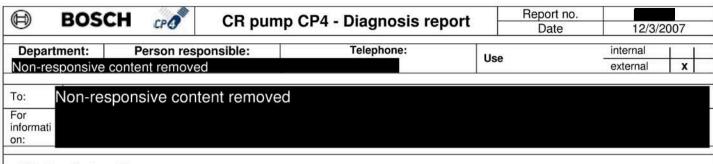
EA11003EN-00850[0]

BOSCH CPO		Report no. Date	12/3/2007				
Department: Person responsi Non-responsive content removed	ble: Te	elephone:	Use		internal external x		
To: Non-responsive content	removed						
Ation: Pump type:	Customer:	Project:		Project / d	lesign pattern type		
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	VW Date of manufacture:	R4 2.0 BIN5 Serial numbe		Manufaa	C / C2		
Part number (TTNo.): 0445B21060_10	690	Additional Addition of Addition and Additional Additaci Additional Additional Additiona		and the state of the state of the state	turing plant - line euerbach plant) – M -		
SAP-No.: DS – 154947	Samos no.: 568938	Customer order no.:		14/4 1 Max (10/2 1 Max 2 / 2 Max 2	Vehicle number 3LD/17486		
Customer part number	Endurance run type [customer]: Engine trial	Endurance run con Oil dilution + LP fu		:: D	SBFD no.: 18589		
Mileage 995 hParts receipt at dept. DS-PC/EDI: 12/03/2007Process no. 2007-CP4 / 0043Confid 							
1 Subject CP4 customer return Oil dilution program + LP full load							
2 Conclusion No significant change of the hydraulic The wear of the pump is very low. The pump has passed the endurance							
3 Results of diagnosis (visual find 3.1 Drive	11-1-2-0- 7272-807	gend rating stages		CK uncritical Critical	x x x		
No wear detected 3.2 Drivetrain Slight wear observed on the roller	orost and tannot hady /F				x x		
3.3 High pressure Sealing point of intake valve to the	5 N.S. 5 2				x		
3.4 Bearing Very slight wear visible					X		
3.5 Shaft seal Slight recession of the shaft seal ((Fig. 4)				X		
3.6 Holes No striking feature					X		
3.7 Attached components (Metering No striking feature	Unit, Overflow Valve, O	Counting Point)			X		
3.8 Other no					x		

EA11003EN-00850[1]



4 Hydraulic function

				Delivery rate [l/h] of new part	Delivery rate [I/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	11/20/2006	07/26/2007
KL1-S	3375	500	0.4	67.5	67.8
LG	1000	1800	0.4	17.5	17.6
ST	200	200	0.4	3.9	3.9

^	
	+

No significant change of the hydraulic functional values recognizable.

5 Destiny of the parts

Parts will be scrapped during RB 06/2008



Fig. 1: roller crest

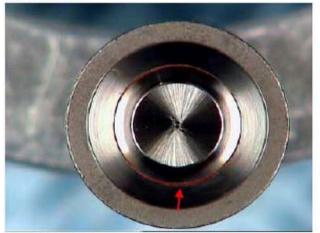


Fig. 3: Intake valve

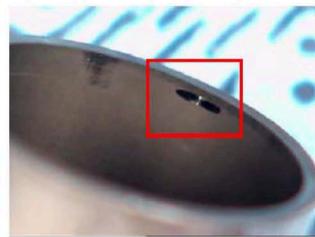


Fig. 2 tappet body inside

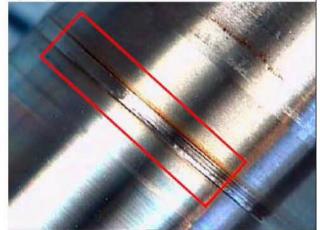


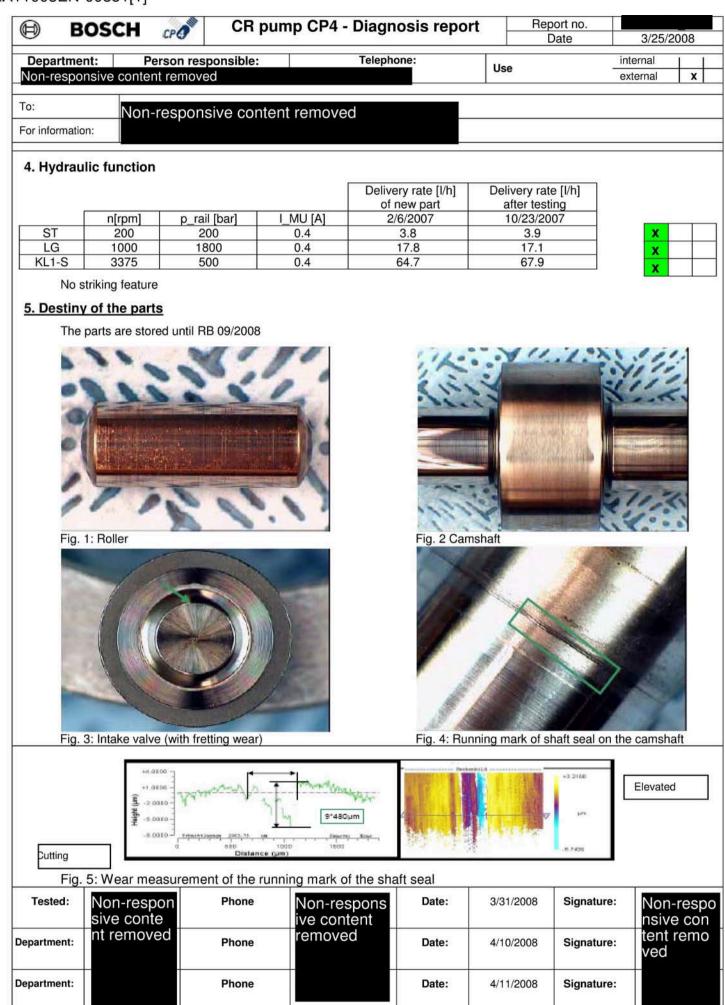
Fig. 4: Camshaft_OilSeal_System

Tested:	Non-responsi ve content r	Telephone:	Non-respons ive content	Date:	1/17/2008	Signature:	Non-resp onsive c
Department:	emoved	Telephone:	removed	Date:	1/17/2008	Signature:	ontent r emoved
Department:		Telephone:		Date:	1/28/2008	Signature:	

EA11003EN-00851[0]

BOSCH CPO	port no. Date	3/25/2008										
Department: Person respo Non-responsive content removed	nsible: Te	Telephone: Use			internal external x							
	ve content removed											
To: Non-responsiv	ve content removed											
	Customer:	Desisate		Ducio et / a								
Pump type: CP4.1S_348_2x5,25_REC_3,3_1,95_MT4		Project: R4 2.0 EU5		Project / C	lesign pattern type D/D							
Part number (TTNo.): 0445B21058	Date of manufacture: 010207	Serial number: 0042			turing plant - line 10 FeP – 1							
SAP-No.: DS – 175041	Samos no.: 588430	Customer order n	o.:	Engine/Vehicle number AU 481-8-8007								
Customer part number	Endurance run type [customer]:	Endurance run cond Q verification	tions:	DSBFD no.: 20213								
Milanna	Vehicle endurance run	D		Confi	dentiality note							
Mileage 100000 km / -miles	Parts receipt at dept. DS-PC/EDI: 11/13/2007	Process no. 2007-CP4_0115			dentiality note Confidential							
1. Subject	<u>.</u>	ly.		7) D								
CP4 customer returns without com												
Diagnosis after end of endurance r												
2. Conclusion												
No hydraulic modification. No critical wear detected.												
The pump has passed the test.												
3. Results of diagnosis (visual	findings)		ļ	OK uncritical	X X							
3.1 Drive	Le	gend rating stages	l	Critical	x							
No striking feature												
3.2 Drivetrain												
					X A							
Only running marks visible (se	e roller Fig. 1 and camshaft	Fig. 2)			x x							
Only running marks visible (se 3.3 High pressure	e roller Fig. 1 and camshaft	Fig. 2)			x							
		Fig. 2)										
3.3 High pressure		Fig. 2)										
3.3 High pressure Slight fretting wear at the intak		Fig. 2)										
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 		Fig. 2)										
3.3 High pressureSlight fretting wear at the intak3.4 Bearing	ke valve (Fig. 3)											
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 3.5 Shaft seal 	ke valve (Fig. 3)											
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 3.5 Shaft seal Slight wearing -in of the shaft 	ke valve (Fig. 3) seal (depth x width = 9x480 p											
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 3.5 Shaft seal Slight wearing -in of the shaft seal Slight wearing -in of the shaft seal Only slight cavitation points vise 3.7 Attached components (Meter 	ke valve (Fig. 3) seal (depth x width = 9x480 µ	um) (Figs. 4 and 5)										
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 3.5 Shaft seal Slight wearing -in of the shaft 3.6 Holes Only slight cavitation points vis 3.7 Attached components (Meter No striking feature 	ke valve (Fig. 3) seal (depth x width = 9x480 µ	um) (Figs. 4 and 5)										
 3.3 High pressure Slight fretting wear at the intak 3.4 Bearing No striking feature 3.5 Shaft seal Slight wearing -in of the shaft seal Slight wearing -in of the shaft seal Only slight cavitation points vise 3.7 Attached components (Meter 	ke valve (Fig. 3) seal (depth x width = 9x480 µ	um) (Figs. 4 and 5)										

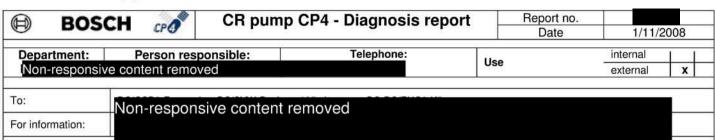
EA11003EN-00851[1]



EA11003EN-00852[0]

BOSCH 🔊	R pump CP4 - Dia	agnosis report	R	eport no. Date	1/11/2008	
Department: Person responsi Non-responsive content removed	ble: Te	lephone:	Use		internal external x	
o: Non-responsive	content removed					
For information:	content removed					
Pump type:	Customer:	Project:		Project /	design pattern type	
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	vw	R4 2.0 BIN5			C / C2	
Part number (TTNo.): 0445B21060_10	Date of manufacture: 690	Serial numbe 4653	r:		Manufacturing plant - line 011M FeP (Feuerbach plant) - I	
SAP-No.: DS –164754	Samos no.: 0577928	Customer order no.:		Station Contract	Engine/Vehicle number 03LD/17477	
Customer part number	Endurance run type [customer]: Vehicle endurance run	Endurance run conditions: Gear Fatigue Test		(C	DSBFD no.: 19423	
Mileage 118338 km	Parts receipt at dept. DS-PC/EDI: 10/17/2007	Process no. 2007-CP4_01			identiality note Confidential	
2. Conclusion The residual contamination test of the The pump was seal-tight in the cold te Slight cavitation erosion was found be range. The pump has passed the test.	st at -25 °C.	ne stationary seal ring,	but is not	in the critical		
3. Results of diagnosis (visual find	lings)		-	OK uncritical	X X	
3.1 Drive Slight wear visible	Le	gend rating stages		Critical	×	
3.2 Drivetrain Slight entrainment of the C coating on (Fig. 1)	the roller crest. Alignmer	nt mark of the roller on	the cam t	rack visible	x x	
3.3 High pressure					X	
Moderate fretting wear on the seal sea 3.4 Bearing	t of the intake valve, but	uncritical (Fig. 2)			x	
Slight running marks visible 3.5 Shaft seal						
Slight running marks visible 3.6 Holes Incipient cavitation erosion in the tappo	at hole of the housing in	oon-running area (Fig	3)		x	
3.7 Attached components (Metering No striking feature			3)		X	
3.8 Other						

EA11003EN-00852[1]



4. Hydraulic function

				Delivery rate [l/h] of new part	Delivery rate [I/h] after testing
[n[rpm]	p_rail [bar]	I_MU [A]	10/24/2006	10/24/2007
ST	200	200	0.4	3.9	3.9
LG	1000	1800	0.4	17.6	17.7
KL1-S	3375	500	0.4	67	67.8



No striking feature

5. Destiny of the parts

Parts will be stored at RB and scrapped in 06/2008

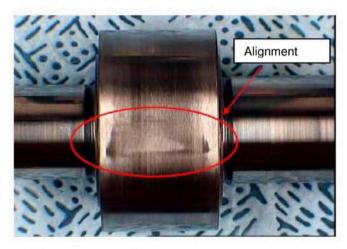


Figure 1 cam track

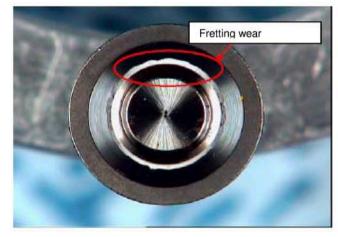


Fig. 2 intake valve



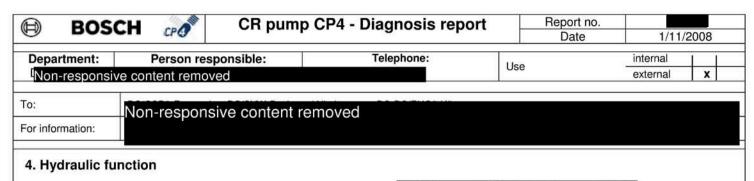
Fig. 3 Housing of tappet hole

Tested:	Non-responsi ve content r	Phone	Non-responsi ve content r	Date:	1/17/2008	2	Non-respon sive conte
Department:	emoved	Phone	emoved	Date:	1/17/2008	Signature:	nt removed
Department:		Phone		Date:	1/28/2008	Signature:	

EA11003EN-00853[0]

	BOSC	:H a	0	CF	R pum	p CP4 - Dia	gnosis report	F	Report no. Date	1/11/2008
	artment:	H G HOLEN	son res	•	e:	Te	elephone:			internal
Nor	1-responsive	e conten	it remov	/ed		I				external I x
To:		Non-re	espons	sive co	ontent i	removed				
For info	ormation:									
	Pur	np type:		1	С	ustomer:	Project:		Project	/ design pattern type
CP4.1	XS_348_2x5,2	25_REC_3	,3_1,95_	MT4,2		VW	R4 2.0 BIN5	5		C / C2
	Part nun	nber (TTN	o.):		Date of	manufacture:	Serial number	er:	Manufa	acturing plant - line
	0445E	321058_06	6			689	4888		011M FeP	(Feuerbach plant) – M -
	SA	AP-No.:			Sa	amos no.:	Customer order	r no.:	Engir	ne/Vehicle number
	DS	-164742			C	0577909				03LA/17301
	Customer part number					ance run type	Endurance run cor	nditions:	DSBFD no.:	
						ustomer]: verification	Gear Fatigue T	ſest		19426
		lileage			1000	eceipt at dept.	Process no.		Cor	fidentiality note
		0 km/- mile	es		D	S-PC/EDI:	2007-CP4_01			Confidential
	10/17/2007 Complaint: None.									
1.5	Subject									
	4 customer r	eturn								
	erification	otani								
End	durance run e	end								
2. Co	nclusion									
Hyd	draulic testing	g points v	vithin tol	erance f	or new p	arts.				
	y slight wear									
	e pump has r		2 - 200.04							
	sults of dia	agnosis	(visua	l findin	gs)				{ OK uncritical	x
	Drive					Le	gend rating stages		L	×
On	y slight runn	ing marks	5						Critical	x
32	Drivetrain									x
1000	ht wear mar	ks visible								
	High press									X
	Tel 150		rosion oi	n the pis	ton base	visible (Fig. 1).	P.			
						- 그는 것 같은 것 같아요. 승규가 가지?	ry seal ring visible (Fig	g. 2)		
3.4	Bearing									x
Slig	ht wear mar	ks visible								
3.5	Shaft seal									X
	aft seal slippe	ed off the	camsha	ıft						
	Holes	uitation -	roolen I-	topset	holo roc	anizable				x
	e onset of car					flow Valve, Co	unting Point)			X
	erflow valve	10-00-00-00-00-00-00-00-00-00-00-00-00-0	1		int, over	now valve, co	anting Form)			·
2.4	Other		g engina	,						
5.0	Julei									

EA11003EN-00853[1]



				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	9/12/2006	10/24/2007
Starting point	200	200	0.4	3.8	3.9
1000 rpm, p_rated	1000	1800	0.4	17.2	17.2
n_max_p, 500bar	3375	500	0.4	65.0	66.3

OK

5. Destiny of the parts

Parts will be stored at RB and scrapped in 06/2008

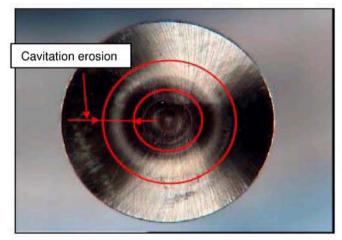
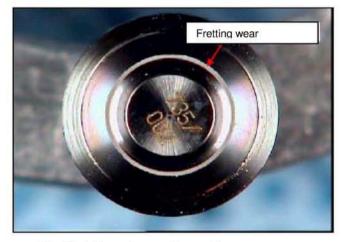


Fig. 1 High-pressure piston base



X

Fig. 2 Intake valve sealing surface

Tested:	Non-respons ive content removed	Phone	Non-responsi ve content r	Date:	1/17/2008	Signature:	Non-respond Noive con tent remo
Department:		Phone	emoved	Date:	1/17/2008	Signature:	ved
Department:		Phone		Date:	1/29/2008	Signature:	

EA11003EN-00854[0]

	BOSC	H CPO	CR p	oump CP4 - Dia	R	eport no. Date	3/26/2008		
	artment:	Person res		le: Telephone:				internal	
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To:	1	Non-respons	sive cont	ent removed					
For info	ormation:				2				
	Pum	p type:	-	Customer:	Project:		Project / o	design pattern type	
CP4.1		5_REC_3,3_1,95_	MT4,2	vw	R4 2.0 EU5		D/D		
	Part num	ber (TTNo.):		Date of manufacture:	Serial numbe	er:	Manufad	turing plant - line	
		B21058		11206	0010		011M FeP (Feuerbach plant) -		
	SA	P-No.:		Samos no.:	Customer order	no.:	Engine	Engine/Vehicle number	
	DS –	DS -175042 588432					1574	G000003	
	Customer part number			Endurance run type	Endurance run conditions:		DSBFD no.:		
	CHEVENER PROVIDED. INCOME PROPERTY CONTRACTOR			[customer]:	EW1 KIN			20212	
		2		ehicle endurance run					
		leage	F	Parts receipt at dept. DS-PC/EDI:	Process no			identiality note	
	95598 km			11/29/2007	2007-CP4_01	23		Confidential	
Fu We The	e pump has p a	uring the runnin assed the test.							
3. Re	esults of dia	gnosis (visua	al findings	;)		-	OK uncritical	x	
3.1	Drive			Le	gend rating stages		Critical	X	
No	striking featur	e						X	
3.2	Drivetrain							x	
On	ly slight runnir	ng marks on rolle	er (Fig. 1) a	nd camshaft (Fig. 2)	visible				
3.3	High pressu	re						X	
Slię	ght fretting we	ar at the intake	valve (Fig. 3	3)					
3.4	Bearing							X	
No	striking featur	re							
3.5	Shaft seal							X	
No	striking featur	re							
3.6	Holes							X	
No	striking featur	re							
			tering Unit,	Overflow Valve, Co	unting Point)			X	
	striking featur	re							
	Other							X	
No striking feature									

EA11003EN-00854[1]

🗩 B	OSCH	CPO CR	pump CP4	 Diagnosis repo 	ort Report no		
	USCH	CPO	· pamp or ·	Diagnooid rope	Date	3/26/2	800
Departmen	nt: Po	erson responsible	:	Telephone:	Use	internal	1
Non-resp	onsive conte	nt removed			Use	external	x
	ic function						
				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing		
	n[rpm]	p_rail [bar]	I_MU [A]				
ST		p_rail [bar] 200	I_MU [A] 0.4	of new part	after testing	x	
	n[rpm]			of new part 10/24/2006	after testing 10/24/2007	x	

5. Destiny of the parts

The parts are stored until 09/2008 at RB

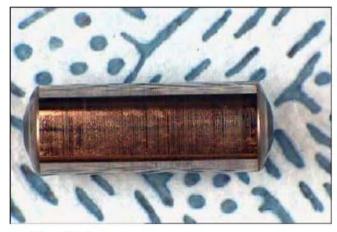


Fig. 1 Roller



Fig. 2: Camshaft

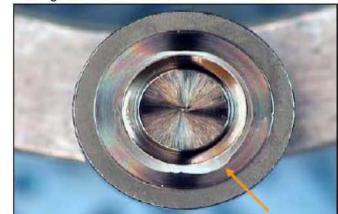


Fig. 3 intake valve

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Department:	removed	Phone	emoved	Date:	4/10/2008	Signature:	tent remo ved
Department:		Phone		Date:	4/11/2008	Signature:	

EA11003EN-00855[0]

BOSCH CPO C	R pump CP4 - Dia	gnosis report		port no. Date	3/26/2008
Department: Person responsib	le: Te	elephone:	Use		internal x
Non-responsive content removed					
To: Non-responsive c	ontent removed				
For information:					
Pump type:	Customer:	Project:		Project /	design pattern type
CP4.1XS_348_2x5,25_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5			D/D
Part number (TTNo.):	Date of manufacture:	Serial numbe	er:	Manufad	cturing plant - line
0445B21058	201206	0043		0	110 FeP – 1
SAP-No.:	Samos no.:	Customer order	no.:	Engine	/Vehicle number
DS -167929	582051			03	3LAP270028
Customer part number	Endurance run type	Endurance run con	ditions:	0	SBFD no.:
	[customer]:	Polycyclic enduran	ice run		19584
	Engine endurance run			51.5	
Mileage 718 h	Parts receipt at dept. DS-PC/EDI:	Process no. 2007-CP4_0124		Confidentiality note Confidential	
/1611	11/29/2007	2007-0F4_01	24		Somuential
2. Conclusion No change in the hydraulic testing detect Wear of all parts minimal. The pump has passed the test.	ted.				
3. Results of diagnosis (visual findi	nas)			ОК	X
an a		Legend	rating stage	s uncritical Critical	x
3.1 Drive No striking feature					
20 ⁻					X
3.2 Drivetrain					X
In very good condition (see roller Fig. 1	and camshaft Fig. 2)				x
3.3 High pressure	(Fig. 2)				
Only running marks on HP piston visible	(Fig. 3)				x
3.4 Bearing No striking feature					
3.5 Shaft seal					x
3.5 Snaπ seal					
3.6 Holes					X
No striking feature					
3.7 Attached components (Metering L	Init, Overflow Valve, Co	unting Point)			X
No striking feature					
3.8 Other					X
No striking feature					

EA11003EN-00855[1]

Э В	OSCH	CPO CF	R pump CP4	 Diagnosis repo 	ort 🗌	Report no.		
y D	00011	LPO		• •		Date	3/26/2	800
Departme	nt: Pe	erson responsibl	e:	Telephone:	Use		internal	1
Non-respo	onsive conter	nt removed			Use		external	X
				Delivery rate [l/h]		rate [l/h]		
	n[rpm]	p_rail [bar]	I_MU [A]	Delivery rate [l/h] of new part 12/19/2006	after	v rate [l/h] testing 7.2007		
ST	n[rpm] 200	p_rail [bar] 200	I_MU [A] 0.4	of new part	after 12.07	testing	×	
ST LG				of new part 12/19/2006	after 12.07 3	testing 7.2007	X	

5. Destiny of the parts

The parts will be stored at RB until 09/2008



Fig. 1 Roller



Fig. 2: Camshaft



Fig. 3: HP piston

Tested:	Non-respor sive conte nt removed	Phone	Non-responsi ve content r	Date:	3/31/2008	Signature:	Non-responsive con
Department:	ntremoved	Phone	emoved	Date:	4/10/2008	Signature:	tent remo ved
Department:		Phone		Date:	4/11/2008	Signature:	

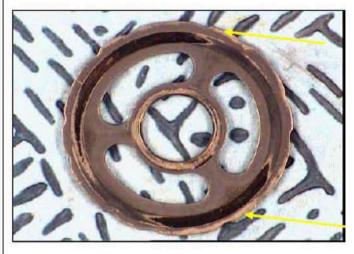
EA11003EN-00856[0]

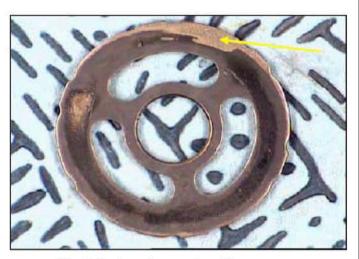
Pump type: Customer: Project: Project / design pattern type CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2 VW R4 2.0 EU5 C / C Part number (TTNo.): Date of manufacture: Serial number: Manufacturing plant - line	BOSCH 🛷	CR pump CP4 - Dia	gnosis report	eport no. 1/25/2008	
or Non-responsive content removed or information: Project / design pattern type cr /rinformation: Project / design pattern type CP4.15_348_265_25_FEC_3.3_1.95_MT4.2 WW R4 2.0 EU5 Project / design pattern type CP4.15_348_265_25_FEC_3.3_1.95_MT4.2 WW R4 2.0 EU5 O / C Manufacturing plant - line 0 Date of manufacture: 0111 D11M FeP (Feuetbach plant) - Engine/Vehicle number 0 Endurance run type Customer order no.: Engine/Vehicle number CAG 0000 060 0 Endurance run type Endurance run conditions: DBSPF D no.: 19089 0 Endurance run type Endurance run conditions: DBSPF D no.: 19089 0 Base of the parts receipt at dept. 2007-CP4_0140 Confidential 10/18/2007 2007-CP4_0140 Confidential Confidential 1.Subject Conclusion Confidential Confidential Confidential 1.Subject in endormance run Conclusions. Confidential Confidential Confidential 1.Subject in endormance run Conclusions. Confidential Confidential Confidentia		ible: Te	lephone: Use	the second se	
Pump type: Customer: Project: Project / design pattern type CP4.15_348_265_E_EC_3.3_1.95_MT4.2 WW R4 2.0 EUS C/C Part number (TTNo.): Date of manufacture: Sorial number: Manufacturing plant - line 0445B21058 071206 0011 011M Fe9 (Fausch plant) - int SAP-No.: Samos no.: Customer order no.: Engine/Vehicle number 05-154940 568322 Customer order no.: Engine/Vehicle number 0 Endurance run type Endurance run conditions: DSBFD no.: 0 Battomeretination 2007.CP4_0140 Confidentiality note 0 286 h 10/19/2007 2007.CP4_0140 Confidentiality note 1. Subject Confidentiality note 2007.CP4_0140 Confidentiality note 1. Subject Confidentiality note 2007.CP4_0140 Confidentiality note 2. Conclusion Interventical entrainment of the anti-friction paint. The delivery rates after endurance run Confidentiality note 3. Subject Samos nortical entrainment of the anti-friction paint. X X X 3. Sorial seal Interventis islow. X X <th>Non-responsive content removed</th> <th>χ</th> <th>19979 (N.)</th> <th></th>	Non-responsive content removed	χ	19979 (N.)		
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3.9 Images of visual findings





X

Fig. 2: Spring plate, spring side

Fig. 1: Spring plate, tappet side

4. Hydraulic function

				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	12/19/2006	7/26/2007
ST	200	200	0.4	4.0	3.9
LG	1000	1800	0.4	16.6	17.3
KL-1	3375	500	0.4	67.0	67.0

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 I/h after running time) is met.

No significant fuel-quantity drift compared to delivery measurement.

5. Destiny of the parts

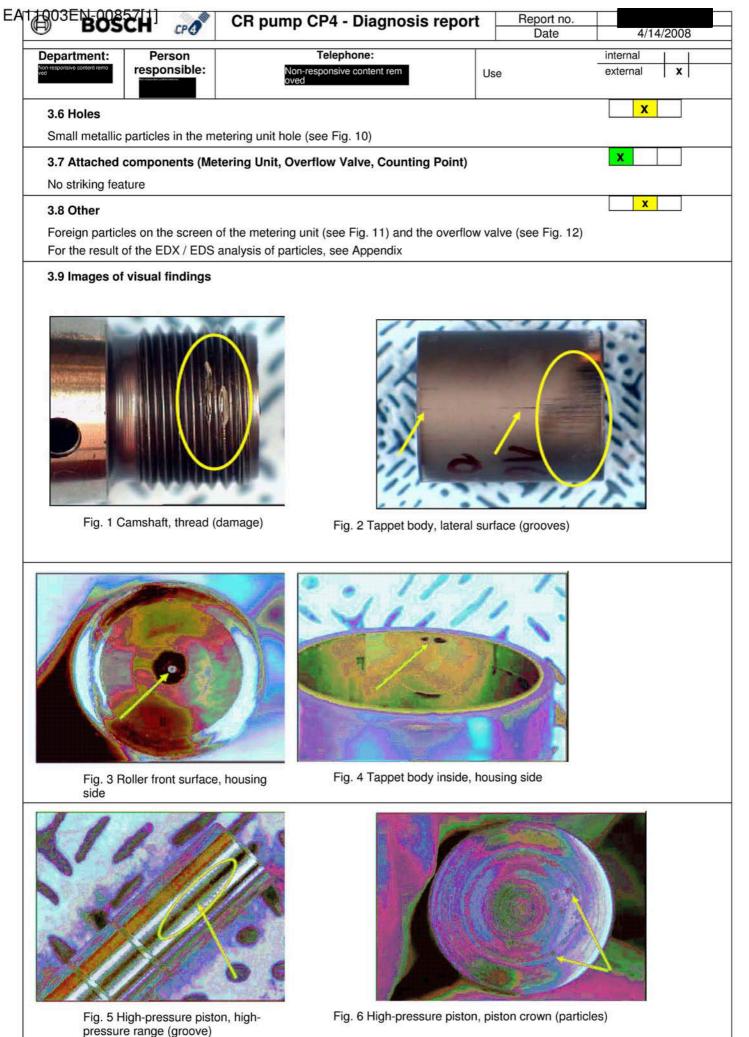
The parts are stored until 06/2008 at RB

6. Attachments

None

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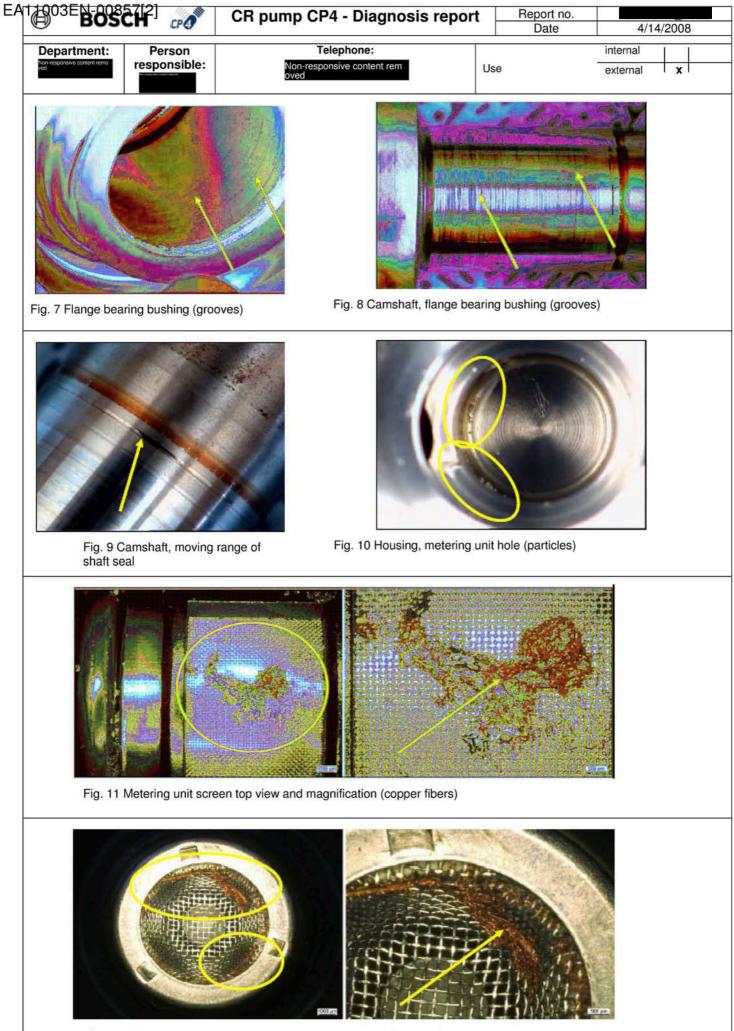


Fig. 12 Overflow valve screen top view and magnification (copper fibers)

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4. Hydraulic function

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated ≥ 15.5 or 15.2 l/h after running time) is

				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing	
	n[rpm]	p_rail [bar]	I_MU [A]	3/27/2006	7/26/2007	1
Starting point	200	200	0.4	3.8	3.9	x
1000 rpm, p_rated	1000	1800	0.4	17.1	17.4	X
N_max_p, 500 bar	3375	500	0.4	67.2	67.2	X

met.

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is met.

No significant fuel-quantity drift compared to delivery measurement.

