwards until tool rests on cylinder head.

Important:

Fit tools carefully so as not to damage carbide tip.

4 Release locking screw (1), force pilot support (2) downwards until it contacts pilot, and then retighten locking screw (1).

5 Turning the knurled collar serves to adjust tool height to point where it is just clear.

6 Lock floating guide horizontally with aid of steady clamp, making sure to set working depth between adjusting ring and floating guide. See 1.2/4 for working depth.











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UKD 30 402 21 42-01



7 Calculate adjustment "2": Basic bore "c" or "d" + pilot dia, "1" 2

See table 1.2/4 for "c" and "d"

8 Release coupling nut, set micrometer to "2", slightly lift cutter, attach micrometer to pilot, and exactly adjust tool to size "2" using quick-action adjuster (1). Tighten coupling nut (2).

Note: You are advised to reduce tool setting by 0.1 mm in diameter for first cut.

9 Turn horizontal stop screw (1) fully home against body and tighten screw (2) beneath, so preventing stop screw from turning.

10 Turn hand crank and simultaneously hold upper knurled collar for vertical feed. Cut bore for valve seat ring until adjusting ring (1) contacts steady bearing (2).

Note: Keep adjusting tool until adjustment calculated in job No. 7 is reached. Then turn once without chip feed to obtain peak-to-valley height of max. 0.006 mm.

11 Release coupling nut and draw back tool at quick-action screw, while slightly raising cutter.

12 Turn hand crank and simultaneously hold lower knurled collar for horizontal feed. Reface bottom end surface until stop screw contacts body.

13 Remove cutter, and measure bore (be sure to obtain valve seat ring/bore overlap).See 1.2/4 for bore dimensions.



Checking

Note: Engine temperature is to be +50°C to 80°C.

1 Remove injection nozzle without protective bushing. See 07.8-4.1/1.

2 Introduce special tool No. 17 into protective bushing and tighten with thrust screw from nozzle holder.

3 Attach compression pressure tester to special tool No.17.

4 Place recording card in tester and set appropriate cylinder.

5 Move hand throttle to stop position and start engine several times.







6 Note pressure reading on recording card. See 1.2/1 for compression pressure.

7 Detach compression pressure tester and special tool No. 17.

Install injection nozzle, referring to 07.8-4.1/1.



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