5. Destiny of the parts

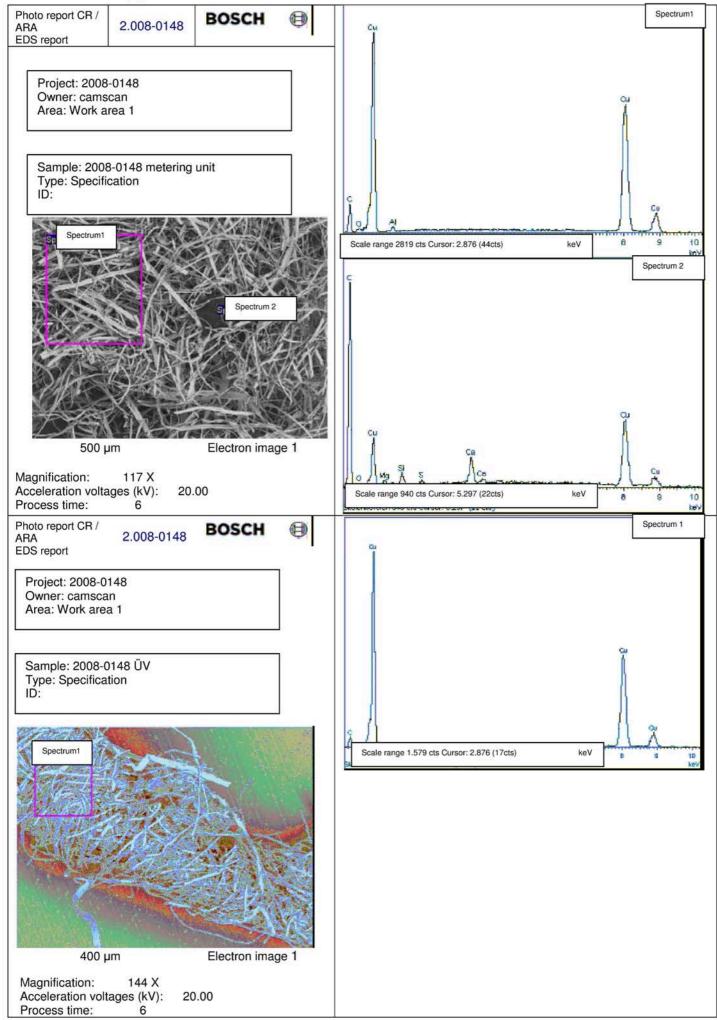
The pump is stored at RB until 06/2008 and then scrapped.

6. Attachments

The result of the EDX / EDS analysis of particles (2008-0148)

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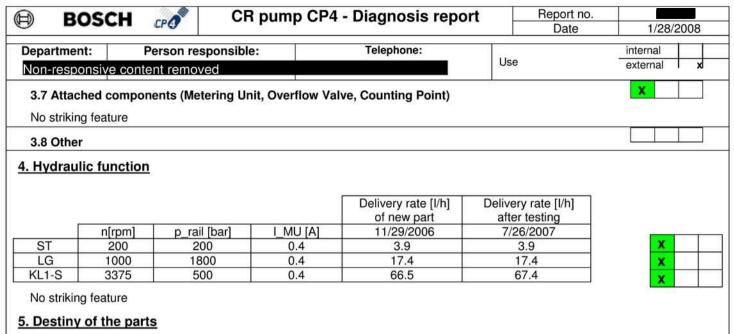
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3.2 Drivetrain						x	
Very slight runn	ing marks recognizable	e (Example: Fig. 1 camshaf	t and Fig. 2 roller)				
						X	
3.3 High press	ure						
	ure ing marks recognizable	e (Fig. 3 HP piston)					
		e (Fig. 3 HP piston)				X	
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Very slight runn 3.4 Bearing No striking feat 3.5 Shaft seal	ing marks recognizable ure (Fig. 4 Flange beari						

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The parts will be stored at RB until 08/2008



Fig. 1 Camshaft



Fig. 3: HP piston



Fig. 2: Roller

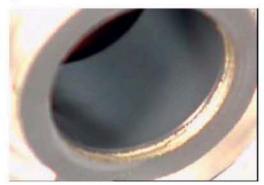


Fig. 4: Flange bearing

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Pump ty	pe:	C	ustomer:	Project:		Project /	design pattern typ
CP4.1S_348_2x5,25_R		20	W	R4 2.0 EU5	5		C / C2
Part number	(TTNo.):	Date of	manufacture:	Serial numbe	er:	Manufa	cturing plant - line
0445B2105	8_06		689	4890		011M FeP	(Feuerbach plant) -
SAP-No	o.:	Sa	imos no.:	Customer orde	r no.:	Engin	e/Vehicle number
30-10100	5-07		578258				03LA/17098
Customer part	number	Endura [cu	ance run type ustomer]:	Endurance run cor			DSBFD no.:
			endurance run	VW462-7-022	24		19419
Mileag	e		eceipt at dept. S-PC/EDI:	Process no	i.	Con	fidentiality note
19940	h	9159)/22/2007	2007-CP4_01	48		Confidential
VA / ETC	no.:	Endura	ance run type				
DS-1647	66		[RB]:				
Components - Wear of the com				antity drift in comparis g features.	on with the	e new state.	
Result The pump has pass	ed the test.						
3. Results of diagno 3.1 Drive No striking featu		findings)		Legend	d rating staç	ges { OK uncritica Critica	x
3.2 Drivetrain Lateral roller slip	155114	available)					x
3.3 High pressure No striking featu		availabic)					x
3.4 Bearing No striking featu							x
3.5 Shaft seal No striking featu	re						X
3.6 Holes	re						X
	onents (Meter	ing Unit, Over	flow Valve, Co	ounting Point)			x

EA11003EN-00859[1] No striking feature

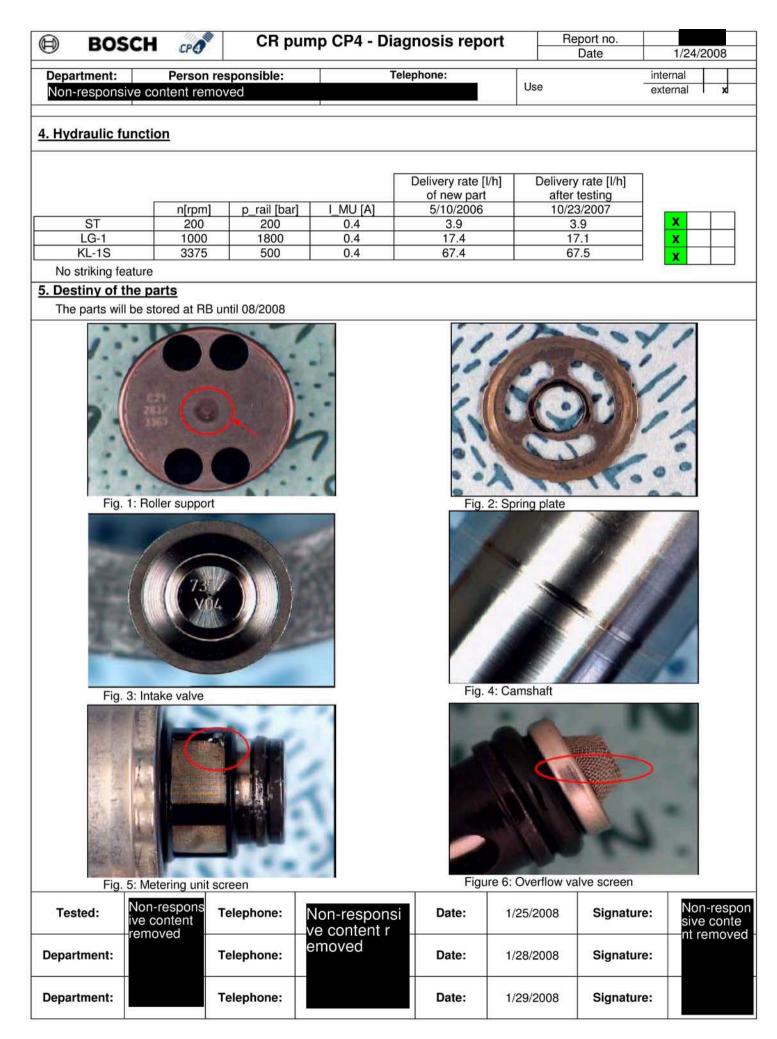
🖻 BOSC	CPO	CR pur	np CP4 - Di	agnosis report	R	eport no. Date	2/27/	2008
Deserterent	Barra			Telenhene		Duit		1 1
Department:	ALCONTRACTOR AND A CONTRACTOR	sponsible:		Telephone:	Use	-	internal external	
Non-responsiv	e content remo	ved	1				external	
I. Hydraulic fui	nction							
				Delivery rate [l/h] of new part		ry rate [l/h] r testing		
	n[rpm]	p_rail [bar]	I_MU [A]	9/12/2006		23/2007		
Starting point	200	200	0.4	3.9		3.9	x	
1000 rpm, p_rate	The second se	1800	0.4	17.1		17	x	
n_max_p, 500ba	r 3375	500	0.4	65.8	6	6.6	x	
	uel-quantity drift	compared to del	ivery measurem	nent.				
5. Destiny of th The pump is sto	e parts pred at RB until (ient.				
5. Destiny of th The pump is sto 6. Attachments None Tested:	e parts bred at RB until (Non-respon sive conte	06/2008 and the Phone:	n scrapped.	Date:	3/31/2008	Signature	sive	-resp
5. Destiny of th The pump is sto 6. Attachments None Tested:	e parts bred at RB until (Non-respon	06/2008 and the Phone:	n scrapped.	V Date:	3/31/2008 4/10/2008	Signature: Signature:	sive nt re	-resp conte

EA11003EN-00860[0]

B BO	SCH CPO		pump CP4 - Dia	· · ·		eport no. Date	1/22/2008
Department: Non-response	Person sive content rem	responsible loved	: Te	ephone:	Use	a	internal x
			1				
o: or information:	Non-respo	onsive co	ntent removed				
00440.040.0	Pump type:	E MELO	Customer:	Project:	- 	Project / de	sign pattern typ
	x5,25_REC_3,3_1,9	5_M14,2	VW	R4 2.0 EU	5		C/C
	number (TTNo.): 0445B21058		Date of manufacture: 081206	Serial numb 0035	er:		u ring plant - line Feuerbach plant) M -
	SAP-No.:		Samos no.:	Customer orde	er no.:	Engine/V	ehicle number
	DS-164776		578285	CBA000030)3	CBA	A0000 303
	omer part number CBA0000303		Endurance run type [customer]:	Endurance run co GDV;CBA 0000		100.7	BFD no.: 19415
	- Joseffers		CR-engine				
	Mileage 52008 h		Parts receipt at dept. DS-PC/EDI: 10/22/2007	Process no 2007-CP4_0			entiality note
3.1 Drive	f diagnosis (vis	ual finding	<u>15)</u>	Legen	d rating stag	es uncritical Critical	x x x
3.2 Drivetra	75.Le	visible					X X
3.3 High pro	-	VIOLOIC					
•	essure						X
Slight w	essure vear marks visible						x
3.4 Bearing	vear marks visible						x
3.4 Bearing No strik 3.5 Shaft se	vear marks visible I king feature						
 3.4 Bearing No strik 3.5 Shaft se No strik 3.6 Holes 	vear marks visible I king feature eal						×
 3.4 Bearing No strik 3.5 Shaft se No strik 3.6 Holes No strik 3.7 Attache 	vear marks visible king feature eal king feature	Netering Un	it, Overflow Valve, Co	unting Point)			x
 3.4 Bearing No strik 3.5 Shaft se No strik 3.6 Holes No strik 3.7 Attache No strik 4. Destiny of 	vear marks visible king feature eal king feature king feature ed components (N king feature			unting Point)			x x
 3.4 Bearing No strik 3.5 Shaft se No strik 3.6 Holes No strik 3.7 Attache No strik 4. Destiny of 	vear marks visible king feature eal king feature cd components (N king feature of the parts rts are stored until		RB Non-responsive c		3/2008	Signature:	x x x
 3.4 Bearing No strik 3.5 Shaft se No strik 3.6 Holes No strik 3.7 Attache No strik 4. Destiny o The par 	vear marks visible king feature eal king feature d components (M king feature of the parts rts are stored until	07/2008 at	RB	Date: 1/2	3/2008 3/2008	Signature: Signature:	x

EA11003EN-00861[0]

BOSCH 🛷 C	R pump CP4 - Dia	gnosis report	R	eport no. Date	1/24/2008
Department: Person responsib Non-responsive content removed	le: Te	lephone:	Use		internal external x
p: Non-responsive co	ontent removed				
Pump type: CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	Customer: VW	Project: R4 2.0 EU5	;	Project / o	design pattern typ C / C
Part number (TTNo.): 0445B21058_02	Date of manufacture: 685	Serial numbe 4747	er:	120010-070250-054007 20040730-0614-0404-05	turing plant - line Feuerbach plant) –
SAP-No.: DS –164778	Samos no.: 0578290	Customer order	r no.:	100000000000000000000000000000000000000	/Vehicle number 3LD/16369
Customer part number	Endurance run type [customer]: Engine trial	Endurance run cor Function	nditions:	D	SBFD no.: 19414
Mileage 2056 h	Parts receipt at dept. DS-PC/EDI: 10/22/2007	Process no 2007-CP4_01			dentiality note Confidential
The parts have an incipient wear (2,056 mounted before end 06/2006. Between (friction paint on the spring plate. Since th also found on overflow valve and the me the customer, since it is not the first case. The pump has passed the test.	05/2006 and 06/2006, pro nen, the process has been etering unit screen. Risk o	blem of adhesion occ n improved. Copper p	curred durin articles wh	ng the applica nich do not co	tion of the anti- me from CP4 we
 Results of diagnosis (visual findia 3.1 Drive No striking feature 	ngs)	Legend	d rating stag	es Uncritical Critical	
3.2 Drivetrain Incipient cavitation on the piston base at peeled-off (Fig. 2).	the roller support (Fig. 1)). Anti-friction paint on	the spring) plate	x
3.3 High pressure Incipient fretting wear at the seal seat of	the intake valve (Fig. 3)				X
3.4 Bearing No striking feature					X
3.5 Shaft seal Incipient wear of the shaft seal on the ca	amshaft (Figure 4)				X
3.6 Holes Anti-friction paint of the spring plate in th		e housing (Fig. 5)			X
3.7 Attached components (Metering U Anti-friction paint of the spring plate on the screen	Init, Overflow Valve, Co	unting Point)	ve and me	tering unit	x
3.8 Other					



BOSCH CPO CI	R pump CP4 - Dia	gnosis report		port no. Date	2/27/2008
Department: Person responsite Non-responsive content removed	ole: Te	lephone:	Use		internal external x
To: Non-responsive c	ontent removed				
For information:					
Pump type:	Customer:	Project:		Project /	design pattern ty
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5			C / C
Part number (TTNo.): 0445B21058	Date of manufacture: 010207	Serial number 0080	r:		c turing plant - lin (Feuerbach plant) -
SAP-No.: 30-101005-07	Samos no.: 578254	Customer order	no.:	273	e/Vehicle number
Customer part number	Endurance run type [customer]: Engine endurance run	Endurance run con Reso-run	ditions:	E	DSBFD no.: 19421
Mileage 209 h	Parts receipt at dept. DS-PC/EDI: 10.22.2007	Process no. 2007-CP4_015			identiality note Confidential
VA / ETC no.: DS-164759	Durability test type [RB]:				
Complaint:			-		
Findings at the end of endurance run 2. Conclusion No back measurement of the function, b complaint. Wear of the components is low and with			time is not	expected ar	nd there is no
The pump has passed the test.	740)			ОК	X
 Results of diagnosis (visual findi 3.1 Drive No striking feature 	iigs)	Legend	rating stage	uncritical Critical	x
3.2 Drivetrain No striking feature					x
3.3 High pressure No striking feature					X
3.4 Bearing No striking feature					x
3.5 Shaft seal No striking feature					
3.6 Holes No striking feature					X
3.7 Attached components (Metering L No striking feature	Jnit, Overflow Valve, Co	ounting Point)			
3.8 Other No striking feature					

BO:	SCH CPO	CR p	ump CP4 - Di	iagnosis repo	rt F	Report no. Date	2/27	/200	8
Department: Non-respons	Persor sive content rer	responsible: noved		Telephone:	Use		internal external		×
4. Hydraulic 1	unction		1		.1				
			į	Delivery rate [l/ of new part		ry rate [l/h] er testing]		ĺ
	n[rpm] p_rail [ba	r] I_MU [A]						
No functiona	al testing due to t	he short running	time and classific	ation in the third dia	ignosis catego	ry.			Į
5. Destiny of The parts ar 6. Attachmen None	e stored at RB u	ntil 06/2008 and	then scrapped.						
Tested:	Non-respon sive conte nt removed	Telephone:	Non-respons e content rer		2/29/2008	Signatur	e. ns	n-re ive c nt rer	:0
Department:	in removed	Telephone:	oved	Date:	3/4/2008	Signatur	ve		

	H CPO	CR pump Cl	P4 - Diag	nosis report	Re	eport no. Date	2/27/200	08
Department:	Person respons	sible:	Tele	phone:	Use		internal external	x
Non-responsive	content removed						external	_
To:	Non-responsive	content rem	oved					
For information:								
		94 194 1942 (1941)	0	446 1866 1870			54 7526 - 550	75
	np type:	Custom	9-1-12	Project:		Project / o	design pattern	typ
CP4.1S_348_2x5,2	5_REC_3,3_1,95_MT4,2	2 VW		R4 2.0 EU5	5		C / C	
Part nun	nber (TTNo.):	Date of manu	ufacture:	Serial numb	er:	Manufac	cturing plant - I	line
445	5010507	27040)7	0008		011M FeP	(Feuerbach plar	nt) ·
	AP-No.:	Samos		Customer orde	r no.:	2005	/Vehicle numb	er
30-1	01005-07	57776	5			C	BDP170811	
Custome	r part number	Endurance		Endurance run co	nditions:	C	SBFD no.:	
		[custom Engine endur		ÖVL+PZD			19444	
~13 V.		- 1, 779		2001			346 JC 986 - C	
	lileage	Parts receipt DS-PC/E	t at dept. EDI:	Process no			identiality note	
9	227 h	10/17/2		2007-CP4_01	54	C	Confidential	
VA/	ETC no.:	Durability te						
DS	-164722	[RB]						
Compla	aint:							
1. Subject CP4 customer r Diagnosis of en 2. Conclusion	eturn durance run end withc	out complaint						
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result	durance run end withd tes after endurance ru e components is low a	n without signific nd without signifi		977797 8 - 200799797979797979797979797979797	ison with th	e new state.	4 2	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h	durance run end witho tes after endurance ru e components is low an has passed the endur	n without signific nd without signifi ance run.		977797 8 - 200799797979797979797979797979797	ison with th		_	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of diagonal - Delivery rates - Delivery - Delive	durance run end withd tes after endurance ru e components is low a	n without signific nd without signifi ance run.		features.	ison with th	Гок	X	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump H 3. Results of dia 3.1 Drive	durance run end withd tes after endurance ru e components is low ar has passed the endur agnosis (visual fin	n without signific nd without signifi ance run.		features.		Гок	X	<
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of diagonal - Delivery rates - Delivery - Delive	durance run end withd tes after endurance ru e components is low ar has passed the endur agnosis (visual fin	n without signific nd without signifi ance run.		features.		OK uncritical	x x v v	C
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain	durance run end withd tes after endurance ru e components is low a has passed the endur agnosis (visual fin ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	X X X	<
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip	durance run end witho tes after endurance ru e components is low a has passed the endur agnosis (visual fin ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	x x x x	<
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press	durance run end witho tes after endurance ru e components is low an has passed the endur agnosis (visual fin ure o off (no picture availa ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	x x v v	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu	durance run end witho tes after endurance ru e components is low an has passed the endur agnosis (visual fin ure o off (no picture availa ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	x x x x	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press	durance run end witho tes after endurance ru e components is low an has passed the endur agnosis (visual fin ure o off (no picture availa ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	X X 10000000000000000000000000000000000	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal	durance run end witho tes after endurance ru e components is low at has passed the endur agnosis (visual fin ure <u>p off (no picture availa</u> ure ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	X X 10000000000000000000000000000000000	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal No striking featu	durance run end witho tes after endurance ru e components is low at has passed the endur agnosis (visual fin ure <u>p off (no picture availa</u> ure ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical		
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump H 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal No striking featu 3.6 Holes	durance run end witho tes after endurance ru e components is low ai has passed the endur agnosis (visual fin ure <u>o off (no picture availa</u> ure ure	n without signific nd without signifi ance run. dings)		features.		OK uncritical	X X 10000000000000000000000000000000000	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal No striking featu 3.6 Holes No striking featu	durance run end witho tes after endurance ru e components is low an has passed the endur agnosis (visual fin ure <u>o off (no picture availa</u> ure ure ure	n without signific nd without signifi ance run. dings) ble)	cant striking	features.		OK uncritical		
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal No striking featu 3.6 Holes No striking featu 3.7 Attached co	durance run end witho tes after endurance ru e components is low au has passed the endur agnosis (visual fin ure o off (no picture availa ure ure ure ure ure ure	n without signific nd without signifi ance run. dings) ble)	cant striking	features.		OK uncritical	x x 1000	
CP4 customer r Diagnosis of en 2. Conclusion Function - Delivery rat Components - Wear of the Result - The pump h 3. Results of dia 3.1 Drive No striking featu 3.2 Drivetrain Lateral roller slip 3.3 High press No striking featu 3.4 Bearing No striking featu 3.5 Shaft seal No striking featu 3.6 Holes No striking featu	durance run end witho tes after endurance ru e components is low au has passed the endur agnosis (visual fin ure o off (no picture availa ure ure ure ure ure ure	n without signific nd without signifi ance run. dings) ble)	cant striking	features.		OK uncritical	x x 1000	

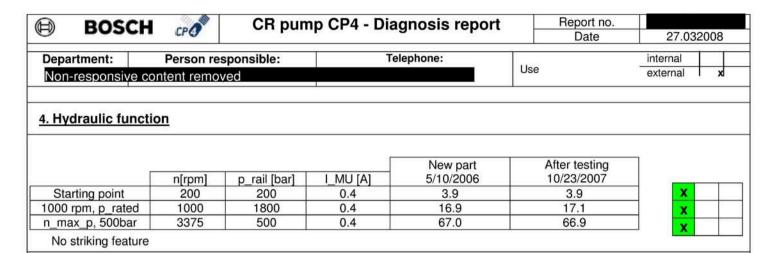
BOSCH	CPO	CR pur	np CP4 - Di	agnosis report	Re	eport no. Date	2/27	/2008
Department: Non-responsive co	Person res	-77		Telephone:	Use	:-	internal external	x
4. Hydraulic function	on							
				Delivery rate [l/h] of new part		y rate [l/h] testing		
	n[rpm]	p_rail [bar]	I_MU [A]	4/27/2007		5/2007		
Starting point	200	200	0.4	3.9		.1	x	
1000 rpm, p_rated n_max_p, 500bar	1000 3375	1800 500	0.4	17.7 67.3		7.8 5.9	x	
time) is met.		254 AB		0 rpm, p_rated \geq 15.5	or 15.2 l/h a	fter running	X	
	quantity drift o arts	compared to del	ivery measuren	4. 1002/07/2	or 15.2 l/h a	fter running		
time) is met. No significant fuel- 5. Destiny of the pa	quantity drift o arts	compared to del	ivery measuren	4. 1002/07/2	or 15.2 l/h a	fter running		
time) is met. No significant fuel-o 5. Destiny of the pa The pump is stored 6. Attachments None Tested: Non-	quantity drift o arts d at RB until 0 -respon conte	compared to del 6/2008 and the elephone:	ivery measurem n scrapped. Non-respons	siv Date: 3	or 15.2 l/h a	fter running	: No	on-res 'e con
time) is met. No significant fuel-o 5. Destiny of the pa The pump is stored 6. Attachments None Tested: Non-	quantity drift of arts arts d at RB until 0 respon conte moved	compared to del 6/2008 and the elephone:	ivery measurem n scrapped. Non-respons	siv Date: 3			: No siv	on-res re cor remo

BOSCH CPO C	R pump CP4 - Dia	gnosis report	Report no. Date	2/27/2008
Department: Person responsi Non-responsive content removed	ble: Te	lephone:	Jse	internal external x
To: Non-responsive of For information:	content removed			
Pump type: CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	Customer: VW	Project: R4 2.0 EU5	Project /	design pattern type C / C
Part number (TTNo.): 0445B21058	Date of manufacture: 020207	Serial number: 0028		cturing plant - line (Feuerbach plant) –
SAP-No.: 30-101005-07	Samos no.: 577772	Customer order n	2075	e/Vehicle number 3LAP270109
Customer part number	Endurance run type [customer]: Engine endurance run	Endurance run condi 70h ÖVL+70h PZ	01/1/2016/2016-20 04/	DSBFD no.: 19438
Mileage 340 h	Parts receipt at dept. DS-PC/EDI: 10/17/2007	Process no. 2007-CP4_0156		fidentiality note Confidential
VA / ETC no.: DS-164727	Durability test type [RB]:			
Complaint:				
CP4 customer return Findings at the end of endurance run 2. Conclusion Delivery rates after endurance run or te Wear of the components is low and with The pump has passed the endurance r	nout significant striking fea			
3. Results of diagnosis (visual find 3.1 Drive	ings)	Legend ra	ating stages Uncritica Critica	x
No striking feature 3.2 Drivetrain				X X
Lateral roller slip off (no picture availabl 3.3 High pressure No striking feature	6)			X
3.4 Bearing No striking feature				X
3.5 Shaft seal No striking feature				
3.6 Holes No striking feature				
3.7 Attached components (Metering No striking feature	Unit, Overflow Valve, Co	ounting Point)		X
3.8 Other No striking feature				X

BOSC		CR pu	mp CP4 - Di	agnosis repo	rt Re	port no.		
	CP ()					Date	2/27	2008
Department:	Person re	sponsible:		Telephone:		in	ternal	T
Non-responsive					Use	e	xternal	
4. Hydraulic func	tion							
				Delivery rate [l/h	n] Delivery	rate [l/h]		
	1 million		- 10	of new part	after	testing		
	n[rpm]	p_rail [bar]	I_MU [A]	2/2/2007	10/2	5/2007		
Starting point	200	200	0.4	3.9			×	
1000 rpm, p_rated	1000	1800	0.4	17.6			x	
n_max_p, 500bar	3375	500	0.4	65.6	66	6.1	x	
No significant fue 5. Destiny of the The pump is stor 6. Attachments None	parts	•		5-2907				
ive	n-respons content noved	elephone:	Non-respons e content ren	iv Date:	2/29/2008	Signature:	siv	n-res e coi emo
		elephone:	oved	Date:	04.03.02008	Signature:		01110
Department:				5				

EA11003EN-00865[0]

BOSCH CPO	CR pump CP4 - Dia	gilosis report	110	eport no. Date	3/27/2008	
Department: Person respons Non-responsive content removed	ible: Tel	lephone:	Use		internal external x	
»: Non-responsive	content removed					
or information:						
Pump type:	Customer:	Project:		Project /	design pattern type	
CP4.1S_348_2x5,25_REC_3,3_1,95	vw	R4 2.0 EU5			C / C1	
Part number (TTNo.):	Date of manufacture:	Serial number:		Manufacturing plant - lin		
0445B21058_02	685	4742		011M FeP	(Feuerbach plant) -	
SAP-No.:	Samos no.:	Customer order	no.:	Engin	e/Vehicle number	
DS-164746	577913	Endurance run conditions: CR-engine			03LA/16870	
Customer part number	Endurance run type [customer]:			DSBFD no.: 19425		
Mileage 70440 h	Parts receipt at dept. DS-PC/EDI:	Process no.			fidentiality note	
70440 h	10/17/2007	2007-CP4_016	50		Confidential	
Functioning OK Particle accumulation on metering unit from the pump housing, but this could The pump has passed the test.	screen: Contamination resi not be proven through a fau	idues of plastic and al ılt. The origin of the pl	uminum all astic partic	loy. The par les could no	ticles could origina ot be determined.	
3. Results of diagnosis (visual find	lings)	Lagand	rating stage	OK uncritica		
3.1 Drive		Legend	raing stage	Critica		
No striking feature					x	
3.2 Drivetrain					x	
Only running marks visible 3.3 High pressure					X	
Slight fretting wear at the seal sea	t of the intake valve (Fig. 1)					
3.4 Bearing No striking feature					X	
3.5 Shaft seal Slight recession of shaft seals < 1	0.um (Fig. 2)				X	
3.6 Holes	שיוו (ו ואַ בּ/				x	
No striking feature	Unit Overflow Velue Or	unting Point)			x	
3.7 Attached components (Metering Particle collection of contamination housing) on the metering unit scree	n residues (origin unknown)		bly from C	P4		
3.8 Other					X	
Pump outside slightly rusted (Fig.	2)					



5. Destiny of the parts

The parts are stored until 09/2008 at RB



Fig. 1: Intake valve



Fig. 3: Metering Unit

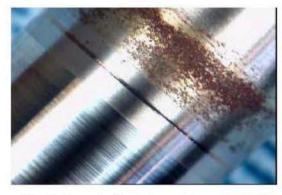


Fig. 2: Camshaft running surface of shaft seal

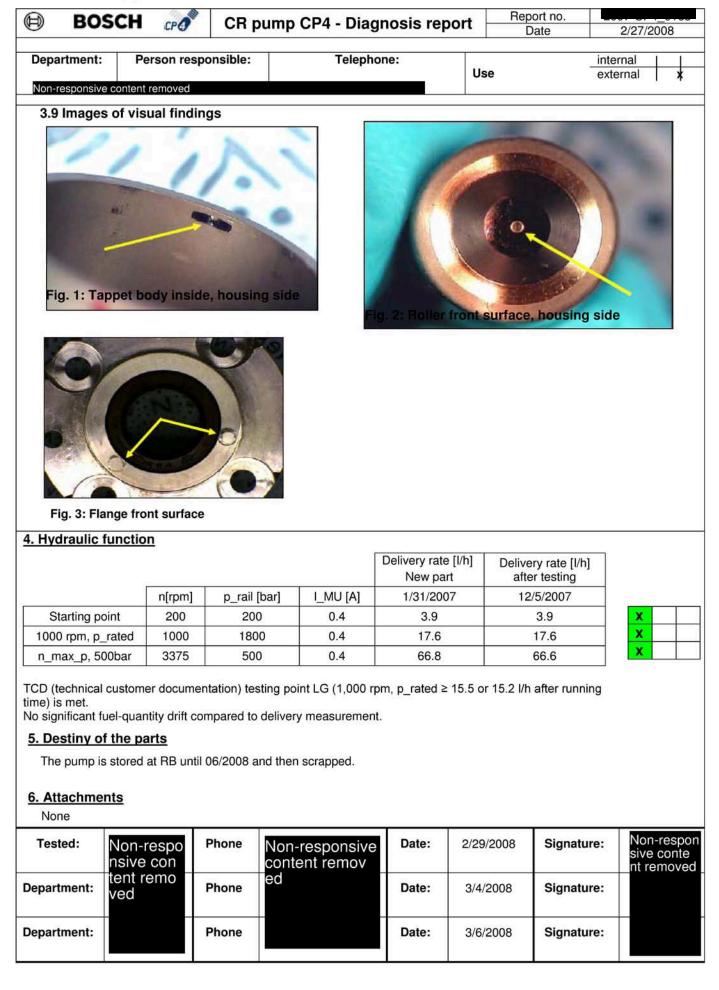
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EA1 1003EN-00868[1] Marks on flange front surface with 6 mm diameter (see Fig. 3)

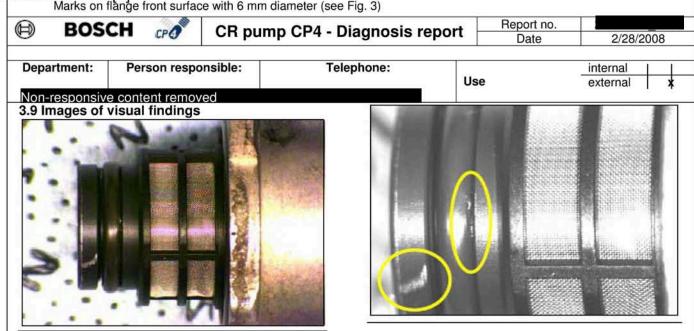


Fig. 2 Metering unit, detail view O-ring

Fig. 1 Metering unit

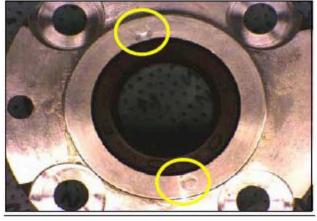


Fig. 3 Flange front surface

4. Hydraulic function

				Delivery rate [I/h] of new part	Delivery rate [l/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	2/1/2007	12/5/2007
Starting point	200	200	0.4	3.9	3.7
1000 rpm, p_rated	1000	1800	0.4	17.8	17.7
n_max_p, 500bar	3375	500	0.4	64.8	66.6

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is met. No significant fuel-quantity drift compared to delivery measurement.

5. Destiny of the parts

The pump is stored at RB until 06/2008 and then scrapped.

6. Attachments

None

Tested:	Non-responsiv e content rem oved	Phone	Non-responsive co ntent removed	Date:	3/29/2008	Signature:	Non-respons ive content removed
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Fig. 1: Metering (foreign particle								
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TCD (technical cus time) is met. No significant fuel-			30 O O	n, p_rated ≥ 1	5.5 OF 15.2 I/N	aπer running	}	
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Born-responsive conductances 10: Non-responsive content removed inform 20: Pump type: CP4.15_348_2x525_REC_3.3_ WW R4 2.0 EU5 C / C Part number (TTNo.): Date of manufacture: SAP-No:: Samos no.: SAP-No:: Samos no.: Customer part number Endurance run type (customer): Engine eVance run type (customer): Endurance run type (customer): Mileage Part sceipt at dept. Process no. Confidentiality not 20203 450 h 11/29/2007 VA / ETC no.: Durability test type DS-175660 Drability test type DS-175660 Image: Part sceipt at dept. Conclusion Function - Delivery rates after endurance run without significant fuel-quantity drift in comparison with the new state. Striking features - - The guap press-in diameter is due to this or the entry via the low-pressure system upstro the pump. - The severe corrosion on the cam and the roller outside the running range is due to the presence of free water. - The severe corrosion on the cam and the roller outside the running range is due to the pressure system upstro the pump.	Department: Pers	son respo	onsible:		Use internal
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3.6 Holes				x
Cavitation	erosion in the tappet hol	le outside the moving range of the ta	appet (see Fig. 6); foreign	
		see Fig. 7) and in the overflow valve ing unit, overflow valve, count		X
Foreign pa	articles on the screen of t	the metering unit (see Fig. 9) and th		
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2. The same data service and service		to flange assembly (see Figures 11	and 12)	
3.9 Images o	f visual findings			
Fig. 1 Camsha	aft, running range of		shaft, top dead center	
Fig. 3 Tappet b	body inside, housing	side		

Ø	BOS(CH CPO	CR pump	CP4 - Diagnosis report	Report no. Date	2/28/2	2008
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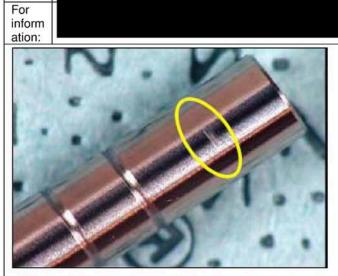


Fig. 5 High-pressure piston, high-pressure

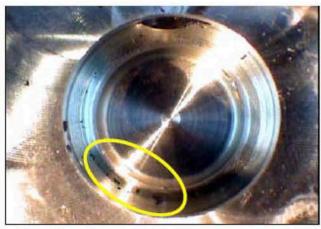


Fig. 7 Housing, metering unit

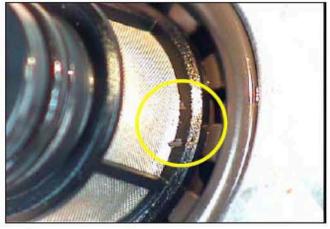


Fig. 9 metering



Fig. 6 Tappet hole, top



Fig. 8 Housing, overflow valve

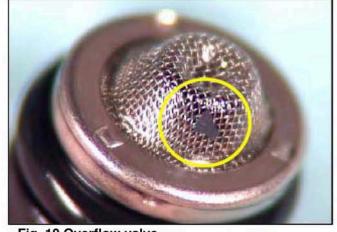


Fig. 10 Overflow valve, screen

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Fig. 11 Flange, press-in composite

Fig. 13 Housing, press-in diameter

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				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing	
	n[rpm]	p_rail [bar]	I_MU [A]	5/8/2006	12/4/2007	
Starting point	200	200	0.4	3.9	3.9	X
1000 rpm, p_rated	1000	1800	0.4	17.1	17.1	X
500	0075	500	0.4	67.5	66.8	X
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TCD (technical custom time) is met. No significant fuel-qua	ntity drift cor	tation) testing po	bint LG (1,000 rpm	/	Part Constanting	ng
TCD (technical custom time) is met.	ner documen ntity drift cor arts	tation) testing po	pint LG (1,000 rpm	/	Part Constanting	ig
TCD (technical custom time) is met. No significant fuel-qua 5. Destiny of the p The pump is stored 6. Attachments None Tested: Non-r	er documen ntity drift cor arts at RB until (at RB until (tation) testing po npared to deliver 06/2008 and the Phone Non con	pint LG (1,000 rpm	n, p_rated ≥ 15.5 c	Part Constanting	e: Non- nsive
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VA / ETC no.: DS-175052	Durability test type [RB]:			
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10 C	feature					-

3.9 Images of visual findings

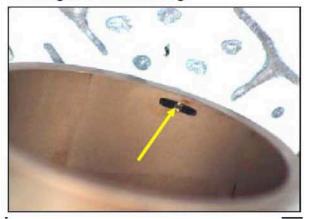


Fig. 1 Tappet body inside, flange side

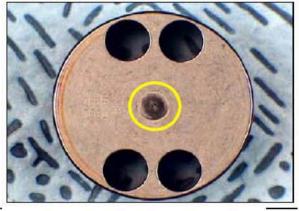


Fig. 3 Roller support, piston base support

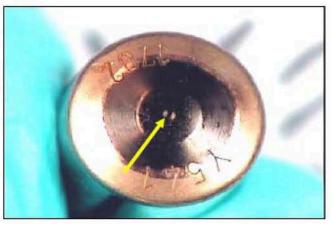


Fig. 2 Roller front surface, flange side

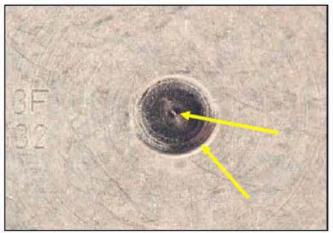


Fig. 4 Roller support, piston base support in

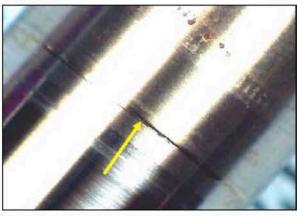


Fig. 5 Camshaft, moving range of shaft seal

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	n[rpm]	p_rail [bar	'] I_MU [A]	9/25/2006	12/4/2007		
Starting point	200	200	0.4	3.7	3.9	X	
1000 rpm, p_rate	ed 1000	1800	0.4	17	17.7	X	
n_max_p, 500b	ar 3375	500	0.4	67.3	67.2	X	
ime) is met.		10.52 5.52 5.52 5.52 F	g point LG (1,000 rpr livery measurement.	n, p_rated ≥ 15.5	or 15.2 l/h after runni	ng	
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	n[rpm]	p_rail [bar]	Contraction of the second	10/12/200	6		
Starting point	200	200	0.4	3.9			
1000 rpm, p_rated	1000	1800	0.4	17.1			
n_max_p, 500bar	3375	500	0.4	67.4]	
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nsiv	re con	Phone No	on-responsive ntent removed	Date:	3/31/2008	Signature:	Non-respo sive conte
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Fig. 2 Roller front surface, housing side

X

4. Hydraulic function

				Delivery rate [I/h] of new part	Delivery rate [l/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	12/7/2006	12/20/2007
Starting point	200	200	0.4	3.9	3.7
1000 rpm, p_rated	1000	1800	0.4	16.7	17.7
n_max_p, 500bar	3375	500	0.4	67.1	67.2

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is met.

No significant fuel-quantity drift compared to delivery measurement.

5. Destiny of the parts

The pump is stored at RB until 06/2008 and then scrapped.

6. Attachments

None

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Department:		Phone		Date:	5/6/2008	Signature:	

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The pump has	s passed the end	lurance run						
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No striking	· · · · · · · · · · · · · · · · · · ·						x	
3.2 Drivetrai							X	
No striking 3.3 High pres							v	
No striking							X	
3.4 Bearing	jioataro						x	
No striking	g feature							
3.5 Shaft sea	al						X	
No striking	g feature						_	
3.6 Holes							x	
No striking	Construction of the costs	(motoring	unit ovorflo	w valve, counting poi	nt)			
No striking	Sare?	(metering	unit, overno	w valve, counting pol	iii)		X	
3.8 Other	lisature						X	_
	n connection fau	ltv (see Figs	. 1 and 2)					
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	-				part	Jacobrean Material	
0111		n[rpm]	p_rail [bar]	I_MU [A]	6/28/2007	12/21/200	
Starting po 1000 rpm, p_		200	200	0.4	3.9 17.9	3.9	X
n_max_p, 50		3375	500	0.4	66.1	67.2	X
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Starting point	n[rpm]	p_rail [bar] 200	I_MU [A] 0.4	[l/h] of new part	after testing		
	n[rpm]			[l/h] of new part 4/11/2007	after testing 12/21/2007	_	

No striking feature.

5. Destiny of the parts

The parts will be stored at RB until 10/2008.



Fig. 1: roller crest



Fig. 2: Tappet body

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Function	BOSCH CR pump CP4 - Diagnosis report Heport no. Date 4/17/20 cent: Person responsible: Telephone: Use internal external consive content removed Use internal external external On-responsive content removed VW R4 2.0 EU5 D / Series Pump type: Customer: Project: Project / design patte 195_MT4_2 WW R4 2.0 EU5 D / Series number (TTNo.): Date of manufacture: Serial number: 011M FeP (Feuerbach 445010507 050607 0404 011M FeP (Feuerbach 0-101005-07 584308 CAH0000111 mer part number Endurance run type Reso-run 20041 111 hr DS-PC201 2007-CP4_0187 Confidentiality no 111 hr DS-PC2007 2007-CP4_0187 Confidentiality no Complaint: Endurance run type Fuel: En590 Complaint: Endurance run type Fuel: Confidential 111 hr 12/20/2007 En590 Confidential Stof endurance run end without complaint							
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No striking featu	Iro							-
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3.3 High pressure							X	
No striking featur	re							T
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3.6 Holes							X	
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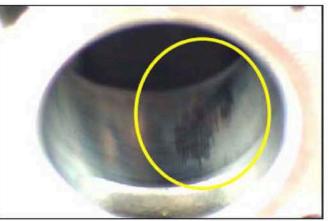


Fig. 1 Tappet body, lateral surface

Fig. 2 Housing, tappet hole

4. Hydraulic function

				Delivery rate [I/h] of new part	Delivery rate [l/h] after testing
	n[rpm]	p_rail [bar]	I_MU [A]	6/5/2007	12/20/2007
Starting point	200	200	0.4	3.9	3.8
1000 rpm, p_rated	1000	1800	0.4	17.8	17.7
n_max_p, 500bar	3375	500	0.4	66.1	66.2

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is met.

No significant fuel-quantity drift compared to delivery measurement.

5. Destiny of the parts

The pump is stored at RB until 06/2008 and then scrapped.

6. Attachments

None

Tested:	Non-respons ive content removed	Phone	Non-responsive content removed	Date:	4/28/2008	Signature:	Non-respo nsive con tent remo
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Complaint:		12				
2. Conclusion Function - Delivery rates after endural during the first back measure - Cold seal-tightness after en shaft seal due to contaminat measurement normal). Components - Wear of the remaining col - Damage to the camshaft v	ement after reassem ndurance run or test ion in the form of a h mponents is low and	bly could not be confir confirmed up to -30 °C air and particles verifie without significant stri	med). C (Leakage du ed through cle king features.	ring the eaning ar	first meas nd retest,	surement on the camshaft wear
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is seal-tigh	t in bubble test at room te	s, see Fig. 3) resulted in a leak in the cold te emperature (after back measurement and re range on the camshaft normal (see Figs. 4 a	assembly); wear)
3.6 Holes		200 - 100 - 100a		x
No striking	feature			
3.7 Attached	components (meterin	ig unit, overflow valve, counting poin	nt)	x
No striking	feature			
3.8 Other				x
No striking				

3.9 Images of visual findings



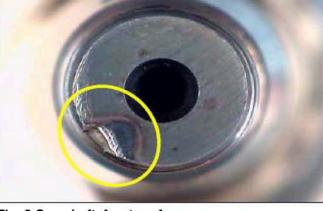


Fig. 1 Camshaft, thread

Fig. 2 Camshaft, front surface

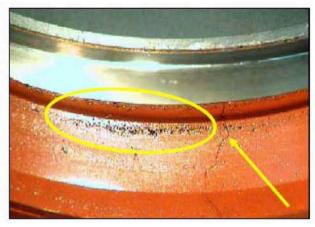


Fig. 1 Flange, shaft seal sealing lip

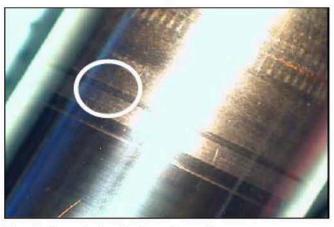
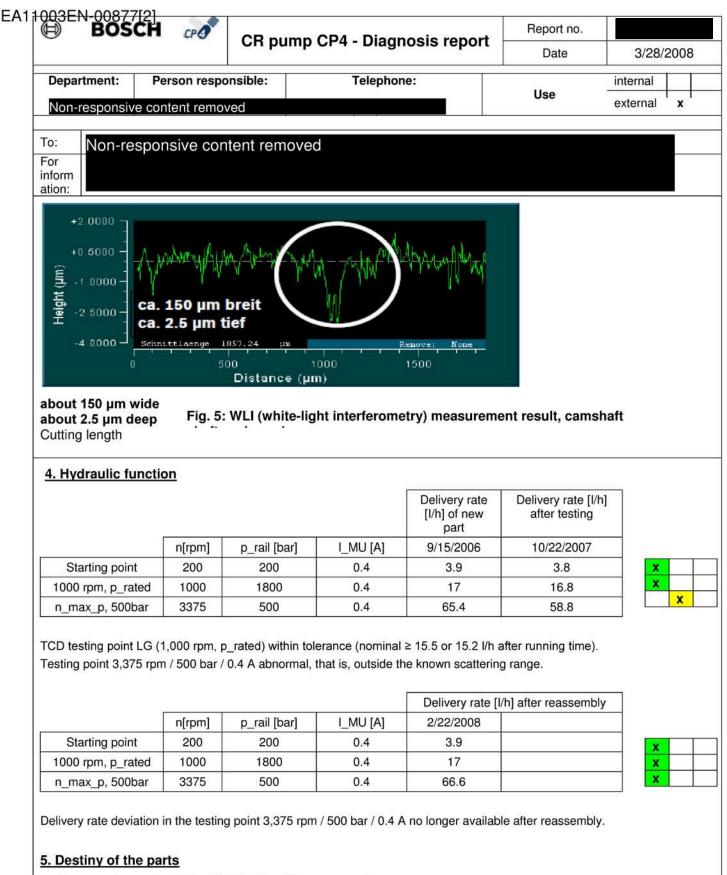


Fig. 4: Camshaft, shaft seal running range



The pump is stored at RB until 06/2008 and then scrapped.

6. Attachments

None

1003EN-00877 BOS	CH CPO	С			Re	port no.		
			pump CP4 - Diagn	losis rep		Date	3/28/200	
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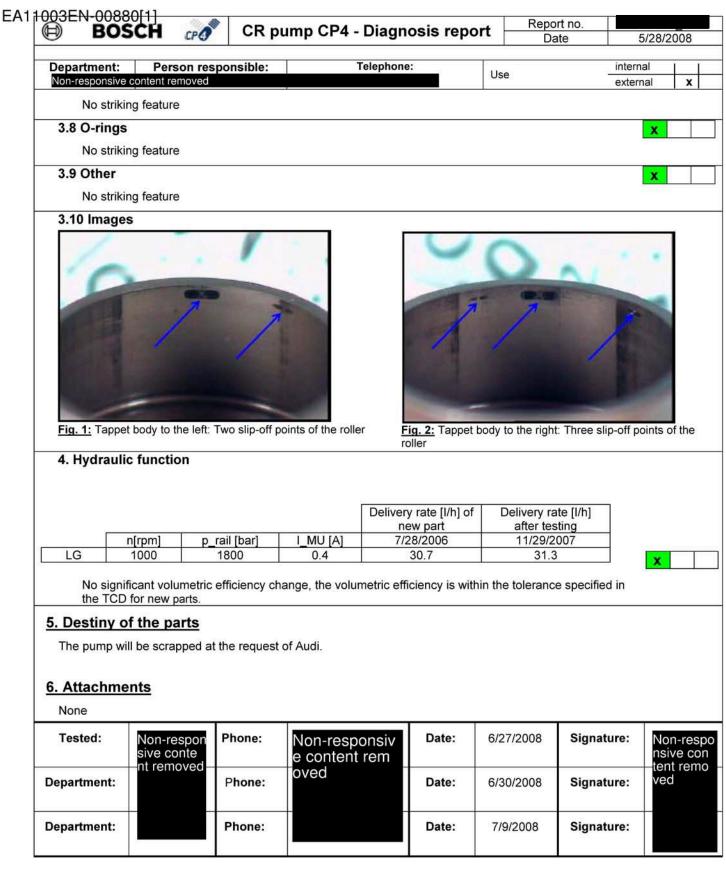
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	Part number (TTNo.): 0445B21058	Date of manufacture: 081206	Serial number: 0073		facturing plant - l P (Feuerbach plan
	SAP-No.: DS-164773	Samos no.: 0578260	Customer order no.	: Engi	ne/Vehicle numb 3LAP270056
	Customer part number	Endurance run type [customer]: Engine endurance run	Endurance run condition GDV-Ehra variable track passenger cars	5.0.2.Th 0.0	DSBFD no.: 19417
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	Fig. 1: Spring	plate	Fig. 2: In	itake valve		
	Fig. 3: Tappet	hole				
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SAP-No.: 30-101581-07	Samos no.: 584304	Customer order	no.:		e/Vehicle numb 3LAP270027
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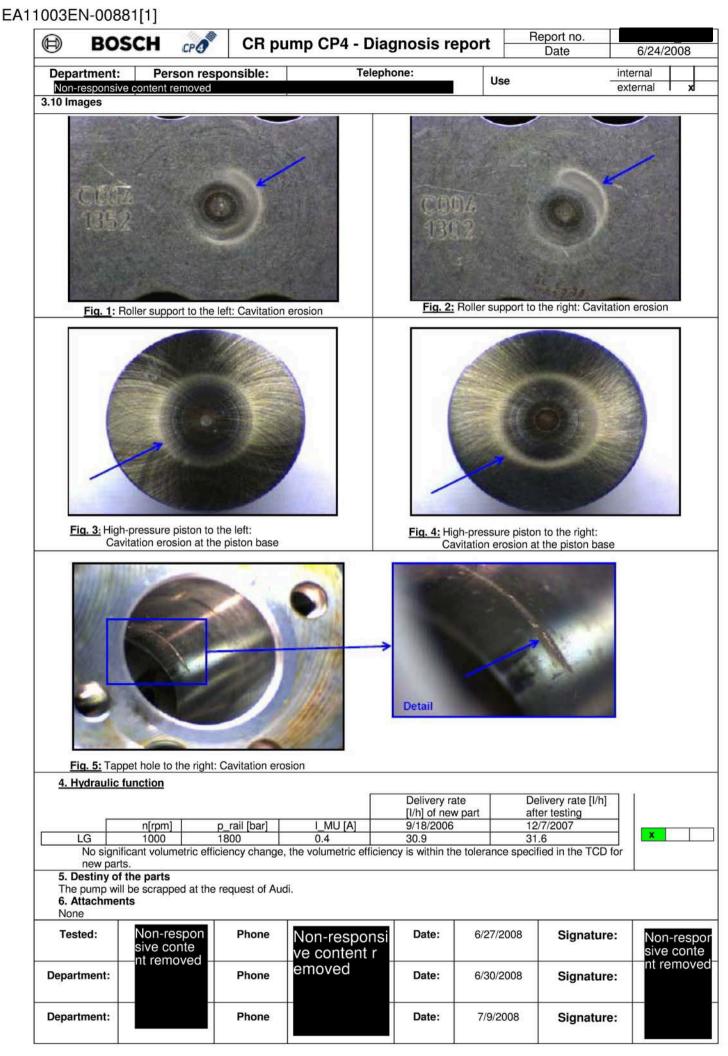
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	Starting		200	200	0.4		3.9	3.8		x	_
	1000 rpm,		1000	1800	0.4		7.6	17.6		X	
-	n_max_p,	500bar	3375	500	0.4	6	6.2	66.9		X	_
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Part number (TTNo.): 0445B20162_05	Date of manufacture: 250706	Serial number: 0008	Manufacturing plant - line 0110 FeP (Feuerbach plant) - Engine/Vehicle number 059 D V6N 025 s: DSBFD no.: 19695		
SAP-No.: DS-169128	Samos no.: 582246	Customer order no.:			
Customer part number	Endurance run type [customer]: CR-engine	Endurance run conditions: Engine map operation			
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<u>2. Co</u> Fur - -	gine 059.D EU5 114 Inclusion Delivery rates after The cold seal-tight mponents	endurance ness after er	run or test wi	thout significant or test has been	fuel-quantity drift in corr proven up to -25 °C (K	nparis ACO	on with t shaft sea	he new state. al).		
-	mponents The wear due to ca The wear due to ca The wear due to ca	avitation eros avitation eros avitation eros	sion is increas sion is increas sion is increas	sed on the roller sed on the high-p sed in the housin	support (HP piston cont pressure piston (piston t g (right tappet hole), bu cant striking features.	tact), base).	but uncri , but unc	tical.		
•	The pump has pas	sed the end	durance run.							
3.1	sults of diagnosi Drive No striking feature	<u>s (visual fi</u>	indings)	IS) Legend rating stages			<pre>{ OK uncritical Critical</pre>		x x	x
								x		
100000	Drivetrain Roller support: Cavita	ation erosion	around the c	enter of the HP	piston contact area (see	3.10	Figures	1 and 2)	X	
	High pressure IP piston, piston bas	e: Cavitatior	n erosion at th	ne contact area (see 3.10 Figures 3 and	4)			X	
	Bearing No striking feature								X	
	Shaft seal No striking feature								x	
	Holes lousing, tappet hole	to the right:	Cavitation ero	osion (see 3.10,	Figure 5)				X	
	Attached compone	ents (Meterii	ng Unit, Ove	rflow Valve, Co	unting Point)				x	
3.8	O-rings No striking feature								X	
	Other No striking feature								x	



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WLI measurement of O-ring screw cap cylinder head notch (see Figs. 2 and 3)							-
	2	WLI measurement of O-ring screw	cap cylinder head notch (se	ee Figs. 2 and 3)			

3.9 Images of visual findings Hoebenhild Einkerbung -1250.823 Notch, elevated image Fig. 2 WLI (white-light interferometry) measurement of O-ring notch Fig. 1 O-ring screw cap cylinder head inside (profile interface) +25.0000 1.50.0000 Breite ca. 190 µm Tiefe ca. 30 µm Einkerbung ttlaenge Hone 1000 Distance (µm) Notch, width of approximately 190 µm, about 30 µm deep, cutting length Fig. 3 WLI (white-light interferometry) measurement of O-ring notch, profile interface 4. Hydraulic function

				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing	
	n[rpm]	p_rail [bar]	I_MU [A]	7/19/2007	2/11/2008	
Starting point	200	200	0.4	3.8	3.8	x
1000 rpm, p_rated	1000	1800	0.4	17.9	17.9	x
n_max_p, 500bar	3375	500	0.4	65.9	66.5	x

TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated ≥ 15.5 or 15.2 l/h after running time) is met. No significant fuel-quantity drift compared to delivery measurement.

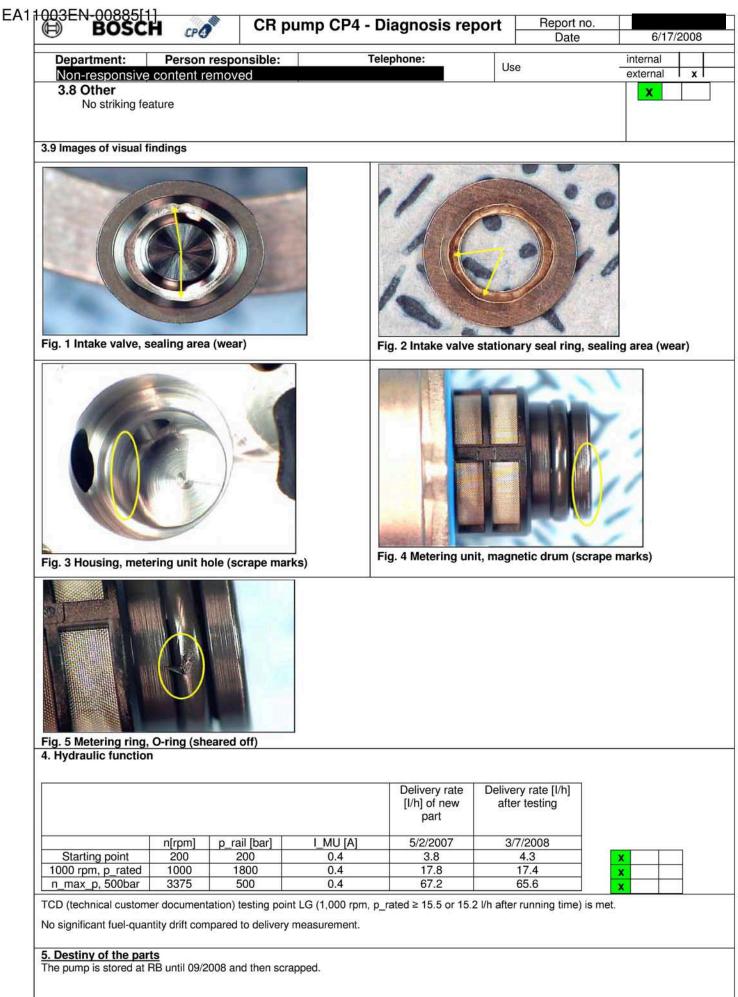
5. Destiny of the parts The pump is stored at RB until 09/2008 and then scrapped.

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Part number (TTNo.): 445010507	Date of manufacture: 050607	Serial number: 0328	Manufacturing plant - I 011M FeP (Feuerbach plant)-
SAP-No.: 30-101005-01	Samos no.: 590401.001	Customer order no.:	Engine/Vehicle numb
Customer part number	Endurance run type [customer]: Engine endurance run	Endurance run conditions: endurance run 1+ÖVL	DSBFD no.: 20454
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2. Conclusion			
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Function - Delivery rates after endurance run Components - Wear of the components is low an Result - The pump has passed the endur 3. Results of diagnosis (vis 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature	nd without significant striking fe urance run. sual findings)	eatures.	OK uncritical Critical X X X X X

	CP	🍸 CR p	ump CP4 - I	Diagnosis re	port	Report	no.	
		-	-144 -	1944 - 20		Date	e	6/9/200
Department:	Doreon	responsible:	Те	elephone:			int	ernal I
Non-responsive				alephone.	Use	6	1	ernal
4. Hydraulic function		ine ved					0,1	ioniai
				Delivery rate [I/h] of new part		y rate [l/h] testing		
	n[rpm]	p_rail [bar]	I_MU [A]	6/5/2007	3/7	/2008	-	
Starting point	200	200	0.4	3.9		4.2	x	
1000 rpm, p_rated	1000	1800	0.4	17.5		7.1	X	
n_max_p, 500bar	3375	500	0.4	66.1	(65.8	x	
5. Destiny of the par The pump is stored at	<u>ts</u> RB until 09/	2008 and then sci	apped.					
5. Destiny of the par The pump is stored at	<u>ts</u> RB until 09/	2008 and then sci	rapped.					
5. Destiny of the par The pump is stored at 6. Attachments None	<u>ts</u> RB until 09/	2008 and then sci	apped.					
The pump is stored at <u>6. Attachments</u> None Tested:	RB until 09/	2008 and then sci	Non-responsiv	e co Date:	6/23	/2008	Signature:	Non-res e conter
The pump is stored at <u>6. Attachments</u> None Tested:	RB until 09/		Non-responsiv	e co Date: Date:	tornar	/2008	Signature: Signature:	Non-res e conter oved

Department: Person resp				Date	
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To: Non-responsive conter	nt removed				
Pump type:	Customer:	Project:		Project /	design pattern ty
CP4.1S_348_2x5,25_REC_3,3_1,95_ MT4,2	vw	R4 2.0 EU5		i i i oject /	D / Series
Part number (TTNo.): 445010507	Date of manufacture: 020507	Serial numbe	r:		acturing plant - lin ? (Feuerbach plant) -
SAP-No.:	Samos no.:	Customer order	no.:		e/Vehicle numbe
30-101005-01	590270.001	CAH0000074		2.5	CAH0000074
Customer part number CAH0000074	Endurance run type [customer]: Vehicle endurance run	Endurance run con GDV-EWP	ditions:		20469
Mileage 101956 km	Parts receipt at dept. DS- PC/EDI: 2/26/2008	Process no. 2008-CP4_018	ß	Con	fidentiality note Confidential
VA / ETC no.: DS-176922	Durability test type [RB]:	Fuel: EN590			
Complaint:					
Function	n without cignificant fuel aven	titu daitt in composicon u	ith the ne	uu atata	
Function - Delivery rates after endurance run - Cold seal-tightness confirmed up Components - The slightly asymmetric wear of th - metering unit O-ring slightly cut b The error is known through 0-km - Wear of the remaining component Result - The pump has passed the e	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant	onary seal ring is still ur the housing and at the r ed on 8D.	ncritical.		
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D. nt striking features.	ncritical. metering u	init).	
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut b The error is known through 0-km Wear of the remaining component Result The pump has passed the enderty 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D.	ncritical. metering u	ınit).	
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining componen Result The pump has passed the examples 3. Results of diagnosis (vision) 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D. nt striking features.	ncritical. metering u	unit).	l x
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the essential of diagnosis (vise 3.1 Drive 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D. nt striking features.	ncritical. metering u	unit).	l x
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of th metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the e 3.1 Drive No striking feature 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D. nt striking features.	ncritical. metering u	unit).	
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the e 3.1 Drive No striking feature 3.2 Drivetrain 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run.	onary seal ring is still ur the housing and at the r ed on 8D. nt striking features.	ncritical. metering u	unit).	
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the eta 3. Results of diagnosis (visting 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run. sual findings)	onary seal ring is still ur the housing and at the ed on 8D. nt striking features. Legend rating	stages	unit).	
 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the eta 3. Results of diagnosis (vision) 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure Fretting wear between intake 3.4 Bearing 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run. sual findings)	onary seal ring is still ur the housing and at the ed on 8D. nt striking features. Legend rating	stages	unit).	
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 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the eta 3. Results of diagnosis (vision) 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure Fretting wear between intake 3.4 Bearing 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run. sual findings)	onary seal ring is still ur the housing and at the ed on 8D. nt striking features. Legend rating	stages	unit).	
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 Delivery rates after endurance run Cold seal-tightness confirmed up Components The slightly asymmetric wear of the metering unit O-ring slightly cut by The error is known through 0-km Wear of the remaining component Result The pump has passed the eta 3. Results of diagnosis (vis 3.1 Drive No striking feature 3.3 High pressure Fretting wear between intake to an arrive striking feature 3.4 Bearing No striking feature 3.5 Shaft seal 	to -30°C after endurance run he intake valve plate and stati y oblique assembly (marks in complaints at VW and recordents is low and without significant endurance run. sual findings)	onary seal ring is still ur the housing and at the ed on 8D. Int striking features. Legend rating	ring (see	unit).	



003EN-00885 BOS	CH CPO	CR pu	ump CP4 - Diagi	nosis rep		ort no.		
<u> </u>	cro		G 837	576.		late	6/17/	/2008
Department:	Person resp	onsible:	Telephor	ne:	10-2	ir	iternal	
Non-responsiv	ve content remo	ved			Use	e	xternal	X
6. Attachments None								
None Tested:	Non-respon sive conte	Phone	Non-responsiv e content rem	Date:	6/23/2008	Signature	ive	n-res
None Tested:		Phone Phone		Date: Date:	6/23/2008 6/23/2008	Signature	ive	

Department:	Person res	oonsible: T	elephone:	1.1		internal
	content removed			Use	2	external
™ Non-res	ponsive conte	nt removed				
For inform ation:						
Pump	o type:	Customer:	Project:	1	Project /	design pattern t
	25_REC_3,3_1,95_ [4,2	vw	R4 2.0 EU5			D / Series
Part numb	per (TTNo.):	Date of manufacture:	Serial numbe	er:		cturing plant - li
	10507 P-No.:	100407 Samos no.:	0277 Customer order	no.:		(Feuerbach plant) - e/Vehicle numbe
30-101	1005-01	590405.001	CBA0000545	6		CBA0000545
ann an seachart an S	part number 000545	Endurance run type [customer]: Engine endurance run	Endurance run cor Vehicle air-conditioning t reclaimed refrigeran	echnology -	1	20453
	eage 25 h	Parts receipt at dept. DS- PC/EDI:	Process no 2008-CP4_018			fidentiality note Confidential
	TC no.: -176931	2/26/2008 Durability test type [RB]:	Fuel: EN590			
Compla	int.				1	
2. Conclusio			ntity drift in comparison	with the new	u state	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result	s after endurance ru ntness confirmed up components is low a	n without significant fuel-qua to -30°C after endurance rur nd without significant striking	1	with the new	v state.	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har	on s after endurance ru htness confirmed up components is low a s passed the end	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		с ок	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	1			
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking 3.2 Drivetra	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking No striking	n s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in f feature essure	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump have 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre- No striking	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in f feature essure	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump have 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High present No striking 3.4 Bearing	an s after endurance runt notness confirmed up components is low a s passed the end f diagnosis (vis f feature in feature g feature g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	X X X
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre No striking 3.4 Bearing No striking	on s after endurance ru ntness confirmed up components is low a <u>s passed the end</u> f diagnosis (vis f diagnosis (vis f feature in f feature g feature g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x x x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump have 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High present No striking 3.4 Bearing	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in feature g feature g feature g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump have 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre No striking 3.4 Bearing No striking 3.5 Shaft se	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in feature g feature g feature g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	x x x
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre No striking 3.4 Bearing No striking 3.5 Shaft se No striking	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in feature g feature g feature g feature al g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.		OK	
2. Conclusio Function - Delivery rates - Cold seal-tigh Components - Wear of the c Result - The pump har 3. Results of 3.1 Drive No striking 3.2 Drivetral No striking 3.3 High pre No striking 3.4 Bearing No striking 3.5 Shaft se No striking 3.6 Holes No striking	on s after endurance ru ntness confirmed up components is low a s passed the end f diagnosis (vis f feature in f feature g feature g feature g feature g feature g feature g feature g feature	n without significant fuel-qua to -30°C after endurance rur nd without significant striking urance run.	features.	g stages	OK	

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<u> </u>	00		Ф.	537 ST	¢.	Date	e	6/18/	200
Department:	Person	responsible:	Tele	ephone:			in	ternal	ĩ
Non-responsive co		ed	1		Use		e	ternal	
4. Hydraulic functio	n								
				Delivery rate	Delivery	rate [l/h]	٦		
				[I/h] of new part		testing			
	n[rpm]	p_rail [bar]	I_MU [A]	4/10/2007	3/7/	2008			
Starting point	200	200	0.4	3.8	4	.3	x		1
1000 rpm, p_rated	1000	1800	0.4	17.5		7.2	x		1
n_max_p, 500bar	3375	500	0.4	67	6	5.5	x		1
 <u>5. Destiny of the pa</u> The pump is stored a 	rts		ery measurement.						
5. Destiny of the pa	rts		n et 🖝 independent of Antonie signaliser for enderer						
5. Destiny of the pa	rts		n et 🖝 independent of Antonie signaliser for en sons						
5. Destiny of the pa The pump is stored a 6. Attachments None Tested:	rts t RB until 09/ on-respons e content		n et 🖝 independent of Antonie signaliser for en sons	c Date:	6/23/	2008	Signature	e co	nter
5. Destiny of the pa The pump is stored a 6. Attachments None Tested:	r <u>ts</u> t RB until 09/	2008 and then sc	rapped.	c Date: Date:	6/23/2	(1, 4, 45)	Signature	e co oved	nten

)iagnosis report	Report no.Date6/18/200
Department: Person res Non-responsive content removed	ponsible: Tel	ephone: Use	internal external
To: Non-responsive conte	ent removed		
Pump type: CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	Customer:	Project: R4 2.0 EU5	Project / design pattern t
Part number (TTNo.):	Date of manufacture:	Serial number:	Manufacturing plant - li
445010507 SAP-No.:	050607	0325	0110 FeP (Feuerbach plant) -
30-101005-01	Samos no.: 590283.001	Customer order no.: CAH0000136	Engine/Vehicle numbe CAH0000136
Customer part number CAH0000136	Endurance run type [customer]: Engine endurance run	ÖVL+endurance run 1+ÖVL	DSBFD no.: 20468
Mileage 440 h	Parts receipt at dept. DS- PC/EDI:	Process no. 2008-CP4_0187	Confidentiality note Confidential
VA / ETC no.: DS-176925	2/26/2008 Durability test type [RB]:	Fuel: EN590	
Complaint:			
 Delivery rates after endurance ru Components Wear of the components is low a Result The pump has passed the durabil 	nd without significant striking fe		
3. Results of diagnosis (vi	aual findings)		
	suar mungs)	Legend rating stage	s J OK X
3.1 Drive	<u>suar mungs</u>	Legend rating stage	s - uncritical
3.1 Drive No striking feature	<u>suar mungs</u>	Legend rating stage	s { uncritical Critical
No striking feature 3.2 Drivetrain	<u>suar mungs</u>	Legend rating stage	s - uncritical
No striking feature	<u>suar mungs</u>	Legend rating stage	s { uncritical x Critical x x
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure	<u>suar mungs</u>	Legend rating stage	s { uncritical x Critical 2
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature	<u>suar mungs</u>	Legend rating stage	s { uncritical Critical Critical X
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing	<u>suar mungs</u>	Legend rating stage	s { uncritical Critical Critical x
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature	<u>suar mungs</u>	Legend rating stage	s { uncritical Critical Critical X
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal		Legend rating stage	s { uncritical Critical Critical X
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature		Legend rating stage	s { uncritical Critical Critical X
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 3.6 Holes		Legend rating stage	s { uncritical Critical Critical X
No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature			s { uncritical Critical Critical X

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<u> </u>			544	34F 55		Date	te 6/18		(
Department:	Person	responsible:	Telep	ohone:	1		inte	rnal I	_
Non-responsive co					Use		exte	ernal	
4. Hydraulic functio	n				(9 7)				
				Delivery rate [I/h] of new part		/ rate [l/h] testing			
	n[rpm]	p_rail [bar]	I_MU [A]	6/5/2007	3/7	/2008	-		
Starting point	200	200	0.4	3.9		1.2	- X		
1000 rpm, p_rated	1000	1800	0.4	17.9	1	7.6	×	_	
n_max_p, 500bar	3375	500	0.4	66.6		5.9	x		
No significant fuel-qu 5. Destiny of the par The pump is stored a	rts	Ma	2						_
5. Destiny of the particular	rts	Ma	2						
5. Destiny of the particular	rts	Ma	2						
5. Destiny of the par The pump is stored a 6. Attachments None Tested: No	r <u>ts</u> t RB until 09/	Ma	2	Date:	6/23/	2008	Signature:	Non-re: e conte	S
5. Destiny of the par The pump is stored a 6. Attachments None	r <u>ts</u> t RB until 09/	2008 and then scr	apped.	Date: Date:	20000000	2008	Signature: Signature:	Non-re e conte oved	S

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For inform ation:			
Pump type:	Customer:	Project:	Project / design pattern
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5	D / Series
Part number (TTNo.): 445010507	Date of manufacture: 230707	Serial number: 0222	Manufacturing plant - I 0110 FeP (Feuerbach plant)
SAP-No.:	Samos no.:	Customer order no.:	Engine/Vehicle numb
30-101005-01	590276.001	CBA0002352	CBA0002352
Customer part number CBA0002352	Endurance run type [customer]: Vehicle endurance run	Endurance run conditions: GDV-EWP	DSBFD no.: 20467
Mileage	Parts receipt at dept. DS-	Process no.	Confidentiality note
44950 km	PC/EDI:	2008-CP4_0188	Confidential
VA / ETC no.: DS-176924	2/26/2008 Durability test type [RB]:	Fuel: EN590	
03-170924		-2012/2019 1074	
Complaint:			
1.Subject			
CP4 customer return			
Diagnosis of endurance run end wit	hout complaint		
2. Conclusion Function - Delivery rates after endurance ru Components		Promotion of the state of th	w state.
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat	and without significant striking fo	Promotion of the state of th	w state.
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat <u>3. Results of diagnosis (vi</u>	and without significant striking fo	Promotion of the state of th	∫ OK x uncritical x
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat	and without significant striking fo	eatures.	Г ОК <mark>х</mark>
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat <u>3. Results of diagnosis (vi</u>	and without significant striking fo	eatures.	∫ OK x uncritical x
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat 3. Results of diagnosis (vi 3.1 Drive No striking feature	and without significant striking fo	eatures.	∫ OK x uncritical x
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the dural 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain	and without significant striking fo	eatures.	OK X uncritical X
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the durat 3. Results of diagnosis (vi 3.1 Drive No striking feature	and without significant striking fo	eatures.	OK x uncritical x Critical x X x
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the dural 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain	and without significant striking fo	eatures.	OK x uncritical x Critical x X x
Function - Delivery rates after endurance ru Components - Wear of the components is low a Result - The pump has passed the dural 3. Results of diagnosis (vi 3.1 Drive No striking feature No striking feature	and without significant striking fo	eatures.	OK x uncritical x Critical x X x
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						Da	Date	
Department:	Person	responsible:	Te	lephone:	11-	- 11	in	ternal
Non-responsive con	tent remove	d			Us	Э	e	kternal
4. Hydraulic function	1							
				Delivery rate [I/h] of new part		ry rate [l/h] r testing		
	n[rpm]	p_rail [bar]	I_MU [A]	7/19/2007	3/	7/2008	-	
Starting point	200	200	0.4	3.8	- Or	4.3	- ×	
1000 rpm, p_rated	1000	1800	0.4	17.7	()	17.4	X	
n_max_p, 500bar	3375	500	0.4	66.8		66.3		<u></u>
TCD (technical custon No significant fuel-qua 5. Destiny of the part The pump is stored at	antity drift co	ompared to delive	ery measurement.					
No significant fuel-qua	antity drift co	ompared to delive	ery measurement.					
No significant fuel-qua	antity drift co	ompared to delive	ery measurement.					
No significant fuel-qua 5. Destiny of the part The pump is stored at 6. Attachments None Tested: Non ve c	responsi ontent r	ompared to delive	ery measurement.		6/2:	3/2008	Signature	conter
No significant fuel-qua	responsi ontent r	/2008 and then s	ery measurement.		1.200	3/2008	Signature: Signature:	conter ed

Description Description	(in	747 SW.	Re	Date	7/15/2008
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Non-responsive conte	ent removed				
For inform					
ation:					• • • • • • • • • • • • • • • • • • • •
Pump type: CP4.2S_644_2x4,85_REC_3,3_1,3_R2,0	AUDI	Project: W19 EU5		Project / c	design pattern t
Part number (TTNo.): 0445B20197	Date of manufacture: 070227	Serial number			turing plant - li (Feuerbach plant)
SAP-No.: 30-100481-06	Samos no.: 593398	Customer order	no.:	and the second	/ Vehicle numbe 9 D CO2 012
Customer part number CP4.2_081	Endurance run type [customer]: Engine endurance run	Endurance run cono Diesel 5	litions:	C	20661
Mileage 530 h	Parts receipt at dept. DS- PC/EDI:	Process no. 2008-CP4_0255			dentiality note Confidential
VA / ETC no.: DS-179387	3/19/2008 Durability test type [RB]:	Fuel: EN590			
2. Conclusion Function - The volumetric efficiency of the l (for more details, see 4). - The seal-tightness of the non-re Visual findings	turn valves (RSV) was analyzed	separately and is OK	hen compa	ared to the ne	w part measure
Function - The volumetric efficiency of the l (for more details, see 4). - The seal-tightness of the non-re Visual findings - All components have normal run The test was passed.	turn valves (RSV) was analyzed uning marks only during the runr	d separately and is OK ning time (green rating).	(ОК	x
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Function - The volumetric efficiency of the l (for more details, see 4). - The seal-tightness of the non-re Visual findings - All components have normal rur The test was passed. 3. Results of diagnosis (vi	turn valves (RSV) was analyzed uning marks only during the runr	d separately and is OK ning time (green rating).	(- OK uncritical	X
Function - The volumetric efficiency of the l (for more details, see 4). - The seal-tightness of the non-re Visual findings - All components have normal run The test was passed. 3. Results of diagnosis (vi 3.1 Drive	turn valves (RSV) was analyzed uning marks only during the runr	d separately and is OK ning time (green rating).	(- OK uncritical	X
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Department:	Person	responsible:	Те	lephone:	1222		internal I
Non-responsi					Use		external
3.9 Other No striking featu	ure						
4. Hydraulic funct	ion						
				Delivery rate [I/h] of new part	Delivery after te		
	n[rpm]	p_rail [bar]	I_MU [A]	2/26/2007	4/7/2	008	
LG	1000	1800	0.4	31.3	31		x
The volumetric effic There is no signific 5. Destiny of the p	ant drift when	compared to the	new part measure				
There is no signific	ant drift when	compared to the	new part measure				
There is no signific 5. Destiny of the p	ant drift when	compared to the	new part measure				
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There is no signific 5. Destiny of the p The pump will be s 6. Attachments None	ant drift when boarts crapped at the	compared to the	new part measure	ement.	7/21/20		content ed

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~	Pump type:	Customer:	Project:		Project /	design pattern
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	445010611 SAP-No.:	171106 Samos no.:	0001 Customer order	no.:	LEUK BUTSCH	(Feuerbach plant) e/Vehicle numb
	30-100481-06	593551		01024	- 3	CAS 508
	Customer part number CP4.2_078	Endurance run type [customer]: Vehicle endurance run	Endurance run cono Q-AL in Q7	ditions:	ji I	20678
	Mileage 65000 km	Parts receipt at dept. DS- PC/EDI: 3/19/2008	Process no. 2008-CP4_0258	I		fidentiality note Confidential
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- (f -	Conclusion unction The volumetric efficiency of the b for more details, see 4). The metering unit was diagnosed		6 '			
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3.9 Other		0	-F					externa	ai I
No striking feat									
4. Hydraulic funct	ion								
				Delivery rate [I/h] of new part		ery rate [l/h] er testing]		
	n[rpm]	p_rail [bar]	I_MU [A]	11/17/2006	1/	4/2008	-		
		1800	0.4	31.4		32			·
There is no signific	ant drift when	ack measuremen	nt is OK (within TCD new part measurem	nominal value).					
The volumetric effi	ciency of the b ant drift when	ack measuremen compared to the	nt is OK (within TCD new part measurem	nominal value).					
The volumetric effinition There is no signific	ciency of the b ant drift when	ack measuremen compared to the	nt is OK (within TCD new part measurem	nominal value).					
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BOSCH	CPO	Diagnosis ZVM 614	Waiblingen, 07.01.2008
Metering	unit 092	8400708 serial no. 53 date of	manufacture 69006

Customer Audi

E:29_ZME_CP4\B5_Erprobung_Pumpe_Motor_Fahrzeug\B54_Befundung_ZME4\B541_ZVM_Nummern\600-699\614\UB Audi DS-179498 DNA2282 ZVM614.doc Page 2/2

EA11003EN-00890[2] Non-responsive content removed Cc

> Pump 0445010611 serial no. 0001 date of manufacture 171106 Endurance run diagnosis no. DNA 2282; ASMUS / SAMOS 0593551; diagnosis no. 20678; DS-179498 SAP 30-100481-01

1. DescriptionMetering unit complaint:NoSystem designVehicleEndurance run typeQ-AL in Q7Running time65000 km

Remark:

Customer return no. 2008-CP4_0258. Project: W19EU5. The development no. 0928 B01 481 is also printed on the metering unit. Fuel: EN590.

2. Diagnosis

Visual findings (external):

Metering unit housing is contaminated and / or rusted and a piece of plastic injection molding is broken off, both without any impairment of function, see photos. Otherwise, no complaints are externally visible.

• Function:

The characteristic curve of the displacement / current measurement looks good. During the delivery rate / current measurement, all values are within the tolerances.

• Wear:

There are no or only slight running marks on the components.

Other:

None.

3. Result

[X] Passed

[] Conditionally passed

[] Failed

The metering unit is functionally OK, delivery rate and displacement measurements yielded positive results. Wear of the components is low.

4. Corrective actions

No error.

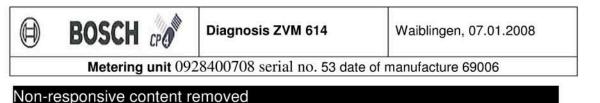
5. Other tests (e.g. material analysis. process analysis)

No further tests are performed.

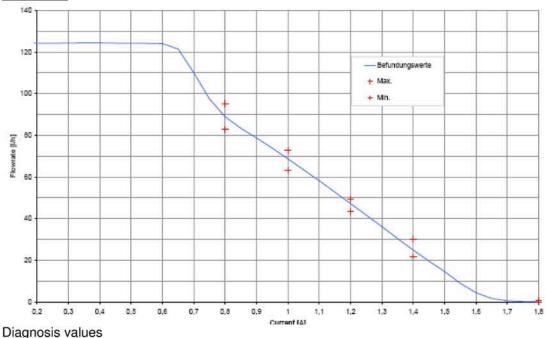
6. Destiny of the parts

Metering unit is returned to the client.

Person respor	nsible:	Non-responsive content removed	
Approval:	Non-	responsive content removed	0



EA11003EN-00890[3]

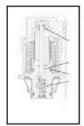


Diagnosis values Delivery rate [l/h] Current [A]

Testing point [A]	0.8	1.0	1.2	1.4	1.80
Diagnosis values [l/h]	88.93	68.72	47.17	24.86	0.15

Wear:

External	1	2	3	4	5	6	7	8	9	10
contamination:					Х					
Damage:					Х					
Filter contamination		X								
Filter damage		х								
O-ring outside		X								
Seal		X								



internal	1	2	3	4	5	6	7	8	9	10
Tappet housing:		x								
Bearing housing:		X								
Tappet magnetic core:		x								
Bearing magnetic core:		x								
O-ring inside:		х								
Valve piston:		X								



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EA11003EN-00890[4] Metering unit 0928400708 serial no. 53 date of manufacture 69006

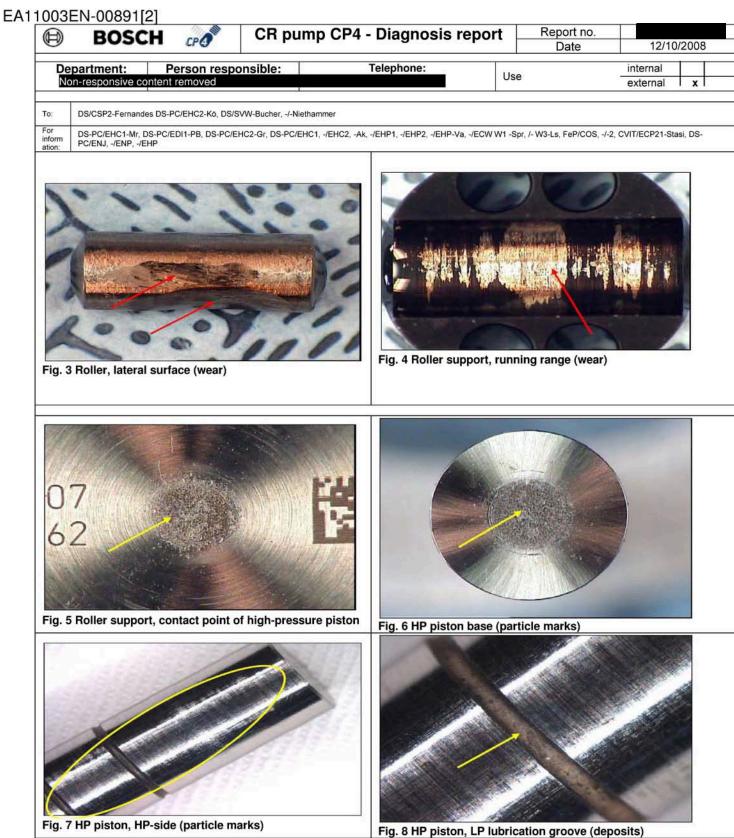


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Department: Person responsible: Telephone: Use Interview Tom-responsive content removed Use withernal x Tom-responsive content removed Use withernal x Tom-responsive content removed WW R4 2.0 EUS Project / design pattern time Pump type: Customer: Ref 2.0 EUS Project / design pattern time Manufacturing plant - lin 448010607 190568 0741 Stable July July July July July July July July	BOSCH CP	CR pump CP4 - I	Diagnosis report			12/10/	200
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ation: 3.	2 Drivetrain							3
	abrasion and a of pressure p	small and a large 90°	wear mark (see Figu 4); roller support	10° rotation mark (see Figure 1 and Figure 3); US field roller support with at the contact point of the high-j	C coati	ing wear in the form	n	
3.	.3 High press High-pressur		n many particle im	pressions (see Figure 6)			x	
		Provide and the second se		es or particle marks (see Figure	7)			
	565 W. 61.54			rooves of the high-pressure pist		Figure 8)		
2	4 Bearing							
5.		ng of the flange (s	ee Figure 9) and I	housing (see Figure 10) with pa	rticle im	pressions	X	_
	Bearing area impressions	of the camshaft f	lange-side (see F	igure 11) and housing-side (see	Figure	12) with particle		
3.	.5 Shaft seal						X	Τ
	No striking fe	eature					10	
3.	.6 Holes						X	Γ
	Tappet hole	with many particle	impressions and	drafts (see Figure 13)				
3.	7 Attached o No striking fe		netering unit,	overflow valve, counting	point)		X	
	.8 O-rings etering unit O-ri	ng sheared to an	extent of about 18	30° (see Figure 14)				3
	9 Other eposits on the fr	ont surface of the	flange bearing bu	ushing along the shaft seal (see	Figure	15)	X	
3.	10 Images of v	isual findings						
()	111		12	Silila	-	Tiell	$\langle \cdot \cdot \rangle$	Ì

Fig. 1 Camshaft, BDC (bottom dead center) (wear)

Fig. 2 Camshaft, TDC (top dead center) (wear)



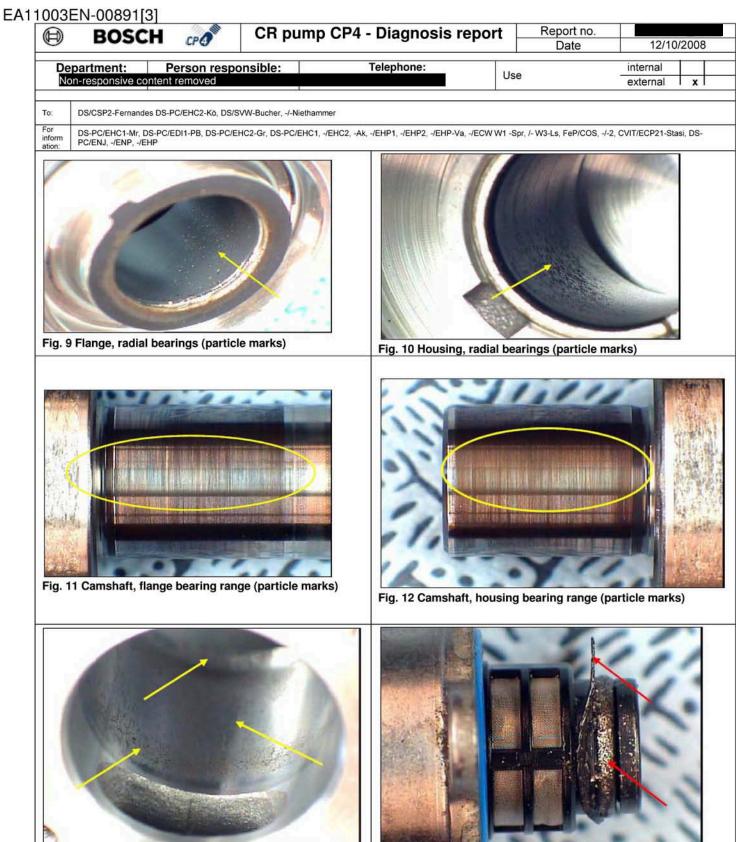
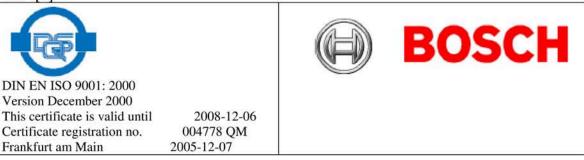


Fig. 13 Housing, tappet hole (particle marks)

Fig. 14 Metering unit, O-ring (sheared off)

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CR/ARA Corporate Sector Research and Advance Engineering Applied Research 1 - Analytics CR / ARA analysis report, analysis number: 2008-1206

dated 11.27.2008

Version 1

Order:

2008-CP4-0776 Deposit analysis of flange bearing bushing / VW R4 2.0I EU5 / failure vehicle testing #190508-0741 Non-responsive content removed

Client:

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Receipt of samples: 11/3/2008

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Order: 2008-CP4-0776 Deposit analysis of flange bearing bushing / VW R4 2.0I EU5 / failure vehicle testing Mexico / pump #190508-0741

 IR / UV / VIS (infrared/ultraviolet/visible) spectrometry, electron

 Procedure:
 microscopy (scanning electron microscope-SEM), EDS / WDS

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Question:

Identification and origin of the deposit	on the front surface	of the flange	bearing bushing of a
CP4.		·	

Result:

The deposit is mainly composed of defined soaps and small amounts of carbonyl compounds (possibly fuel aging products). The observed metal particles were probably entrained by the damage process.

The tin particles found in the deposit may have originated from the detachment of the residue from the bushing (galvanization of the wide band).

Conclusion:

The residues are reaction and aging products of the fuel used.

Person in charge:	Date: 11/27/2008
Tel.:	Signature: Signed by
CR / ARA is certified according to DIN EN ISO 9001:2000 with conformity asse	essment according to ISO / TS 16949:2002; reg. no. 004 778 QM, valid until
12.06.2008.	
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	Analysis no. 2008-1206	Author	Date 11/27/2008

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BOSCH 🖷	Analysis report	Version / supplement 1	
CR/ARA	Analysis no. 2008-1206	Author	Date 11/27/2008

1. Samples and further information on the order

Common rail pump 2008-CP4-0776 with a reddish deposit on the front surface of the flange bearing bushing to the shaft seal.

VW R4 2.0I EU5, pump # 190508-0741. VW EU5 pump for diesel fuel EN590 validated.

Drivetrain failure of the pump (roller / cam due to wear) in summer trials in Mexico after 13,539 km.

Fuel used and the exact running times in Mexico and Germany are not known.

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2. Detailed results of the methods used

2.1. Fourier Transform Infrared Spectrometry (FTIR)

Objective:

Identification of the deposit composition on the flange bearing bushing of CP4.

Sample preparation:

The deposit was applied on a sample carrier (potassium bromide disk) and measured, then rinsed with methylene chloride on the sample holder and measured again.

Measurement procedure:

The measurements of the deposit was made on the IR (infrared) microscope Equinox-55-1 spectrometer (device SOP OA-G-08-001) from Bruker in transmission mode.

Analysis of the measurements:

The obtained IR (infrared) spectra were evaluated using computerized databases, own and commercially available spectral collections.

Measuring results:

Hydrocarbons with / and low content of esters and weaker acids adhere to the deposit; they could be isolated by treatment with dichloromethane.

According to the IR spectra, the dichloromethane-insoluble deposit is mainly composed of defined soaps as well as small amounts of carbonyl compounds (esters, weaker acids). The IR (infrared) spectra revealed no evidence of significant entrainment of inorganic components.

Assessment:

The deposit is mainly composed of defined soaps and small amounts of carbonyl compounds (possibly fuel aging products).

The fuel used is not known, therefore we cannot accurately classify the carbonyl compounds.

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EA11003EN-00891[10]

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BOSCH	Analysis report	Version / supplement 1	
CR/ARA	Analysis no. 2008-1206	Author	Date 11/27/2008

2.2. Scanning Electron Microscopy (SEM) and Energy Dispersive Spectroscopy (EDS)

Objective:

Analysis of the composition (elements) of the residue on the front surface of the flange bearing bushing.

Sample preparation:

The residue was removed with a preparation needle and rinsed with petroleum ether.

Measurement points:

The residue was analyzed directly on the preparation needle.

Measurement procedure:

The analysis was carried out using SEM (Scanning Electron Microscopy) (1450 VP, Zeiss) and the coupled EDS (Energy Dispersive Spectroscopy) system (INCA Energy, Oxford Instruments Co.). An accelerating voltage of 20.0 KV was used.

Measuring results:

The preparation needle is made of nickel-plated steel. The first spectrum shows the needle material.

The particles next to the residue consist of iron (Fe), with minor amounts of chromium (Cr), molybdenum (Mo), tungsten (W) and manganese (Mn). In addition, particles of tin (Sn) occur. The residue itself consists mainly of carbon (C) with small amounts of nitrogen (N) and oxygen (O). Within the residue there are tiny particles of iron (Fe) and oxygen (O).

Assessment:

Besides containing various metal particles, the residue is an organic residue (fuel conversion?) with fine iron particles. These very fine iron particles which rapidly oxidize (rust) would be responsible for the (reddish-brown) color.

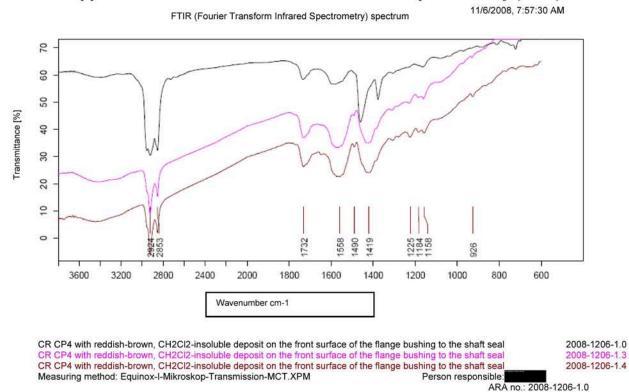
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Analysis report	Version / supplement 1	
Analysis no. 2008-1206	Author	Date 11/27/2008
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3. Appendix

3.1. Appendix for the Fourier Transform Infrared Spectrometry (FTIR)

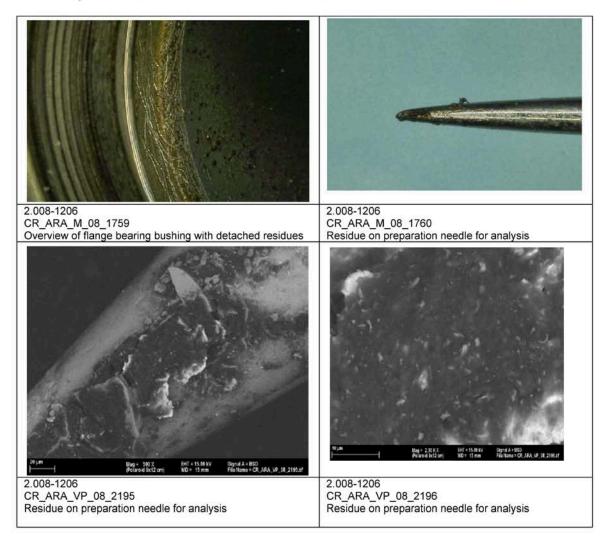


3.2. Appendix to SEM-EDS

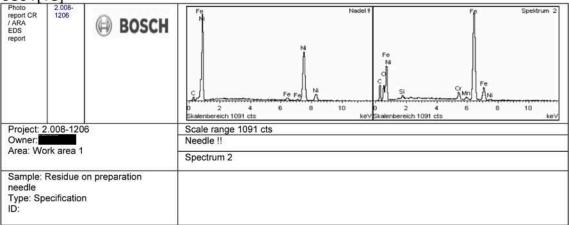
A photo report (Bilder_2008-1206.pdf) and an EDS report (EDS_2008-1206.pdf) were created. These will be added to the analysis report separately.

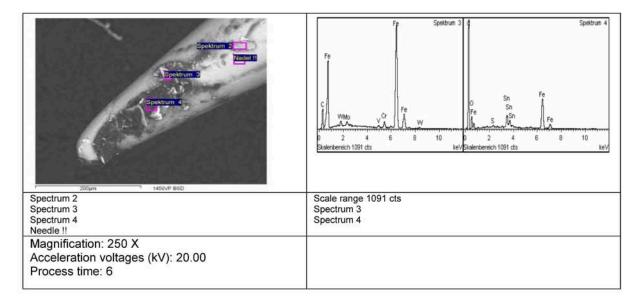
EA11003EN-00891[12] Photo report CR / ARA

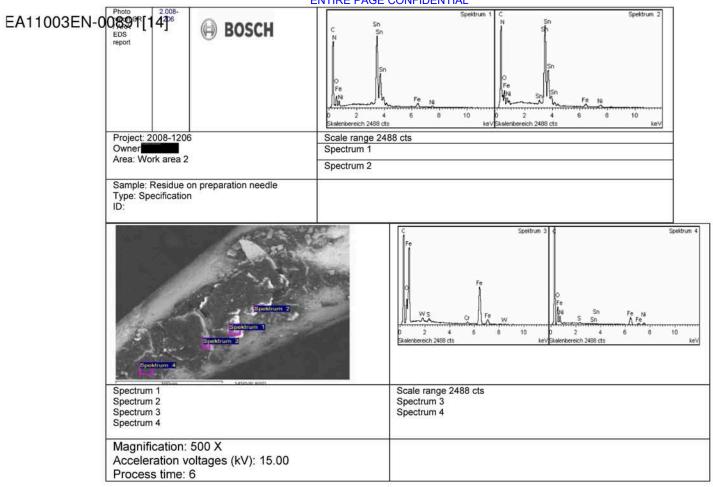
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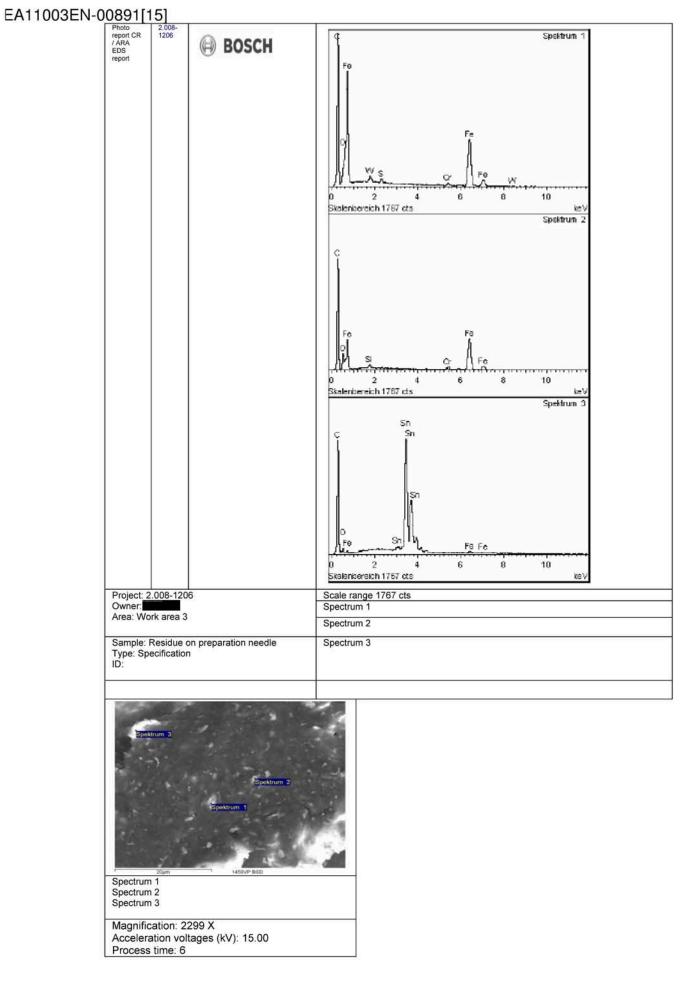


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on-responsive conte				C or	external x
Results of diagnosis	s (visual findings)		Legend rating	stages uncritical	X X
3.1 Drive				Critical	X
No striking feature					x
3.2 Drivetrain					x
Cavitation erosion of cavitation erosion of	on the roller support ba on the high-pressure pi	ack on the piston contact point (se iston base (see Figure 2)	e Figure 1), b	ut only very low	
3.3 High pressure					x
No striking feature					
3.4 Bearing					X
No striking feature					
3.5 Shaft seal					x
No striking feature					
3.6 Holes					X
No striking feature					
3.7 Attached compone	ents (Metering Unit, C	Overflow Valve, Counting Point)			X
No striking feature					
3.8 O-rings					X
No striking feature					
3.9 Other					X
No striking feature					
3.10 Images of visual f	indings				
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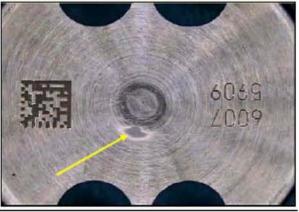


Fig. 1 Roller support, HP piston contact (cavitation)

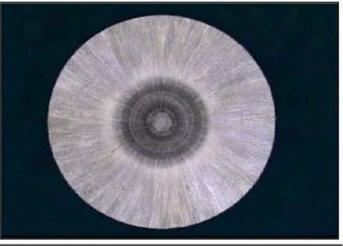


Fig. 2 HP piston, piston base (very low cavitation)

EA11003EN-00892[2]

	BOSCH CR pump CP4 - Diagnosis report Report no. Date							
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. Hydraulic func	tion							
			Γ	Delivery rate [l/h]		y rate [l/h]		
	n[rom]	p_rail [bar]	I_MU [A]	of new part 4/16/2008		testing 0/2008		
Starting point	n[rpm] 200	200	0.4	4/10/2008		1.2		
000 rpm, p_rated	1000	1800	0.4	17.1		7.4	X	
n_max_p, 500bar	3375	500	0.4	64.3		6.3	x	
The pump is		ntil 12/2010 and	then scrapped.					
The pump is 5. Attachments Appendix 1: 1	stored at RB u mages of visua							
The pump is 5. Attachments Appendix 1: Appendix 2: Tested:	stored at RB u mages of visua Metering unit d on-respon /e conte	al findings liagnosis report 2 Phone:	ZMV 688 on-responsiv	Date:	12/16/2008	Signature	• sive	conte
5. Attachments Appendix 1: Appendix 2: Tested:	stored at RB u mages of visua Metering unit d	al findings liagnosis report 2 Phone:	ZMV 688 on-responsiv content rem	Date: Date:	12/16/2008 2/17/2008	Signature	nt rei	respo conte moveo

EA1 2008-CP4_0824 Appendix 1: Images of visual findings of modification package 3



EA11003EN-00892[4]

2008-CP4_0824 Appendix 1: Images of visual findings of modification package 3

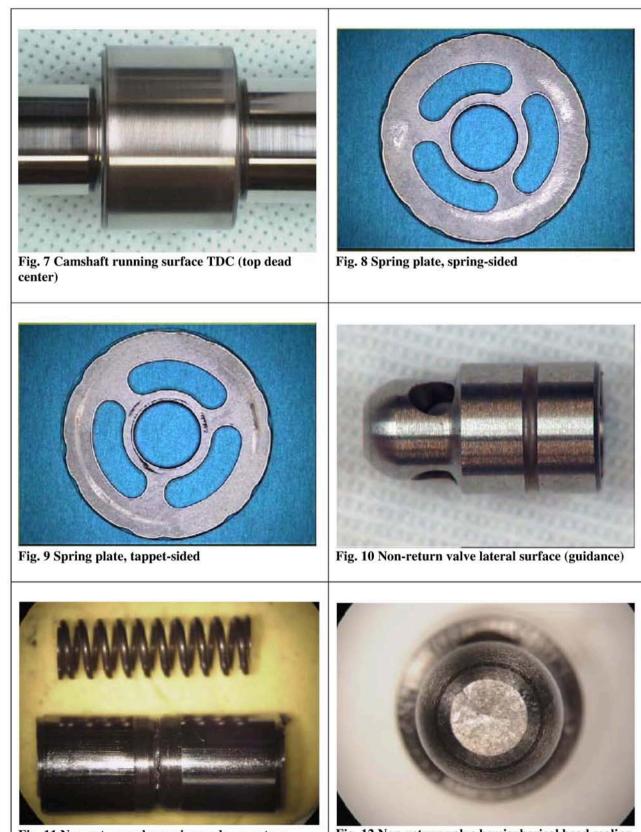
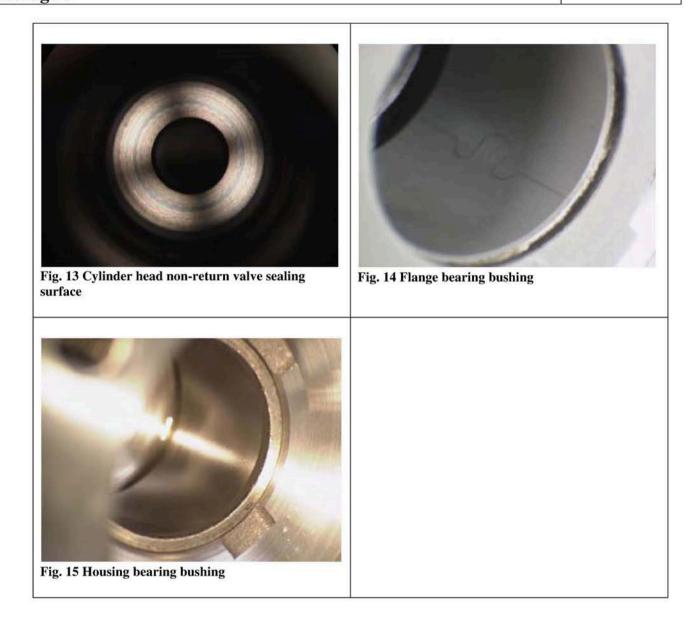
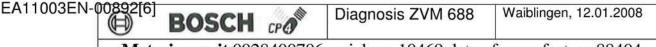


Fig. 11 Non-return valve spring and non-return valve spring seat

Fig. 12 Non-return valve hemispherical head sealing surface

EA1 2008-CP4_0823 Appendix 1: Images of visual findings of modification package 3





Metering unit 0928400706 serial no. 10469 date of manufacture 88404

Customer VW To Non-responsive content removed

Cc

Pump Serial No. Date of manufacture Endurance run diagnosis no. 2008_CP4-0824 SAP

1. Description Metering unit complaint: Testing release System design Endurance run type Running time

Remark:

Fuel:

2. Diagnosis

Visual findings (external):

Visual findings externally good. Housing undamaged. Hydraulics and filter clean, undamaged.

• Function:

The characteristic curve of the displacement / current measurement is OK. During the delivery rate / current measurement, all values are within the tolerances.

• Wear:

There are no or only slight running marks on the components.

• Other:

3. Result [X] Passed

[] Conditionally passed

[] Failed

The metering unit is functionally OK, delivery rate and displacement measurements yielded positive results. Wear of the components is low.

4. Corrective actions

No error.

5. Other tests (e.g. material analysis. process analysis)

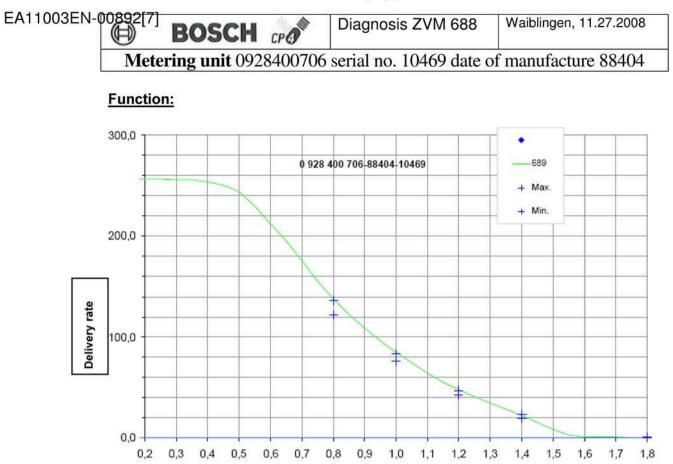
No further tests are performed.

6. Destiny of the parts

Metering unit remains with

Person responsil	ble: Non-responsive content removed	
Approval:	Non-responsive content removed	
		Date/Signature

F:29_ZME_CP4\B5_Erprobung_Pumpe_Motor_Fehrzeug\B54_Befundung_ZME4\B541_ZVM_Nummern\600-699\688\UB ZME4 VW ZVM688.doc

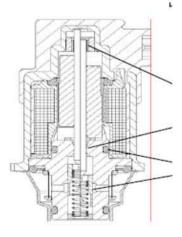


Current [A]

Testing point [A]	0.80	1.00	1.20	1.40	1.80
Diagnosis values [l/h]	136.37	82.95	46.04	20.44	0.33

Wear:

External	1	2	3	4	5	6	7	8	9	10
contamination:		x								
Damage:		x								
Filter contamination		x								
Filter damage		x								
O-ring outside		x								
Seal		x								



internal	1	2	3	4	5	6	7	8	9	10
Tappet housing:		х								
Bearing housing:		x								
Tappet magnetic core:		x								
Bearing magnetic core:		x								
O-ring inside:		x								
Valve piston:		x							(



BOSCH COSCIE	R pump CP4 - Dia	gilosis report		eport no. Date	12/15/2	2008
Department: Person responsit	ole: Te	lephone:	Use		internal	
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Non-responsive c	optopt romoved					
For information:						
Pump tunes	Customer:	Project		Droigot /	looinn notton	- h
Pump type:		Project:		Project / C	lesign patter	n ty
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	VW	R4 2.0 EU5			C1 / C1	
Part number (TTNo.):	Date of manufacture:	Serial numbe	er:	Manufac	turing plant	lin
0445B21070	150408	0679		01	10 FeP – 04	
SAP-No.:	Samos no.:	Customer order	no.:	Engine	/Vehicle num	ber
30-101005-02	718361.001	731223			A 655 000268	
Customer part number	Endurance run type	Endurance run con	ditioner		SBFD no.:	
	[customer]:		C 11755			
731223	Vehicle endurance run	VW-Passat PC	246		23033	
VA / ETC no.:	Actual mileage	Fuel:		Confi	dentiality not	
	1008 Tex. 1911 (Taper of the	DATES 0.5 Association			· ••••••••••••••••••••••••••••••••••••	e
DS-202948	10/17/2007	EN590			Confidential	
Diagnosis after endurance run end withe 2. Conclusion	out complaint					
Function						
 Delivery rates after endurance run v 	without cignificant fuel aus	antitu drift in comparie	on with the	now state		
Components	without significant fuel-qua	anity unit in compans		new state.		
 Wear due to cavitation erosion in th support back and slightly more pror 				port occurs o	only on the ro	oller
 The groove in the C coating of the r 						
 The metering unit diagnosis did not 				689).		
 Wear of the remaining components 	Share a second a second se	to a second car before and contraction and the).		
Change package 3		g				
Roller support with C2.1 coating						
 Features C2.1 coating is not visible 	over the TTNR of the roll	er support (6007 = se	ries) and wa	as detected b	ov EDX	
Roller: C2 tip coating, a second sup					,,	
 Front surface without the characteri 	and the second	and Figure 5 in Apper	ndix 1).			
 Length of roller 24.59 mm 	g (i iguio +					
Camshaft: Omission of shot blasting	,					
1000-00 No. 120 Herbrid 100 De 100						
 Missing shot blasting impressions y 		iqure 7 in Appendix 1).			
 Missing shot blasting impressions v spring seat: Omission of anti-friction 	isible (see Figure 6 and F	igure 7 in Appendix 1).			
spring seat: Omission of anti-friction	isible (see Figure 6 and F <i>coating</i>	thilded to exercise		dix 1)		
spring seat: Omission of anti-frictionFront surface of the spring plate wit	isible (see Figure 6 and F <i>coating</i> hout anti-friction paint (se	e Figure 8 and Figure		dix 1).		
spring seat: Omission of anti-friction - Front surface of the spring plate wit Cylinder head: Non-return valve her	isible (see Figure 6 and F <i>coating</i> hout anti-friction paint (se nispherical head with re	e Figure 8 and Figure ed. Play	9 in Appen	dix 1).		
spring seat: Omission of anti-frictionFront surface of the spring plate wit	isible (see Figure 6 and F <i>coating</i> hout anti-friction paint (se <i>nispherical head with re</i> stic groove on the surface	e Figure 8 and Figure ed. Play	9 in Appen	dix 1).		

- Spring seat with characteristic groove on the surface (see Figure 11 in Appendix 1), opening pressure after the endurance run 1.19 bar.

Bearing bushing: Second supplier

- Identification recognizable via tappet latching (see Figure 14 in Appendix 1).

Metering unit: NC bearing

- see metering unit report ZVM 689 (picture on page 3 "bearing in the housing")

Result

- The components with modification package 3 have a wear rating green.
- The pump has passed the endurance run.

Page: 1/3

BOSCH	100	CR pum	p CP4 - Diagnosis repor	t	Repo	rt no.		
Bosch	CPO		· · · · · · · · · · · · · · · · · · ·	-	Da	ate	12/15/	2008
Department:	Person res	ponsible:	Telephone:	1			internal	
Non-responsive conte			A 2540 • 10 10 10 10	Us	se		external	x
3. Results of diag		l findings)	Leg	end rati	ing stages	OK uncritical	x x	
3.1 Drive					L	Critical		x
No striking fea	ture						x	
3.2 Drivetrain							X	
			on the piston contact point (see Fig base (see Figure 2)	gure 1)	, but only v	very low		
Groove in the	C coating on t	he roller support,	roller hole (see Figure 3)					
3.3 High pressure		Can Africa - La C					x	
No striking fea	ture							
3.4 Bearing							x	
No striking fea	ture							
3.5 Shaft seal							x	
No striking fea	ture							
3.6 Holes							x	
No striking fea	ture							
3.7 Attached com	ponents (Met	ering Unit, Over	flow Valve, Counting Point)				x	
No striking fea	ture							
3.8 O-rings							x	
No striking fea	ture							
3.9 Other							x	
No striking fea	ture							

3.10 Images of visual findings

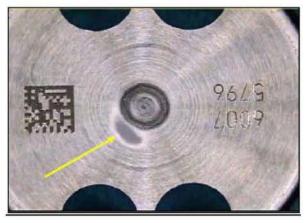


Fig. 1 Roller support, HP piston contact (cavitation)



Fig. 2 HP piston, piston base (very low cavitation)

Page: 2/3

	CH CPO			agnosis report		eport no. Date	03.272008	
Department:		esponsible:	,	Telephone:	Line	·	internal	
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Hig. 3 Ro	iller support, rolle	r noie (particle m	ark)					
				Delivery rate [l/h]		y rate [l/h]		
		m mail firmai		of new part		testing		
Starting point	n[rpm] 200	p_rail [bar] 200	I_MU [A] 0.4	4/16/2008 3.9		0/2008	X	
000 rpm, p_ra		1800	0.4	16.8		17	x	
			VII VII					
TCD (tec	hnical customer o	500	0.4	65.9 1,000 rpm, p_rated ≥	6	5.6	x	
running t No signif . Destiny of t The pum . Attachmen Appendi>	hnical customer o ime) is met. icant fuel-quantity t he parts p is stored at RB	documentation) to a drift compared t until 12/2010 and	0.4 esting point LG (o delivery measu	65.9 1,000 rpm, p_rated ≥ urement.	6	5.6		
TCD (tec running t No signif . Destiny of t The pum . Attachmen Appendi»	hnical customer of ime) is met. icant fuel-quantity the parts p is stored at RB ts (1: Images of vis) (2: Metering unit Non-responsi ve content r	documentation) te e drift compared t until 12/2010 and ual findings diagnosis report Phone:	0.4 esting point LG (o delivery measu	65.9 1,000 rpm, p_rated ≥ urement.	6	5.6	x Non-resp nsive cor	
TCD (tec running t No signif . Destiny of t The pum . Attachmen Appendia Appendia	hnical customer of ime) is met. icant fuel-quantity the parts p is stored at RB ts (1: Images of vis) (2: Metering unit	documentation) te e drift compared t until 12/2010 and ual findings diagnosis report	0.4 esting point LG (o delivery measu d then scrapped. ZMV 689	65.9 1,000 rpm, p_rated ≥ urement.	: 15.5 or 15.2	5.6 I/h after	x Non-resp nsive con tent remo	

EA11003EN-00893[3]

Page: 3/3

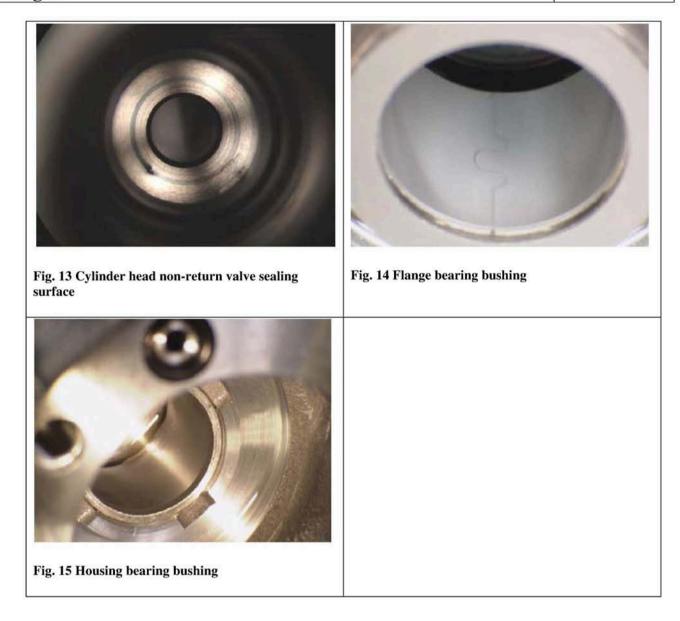
2008-CP4_0823 Appendix 1: Images of visual findings of modification package 3



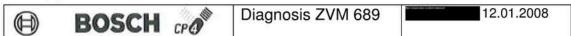
EA1 2008-CP4_0823 Appendix 1: Images of visual findings of modification package 3



EA1 2008-CP4_0823 Appendix 1: Images of visual findings of modification package 3



EA11003EN-00893[6]



Metering unit 0928400706 serial no. 10469 date of manufacture 88404

Customer VW

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Cc

Pump Serial No. Date of manufacture Endurance run diagnosis no. 2008_CP4-0823 SAP

1. Description Metering unit complaint: Testing release System design Endurance run type Running time

Remark:

Fuel:

2. Diagnosis

• Visual findings (external):

Visual findings externally good. Housing undamaged. Hydraulics and filter clean, undamaged.

• Function:

The characteristic curve of the displacement / current measurement is OK.

Characteristic curve in the upper delivery rate range slightly above the upper tolerance limit

• Wear:

There are no or only slight running marks on the components.

• Other:

3. Result [X] Passed

[] Conditionally passed

[] Failed

The metering unit is functionally OK, delivery rate and displacement measurements yielded positive results. Wear of the components is low.

4. Corrective actions

No error.

5. Other tests (e.g. material analysis. process analysis)

No further tests are performed.

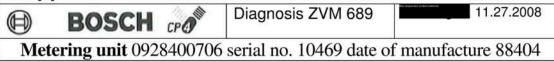
6. Destiny of the parts

Metering unit remains with

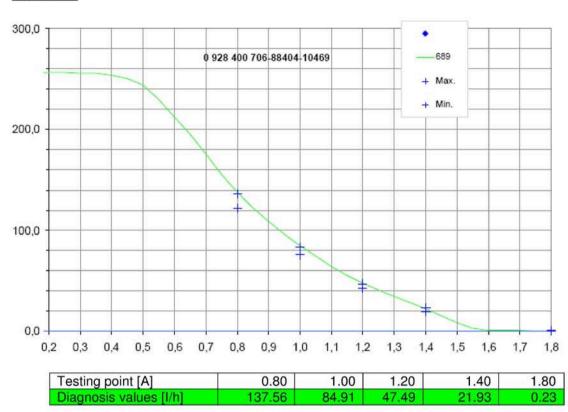
Person res	oonsible:	
Approval: 2764	Non-responsive content removed	
2.0.		Date/Signature

F/29_ZME_CP4/B5_Erprobung_Pumpe_Motor_Fehrzeug/B54_Befundung_ZME4/B541_ZVM_Nummern/600-699/689/UB ZME4 VW ZVM688.doc

EA11003EN-00893[7]

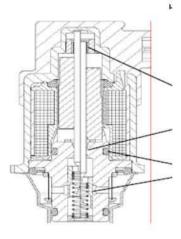


Function:

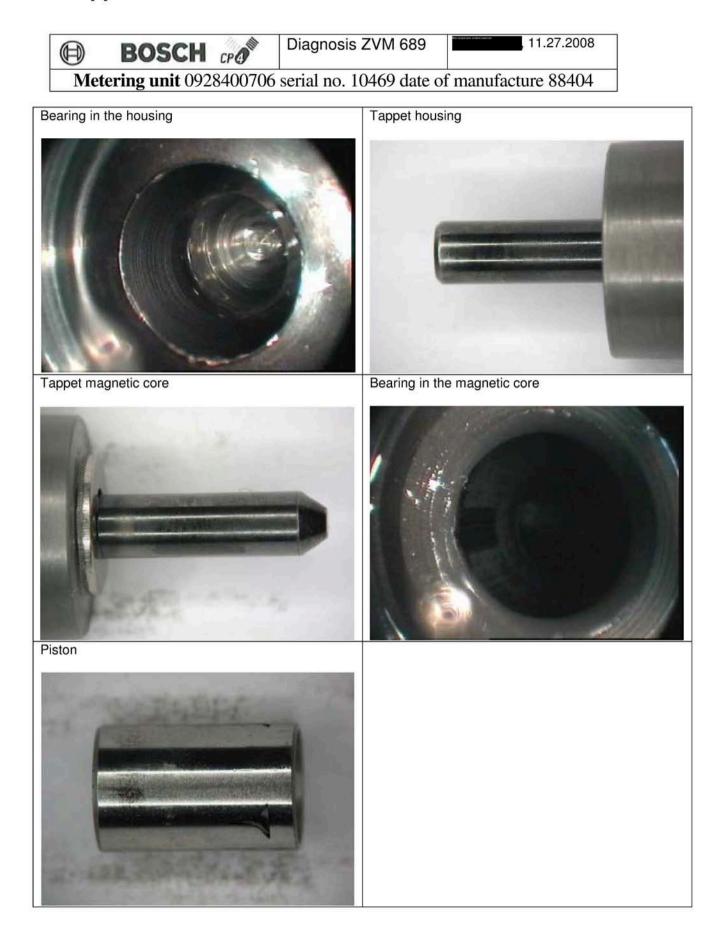


Wear:

External	1	2	3	4	5	6	7	8	9	10
contamination:		х								
Damage:		x								
Filter contamination		x								
Filter damage		x								
Filter damage		x								
Seal		x								



internal	1	2	3	4	5	6	7	8	9	10
Tappet housing:		х								
Bearing housing:		x								
Tappet magnetic core:		x								
Bearing magnetic core:		x								
O-ring inside:		x								
Valve piston:		x								



BOSCH CPO C	R pump CP4 - Diag	gnosis report	Report no. Date	6/23/2008
Department: Person responsib Non-responsive content removed	le: Tel	ephone:	lse	internal external
To: Non-responsive c	ontent removed			
For information:				
Pump type:	Customer:	Project: R4 2.0 EU5	Project /	design pattern ty D / Series
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2				
Part number (TTNo.): 0445B21057	Date of manufacture: 050607	Serial number: 0355		cturing plant - lir P (Feuerbach plan
SAP-No.: 30-101008-01	Samos no.: 594599,001	Customer order no 03L 130 755	(145)0 7 -460	e/Vehicle numbe
Customer part number 03L 130 755	Endurance run type [customer]: Vehicle endurance run	Endurance run condit not known	tions: I	20851
Mileage 27655 km	Parts receipt at dept. DS-PC/EDI: 4/3/2008	Process no. 2008-CP4_0289		identiality note
VA / ETC no.: DS-180763	Durability test type [RB]:			
Function Delivery rates after endurance run v Components Wear of the components is low and Result			with the new state.	
The pump has passed the test.			Гок	x
3. Results of diagnosis (visual findi	ngs)	Legend ra	ting stages uncritical	x
3.1 Drive No striking feature			L Critical	
3.2 Drivetrain No striking feature				x x
3.3 High pressure No striking feature				X
3.4 Bearing No striking feature				x
3.5 Shaft seal No striking feature				x
3.6 Holes No striking feature				x
3.7 Attached components (Metering U No striking feature	Init, Overflow Valve, Cou	nting Point)		x

EA11003EN-00894[1]

BOSCH	CPO	CR pur	np CP4 - Di	agnosis repor	t	Report no. Date	6/22	8/2008
			-			Date		1 1
Department:	Person res			lelephone:	Use		internal	
Non-responsive co	ontent remov	/ed	1				external	I XI
3.9 Other							x	
No striking feature								
4. Hydraulic function	on							
				Delivery rate [l/h]	Deli	ivery rate [l/h]		
				of new part		ifter testing		
]	n[rpm]	p_rail [bar]	I_MU [A]	6/5/2007		4/16/2008		
Starting point	200	200	0.4	66.7		66.6	x	
1000 rpm, p_rated	1000	1800	0.4	17.7		17.6	x	
n_max_p, 500bar	3375	500	0.4	3.8		4.3	x	
time) is met. No significant fuel-	quantity drift o	compared to del	livery measurem	ent.	(2) - 12 (Mull) - 22 (Hered (1))			
5. Destiny of the pa								
The pump is stored	at RB until 0	9/2008 and the	n scrapped.					
6. Attachments								
None								
ve con	tent r	elephone:	Non-responsive	Date:	6/27/2008	B Signature	e. ive	n-respons content noved
Department emove	15.75	elephone:		Date:	6/30/2008	B Signatur		

EA11003EN-00895[0]

	CR pump CP4 - I		Date	6/23/2008	
Department:	Person responsible:	Telephone:	2.25.05	internal	Π
Non-responsive conte	ent removed		Use	external	X
Non-responsive conte					
Non-responsive conter	nt removed				
Pump type:	Customer:	Project:	Proje	ct / design patter	n tvn
4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	VW	R4 2.0 EU5		D / Series	iii (jp
Part number (TTNo.): 445010507	Date of manufacture: 190707	Serial number: 0499		ufacturing plant FeP (Feuerbach	
SAP-No.: 30-101008-01	Samos no.: 594603.001	Customer order no.: 03L 130 755	En	gine/Vehicle nun CAH0000109	nber
Customer part number 03L 130 755	Endurance run type [customer]: Engine endurance run	Endurance run conditions: not known		DSBFD no.: 20845	
Mileage	Parts receipt at dept. DS-PC/EDI:	Process no.	C	Confidentiality no	ote
183 h VA / ETC no.:	4/3/2008	2008-CP4_0291 Fuel:		Confidential	
DS-180766	Durability test type [RB]:	EN590			
Components – Wear of the componer Result	rance run without significant fuel-quar nts is low and without significant s	triking features.	ew state.		
Function – Delivery rates after endur Components – Wear of the componer Result – No effect due to the omis	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features.	. {	OK X Uncritical	X
Function Delivery rates after endur Components Wear of the componer Result No effect due to the omis The pump has pase 	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Philipping and a second	X
Function Delivery rates after endur Components Wear of the componer Result No effect due to the omis The pump has pase 	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical	X
Function	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	X
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pase 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	X
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pase 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	X
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pase 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	x
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	x
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	x
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	
Function - Delivery rates after endur Components - Wear of the componer Result - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	triking features. pring plate visible,	. {	Uncritical Critical	
Function - Delivery rates after endur Components - Wear of the componer Result - - No effect due to the omis The pump has pass 3. Results of diagnosis (v 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 3.6 Holes No striking feature	nts is low and without significant s sion of the anti-friction paint on the sp sed the endurance run.	striking features. pring plate visible, Legend rating stages	. {	Uncritical Critical	

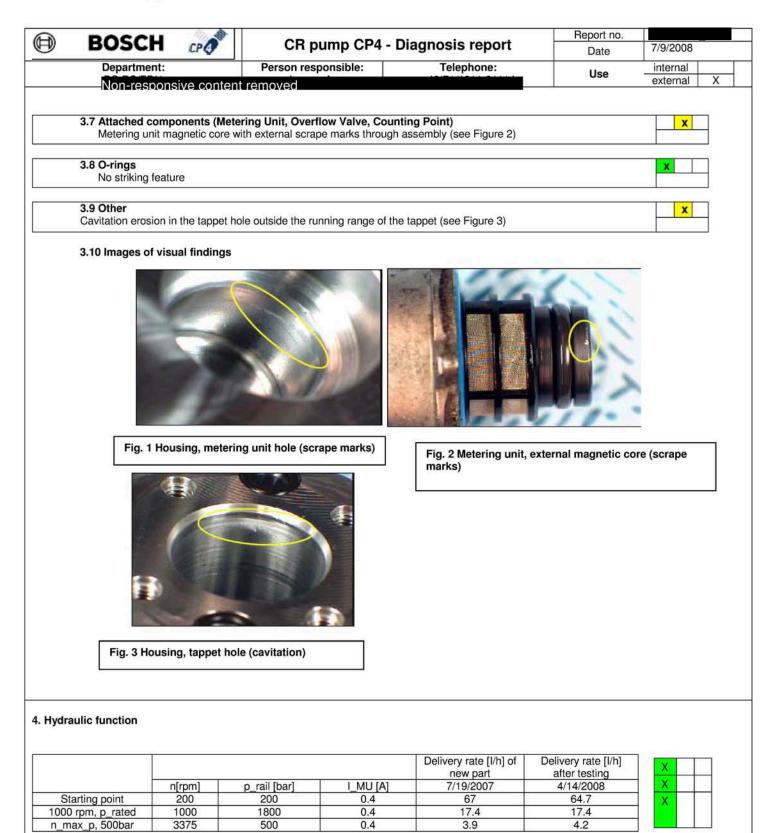
EA11003EN-00895[1]

BOSCH	CPO	CR pum	p CP4 - Di	iagnosis	report	R	eport no.	
Department	-	Person responsib	7		phone:		Date	6/23/2008
		tent removed			spinonor		Use	internal external X
								external X
3.8 O-rings	1							X
No striking fe	eature							
3.9 Other No striking fe	eature							X
8.10 Images of visua								
				RC	Sh			
Fia. 1	Spring plate	e. tappet side	Fia.	1 Spring pla	te. sprina s	ide		
Fia. 1 Hydraulic funct		a. tappet side	Fia.					
	ion		~15282A	Delivery	rate [l/h] of w part	Delivery ra	sting	
Hydraulic funct	ion n[rpm]	p_rail [bar]	I_MU [A]	Delivery nev 5/9	rate [l/h] of w part /2007	Delivery ra after tes 6/3/20	sting 08	
Hydraulic funct	ion n[rpm] 200	p_rail [bar] 200	I_MU [A] 0.4	Delivery nev 5/9	rate [l/h] of w part /2007 55.8	Delivery ra after tes 6/3/20 65.6	sting 08	
Hydraulic funct	ion n[rpm]	p_rail [bar]	I_MU [A]	Delivery nev 5/9 6	rate [l/h] of w part /2007	Delivery ra after tes 6/3/20	sting 08 5	
Hydraulic funct Starting point 1000 rpm, p_rated n_max_p, 500bar TCD (technical o No significant fu	ion n[rpm] 200 1000 3375 customer docc el-quantity dri	p_rail [bar] 200 1800	I_MU [A] 0.4 0.4 0.4 LG (1,000 rpr	Delivery nev 5/9 6 1 ; n, p_rated ≥ 1	rate [l/h] of w part /2007 55.8 8.1 3.7	Delivery ra after tes 6/3/20 65.6 17.4 4.1	sting 08 5	x
Hydraulic funct Starting point 1000 rpm, p_rated n_max_p, 500bar TCD (technical o No significant fu	ion n[rpm] 200 1000 3375 sustomer doct el-quantity dri e parts	p_rail [bar] 200 1800 500 umentation) testing point	I_MU [A] 0.4 0.4 0.4 LG (1,000 rpr neasurement.	Delivery nev 5/9 6 1 ; n, p_rated ≥ 1	rate [l/h] of w part /2007 55.8 8.1 3.7	Delivery ra after tes 6/3/20 65.6 17.4 4.1	sting 08 5	x
Hydraulic funct Starting point 1000 rpm, p_rated n_max_p, 500bar TCD (technical o No significant fu	ion n[rpm] 200 1000 3375 sustomer doct el-quantity dri e parts	p_rail [bar] 200 1800 500 umentation) testing point ft compared to delivery n	I_MU [A] 0.4 0.4 0.4 LG (1,000 rpr neasurement.	Delivery nev 5/9 6 1 ; n, p_rated ≥ 1	rate [l/h] of w part /2007 55.8 8.1 3.7	Delivery ra after tes 6/3/20 65.6 17.4 4.1	sting 08 5	x
Hydraulic funct Starting point 1000 rpm, p_rated n_max_p, 500bar TCD (technical o No significant fu 5. Destiny of th The pump is s	ion n[rpm] 200 1000 3375 sustomer doct el-quantity dri e parts	p_rail [bar] 200 1800 500 umentation) testing point ft compared to delivery n	I_MU [A] 0.4 0.4 0.4 LG (1,000 rpr neasurement.	Delivery nev 5/9 6 1 ; n, p_rated ≥ 1	rate [l/h] of w part /2007 55.8 8.1 3.7	Delivery ra after tes 6/3/20 65.6 17.4 4.1	sting 08 5	x
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44.15.348.256.25(nEC 33, 1.95, MT4.2 W R4 2.0 EU5 D./ Series Part number (TTNo.): Date of manufacture: Serial number: Manufacturing plan 30.101008-01 554650,001 Otstome order no.: Castomer order no.: CAH000170 Customer part number Endurance run type Endurance run conditions: DSBFD no.: 20843 03L 130 755 Vehicle endurance run passenger cars 20843 74380 km Parts receipt at dept. DS- 2008-CP4_0292 Confidentiality n 74380 km Parts receipt at dept. DS- 2008-CP4_0292 Confidential VA / ETC no.: Durability test type [RB]: Fuel: Confidential OP4 customer return Diagnosis of endurance run end without complaint ENS90 Confidential 2 Conclusion - Confidential Confidential - Delivery rates after endurance run without significant fuel-quantity drift in comparison with the new state. - Cold seal-tightness confirmed up to -30°C after endurance run Components - At the metering unit and metering unit hole, marks of an oblique assembly can be recognized. The risk O fring damage is confirmed by complaints in the 0-km range and is being pursued using 8D. - </td <td></td> <td></td> <td></td> <td></td>				
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3.6 Holes	Legend rating stages	v complaints in the 0-km range and outside the tappet guide is an indic and without significant striking fea n.	damage is confirmed by consistent of the tappet hole outs soure. In the tappet hole outs soure. In the components is low an assed the endurance run.	The risk of O-ring dama The cavitation erosion i pump interior pressure. Wear of the remaining of Result The pump has passed The pump has passed Cesults of diagnosis (visu Drive No striking feature Drivetrain No striking feature High pressure No striking feature Bearing No striking feature Shaft seal

EA11003EN-00896[1]



TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is met. No significant fuel-quantity drift compared to delivery measurement.

EA11003EN-00896[2]

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						Use	external	Х
5 Doctin	v of the parts							
J. Destin	ly of the parts							
The pum	p is stored at RB un	til 09/2008 and the	en scrapped.					
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6. Attach	iments							
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	Non-responsiv	Tolonhono;	Non-responsi	VO Data:	7/14/2008	Signatura	Non-res	
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CP4.1S_348_2x5,25_REC_3,3_ 1,95_MT4,2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		R4 2.0 EU5			D / Series
Part number (TTNo.): 445010507	Date of man 0406		Serial number 0279		1.00 PT000 CT0111 CT000 PT 1000	cturing plant P (Feuerbach p 01
SAP-No.: 30-101005-07	Samos 5974		Customer order r	10.:	-	e/Vehicle num CAH0000148
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BOSCH	CPO	CR pump	CP4 - Diagr	nosis report	Repo	ort no.	
		on pump	or y Diagr		. D	ate	8/21/20
Department: F	Person respo	onsible:	Telephor	ne:	Use	, -	internal
Non-responsive co	ontent remo	ved			000	•	external
3.5 Shaft seal No striking fea	turo						X
3.6 Holes	luie						x
No striking fea	ture						
3.7 Attached co	mponents	metering unit,	overflow valu	e, counting p	oint)		x
No striking fea	ture						
3.8 Other							X
No striking fea	12320-125						
3.9 Images of visu	al findings						X
No striking feature	е						
4. Hydraulic funct	ion						
				Delivery rate [I/h] of new		y rate [l/h] r testing	
				part	ane	testing	
	n[rpm]	p_rail [bar]	I_MU [A]	6/4/2007	6/2	2/2008	
Starting point	200	200	0.4	3.9		4.2	x
1000 rpm, p_rated	1000	1800	0.4	17.9		17.3	x
n_max_p, 500bar	3375	500	0.4	66.6		66.2	X
time) is met. No significant fuel-qua <u>5. Destiny of the pa</u> The pump is stored	arts						
<u>6. Attachments</u> None			36 B)				
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2. Conclusio Function - Delivery rate Components	n es after enduranc	e run withou	ut significant fue	el-quantity drift in compa striking features.	arison witl	h the new st	ate.	
2. Conclusio Function - Delivery rate Components - Wear of the Result	n es after enduranc	e run withou low and with	ut significant fue		arison with	2 Divid		
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3.9 Other							x
No striking feature	e						
4. Hydraulic funct	ion						
9 				Delivery ra [l/h] of ne part		ery rate [l/h] er testing]
	n[rpm]	p_rail [bar]	I_MU [A]	10/25/20	07 6/	/3/2008	1
Starting point	200	200	0.4	3.6		4.3	x
1000 rpm, p_rated	1000	1800	0.4	17.8		17.5	x
n_max_p, 500bar	3375	500	0.4	66.3		65.8	×
TCD (technical custon time) is met. No significant fuel-qua				i, p_rated ≥ 1	5.5 or 15.2 l/h	after running	3
5. Destiny of the particular of the particular of the pump is stored	a state of the sta	2/2008 and the	en scrapped.				
C Attachments							
6. Attachments None							
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Non-responsi	ve content remo	oved			U	se	external	
3.5 Shaft s	ve content remo eal			21			X	
No striki	ng feature							
3.6 Holes								
	ng feature						X	
	ing leature							
3.7 Attache	ed components	(metering	unit, overflow val	ve, counting	point)		X	
	ng feature							
3.8 O-rings							X	
No striki	ng feature							
3.9 Other							x	
No striking	feature							
12174								
4. Hydraulic	function							
				Delivery rat	e Deliv	ery rate [l/h]		
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				part		1010000	_	
Ctarting pa	n[rpm] int 200	p_rail [ba 200	ar] I_MU [A] 0.4	11/26/2007	6	6/3/2008 4.2	-	
Starting po 1000 rpm, p_		1800	0.4	17.6		4.2	_ <u>x</u>	
n_max_p, 50		500	0.4	67.1		66.1	X	
p, 50	004 0070	500	0.4	07.1		00.1		
5. Destiny of	<u>the parts</u> stored at RB unti		elivery measurement					
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	ve content remo			Use		external	x	
3.7 Attached No striking	201 12	metering unit	t, overflow valve, counting	point	()	X		
3.8 O-rings No striking	g feature					X]
3.9 Other						X]

No striking feature

3.10 Images of visual findings

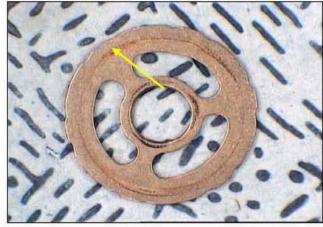


Fig. 1 Spring plate, tappet-side (traces of corrosion)

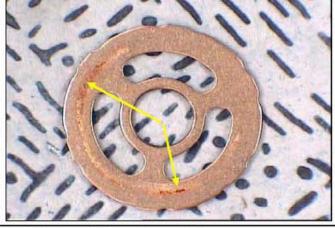


Fig. 2 Spring plate, spring-side (traces of corrosion)

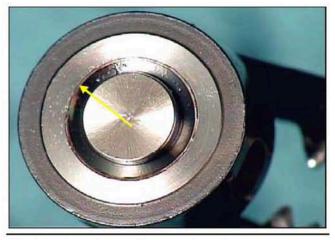


Fig. 3 Intake valve, sealing area (wear)

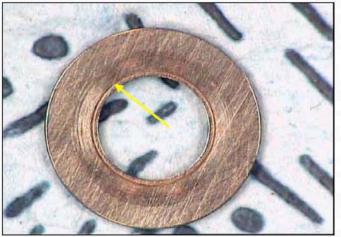


Fig. 4 Stationery seal ring, SV direction (traces of corrosion)

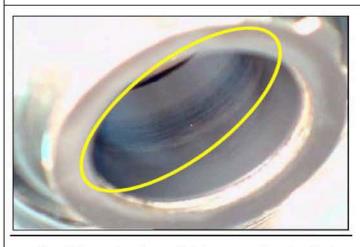


Fig. 4 Flange bearing, radial (grooves, discoloration)

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Non-responsive con 4. Hydraulic function			_h *				
				Delivery rate [l/h] of new part	Delivery rat after test		
	n[rpm]	p_rail [bar]	I_MU [A]	11/1/2007	5/27/20	08	
Starting point	200	200	0.4	67.5	66		x
1000 rpm, p_rated	1000	1800	0.4	17.8	17.6		x
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me) is met. lo significant fuel-quar 5. Destiny of the pa	ntity drift cor	npared to deliver	y measurement.	n, p_rated ≥ 15.5	or 15.2 l/h after	running	
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/lin er					
ad					
1500003 (Pump type:	Customer:	Project:	Project / design patter	n type
P4.1S_3	348 2x5,25 REC 3,3 1,95 MT4,2 Part number (TTNo.):	VW Date of manufacture:	R4 2.0 EU5 Serial number:	D / Series Manufacturing plant	- line
	0445010507	110308	0491	0110 FeP (Feuerbach pl	ant) – 01
	SAP-No.: 30-101005-01	Samos no.: 718616	Customer order no.: 731223	Engine/Vehicle nur not known	nber
1	Customer part number 731223	Endurance run type [customer]: Engine trial	Endurance run conditions: Measurement program (see below)	DSBFD no.: 23076	
	VA / ETC no.: DS-203337	Actual mileage 8 h	Fuel: Reference diesel CEC RF-06-03	Confidentiality no Confidential	ote
C		puild up high pressure any longer			
	CP4 oustomor roturne :	with complaint			
	CP4 customer returns v	vith complaint			
	Pump has been disass	embled by the customer and the			
	The HP piston seized in	n the top dead center (TDC) posi	tion was dismantled by the cust	omer.	
	Testing conditions: Mass				
	Reference diesel CEC R	suring program A, B, E, 0.4 x F			
		F-06-03			
		F-06-03			
	Description of the measu				
	Description of the measu A: 1 h start-up program	uring program			
	Description of the measu A: 1 h start-up program B: Program for reproducibili	uring program ty (5 x 12 points)	x 1240 points) at Tclosed = 20 °C		
	Description of the measu A: 1 h start-up program B: Program for reproducibili C: Long program high press D: Long program high press	uring program ty (5 x 12 points) sure fuel pump (HPFP) compression (1 sure fuel pump (HPFP) compression (1	x 1240 points) at Tclosed = 70 °C		
	Description of the measu A: 1 h start-up program B: Program for reproducibili C: Long program high press D: Long program high press E: Shortened program High	uring program ty (5 x 12 points) sure fuel pump (HPFP) compression (1 sure fuel pump (HPFP) compression (1 pressure fuel pump (HPFP) compress	x 1240 points) at Tclosed = 70 °C sion (1 x 261 points) at Tclosed = 20°C		
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2.	Description of the measu A: 1 h start-up program B: Program for reproducibili C: Long program high press D: Long program high press E: Shortened program High F: Shortened program High Conclusion Function - No functional test possible	uring program ty (5 x 12 points) sure fuel pump (HPFP) compression (1 sure fuel pump (HPFP) compression (1 pressure fuel pump (HPFP) compress pressure fuel pump (HPFP) compress	x 1240 points) at Tclosed = 70 °C sion (1 x 261 points) at Tclosed = 20°C sion (1 x 261 points) at Tclosed = 70 °C	2	
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EA11003EN-00901[1]

BOSCH	CRA	CR pump CP4 - Dia	anosis report	Report no.	2/20/2009	
Department:	ury	Person responsible:	Telephone:	Date	internal	1
Non-responsi	ve content remov	red		Use	external X	
3. <u>Results of diagnosis</u>	s (visual findir	igs)	Leger	d rating stages	OK X Uncritical	x
3.1 Drive No striking feature					X	
	n the inner ring (e	entrainment HP piston) at two bars	(see Figure 1 and Figure 2)			X
Cylinder head / piston t HP piston with adhesive	oore opposite sid e wear between t	of adhesion and abrasion in the LP e without increased traces of wear he 1st and 2nd lubrication groove of age of HP piston in the material co	(see Figure 5) on the LP side (see Figure (6)	erials (see	×
3.4 Bearing No striking features, the	e bearings were o	delivered in the pressed-out state			×	
3.5 Shaft seal No striking feature					×	
3.6 Holes No striking feature					_ <u>×</u>	
3.7 Attached components No striking feature	s (Metering Unit	, Overflow Valve, Counting Point)		x	
3.8 O-rings No striking feature					x	
3.9 Other No striking feature					×	
3.10 Images of visual findi	ngs					
	Fia. 1 Spri	ng plate. tappet-side	Fig. 2 Detail of Fig	ure 1. the]	
	Fig. 3 Cylinde	r head, piston hole (wear)	Fig. 4 Detail of F	igure 3 (wear)		

EA11003EN-00901[2]

\blacksquare	BOSCH	CPO	CR pu	mp CP4 - Dia	agnosis report		Report no. Date	2/20/2009	
	Department:		Person respons	107 K. 15	Telephone:		Duit	internal	
	Non-responsiv	e content re	emoved				Use	external	x
							1412		
	Fig.	. 5 Cylinder	r head, piston hole o	pposite side	Fig. 6 HP piston, L	P-side (wea	ar)		
	and the second						-		
Hydra	BEM HV: 20.00 MV Deleminuty Stria BECV1 Fig. 7	HP piston,	nne 20 me se 20 me se 20 me SEM (scanning elec erial contrast	eow	Fig. 8 HP piston, SEN microscopv) image (v	I (scanning wear)	rate [l/h]		
Hydra	BEM HV: 20 DD HV Delemany, 21/13 BECV1 Fig. 7 micro	HP piston,	SEM (scanning elec	eow	Fig. 8 HP piston, SEM microscopy) image (v	4 2773 / HO-Kolben 1 (scanning wear)	electron		
Hydra	BERM HV: 20.00 HV Determinity 2013 BECV1 Fig. 7 micro	HP piston,	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v	(scanning wear)	electron		
Hydra	BERM HV: 20.00 HV Determinity 2013 BECV1 Fig. 7 micro	HP piston,	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v	(scanning wear)	electron		
Hydra	BERM HV: 20.00 HV Determinity 2013 BECV1 Fig. 7 micro	HP piston,	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v	(scanning wear)	electron		
No fur	Aulic function	HP piston, scopv mate	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v Delivery rate [l/h] of new part	(scanning wear)	electron		
No fur 6. Des The	Aulic function	HP piston, scopv mate	SEM (scanning elec erial contrast p_rail [bar]	tron	Fig. 8 HP piston, SEM microscopy) image (v Delivery rate [l/h] of new part	(scanning wear)	electron		
No fur 6. Des The 7. App		HP piston, scopv mate	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v Delivery rate [l/h] of new part	(scanning wear)	electron		
No fur 6. Des The 7. App	Aulic function Fig. 7 micro aulic function n[rpm] nctional test possible stiny of the parts a pump is stored at I pendix b. 230002262459 in	HP piston, scopv mate	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (v Delivery rate [l/h] of new part	(scanning wear)	electron		respon
<u>No fur</u> 6. Des The 7. App 8D no		HP piston, scopv mate	SEM (scanning elec erial contrast	tron	Fig. 8 HP piston, SEM microscopy) image (w Delivery rate [l/h] of new part	I (scanning wear)	rate [l/h]	Non-ive co	respon ontent vved

Page: 3/3

EA11003EN-00901[3]

🕀 BOS	CH	Referen		eport 00001280-001			19-Sep-08	
-		ce no.	BSAU	0001280-001	Reis	sue:	19-Sep-08	
		QC no.:	23000	2245964		Interim report:		
		Q8 No:	23000	2262459		Final report:	10-Oct-08	
Header data	-			-				
Complaint date:	19-Sep-	08		Product:		RADIAL-PIST	ON PUMP	_
8D title:	Q8: pisto	on pump seiz	ed	Bosch material r	10.	0445010507		
Defectiveness:		responsibili		Bosch manufact plant:	uring	Jihlava plant -	DS (5150)	
Claim Customer	VOLKS	WAGEN AG		Application:				
Delivery customer:	VW			Customer servic no.	e materia	03L130755		
Complaint type:	0-km, ob	structed		Serial number:		BPT 0958		
Failure location:	fleet acti	UT (1/2.)		ID no.		IKB 732262		
Goods used	Dispatch	: for analysis	to RB					
Goods used	For scr	apping at R	в	Problem number	6	4814268		T
After analysis								
Issued by	Non-resp oved	onsive conte	nt rem	Initiated by:		Non-responsive	content removed	
C.C.:	7.00							t
								ł
Customer's clerk:							epho	
Business address:						ne: Fax	1)	
D1 problem-solvin	a	Sponso	n:	a contract presented				
Team leader: E-mail:		e content removed				ne: Fax	: Hereita	_
Business address:								
Team members:	Non-r	esponsiv		tent remove	d			ł
						to at the second second		_
D2 Description of Customer complaint:		ail pressure;	(malfund	-	Jate of m	anufacture: 12-0	Jun-08	_
Customer complaint.	NOT	an pressure,	(manunc	alony				
Bosch description:	(For	checking at	U-point)					
Self-diagnosis of								
customer: Bosch self-diagnosis:								_
Vehicle type:	· 1	1		founting location in	the vehi	cle:		
Engine designation:				ehicle identificatio				
Number of faulty item	IS:	1		leturned qty. to the		r:		
Mileage:			0	ustomer code:		1		
Date of purchase:			F	ailure date:		19-5	Sep-08	
Code no. of co-inspe Subsupplier								
Geographic location complaint:	of the		, Lower	Saxony, VW vehi	cle plant	Emden		
Fault location in the promodule:	oduct /	Cylinder head (L) piston	ι	plant:		Plar	nt Jihlava - DS	
Fault type:		seized	F	inal analysis:		10-0	Oct-08	
D3 immediate meas JhP (Jihlava plant)/Q	MM2.13	25-23			2.50	15 205	results of the assembly	

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tested. Implementation of the possible actions is possib	ble only after the pump ana	ysis.					
Responsible person Non-responsiv	e	19-Sep-08	Effective from:	19-Sep-08			
Consent of customer in process or product-changing	ng immediate measure on:		Responsible person				
Should customer-specific 8D requirements be			porodit				
met? Which ones? No							
D4 root cause analysis Title: Pump piston seized							
Causing process: Exact cause cannot be determined	Others -> cause cannot be	e determined					
Main cause (s) with proof: How could the fault occur? Bosch Jihlava plant/QMM31 analysis 01 / visual inspection not OK, the black cap is missing on the cylinder head 02 / Check of CL and RL connection OK 03 / Non-return valve nominal depth: 3.6 ± 0.05 mm actual: 3.63 mm OK 04 / Fuel removal OK 05 / Bubble test OK 06 / metering unit test OK, metering unit screen without particles 07/ Axial clearance OK should be: from 0.15 - to 0.30 mm: 0.21mm 08 / Cylinder head disassembly not OK - After the cylinder head disassembly, it was found that pump piston in the cylinder has seized. Further action: Analysis of piston seizure at Bosch Jihlava plant/QMM1.4 Fuel analysis at Bosch Jihlava plant/HSE							
Proof furnished by: ^{Non responsive content removed}	Proof furnishe	d on: 04-Sep-08					
be clarified. Close to the seizure area, grooves machining (corundum) or from adjacent parts (f the size of the particles is not possible. In the a The occurrence of corrosion indicates a high ch structure and hardness in accordance with the							
Analysis of the fuel sample enclosed Fuel analysis: - Percentage of methyl esters: should be: up to 5 vol. % is:0.5 ± 0.3 vol. OK - Measurement of water content: up to 200 ppm actual: 60±20 ppm OK - Measurement of flash point: Nominal flashpoint: Greater than 55 °C: 58.0 ± - Elementary analysis: Chlorine content: 0 ppm Proof furnished by Montresponsive content removed		nished on: 26-Sep	-08				
JhP (Jihlava plant)/MFH4 Analysis Analysis of the piston seizure was performed w Five aspects were assessed: 1 - Human 2 - Method 3 - Plant 5 - Material For results of the analysis, please see the end of Proof furnished by		ed on: 05-Nov-08					
Main cause (s) with proof: Why was the fault no JhP (Jihlava plant)/MFH4 Analysis, QMM2.13, Based on the analysis, three failure hypotheses 1. Hypothesis: Seizure due to metal chips after 2. Hypothesis: Seizure due to particles at the pi 3. Hypothesis: Mounting of the piston in the cyli Proof furnished by:	s were defined: shot blasting of the piston I ston (grinding residue after	ubrication groove piston grinding in	at the piston sub the piston lubrica	-supplier ation groove)			

EA11003EN-00901[5]

Reproduction of the error: The error could be reproduced or The error could not be reproduced.	1:	By:					
D5 Possible corrective action	n (s) and p	proof of e	effectiveness (t	esting)			
Rotating groove machining			Action again				
Detachment of doublings within the	ne leakage	oil groove	surface as a co	nsequence of its	s seizure.		
Corrective actions:		,					
Change of the machining of the p Current status: Piston grooves ar		proove (ne	w parts)				
Scheduled status: Piston grooves an							
Detachable doublings or spots of	curring in s	shot blaste	ed grooves (throu	igh shot blasting	a).		
Detachable doublings or spots or Proof furnished by: Non-responsive content rem	oved			Proo	f furnished on: 1	16-Jun-08	
Cleanliness			Action agains	Renampondan context removed	, I		
Seizure due to particles at the pis	ton (grindi	ng residue	after piston grin	ding in the pisto	n lubrication gro	ove)	
1. Increase in the frequency of cle							
 Increase in the frequency of closed 100% visual inspection of the presence of the pr					ina		
4. Introduction of visual inspection					ing .		
5. Change in the working process							
Increase in the check of cylind	er head blis						
Proof furnished by:		Pro	of furnished on: (
Cylinder head and piston assemb	bly		Action against				
Mounting of the piston in the cylir 1. Introduction of the optical sen Proof furnished by:	sor for mor		e correct position ished on: 04-Nov		nile installing the	e piston in the o	cylinder head
D6 Implementation of correct	tive action	ו (s)					
Customer approval on:			by:				
Implementation of corrective a	ction (s)						
Rotating groove machining			Action again	st:	Non ved	-responsive con	tent remo
Detachment of doublings within the Corrective actions: Change of the machining of the p Current status: Piston grooves ar Scheduled status: Piston grooves Detachable doublings or spots oc	iston ring g e rotated are cut.	proove (ne	w parts)				
Responsible Non-responsive content remov		entation				Effective f	rom:
person ed	schedul		29-Nov-08		plemented on:		
Cleanliness Corrective action: 1. Increase in the frequency of cle in piston manufacturing Previous status: 1 x per week New status: 1 x per day D: 10.10. Completed 2. Increase in the frequency of cle of the cylinder head Previous status: 1 x per week New status: 3 x per week (Mon, V 06.10.2008 Status: Completed 3. 100% visual inspection of the p washing, during piston manufactu D: 10.10.2008 Status: Completed 4. Introduction of visual inspection DNA (random sample 10 units per 12/2008 Status: Completed 5. Change in the working process manufacturing after grinding the p D: 10.10.2008 Status: Completed 6. Increase in the check of cylind Feuerbach plant and Jihlava plan D: 22.10.2008 Status: Completed	2008 Statu eanliness a Ved, Fri) D pump pistol iring n of the pistol r small loa ses for pisto piston er head blist	us: inalysis : ns after ton at d carrier) on	D:	Non respensive content rem			
			<u> </u>	lana la ser a set a st	00.0-+ 00	F #aathur	00.0-/ 00
Responsib JHP (Jihlava In le person plant)/MFH4 jo	nplementat n	22-Oct	-08	Implemented on:	22-Oct-08	Effective from:	22-Oct-08

EA11003EN-00901[6]

		scheduled									
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	d and piston assetted the piston in the c		d.		Action again	nst:JhP/MFH	4 An	aiyse			
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			onne	ing the t			WIIII	e motannig the	piston in ti		
	220002245064				7 1	000				S	(A)
Responsib	JHP (Jihlava	ion		10 0	~~				- <i>u</i>		
le person	plant)/MFH4	scheduled	1	19-Dec	-08	Implement	ed o	n:	Effective	from:	
		on:									
	ectiveness for th	ne implemer	nted								
Rotating gro	ove machining			Action a				P (Jihlava plan		nalysi	S
	Proo	of furnished b	oy:		euerbach plan	t)/PUQ1		oof furnished o			
Cleanliness				Action a				P (Jihlava plan			5
		of furnished b	oy:		hlava plant)/M	FH4		oof furnished o			
Cylinder hea	d and piston ass			Action a				P (Jihlava plan		nalysi	5
		of furnished b		JHP (JI	hlava plant)/M	FH4	Pro	oof furnished o	n:		
Cancellation	n of immediate r	neasure (s)									
Cancellation	of immediate me	easures not i	mple								
			oy:		nlava plant)/Ql	MM2.13	on	: Nov 04 2008			
	ve measure (s) a										
	nt of the Quality	Manageme	nt s	ystem (F	MEA (Failure	Mode and E	ffect	s Analysis), p	rocedural	instru	uctions,
PQP, etc.) N				las in se	a a sa la la sua a alcul		ام ما				-1
implemented	ant implementatio	on or measur	es a	also in as	sembly module	e 5, Feuerbac	n pia	int managemen	it was mior	mea	DI
			Imr	lementat	ion		Im	plementation			
Responsible	Non-respon ent removed			eduled o		06-Nov-08		mpleted on:	06-No	v-08	
person											
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	ikely to occur in c					S					
	other processes,										
If yes, what s	sites will you infor	rm (e.g. FME	EA, I	_essons	Learned Coord	linators)?					
Non-resp	onsive cont	tent rem	ov	ed							
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	on't you expect th						<u>67</u>				
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Results:	2 011.										
	of the report confi	irmed by:									
Sponsor:	Name:							Date:		Sigr	nature:
P/QMM:	Name:							Date:		Sigr	nature:
Non-respons	ive content remo	ved									

EA11003EN-00901[7]

Jihlava plant/MFH4 pump CP4 - pistons seized



First influence - human

1.1 <u>Visual inspection:</u> Regular monitoring of cleanliness in piston manufacturing D: 10.10.2008 Completed

Status: Cleanliness analysis 1x per week - result OK

1.2. <u>Visual inspection</u>: Increasing frequency of cleanliness check of pistons from once in two weeks to

daily

D: 10.10.2008 Completed

Result: Measurements in progress - all measurements OK

1.3. Piston fitted incorrectly: Sensor for piston insertion

D: 10.10.2008 in

progress Status: Sensor ordered, delivery date 12/2008

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·	Diesei	systems

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Jihlava plant/MFH4 pump CP4 - pistons seized



First influence - human

1.4. <u>Temperature control too short:</u> Procedural instruction + training for optimal temperature control

D: 10.24.2008 finished

Integrated temperature sensor on pairing the cylinder head system. Pairing process with the parts that are not temperature-controlled is not possible. It is only an infrastructure facility. Procedural instruction and training for optimal temperature control implemented.

1.5. Insertion of piston is not correct: Pattern with piston clamping / piston friction Preparation T: End 12/2008 in progress

Status: No grinding or clamping pistons available, task in progress

1.6. <u>Incorrect piston class</u>: Test delivery rate - 5 pumps with each piston class D: 10.10.2008 completed A cylinder head of class 3 / pistons with classes 1,2,3,4, no seizure detected after functional testing, piston class 5 - fine smoothening visible

Diesel systems

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Jihlava plant/MFH4 pump CP4 - pistons seized



Second influence - method

2.1. <u>Cleanliness:</u> Frequency increase cleanliness check of cylinder head - check capacity and possibilities: 10.06.2008 completed

Analysis of the cleanliness of cylinder head 3x per week (Mon, Wed, Fri)

- 2.2. <u>Washing, storage, manipulation:</u> Comparison Jihlava plant- Feuerbach plant D: 10.10.2008 completed
- Washing Feuerbach plant: High pressure washing system Storage Feuerbach plant: Supermarket / washing frame

Manipulation Feuerbach plant: Milkrun

Jihlava plant: water washing system Jihlava plant: washing frame in small load carrier, VCI/ (*) JhP: Milkrun

(*) Reason: Piston manufacturing in another hall

3	Diesel systems	BOSCH
	rights.	

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Jihlava plant/MFH4 pump CP4 - pistons seized



Second influence - method

- 2.3. <u>Washing, storage, manipulation</u>: Limit class pistons exotic types D: 10.10.2008 completed
 - Washing Feuerbach plant: High pressure washing system Storage Feuerbach plant: Supermarket / washing frame

Jihlava plant: water washing system Jihlava plant: washing frame in small load carrier, VCI/ (*) JhP: Milkrun

Manipulation Feuerbach plant: Milkrun

(*) Reason: Piston manufacturing in another hall

2.4. Pairs of pistons: Comparison Jihlava plant- Feuerbach plant D: 10.10.2008 completed

No deviations observed between Feuerbach plant and Jihlava plant. Processes are identical

4

Diesel systems

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Jihlava plant/MFH4 pump CP4 - pistons
Second influence - method
2.5. <u>Rinsing:</u> Check method and medium cleanliness D: 10.10.2008 completed
Check is done 1x per week according to the specification, result OK
2.6. Incorrect piston class: Readings 4 weeks before the complaints Check D: 10.10.2008 completed
Number of pairs about 40,000 pcs., thereof 17 times not OK.
5 Diesel systems Non-responsive content removed including all use, exploitation, reproduction, processing, distribution and in the case of industrial property rights. BOSCH

Jihlava plant/MFH4 pump CP4 - pistons seized

Third influence - plant

3.1. <u>Grinding, measurement, washing:</u> Check for 300 pistons for grinding residues in piston slot D: 10.10.2008 completed

Result: 300 pieces of piston pump checked. No particles or grinding residues found in the piston slot

3.2. <u>Grinding, measurement, washing:</u> Piston hardness - check D: 10.

D: 10.10.2008 completed

Check 6 pcs. - result OK

3.3. <u>Grinding, measurement, washing:</u> 100% visual inspection of the pump piston after washing, during piston manufacturing + DNA random inspection

D: 10.10.2008

completed

100% check during piston manufacturing and random inspection (10 pcs. for each small load carrier) performed on DNA



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Jihlava plant/MFH4 pump CP4 - pistons seized



Fourth influence environment

4.1. <u>Temperature control:</u> Check space for optimal inspection of piston cleanliness (Air - blower, etc.) D: 10.10.2008 Completed

Place for the inspection spot during piston manufacturing has been changed and adapted.

4.2. Shifting - transport: Check in Feuerbach plant and Jihlava plant

D: 10.10.2008 Completed

Transport of the piston in small load carrier, milk run. Feuerbach plant and Jihlava plant identical

4.3. Wash medium: Regularity and results check

D: 10.10.2008 completed

Check 5 times a week, result OK

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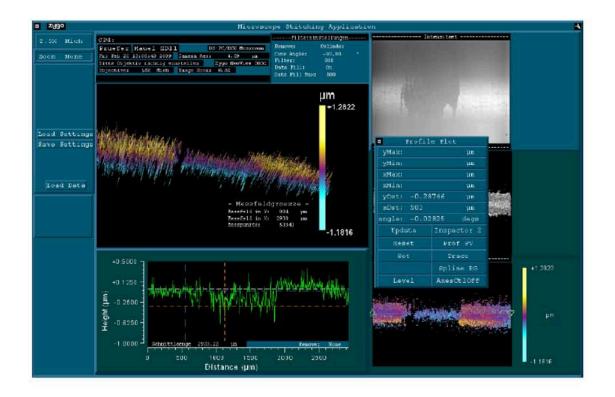
Jihla	ava plant/MFH4 pump CP4 - pistons seized
5. In	fluence - material
5.1.	<u>Geometry, roughness, hardness, temperature:</u> Activities are defined D: 10.24.2008 finished
	ndness, straightness, roughness has been dimensioned for 25 pcs. of pistons. ult OK
8	Diesel systems Non-responsive content removed 10.17.2008 © Robert Bosch GmbH 2008. All rights reserved, including all use, exploitation, reproduction, processing, distribution and in the case of industrial property rights.

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3.7 Attached components (Metering Unit, Overflow Valve, Counting Point) No striking feature 3.8 O-rings No striking feature 3.9 Other No striking feature 3.10 Images Appendix 1, measurement 2 Opendix 1, measurement 2 Delivery rate [l/h] of new part Hydraulic function Delivery rate [l/h] of new part Starting point Starting point	X	x						S	3.6 Ho
No striking feature 3.8 O-rings No striking feature 3.9 Other No striking feature 3.10 Images Joint I (measurement 1) Opendix 1, measurement 2 Hydraulic function Image: I								riking feature	No
No striking feature 3.8 O-rings No striking feature 3.9 Other No striking feature 3.10 Images Joint I (measurement 2) Opendix 1, measurement 2	x	nt) 🛛 🗙	unting Point)	flow Valve, Cour	Unit. Over	(Meterino	nponents	ached con	3.7 A
No striking feature 3.10 Images Appendix 1, measurement 2 opendix 1, measurement 2 Ityraulic function Appendix 1, measurement 2 Ityraulic function Delivery rate [l/h] of new part after testing after testing 1 Delivery rate [l/h] of new part after testing 1 Starting point 200 200 0.4 4.1 4.1					, 0.0	(
3.9 Other No striking feature 3.10 Images Pendix 1, rement 1 Appendix 1, measurement 2 Appendix 1, measurement 2 Hydraulic function	X	X							
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3.10 Images 1 Image of the predix 1, predix 1, measurement 2 predix 1, rement 1 Appendix 1, measurement 2 Starting point 1 [predix 1 - ZME [A] 0 0.4 4.1 4.1	X	x							
Appendix 1, rement 1 Appendix 1, measurement 2 Hydraulic function Image: Comparison of the second secon									
Delivery rate Delivery rate Delivery rate [l/h] [l/h] of new part after testing n [rpm] p_rail [bar] I_ZME [A] 05.14.2008 02.02.2009 Starting point 200 0.4 4.1 4.1 3								- / -	
[I/h] of new part after testing n [rpm] p_rail [bar] I_ZME [A] 05.14.2008 02.02.2009 Starting point 200 200 0.4 4.1 4.1			the second s				0		
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Starting point 200 200 0.4 4.1 4.1 3		ent 2	measuremen Delivery rate [I	Delivery rate				function	rement
1 000 rpm p rated 1000 1800 0.4 16.9 16.0 16.0		ent 2 e [l/h]	Delivery rate [I after testing	Delivery rate [I/h] of new part		p rail [bar]	n [rpm]	function	rement
	<u>×</u>	e [I/h] ing 09	Delivery rate [I after testing 02.02.2009 4.1	Delivery rate [I/h] of new part 05.14.2008 4.1	0.4	200	200	ing point	. Hydraul
TCD (technical customer documentation) testing point LG (1,000 rpm, p_rated \geq 15.5 or 15.2 l/h after running time) is	x	e [l/h] ing 09 x	Delivery rate [I after testing 02.02.2009 4.1 16.9	Delivery rate [I/h] of new part 05.14.2008 4.1 16.8	0.4	200 1800	200 1000	ing point	. Hydraul
. <u>Destiny of parts</u> he pump is stored at RB until 12/2010 and then scrapped.	x x	e [l/h] ing 09 x x x	Delivery rate [I after testing 02.02.2009 4.1 16.9 65.6	Delivery rate [I/h] of new part 05.14.2008 4.1 16.8 65	0.4 0.4 0.4	200 1800 500	200 1000 3375	ing point om, p_rated _p, 500bar	. Hydraul
. Attachments ppendix 1: WLI (white-light interferometry) measurement of the roller support running surface	x x	e [l/h] ing 09 x x x	Delivery rate [I after testing 02.02.2009 4.1 16.9 65.6	Delivery rate [I/h] of new part 05.14.2008 4.1 16.8 65	0.4 0.4 0.4 oint LG (1,000 r	200 1800 500 ation) testing p	200 1000 3375 er documenta	ing point om, p_rated _p, 500bar nical custome parts	. Hydraul
tested: Non-responsive content removed Telephone Non-responsive content removed Date: 04.09.2009 Signature:	x x	e [l/h] ing 09 x x x	Delivery rate [I after testing 02.02.2009 4.1 16.9 65.6 or 15.2 I/h after ru	Delivery rate [I/h] of new part 05.14.2008 4.1 16.8 65 pm, p_rated ≥ 15.5 or	0.4 0.4 oint LG (1,000 r	200 1800 500 ation) testing p and then scra	200 1000 3375 er documenta until 12/2010	ing point om, p_rated _p, 500bar nical custome parts stored at RB u	Hydraul St 1.000 n_m TCD (te be pump
ed e	x x	e [l/h] ing 09 x x r running time) is r	Delivery rate [l after testing 02.02.2009 4.1 16.9 65.6 or 15.2 l/h after ru	Delivery rate [I/h] of new part 05.14.2008 4.1 16.8 65 pm, p_rated ≥ 15.5 or	0.4 0.4 oint LG (1,000 r pped.	200 1800 500 ation) testing p and then scra	200 1000 3375 er documenta until 12/2010 nt interferom	ing point om, p_rated _p, 500bar nical custome parts stored at RB u n <u>ts</u> VLI (white-ligh	. Hydraul

Measurement 1

Appendix 1



Measurement 2



BOSCH CPO	CR pump CP4 - I	No.	Date	7/16/2009
Department: Person res		elephone:		internal
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For inform				
ation:	Quataman	Projecto	Deciset	dealars actions to
Pump type: CP4.1S_398_2x6_REC_3,3_1,95_MT4,2	Customer: VW	Project: R4 2.0 EU5	Project /	design pattern ty C/C
Part number (TTNo.): 0445B21116_06	Date of manufacture: 00890	Serial number: 4631	5. THERE BODY & STORE	acturing plant - lin P (Feuerbach plant)-I
SAP-No.:	Samos no.:	Customer order no.:	A REAL PROPERTY AND A REAL	e/Vehicle number
30-101581-07	742724	2010 De 100 De 100 De 100		03LL000116
VA / ETC no.: DS-222364	Endurance run type [customer]:	Endurance run conditions Profile PZD	e (25335
Mileage	Engine endurance run Actual mileage is [h]	Fuel:	Con	fidentiality note
Mincage	697 h			Confidential
Engine number: 03LL000116, 125 Mileage: 697 h, Profile PZD <u>2. Conclusion</u> Function - Delivery rates after endurance re	- 2 George	el-quantity drift in comparison v	with the new state	Э.
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r	is increased, but not critical. oller support. Not critical.	with the new state	9.
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but no	is increased, but not critical. oller support. Not critical. ot critical.	vith the new state	Э.
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but no nts is low and without significa	is increased, but not critical. oller support. Not critical. ot critical.	vith the new state	Э.
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but no nts is low and without significa	is increased, but not critical. oller support. Not critical. ot critical.		
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but nu nts is low and without significa	is increased, but not critical. oller support. Not critical. ot critical.	s { Uncritica	
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but nu nts is low and without significa	is increased, but not critical. oller support. Not critical. ot critical. Int striking features.	<u>с</u> он	X X
Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result - The pump has passed the endu 3. Results of diagnosis (vi	un or test without significant fur ff in the right tappet assembly nning surface for roller in the r ations at the tappet side, but nu nts is low and without significa	is increased, but not critical. oller support. Not critical. ot critical. Int striking features.	s { Uncritica	
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Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind running surface for roller: C c	un or test without significant fue ff in the right tappet assembly nning surface for roller in the re ations at the tappet side, but no nts is low and without significa urance run. sual findings) creased lateral roller start-up (s	is increased, but not critical. oller support. Not critical. ot critical. int striking features. Legend rating stage see Appendix 1, Figure 1 and 2 lepth (see Appendix 1, Figure 3	S { Uncritica Critical	
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Mileage: 697 h, Profile PZD 2. Conclusion Function - Delivery rates after endurance ru Components - Wear through lateral roller slip-o - C coating slightly worn on the ru - Spring plate shows slight indenta - Wear of the remaining compone Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind running surface for roller: C o plate - indentations in the bas 3.3 High pressure No striking feature	un or test without significant fue ff in the right tappet assembly nning surface for roller in the re ations at the tappet side, but no nts is low and without significa urance run. sual findings) creased lateral roller start-up (s	is increased, but not critical. oller support. Not critical. ot critical. int striking features. Legend rating stage see Appendix 1, Figure 1 and 2 lepth (see Appendix 1, Figure 3	S { Uncritica Critical	
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	OSCH CPG		l pump CP4	Diagnosis		Report no.	_
						Date	7/16/200
Departme		responsible	»:	Telephone:		ir	iternal
Non-respo	onsive content re	emoved	19 2			e	xternal
3.6 Hole No st	es triking feature						X
	ched componer triking features, see			ow valve, cou	nting point)		X
3.8 Othe No strik	er king feature						x
3.9 Other No striking	g feature						x
4. Hydraulic	function				Delivery rate [l/h] of new part	Delivery rate [l/h] after testing	
		n[rpm]	p_rail [bar]	I_MU [A]	10/22/2008	7/14/2009	
ļ	LG	1000	1800	0.4	19.91	20.58	
	cant volumetric effic tation) for new parts		the volumetric ef	ficiency is within	the tolerance spec	cified in the TCD (te	chnical cust
5. Destiny of The pump wi 6. Attachme	II be kept at Jihlava	plant after co	nsultation with	and scr	apped after six mo	onths.	
5. Destiny of The pump wi 6. Attachmer Appendix 1 -	II be kept at Jihlava	t UB VW DS-2	222 364 DNA ZVN	120015 nsive c Da		Signature	;

1003EN-00904[0]	CR pump CP4 -	Diagnosis report	Report no. Date	7/14/2009
Department: Person resp Non-responsive content removed	oonsible: T	elephone: Us	e	internal external x
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Pump type: CP4.1S_398_2x6_REC_3,3_1,95_MT4,2	Customer:	Project: R4 2.0 EU5	Project	/ design pattern type
Part number (TTNo.):	Date of manufacture:	Serial number:	Manuf	acturing plant - line
0445B21116_06	00890	4616	na 11 11 11 11 11 11 11 11 11 11 11 11 11	eP (Feuerbach plant)-M
SAP-No.: 30-101581-07	Samos no.: 742718	Customer order no.	.: Engir	03LL000125
VA / ETC no.: DS-222365	Endurance run type [customer]: Vehicle endurance run	Endurance run conditi Profile GDV-EWP (Ehra variab for passenger cars)	CARACTER C.	DSBFD no.: 25339
Mileage	Actual mileage is [h] 103504 km	Fuel:	Cor	nfidentiality note Confidential
1. Subject CP4 customer returns with Engine number: 03LL000125, 125 Mileage: 103,504 km; Profile GDV	kW, EU5			
Components - Wear through lateral roller slip-off - Wear of the remaining componen Result - The pump has passed the endur	ts is low and without signification and without signification and without signification and the signification	creased, but not critical. ant striking features.		K V
3. Results of diagnosis (vis	sual findings)	Legend rating sta	ages 🖌 uncritica	
3.1 Drive No striking feature			Critical	X
3.2 Drivetrain Tappet assembly: Slightly incr	eased lateral roller slip-off (s	ee 3.10 Figures 1 and 2)		x
3.3 High pressure No striking feature				X
3.4 Bearing				x
No striking feature				
3.5 Shaft seal				
No striking feature				X
3.6 Holes No striking feature				X
3.7 Attached components (r No striking features, see mete		valve, counting point)	X
3.8 O-rings No striking feature	2000 A			X

003EN-00	DSCH	CPO	CR pump	o CP4 - Diagi	nosis repoi	rt Rep	oort no.	
0 -							Date	7/14/200
					1921 2			
Departme Non-respons	nt: Pers	son respon	sible:	Telephor	ne:	Use	<	xternal
3.9 Other							e	
No striking	feature							
3.10 Images								
				-		3		
Fig. 1: Roller - h	ousing-side	y		Fig. 2: Tappel	body - housing-si	de		
Fig. 1: Roller - h 4. Hydraulic f		9		Fig. 2: Tappel	Delivery ra	te Deliver	ry rate [l/h] r testing	
The second second second second		9		Fig. 2: Tappet		te Deliver	ry rate [l/h] r testing	
The second second second second	unction		p_rail [bar]	IIIIIIIII	Delivery ra [I/h] of new part 10/22/200	te Deliver N after 8 7/1	7 testing 3/2009	
The second second second second		n[rpm] 1000	p_rail [bar] 1800		Delivery ra [I/h] of new part	te Deliver N after 8 7/1	r testing	x
4. Hydraulic f	LG LG ant volumetric of tion) for new p	1000 efficiency cha arts.	1800 ange, the volu	I_MU [A] 0.4 metric efficiency is	Delivery ra [I/h] of nev part 10/22/200 19.99	te Deliver w after 8 7/1: 1 nce specified	3/2009 9.81 in the TCD (te	x chnical custo
4. Hydraulic f	LG LG ant volumetric of the parts hains after cons ts report UB VW I	1000 efficiency cha arts. sultation with	1800 ange, the volur	I_MU [A] 0.4 metric efficiency is plant and 6	Delivery ra [I/h] of ney part 10/22/200 19.99 within the tolera will be scrapped	te Deliver after 8 7/1: 1 nce specified	r testing 3/2009 9.81 in the TCD (te	
 4. Hydraulic f No signification Mo signification	LG LG ant volumetric o tition) for new p the parts nains after cons ts	1000 efficiency cha arts. sultation with	1800 ange, the volur	I_MU [A] 0.4 metric efficiency is	Delivery ra [I/h] of new part 10/22/200 19.99 within the tolera	te Deliver w after 8 7/1: 1 nce specified	3/2009 9.81 in the TCD (te	

Department: Person res		Diagnosis report	Date	7/16/200
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To: Non-responsive conte	ent removed			
ation:		1	- P -	
Pump type: CP4.1S 398 2x6 REC 3.3 1.95 MT4.2	Customer:	Project:	Project /	design pattern
Part number (TTNo.):	VW Date of manufacture:	R4 2.0 EU5 Serial number:	Manufa	D/D cturing plant - I
0445B21116_07	141108	0477	5150	JhP (Jihlava plant)
SAP-No.: 30-101581-07	Samos no.: 742720	Customer order no.:	Engin	e/Vehicle numb 03LL000264
VA / ETC no.:	Endurance run type	Endurance run conditio	ns:	DSBFD no.:
DS-222366	[customer]: Engine endurance run	Profile endurance run 2+Ö	/L	25336
Mileage	Actual mileage is [h]	Fuel:	Con	fidentiality note
	545 h			Confidential
1. Subject				
CP4 customer returns with	out complaint			
Engine no.: 03LL000264, 125 kW	, EU5			
Mileage: 545h, Profile endurance	run 2+ÖVL			
2. Conclusion				
Function				
- Delivery rates after endurance ru	un or test without significant fu	el-quantity drift in compariso	n with the new state).
0				
Components				
Components		and but not estimate		
- Wear through lateral roller slip-o - Wear of the remaining compone	ff in the tappet assembly is inc nts is low and without significa	reased, but not critical. Int striking features.		
- Wear through lateral roller slip-o - Wear of the remaining compone	ff in the tappet assembly is inc nts is low and without significa	reased, but not critical. nt striking features.		
- Wear through lateral roller slip-o	nts is low and without significa	reased, but not critical. nt striking features.		
- Wear through lateral roller slip-o - Wear of the remaining compone Result	nts is low and without significa urance run.	nt striking features.	ok ges Juncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endumnation 	nts is low and without significa urance run.	reased, but not critical. Int striking features. Legend rating sta		x
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 	nts is low and without significa urance run.	nt striking features.	ges 🖌 uncritica	x
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 	nts is low and without significa urance run.	nt striking features.	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	x
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain 	nts is low and without significa urance run.	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endution 3. Results of diagnosis (visional structure) 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly incomposition 3.3 High pressure 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly inc 3.3 High pressure No striking feature 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind 3.3 High pressure No striking feature 3.4 Bearing 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endution 3. Results of diagnosis (visual striking feature) 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly incompone 3.3 High pressure No striking feature 3.4 Bearing No striking feature 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endution 3. Results of diagnosis (vinderstand) 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly incompone 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 	nts is low and without significa urance run. sual findings)	nt striking features. Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 3.6 Holes No striking feature 	nts is low and without significa urance run. sual findings) creased lateral roller slip-off (se	Legend rating sta	ges 🖌 uncritica	
 Wear through lateral roller slip-o Wear of the remaining compone Result The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain Tappet assembly: Slightly ind 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 3.6 Holes No striking feature 	nts is low and without significa urance run. sual findings) creased lateral roller slip-off (se	Legend rating sta	ges 🖌 uncritica	

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3.9 Other No striking 3.10 Images	feature						
Fig. 1: Roller - hc	busing-side			Fappet body - housi			
152	1752		Fig. 2:	lappet body - housi	ng-side		
4. Hydraulic fu	Inction			Delivery rate [I/h] of new part	Delivery rate [l/ after testing	h]	
	n[rpm]	p_rail [bar]	I_MU [A]	11/14/2008	7/14/2009	-	
LG	1000	1800	0.4	20.25	20.82	X	
100.00 - 40 - 40°-41°							
documental <u>5. Destiny of t</u> The pump rem <u>6. Attachment</u>	ains after consultat	ion with Mr.	plan		lerance specified		nical cust
documental <u>5. Destiny of t</u> The pump rem <u>6. Attachment</u>	tion) for new parts. <u>he parts</u> ains after consultat	ion with Mr.	plan	t and will be scrap			nical cust
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Department: Person res		Diagnosis report	Date 3/15/201
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Pump type: CP4.15_448_2x6.75_REC_3.3_1.95_MT4.6	Customer:	Project: R4 2.0L EA189 2 EU5	Project / design pattern t
Part number (TTNo.): 0445B21088	Date of manufacture:	Serial number: 4536	Manufacturing plant - li 011M FeP (Feuerbach plant)
SAP-No.: 30-101581-07	Samos no.: 750778	Customer order no.:	Engine/Vehicle numbe 03LP000051
MAP-No. DS-227335	Endurance run type [customer]: Vehicle endurance run	Endurance run conditions Profile EWP (Ehra variable track passenger cars)	SPLC / WINGESTREET WASHINGTON
Desired mileage [km]	Actual mileage is [h] 100000 km	Fuel:	Confidentiality note Confidential
	un or test without significant fu	el-quantity drift in comparison	with the new state.
Components - Wear of the components is low a Result - The pump has passed the endu 3. Results of diagnosis (vi	and without any striking feature	A 8 2	es { OK x uncritical x
Components - Wear of the components is low a Result - The pump has passed the endu	and without any striking feature	es.	ОК Х
Components - Wear of the components is low a Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive	and without any striking feature	es.	es { OK x uncritical x
Components - Wear of the components is low a Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain	and without any striking feature	es.	es { OK x uncritical x Critical x
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Components - Wear of the components is low a Result - The pump has passed the endut 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature 3.6 Holes	and without any striking feature	es.	es { OK uncritical Critical Critical X X X X X X X X X X X X X X X X X X X
Components - Wear of the components is low a Result - The pump has passed the endut 3. Results of diagnosis (vi 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing No striking feature 3.5 Shaft seal No striking feature	and without any striking feature urance run. sual findings)	es. Legend rating stage	es { OK uncritical Critical Critical X X X X X X X X X X X X X X X X X X X

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3.9 Other No striking	g feature							x
4. Hydraulic	function							
					Delivery rate [I/h] of new part	Delivery rate [after testing		
		n[rpm]	p_rail [bar]	I_MU [A]	4/11/2008	10/8/2009	6	
	10							X
	LG	1000	1800	0.4	19.38	19.93		
	cant volumetr ation) for nev	1000 ic efficiency o v parts.	1800 the vo		19.38	19.93		
document	cant volumetr ation) for new the parts I be scrapped	1000 ic efficiency o v parts.	1800 the vo	0.4	19.38	19.93		
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Pump type:	Customer:	Project:		Project / c	design pattern
CP4.1S_398_2x6_REC_3,3_1,95_MT4,2	vw	R4 2,0L EA189_2 EU	5	22	C/C
Part number (TTNo.): 0445B21116_03	Date of manufacture: 890	Serial number: 4560			turing plant - l
SAP-No.:	Samos no.:	Customer order no	.:	A D D STREET, A STREET,	/Vehicle numbe
30-101581-07	750778			C	3LP000051
MAP-No. DS-227336	Endurance run type [customer]: Vehicle endurance run	Endurance run condit Profile EWP (Ehra variable tu passenger cars)	85339752 U	D	26012
Mileage	Actual mileage is [h]	Fuel:		Confi	identiality note
	100000 km			C	Confidential
Engine-No.:03LL0000069 103kW EU5 emission standard, running t 2. Conclusion		hra variable track for passer	nger cars		
Function - Delivery rates after endurance r	un or test without significant fu	uel-ouantity drift in comparis	on with the	e new state.	
- Delivery rates after endurance ro Components - Wear of the components is low a Result	and without any striking featur		on with the	e new state.	
- Delivery rates after endurance re Components - Wear of the components is low a Result - The pump has passed the endu	and without any striking featur urance run.	es.	ſ	e new state. OK	x
Delivery rates after endurance rates after endurance rates after endurance rates after endurance rates are set of the components is low a Result The pump has passed the endurance rates are set of the enduranc	and without any striking featur urance run.		ſ		x x
- Delivery rates after endurance re Components - Wear of the components is low a Result - The pump has passed the endu	and without any striking featur urance run.	es.	ſ	ОК	x x
Delivery rates after endurance rates af	and without any striking featur urance run.	es.	ſ	OK uncritical	× ×
- Delivery rates after endurance re Components - Wear of the components is low a Result - The pump has passed the endu 3. Results of diagnosis (vi 3.1 Drive No striking feature	and without any striking featur urance run.	es.	ſ	OK uncritical	
- Delivery rates after endurance rates after endurance rates - Wear of the components is low a Result - The pump has passed the enduration of the enduratio	and without any striking featur urance run.	es.	ſ	OK uncritical	
 Delivery rates after endurance managements Wear of the components is low a Result The pump has passed the endurance 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure 	and without any striking featur urance run.	es.	ſ	OK uncritical	
- Delivery rates after endurance rates are specific to the components is low a Result - The pump has passed the endurance 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature	and without any striking featur urance run.	es.	ſ	OK uncritical	
 Delivery rates after endurance managements Wear of the components is low a Result The pump has passed the enduration 3. Results of diagnosis (violation) 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing 	and without any striking featur urance run.	es.	ſ	OK uncritical	
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3.9 Other No striking feat	ure						x	
4. Hydraulic func	tion			1	P122-722			
				Delivery rate [l/h] of new part	Delivery ra after te			
	n[rpm]	p_rail [bar]	I_MU [A]	10/13/2008	10/8/2	009		
G	1000	1800	0.4	19.73	19.7			
No significant v	volumetric effici	ency change, th	e volumetric efficie	u			x ne TCD (tech	nical custo
No significant v documentation 5. Destiny of the	olumetric effici) for new parts. parts	ency change, th	e volumetric efficie	u				nical custo
No significant v documentation 5. Destiny of the	olumetric effici) for new parts. parts	ency change, th	e volumetric efficie	u				nical custo
No significant v documentation 5. Destiny of the The pump will t 6. Attachments None Tested:	olumetric effici) for new parts. parts	ency change, th	e volumetric efficie	ncy is within the to		cified in th		nical custo

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For inform ation:

To:

Pump type:	Customer:	Project:	Project / design pattern type
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	VW	R4 EU5	Series / Series
Part number (TTNo.):	Date of manufacture:	Serial number:	Manufacturing plant - line
0445010507	140508	1158	5150 JhP (Jihlava plant) - 03
Actual mileage is [h]	Fuel:		
30000 km	no information		
SAP-No.:			Engine/Vehicle number
30-052021-04			CBBB 01001 / TRUZZZ8J891003028
Customer part number			Endurance run conditions:
03L 130 755			Field

1. Subject

CP4 customer returns with complaint from France. (Breakdown) engine no. CBBB 2.0I TDI / 125 kW. (Volkswagen engine installed in an Audi TT Coupe.) Vehicle identification no.: TRUZZZ8J891003028

Pump was disassembled in RB-Jihlava and delivered to the product development.

2. Conclusion

Function

- Due to the drivetrain damage, no functional test was performed.

Components

- Drivetrain damage category I (global, abrasive wear)
- As a result, particle marks and grooves through particles on most components (bearings, tappet holes, contact area of HP piston and roller support, etc.)
- Due to the progression of damage, detailed analysis on the cam track, the roller support and roller is no longer possible.
- The anti-friction paint on the spring plate is partly entrained or ruptured.

Result

- Possible damage hypothesis:

Material fatigue and rupture of the roller led probably to the increased slip between roller and cam track (stiff roller) on the tappet assembly in this failure case. Consequently, there was abrasive wear of drivetrain parts and a final turned tappet by 90°. Possible cause for the development of flat spots and stiff rollers for CP4 pumps is the value falling below the minimum viscosity limit: - Which may have been initiated by wrong fueling, such as kerosene or diesel fuel.

- By overheating of the diesel fuel.
- Furthermore, flat spots and stiff rollers are also created through:
- Commissioning with air in the drivetrain compartment.
- C coating defect, fusing in the roller support hole or metal chips on the lateral surface of roller.
- Omission of the anti-friction paint of the spring plate (no suggestions) in the series.
- The pump is to be assessed as on-field failure.

3. Results of diagnosis (visual findings) 3.1 Drive - No significant wear Base of the contract of the contract along the entire circumference of the contract along the entire

- Roller support, running surface of the roller: C coating is locally entrained (see Appendix 1, Fig.
 Roller support, HP piston contact surface: Particle indentations (see Appendix 1, Fig. 15)
- Tappet body / roller support: Tappet body has rotated relative to the roller support (see Appendix 1, Figures 19
- and 20).

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ation:						
- Tappet body latera	al surface: Groove	s through	particle drafts (consequential errors; see	Appendix 1, Fig. 18)		
- Roller, roller surfa	ce: Abrasive wear	around the	e entire circumference (see Appendix 1,	Figures 9 and 10).		
3.3 High pressure					x	_
- Running surface o	of piston high-press	sure side (upper 50% of the piston length): Groove	s through particles (see		
Appendix 1, Figure - Piston base: Impre		articles (se	e Appendix 1, Figure 7)			
A 1750 A		(1944)	pet spring is partially entrained, chipped	(see Appendix 1		
Figures 1 and 2)	sin the opining plate		per opining to partially orthrained, on ppou	(occrippendix I)		
3.4 Bearing						ĸ
- Bearing bush	: radially melted (s	see Appen	dix 1, Fig. 4)			
3.5 Shaft seal					x	
- No significant	t wear					5.0
3.6 Holes					X	
- Tappet hole t	op and bottom, gro	ooves and	particle indentations (see Appendix 1, F	igures 5 and 6)		
		g Unit, Ov	erflow Valve, Counting Point)		x	
- No significant	twear					
3.8 O-rings	• STATE PROFESSION				X	
- No significant	twear					

3.9 Other - Metering unit,	particle deposition in	n the O-ring spa	ace (see Appendix 1, F	igure 17)			x
4. Hydraulic fu							
Assessment no	longer possible						
5. Destiny of th The parts ar	ne parts re returned to the Qu	ality Assurance	9.				
<u>6. Attachments</u> Appendix 1 - Ph							
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EA11003EN-00910[0]

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CP4.1S_	Pump type: _348_2x5,25_REC_3,3_1	,95_MT4,2	Customer: VW	Project: VW R4 2.0L EU5 CRS3.2 RPU		sign pattern type ies / Series
	Part number (TTNo.) 445010507):	Date of manufacture: 161108	Serial number:		uring plant - line P (Jihlava plant)
	Actual mileage is [h] 50000 km		Fuel: Others			IAP-No. S-241774
	SAP-No.:		Samos no.:	Customer order no.:		Engine
-	30-101745-50 Customer part numb	er	DSBFD no.:	Endurance run type [customer]:		0C000534 e run conditions:
	CR/CP4S1/R35/20	-	27321	Vehicle endurance run		a endurance run
-					•	
1.	Subject					
1.	Subject					
	CP4 customer return	ns without co	omplaint			
	Engine no.: CDC00	0534 (Amarc	ok), emission standard: EU5			
	Testing conditions: Mileage: 50,000km		idurance run			
	willeage. 50,000km					
2.	Conclusion					
	-					
	Function	1 1 10 1				
	Delivery ratesall	er durability te	est without any significant striking	gleatures		
	Components					
	Wear of the compo	nents is low.	There are no significant strikin	ng features seen at the pump.		
	Result					
	The pump has pass	ed the durab	ility test.			
	30 03 1 2		61			
Γ				1	r <u>ok</u>	X
3.	Results of diagnos	is (visual fi	ndings)	Legend rating stages		X
					Critical	X
				10		
3.	1 Drive No significant wear					
	No significant wear					
3.	2 Drivetrain					X
	No significant wear					
3.	3 High pressure No significant wear					×
	. to e.g. mount moul					
3.	4 Bearing					X
	No significant wear					
3.	5 Shaft seal No significant wear					
2	No significant wedi					
3.	6 Holes					X
	No significant wear					

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3.7 Attached components (Met	tering Unit, Overflow Valve,	Counting Point)			X	٦
No significant wear		1990 - M				1
3.8 O-rings					X	
No significant wear					-	
3.9 Other					x	T
No significant wear						1
					1	
Hydraulic function						
The pump function is within aposi	ification limits. There is no si	anificant drift in comp	aricon to the dolive	ory moneuror	mont	
The pump function is within speci	incation innits. There is no si	grinicant unit in comp	anson to the delive	ery measurer	nem	
		Delivery rate [l/h] of	Delivery rate [l/h]	2		

				new part	after testing
	n[rpm]	p_rail [bar]	I_MU [A]	11/16/2008	09.03.2010
ST	200	200	0.4	4.1	4.1
LG	1000	1800	0.4	17.3	17.3

5 Destiny of the parts

The pump will be scrapped at the request of the client.

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Pump type: CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	Customer:	Project: VW R4 2.0L EU5 CRS	3 2 BPI I		lesign pattern ty eries / Series
Part number (TTNo.):	Date of manufactu				turing plant - line
0445010507	161108			5150 J	hP (Jihlava plant)
Actual mileage is [h]	Fuel:				MAP-No. DS-241774
50000 km SAP-No.:	Others Samos no.:	Customer orde	no.:		Vehicle number
30-101745-50	768619		100.000		CDC000534
Customer part number	DSBFD no.:	Endurance run type [d	ustomer]:	Enduran	ce run conditions:
CR/CP4S1/R35/20	27321	Vehicle endurance	e run	Argenti	na endurance run
Function Delivery rates after endurance run Components Wear of the components is low. T Result - The pump has passed the end 3. Results of diagnosis (v	There are no significant s urance run.	triking features seen at the pu		OK	x
3.1 Drive		Legend rating	j stages →	uncritical Critical	X
No significant wear			0		X
into significant wear					x
3.2 Drivetrain					x
No significant wear					
3.3 High pressure					x
3.3 High pressure No significant wear					X
No significant wear					
No significant wear 3.4 Bearing					x
No significant wear 3.4 Bearing No significant wear					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					
No significant wear 3.4 Bearing No significant wear					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					x
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal					x

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3.6 Holes	5						x
No sig	nificant wea	ır					
			netering uni	t, overflow valve, counting poi	int)		X
	nificant wea	ır				I	
3.8 O-rin	gs nificant wea	or.					X
110 019	innount wou						
	nificant wea	ır				I	x
No sig 4. Hydraulic f The pump fund	unction ction is within	n specificatio		ery measurement			X
No sig 4. Hydraulic f The pump fund	unction ction is within	n specificatio		ery measurement Delivery rate [I/h] of new part	Delivery rate [I/h] after testing	e	x
No sig 4. Hydraulic f The pump fund	unction ction is within	n specificatio	on to the delive	Delivery rate [I/h] of new	[l/h] after	e	x
No sig	unction ction is within phificant drift	n specificatio t in comparis n[rpm] 200	on to the delive p_rail [bar] 200	Delivery rate [I/h] of new part I_MU [A] 0.4	[I/h] after testing 3/9/2010 4.1	e	x
No sig	unction ction is withi nificant drift	n specificatio	on to the delive	Delivery rate [I/h] of new part I_MU [A] 11/16/2008	[I/h] after testing 3/9/2010	e	
No sig	unction ction is within prificant drift ST LG the parts will be scrap	n specificatio t in comparis	on to the delive p_rail [bar] 200 1800	Delivery rate [l/h] of new part I_MU [A] 11/16/2008 0.4 4.1 0.4 17.3	[I/h] after testing 3/9/2010 4.1 17.3		x x
No sig	unction ction is within prificant drift ST LG the parts	n specificatio t in comparis	on to the delive p_rail [bar] 200 1800 equest of the cl Phone	Delivery rate [I/h] of new part I_MU [A] 11/16/2008 0.4 4.1 0.4 17.3	[I/h] after testing 3/9/2010 4.1	e Signature:	x x

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	an de com la disponsión d'activity des ser	gun fan Grena her Herefold of Station				For information:
Project / design p Series / Se		Project: VW R4 2.0L EU5 CRS3.2 RPU	Custome VW	r:	Pump t CP4.1S_348_2x5,25_R	
Manufacturing p 5150 JhP (Jihlava		Serial number: 1383	Date of manufa 260109	acture:	Part numbe 044501	
MAP-No).	1303	Fuel:		Actual mile	age is [h]
DS-2417 Engine / vehicle		Customer order no.:	Others Samos no		100000 SAP-N	No.:
Endurance run c	onditions:	CR/CP4S1/R35/20 Endurance run type [customer]:	768619 DSBFD no		30-1017 Customer pa	
Argentina re		Vehicle endurance run	27322		CR/CP4S1	/R35/20
Components C coating ruptures have no effect on f	on the roller s function and se	in without any significant striking upport in allowable size. The C ervice life. ow. There are no significant strik	coating ruptures are		e endurance run con	ditions and
The pump has pas	ssed the endu	rance run.				1
3. Diagnosis Res	ults (visual fir	ndings)				×
			Legend ra	ting stages	OK uncritical	
3.1 Drive No significant stri	iking features				Ĺ	×
3.2 Drivetrain C coating rupture	es on the roller	support in allowable size.				×
3.3 High pressur No significant stri	re iking features					×
3.4 Bearing No significant stri	iking features				I	*
3.5 Shaft seal						

No significant striking features	×

7/14/0010	Report no.	CR pump CP4 diagnos	sis report	A	BOSCH	CON
7/14/2010	Date	Telephone:	Person respon	sible:	Departmen	t:
al	Use	Non-responsive conten				
x extern al	1104.04					
Confidentiality note Confidential						
3.6 Holes No significant we	or				×	
No significant we	ai					
3.7 Attached cor	nponents (Me	tering Unit, Overflow Valve, Co	unting Point)		×	
No significant we	ar	•				
3.8 O-rings					×	
No significant we	ar					
3.9 Other No significant we	ar				*	
a 126 A						
3.10 Images						
				- Martel		
	-				A Section	The second
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Fig. 1: Roller suppo	rt to the right					
C coating ruptures ruptures	en en en en en de la destaction d'an se en 🖝 de la distaction de la destaction de la destac		1	mage 2: Roller	support to the right C co	pating

4. Hydraulic function The pump function is within specification limits. There is no significant drift in comparison to the delivery measurement Delivery rate [I/h] Delivery rate [I/h] After testing New part 1/26/2009 3/9/2010 I_MU [A] p_rail [bar] n[rpm] 0.4 17.7 17.6 200 200 ST × 4.2 4.3 0.4 1800 1000 LG × 5. Destiny of the parts The pump will be scrapped at the request of the client. 6. Attachments None Non-responsi ve content r emoved Non-respon sive conte nt removed Non-responsi ve content r emoved 7/19/2010 Date: **Telephone:** Signature: **Tested:** 7/20/2010 Telephone: Signature: Department: Date:

Internal Use Telephone: Person responsible: Department: Xon-responsive content removed	7/14/2010	Report no. Date	CR pump CP4 diagnosis report			BOSCH	CPO
Image: Content of Content is note Content removed Image: Content removed Von-responsive content removed Image: Content removed Project / design pattern type R2 vol. (US RPU VW Series / Series R2 vol. (US RPU VW State / Series R2 vol. (US RPU VW Manufacturing plant - line Seriel number: Date of manufacture: Part number (TNo.): 0.4333.16.9.17. Manufacturing plant - line Seriel number: Date of manufacture: Part number (TNo.): 0.44560. Engline / vehicle number Customer order no.: SAP-No.: 0.445747. 0.445076. Engline / vehicle number Customer order no.: SAP-No.: 0.4074571/R3520 0.445076. Insubject CCP4 stiftsasco CRICP451/R3520 0.440745.00 CP4 customer returns without complaint Engine endurance run in Argentina Testing conditions: CRICP451/R3520 I.Subject CConcolusion Engine endurance run in Argentina Testing conditions: CRICP451/R3520 Components Constant run durability and service life. The vehicle run conditions and have no effect on function and durability and service life. Content run conditions and have no effect on function and durability and service life. Comp		llee	Telephone:	Person respo	nsible:	Departr	nent:
Confidential Ion-responsive content removed Ion-responsive content removed Ion-responsive content removed Project / design pattern type R4 20 EX RPU Customer: Pump type: Sete // Status // Setes R4 20 EX RPU Version // Setes Pump type: Dist of // Information // Setes Pump type: Pump type: Pump type: Sete // Project // Setes Pate of manufacture: Pump type: Pump type: Dist // Project // Setes Pate of manufacture: Pump type: Pump type: Dist // Project // Setes Pate of manufacture: Pump type: Pump type: Dist // Project // Setes Pate of manufacture: Pump type: Pump type: Dist // Project // Setes Pate of manufacture: Pump type: Pump type: Dist // Project // Setes Others Others Setes Setes Engine values Customer returns without complaint Page transmoster Setes Setes CRCP451/R3520 CP4 customer returns without complaint Engine endurance run Page transmoster CRCP451/R3520 CP4 customer returns without complaint Engine value // Setes CRCP451/R3520 CRCP451/R3520	X external	036	Non-responsive conte	nt removed			
Ion-responsive content removed 10 Project / design pattern type R4 2.0.2 EUS RPU WW CP4 15 448_2.0.22 (REC 33, 15.9 µr. Manufacturing plant - line Serial number: Date of manufacture: Pump type: 5150.0h# (Jihlava plant) - 0.3 1383 20100 Pattern type: Stop // Jihlava plant) - 0.3 1383 20100 Pattern type: Display 10.5 (Jihlava plant) - 0.3 1383 20100 Pattern type: Display 10.5 (Jihlava plant) - 0.3 1383 20100 Pattern type: 0445016007 MANUAL TABLE NUMBER: Others 1: Actual mileage is [N] 0445016007 0445016007 Display 10.5 (Jihlava plant) - 0.3 Endurance run conditions: Endurance run type (oustomer): DSBFD no : Customer pattern type: Display 10.1 (Jihlava plant) - 0.3 Endurance run type (oustomer): DSBFD no : Customer pattern type: CP4 Customer returns without complaint : Engine endurance run in Argentina: Mileage: 100.000 km, emission standard: EU5 2.P4 customer ender endurance run without any significant striking features 20000018 (Amarck) Rec and the components is low. There are no significant striking features 2.Danousin Paspased the endurance run. Resu						990.	
Project / design pattern type Project / design pattern type Pump type: Seties / Seties Ind 2:0: EUS RPU CP4 15_348_2:xx22; dec 3: 35, 55, 35, 35, 35, 35, 35, 35, 35, 35,			removed		i i		For
Series / Series R4 2.0. EUS RPU VW CP18_348_268_2FC3_3168_JTM Manufacturing plant - UB Seriel anumber; Dec of manufacture: Part number (TNo.); 0450.01P (Univer plant) - 03 1383 Dec of manufacture: Part number (TNo.); 0450.01P (Univer plant) - 03 1383 Dec of manufacture: Otto number (PNO.); 0450.01P (Univer plant) - 03 1383 Dec of manufacture: Otto number (PNO.); 0450.01P (Univer plant) - 03 SAP-No: SAP-No: SAP-No: 050.01P (Univer plant) Endurance run conditions: Endurance run type (customer): DSBFD no.; Customer part number Augentina returns Endurance run type (customer): DSBFD no.; Customer part number 20000018 (Univer plant) Engine endurance run 27322 CRCP451/R35/20 20100018 (Dimension standard: EU5 Decodo0018 (Amarok) Eresting conditions: Venicle endurance run in Argentina Mileage: 100.000 km, emission standard: EU5 Endurance run without any significant striking features Decoding ruptures are not due to the endurance run conditions and have no effect on function and durability as service life. Coting ruptures are not significant striking features seen at the pump.	Project / design p	attern type	Project	Custome		Pump	informatio
5150.0hr (Jihlišše jalm) - 03 1383 20109 0445010677 MAP-No. DS:241775 Customer order no.: Samos no.: SAP-No.; Engline / vehicle number Customer order no.: Samos no.: 30-101745-50 Endurance run conditions: Endurance run type [customer]: DSBP5 D no.: CRICP451(R35/20 Endurance run conditions: Endurance run type [customer]: DSBP5 D no.: CRICP451(R35/20 L: Subject Subject CRICP451(R35/20 CRICP451(R35/20 244 CRICP451(R35/20 CRICP451(R35/20 L: Subject Subject CRICP451(R35/20 244 CRICP451(R35/20 CRICP451(R35/20 25 Conclusion CRICP451(R35/20 26 Conclusion CRICP451(R35/20 20 Conclusion and durability and service life. The continon and durability and service life. 20 Created on function and durability and service life. Created on function and durability and service life. The wear of the components is low. There are no significant striking features seen at the pump. Critical Critical 21 Critical Critical Critical Critical Critical <t< td=""><td>Series / Ser</td><td>ries</td><td>R4 2.0L EU5 RPU</td><td>VW</td><td></td><td>CP4.1S_348_2x5,25_REC</td><td>_3,3_1,95_MT4,2</td></t<>	Series / Ser	ries	R4 2.0L EU5 RPU	VW		CP4.1S_348_2x5,25_REC	_3,3_1,95_MT4,2
DS:241775 Others 10000 km Engline / vehicle number Customer order no.: SAP-No.: 30-10174-50 Endurance run conditions: Endurance run type [customer]: DSBFD no.: Others Argentina returns Endurance run type [customer]: DSBFD no.: CRICP451/R35/20 .Subject	5150 JhP (Jihlava	plant) - 03		260109		044501	0507
CRICP451/R3520 768519 30-101745-50 Endurance run conditions: Endurance run type [customer]: DSBFD no.: Customer part number Agentina retums Engine endurance run 27322 CRICP451/R3520 I. Subject 27322 CRICP451/R3520 CRICP451/R3520 2P4 customer returns without complaint right no:: CDC000018 (Amarck) CRICP451/R3520 P24 customer returns without complaint right no:: CDC000018 (Amarck) CRICP451/R3520 P24 customer returns without complaint right no:: CDC000018 (Amarck) CRICP451/R3520 P24 customer returns without complaint right no:: CDC000018 (Amarck) CRICP451/R3520 P24 customer returns without complaint right no:: CDC000018 (Amarck) CRICP451/R3520 P35 Conclusion CDC000018 (Amarck) CRICP451/R3520 Putton Coating ruptures on the roller support in allowable size. The C coating ruptures are not due to the endurance run conditions and have no effect on function and durability and service life. The wear of the components is low. There are no significant striking features seen at the pump. Result Legend rating stages OK uncritical Critical 11 Diagnosis Results (visual findings). Legend rating stages No 12 Diagnosis Results (visual findings). Legend rating stages No 13 Diagnosis ruptures on t							
Endurance run conditions: Endurance run type [customer]: DSBFD no.: Customer part number Argentina returns Engine endurance run 27322 CRCP451/R3520 I. Subject 27322 CRCP451/R3520 P4 customer returns without complaint Engine endurance run 27322 CRCP451/R3520 P4 customer returns without complaint Engine no.: CRCP451/R3520 CRCP451/R3520 P4 customer returns without complaint Engine no.: CRCP451/R3520 CRCP451/R3520 P4 customer returns without any significant striking features Conclusion Sector and durance run without any significant striking features P4 customer net components Conclusion in allowable size. The C coating ruptures are not due to the endurance run conditions and have no effect on function and durability and service life. Not mark the pump. P4 customer net run. Legend rating stages Cot uncritical Critical It prive No significant wear Image: Security Critical Xi 33 High pressure No significant vear Image: Security Critical Image: Security Critical 34 Bearing No significant wear Image: Security Critical Image: Security Critical 35 Shaft seal Image: Security Critical Image: Security Critical Image: Securi	Engine / vehicle	number				SAP-1	lo.:
CP4 customer returns without complaint Engine no.: CDC000018 (Amarok) Testing conditions: Vehicle endurance run in Argentina Wileage: 100,000 km, emission standard: EU5 2. Conclusion Function Delivery rates after endurance run without any significant striking features Components C coating ruptures on the roller support in allowable size. The C coating ruptures are not due to the endurance run conditions and durability and service life. The wear of the components is low. There are no significant striking features seen at the pump. Result The pump has passed the endurance run. 8. Diagnosis Results (visual findings) 8. Diagnosis Results (visual findings) 8. Diagnosis Results (visual findings) 3.1 Drive No significant wear 3.3 High pressure No significant wear 3.4 Bearing No significant wear			Endurance run type [customer]:	DSBFD n	o.:	Customer pa	rt number
The wear of the components is low. There are no significant striking features seen at the pump.	Function Delivery rates after Components C coating ruptures	on the roller s	support in allowable size. The C o		not due to th	ne endurance run con	ditions
3. Diagnosis Results (visual findings) Legend rating stages uncritical × 3.1 Drive No significant wear Image: Stages Image	The wear of the co Result	mponents is l	ow. There are no significant strik	ing features seen at	the pump.		
3.2 Drivetrain C coating ruptures on the roller support in allowable size. 3.3 High pressure No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal	3.1 Drive		ndings)	Legend rat	ing stages	- uncritical	
No significant wear 3.4 Bearing No significant wear 3.5 Shaft seal	3.2 Drivetrain	-	support in allowable size.			[×
No significant wear]	×
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o significant wea	ar							_	×
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ght C coating r	uptures	C coating ruptu	ires				Image 2: F	Roller sup	oport to th
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ght C coating r Hydraulic funct	ion is within specificat	ion limits. There	1011-14	Delivery rate [l/h] of	Delive rate [afte	to the deliv ery I/h] er ng			oport to th
ght C coating r Hydraulic funct	uptures ion		is no sig	Delivery rate [I/h] of new part	Delive rate [afte testin	to the deliv ery I/h] er ng			port to th
ght C coating r	ion is within specificat	ion limits. There	is no sig I_MU [A]	Delivery rate [I/h] of new part 1/26/2009	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng			oport to th
ght C coating r	ion is within specificat n[rpm] 200	ion limits. There	is no sig I_MU [A] 0.4	Delivery rate [l/h] of new part 1/26/2009 17.6	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng		rement	
ght C coating r	ion is within specificat	ion limits. There	is no sig I_MU [A]	Delivery rate [I/h] of new part 1/26/2009	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng		rement	
ght C coating r	ion is within specificat n[rpm] 200	ion limits. There	is no sig I_MU [A] 0.4	Delivery rate [l/h] of new part 1/26/2009 17.6	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng		rement	
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ght C coating r	ion is within specificat n[rpm] 200	ion limits. There	is no sig I_MU [A] 0.4	Delivery rate [l/h] of new part 1/26/2009 17.6	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng		rement	
ght C coating r	ion is within specificat [n[rpm] 200 1000	ion limits. There	is no sig I_MU [A] 0.4	Delivery rate [l/h] of new part 1/26/2009 17.6	Delive rate [afte testin 3/9/2010	to the deliv ery I/h] er ng		rement	

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6. Attachme None	ents						
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Department:		Telephone:		Date:	7/20/2010	Signature:	

6/29/2010	Report no. Date	CR pump CP4 diagr	iosis report		BOSCH
internal	Use	Telephone:	Person respon	isible:	Department:
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Project / design p	attern type	Project:	Customer		Pump type:
Series / Se	ries	R4 2.0 EU5	VW		P4.1S_348_2x5,25_REC_3,3_1,95_MT4,2 Part number (TTNo.):
Manufacturing p 5150 JhP (Jihlava		Serial number: 1419	Date of manufa 260109	icture:	0445010507
MAP-No DS-24310		Diagnosis no. 3706	Fuel: EN590		Actual mileage is [h] 56551 km
Engine / vehicle	e number	Customer order no.:	Samos no	.:	SAP-No.:
CDC000047 120 kW Endurance run c		Endurance run type [customer]:	770357 DSBFD no		30-101745-50 Customer part number
Emission standa		Vehicle endurance run	27479		oustomer part number
Diagnosis after en					
Components		run or test without significant fuel- ce life and the testing conditions.	quantity drift in com	parison with the r	iew state.
Result The pump has pas	ssed the endu	rance run.			
<u>3. Diagnosis Res</u>	ults (visual fi	ndings)	Lege	end rating stages	OK × uncritical × Critical ×
3.1 Drive No significant wea	r				×
3.2 Drivetrain No significant we	ar				×
3.3 High pressur No significant we					×
3.4 Bearing No significant we	ar				×
3.5 Shaft seal No significant we	ar				×
3.6 Holes No significant we	ar				×
3.7 Attached con No significant we		etering Unit, Overflow Valve, Co	ounting Point)		×

6/29/2010	Report no. Date	CR pump	o CP4 di	agnos	sis report		0	BOSCH	CPO	
internal	Use	Tel	ephone:		Person re	esponsible:	ľ	Depart	ment:	
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Confidential										
3.8 O-rings No significant w	ear							Ĺ	*	
3.9 Other No significant v	wear								×	
4. Hydraulic function										
					ery rate [l/h] of new part	Delivery te	rate [l/h] esting	after		
	n[rpm] p_rail [bar]	I_ZME [A]	1	/26/2009	3/2	4/2010			
Starting poir	nt 200	200	0.4		4.1		4.2	_	╡	
1000 rpm, p_ra	ited 1000	1800	0.4		17.4	3	17.6		×	
N_max, p_500	bar 3375	500	0.4		64.5	(65.7			
TCD (technical cu <u>5. Destiny of the</u>	parts					5 or 15.2 l/	'h after ru	unning time) is m	et.	
The pur	np is stored at	RB until 12.2010	0 and then	scrappe	d.					
6. Attachments										
No append	dix									
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						information:
Project / design p Series / Se		Project: R4 2.0 EU5	Customer	8	Pump type CP4.1S_348_2x5,25_REC_	
Manufacturing p	lant - line	Serial number:	Date of manufa	cture:	Part number (T	TNo.):
5150 JhP (Jihlava MAP-No		1419 Diagnosis no.	260109 Fuel:		044501050 Actual mileage	
DS-24310 Engine / vehicle		3706 Customer order no.:	EN590 Samos no.		56551 km SAP-No.:	
CDC000047 120 kW	BiT (Amarok)		770357	12.h	30-101745-	50
Endurance run c Emission standa	이 집에 집에 있는 것이 집에 있는 것이 없다.	Endurance run type [customer]: Vehicle endurance run	DSBFD no. 27479	:	Customer part r	number
Components	er endurance	ithout complaint run or test without significant fue se life and the testing conditions.	l-quantity drift in comp	parison with t	he new state.	
Result - The pump has pa 3. Diagnosis Re			Leg	end rating sta	ages { OK uncritical Critical	× ×
3.1 Drive No significant we 3.2 Drivetrain No significant we	50.0 PM] [×
3.3 High pressure No significant we						×
3.4 Bearing No significant we	ar					×
3.5 Shaft seal No significant we	ar					×
3.6 Holes No significant	wear				[×
3.7 Attached No significant		(Metering Unit, Overflow Valve	e, Counting Point)			×

6/29/2010	Report no. Date	CR pum	p CP4 - Diag	nosis repor	t 🕲	BOSCH	CPO
intern	-	Telephone:		Person responsible	e:	Department:	
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Confidential	ity note						
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3.8 O-rings No significant	wear						×
3.9 Other							_
No significant	wear						×
4. Hydraulic fund	tion						
			[Delivery rate []		ery rate	
				new part		after	
	n[rp	om] p_rail	I_MU [A]	1/26/2009	3/24/	/2010	
		[bar]			24420E-14	5-87 E.L	
Starting poin	it 20	0 200	0.4	4.1	4	.2	×
1000 rpm, p_ra	ted 100	00 1800	0.4	17.4	17	7.6	×
N_max, p_5001		75 500	0.4	64.5	65	5.7	
				0.00			×
TCD (technical cu	stomer docum	entation) testing	point LG (1,000 rp	om, p_rated ≥ 15.5	or 15.2 l/h after	running time) is m	et.
5. Destiny of the	parts						
The pump is st	ored at RB unt	il 12.2010 and th	nen scrapped.				
6. Attachments							
No appendix							
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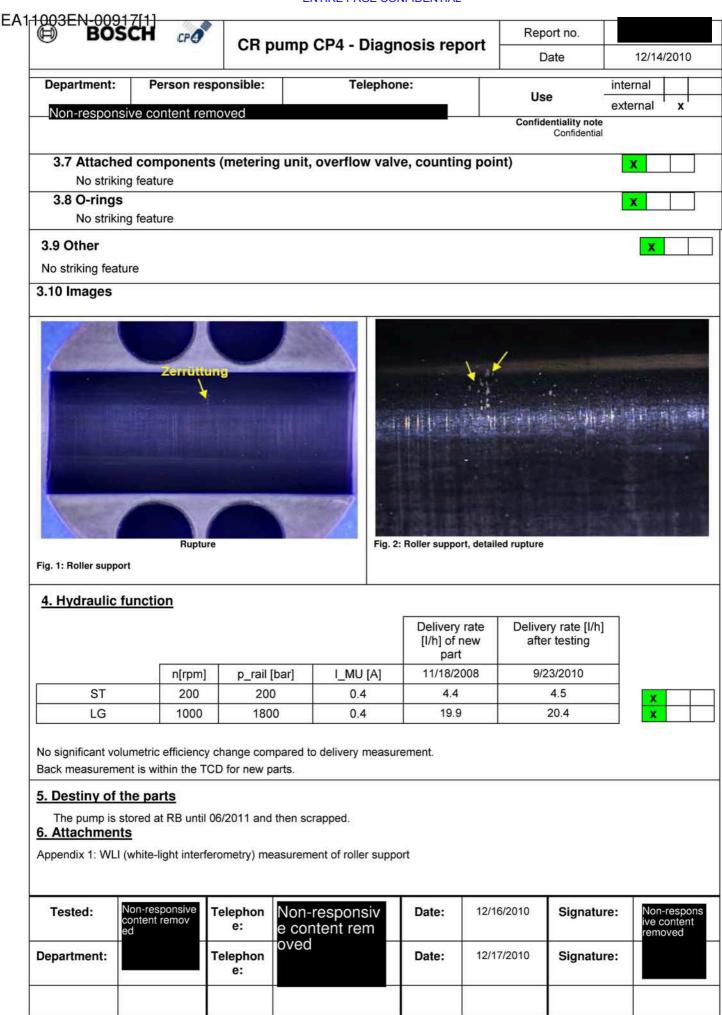
	BOSCH CPO	CR pump CP4 - Diag	nosis report 🛛 🗕	Report no. Date	12/2/2010
	Department:	Person responsible:	Telephone:	Use	internal
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ylinder lead:					
	Pump type:	Customer:	Project:	Project /	design pattern type
2P4.1S	_348_2x5,25_REC_3,3_1,95_M Part number (TTNo.):	Date of manufacture:	R4 2.0 EU5 Serial number:	Manufa	D cturing plant - line
	0445B21116_13	081	4673		P (Feuerbach plant) MAP-No.
	Mileage 104887 km	Fuel: EN590			DS-251677
	SAP-No.: 30-101008-07	Samos no.: 780995	Customer order no.:		e/Vehicle number CFH0126169
	Customer part number 03L 130 755 D	DSBFD no.: 28374	Endurance run type [customer]: Vehicle endurance run	GDV - EW	Proce run conditions: P (Ehra variable trac bassenger cars)
					Jacob
			<u></u>		
ki D P	Pump with special features (see	wing completion of running time			
ki D P . <u>Cc</u>	nown. Diagnosis after diagnosis follo <u>Pump with special features (see onclusion Function Delivery rates after endura</u>	wing completion of running time	e. quantity drift in compariso	n with the new	v state. any functional striki
ki D • <u>Cc</u> • •	nown. Diagnosis after diagnosis follo <u>Pump with special features (see onclusion Function Delivery rates after endura The non-return valve (versifeatures.</u>	owing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier	e. quantity drift in compariso	n with the new	state. any functional striki
ki D P . <u>Cc</u> F -	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Dinclusion</u> Function Delivery rates after endura The non-return valve (vers features. Components (Special featur The roller support (version coating.	owing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no	n with the new s thus without a	any functional striki
ki D P . <u>Cc</u> F -	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>onclusion</u> Function Delivery rates after endura The non-return valve (vers features. Components (Special featur The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier on the cylinder head (version s on the spring and the spring pl itical 8 µm deep smoothening o	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp	n with the new s thus without a on-critical run-in lier 2) of the in	iny functional striki n traces of the C itake valve.
ki D • <u>Cc</u> • •	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Diagnosis after endures</u> <u>Diagnosis after endures</u> <u>Function</u> Delivery rates after endures The non-return valve (versifeatures) Components (Special features The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr wear depth up to 100 µm i The O-rings (version supp	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier on the cylinder head (version s on the spring and the spring pl itical 8 µm deep smoothening o	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp f the running surface (see g features.	n with the new s thus without a on-critical run-in lier 2) of the in	any functional striki n traces of the C take valve.
ki D F - C - - - - - - - - - -	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Diagnosis after endures</u> <u>Diagnosis after endures</u> <u>Function</u> Delivery rates after endures The non-return valve (versifeatures) Components (Special features The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr wear depth up to 100 µm i The O-rings (version supp	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier e on the cylinder head (version s e on the spring and the spring pl itical 8 µm deep smoothening o s uncritical. lier 2) does not show any strikir	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp f the running surface (see g features.	n with the new s thus without a on-critical run-in lier 2) of the in	any functional strikin n traces of the C take valve.
ki D F - C - - - - Re	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Dinclusion</u> Function Delivery rates after endura The non-return valve (vers features. Components (Special featur The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr wear depth up to 100 µm i The O-rings (version supp Wear of the remaining con	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier on the cylinder head (version s on the spring and the spring pl itical 8 µm deep smoothening o s uncritical. lier 2) does not show any strikir nponents is low and without sig	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp f the running surface (see g features.	n with the new s thus without a on-critical run-in lier 2) of the in	any functional strikin n traces of the C take valve.
ki D F - C - - - - Re	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Dinclusion</u> Function Delivery rates after endura The non-return valve (vers features. Components (Special featur The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr wear depth up to 100 µm i The O-rings (version supp Wear of the remaining con	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier e on the cylinder head (version s e on the spring and the spring pl itical 8 µm deep smoothening o s uncritical. lier 2) does not show any strikir nponents is low and without sig durance run.	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp f the running surface (see g features.	n with the new s thus without a on-critical run-in lier 2) of the in	any functional strikin n traces of the C take valve.
ki D F - - - - - - - - - - - - - - - - - -	nown. Diagnosis after diagnosis follo <u>Pump with special features (see</u> <u>Dinclusion</u> Function Delivery rates after endura The non-return valve (vers features. Components (Special featur The roller support (version coating. No striking features visible No striking features visible On the robust flange, uncr wear depth up to 100 µm i The O-rings (version supp Wear of the remaining con esult	wing completion of running time e 6. Appendix 1) ance run without significant fuel- sion supplier 2 for spring, supplier res of modification package): a supplier 2 with material supplier e on the cylinder head (version s e on the spring and the spring pl itical 8 µm deep smoothening o s uncritical. lier 2) does not show any strikir nponents is low and without sig durance run.	e. quantity drift in compariso 3 for hemispherical head) is er 2) does not show any no supplier 2 for soft stage). ate (both are version supp f the running surface (see g features. nificant striking features.	n with the new s thus without a on-critical run-in lier 2) of the in 6. Appendix 2 OK Uncritical	ny functional strikin n traces of the C take valve.) is visible - axial

	BOSCH		CB nump CB4 Disc	Rep	ort no.						
0	Desen	CPO	CR pump CP4 - Diag	inosis report	D	ate	12/2/2010				
		rtment:	Person responsible:	Telepho	ne:	Use	internal				
	Nor	n-responsive cor	tent removed				external X				
						Con	fidentiality note Confidential				
3.	3.3 High pressure X Cylinder and/or the piston running path do not show any striking features X Tappet spring base on the cylinder head light smoothening (Fig. 2) Intake valve base on the cylinder head does not show any striking feature (Fig. 3) Spring and spring plate of the intake valve does not show any striking features, other high-pressure components do not show any striking features 3.4 Bearing Robust flange with non-critical run-in traces on the axial bearing (Fig. 4); no striking features on other										
Ro bea 3.5	bust flange aring compo Shaft seal o striking fea	nents	races on the axial bearing (Fig. 4); no striking features	on other	x					
No 3.7	Holes o striking fea Attached c o striking fea	omponents (Metering	Unit, Overflow Valve, Countin	g Point)		x					
3.	8 O-rings o striking fea					x					
	9 Other o striking fea	ature				X					
3.10	Images					1					
	Fig. 1: Ro	Iler support to the right, ru	nning surface	Fig. 2: Cylinder head to	o the right, ta	appet spring s	uspension system				

EA11003EN-00916[2]

Department: Description of the Ding for the Ding f	Ð	BOSCH	0	CB pu	mn CP4 -	Diagnosis repo		port no.		
$\begin{tabular}{ c c c c c c } \hline Use ternal (Use ternal (Contribution (Use ternal (U$	<u> </u>		9		5		Dai	e		
Confidential Image: Confidential						Telephone		Use		-
		Non-responsiv	e cor	itent remov	/ed			Confic	1 Statistics (1997) (1997)	
A. Hydraulic function Delivery rate [l/h] Delivery rate [l/h] After testing After testing n(rpm) p_rail [bar] 1_MU [A] 1/28/2010 7/7/2010 ST 200 200 0.4 4.5 4.6 LG 1000 1800 0.4 20.0 20.2 X X No significant volumetric efficiency change compared to delivery measurement. Back measurement is within the TCD for new parts. 5. Destiny of the parts The pump is stored at RB until 06/2011 and then scrapped. C. Attachments Appendix 1: Sample configuration for special components Appendix 1: Sample configuration for special components Appendix 2: Set of slides for diagnosis of robust flange Tested: Non-responsive cont Date: 12/6/2010 Signature: Non-responsive cont										
Delivery rate [I/h] Delivery rate [I/h] After testing New part After testing After testing After testing Image: ST 200 200 0.4 4.5 Image: LG 1000 1800 0.4 20.0 20.2 No significant volumetric efficiency change compared to delivery measurement. Back measurement is within the TCD for new parts. Image: Compared to delivery measurement. Back measurement is within the TCD for new parts. Image: Compared to delivery measurement. Image: Compared to delivery measurement. Back measurement is within the TCD for new parts. Image: Compared to delivery measurement. Image: Compared to delivery measurement. Back measurement is stored at RB until 06/2011 and then scrapped. Image: Compared to delivery measurement. Image: Compared to delivery measurement. Appendix 1: Sample configuration for special components Appendix 2: Set of slides for diagnosis of robust flange Image: Configuration for special components Image: Configuration for special components Image: Configuration for special components Appendix 2: Set of slides for diagnosis of robust flange Image: Configuration for special components Image: Configuration for special components Image: Configuration for special components Image: Configuration for special componen		Figure 3 cylinder h	nead to 1	the right, SV syst	tem	Figure 4: robust flang	e, axial running s	urface		
Delivery rate [l/h] Delivery rate [l/h] After testing n[rpm] p_rail [bar] 1_MU [A] 1/28/2010 7/7/2010 ST 200 200 0.4 4.5 4.6 LG 1000 1800 0.4 20.0 20.2 X No significant volumetric efficiency change compared to delivery measurement. Back measurement is within the TCD for new parts. X X X 5. Destiny of the parts The pump is stored at RB until 06/2011 and then scrapped. No Store at RB until 06/2011 and then scrapped. 6. Attachments Appendix 1: Sample configuration for special components Appendix 2: Set of slides for diagnosis of robust flange Tested: Non-responsive ontent removed Date: 12/6/2010 Signature: Non-responsive ontent removed of the removed	4 Hv	draulic function								
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Tested: Non-responsive content removed Phone: Non-responsive cont Date: 12/6/2010 Signature: Non-responsive content removed	Back r	measurement is with	in the T	/ change compa CD for new part	ared to delivery ts.	measurement.				
ed	Th <u>6. Att</u> Appen	he pump is stored at t achments dix 1: Sample config	RB until	for special com	ponents					
	Th <u>6. Att</u> Appen Appen	he pump is stored at tachments dix 1: Sample config dix 2: Set of slides fo	RB until uration or diagn	for special com osis of robust fla	ponents ange Non-responsive	9 cont Date:	12/6/2010	Signature:	Non-respo	nsive

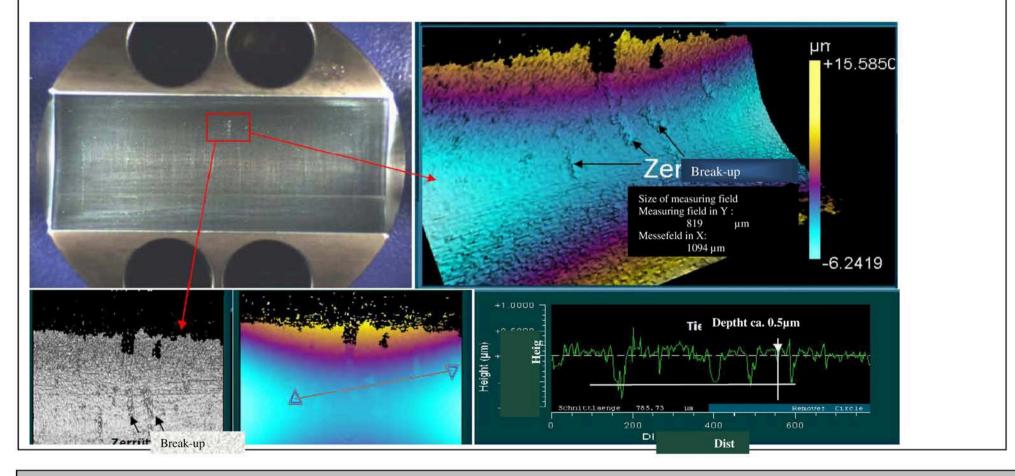
Department: Person Non-responsive content	a responsible: t removed e content remove	Telepi	gnosis report hone: Project: R4 2.0 EU5 Serial number: 4839 Customer order ne PT4839, 000891; ene 03LL000173 or Fa Endurance run ty [customer]: Vehicle trial	o.: gine	Project / d Manufac 011M FeP [Engine 03LL000	D/D cturing plant - lin (Feuerbach plant MAP-No. DS-256645 /Vehicle numbe 173/ VW416000
Non-responsive content Non-responsive or nform ttion: Pump type: P4.1S_398_2x6_REC_3,3_1,9 T4,2 Part number (TTNo.): 0445B21116_05 Actual mileage is [h] 100000 km SAP-No.: 30-101581-07 Customer part number 03L 130 755 D 1. Subject CP4 customer returns with EES (Ehra Start-stop) vehic Diagnosis after running time	t removed e content remove 95_M VW Date of manuf 0891 Fuel: EN590 Samos n 786990 DSBFD n	er: facture: 0 10.:	Project: R4 2.0 EU5 Serial number: 4839 Customer order no PT4839, 000891; eng 03LL000173 or Fa Endurance run tyy [customer]:	o.: gine	Project / d Manufac 011M FeP [Engine 03LL000	external x design pattern t D/D cturing plant - lin (Feuerbach plant (Feuerbach plant MAP-No. DS-256645 //Vehicle numbe 173/ VW416000
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03L 130 755 D 1. Subject CP4 customer returns with EES (Ehra Start-stop) vehic Diagnosis after running time		2240	Endurance run ty [customer]:		Enduran	ce run conditio
CP4 customer returns with EES (Ehra Start-stop) vehic Diagnosis after running time		76	Venicle trial			EES
 Delivery rates after enduration Components The roller support shows a smaller surface (see 6. App also report CP4_0320 2010 Wear of the other component Result 	a local rupture of the C3 bendix 1), rupture is unci 0 in this regard). hents is low and does no	3 coating. Becau ritical. The mos	use of the maximum w t likely cause is inhom	ear depth of ogeneity in t	f 0.5 µm in	
 The pump has passed the It is switched to the optimized 		corrective actio	on for inhomogeneities	in C3 coatir		
3. Results of diagnos findings)	is (visual		Legend rating st		OK Icritical Critical	x x
3.1 Drive No striking feature						x
3.2 Drivetrain Local rupture of C3 coa	ating (Fig. 1, detailed ima	age Figure 2)				X
3.3 High pressure No striking feature	attornet, and gr	uten (The de				x
3.4 Bearing						X
No striking feature						
3.5 Shaft seal No striking feature						X
3.6 Holes No striking feature						x



EA11003EN-00917[2]

CP4 - Investigation R4 2,0 EU5/ #891-4839

- → Pump: D-sample, CP4.1S_398_2x6_REC_3,3_1,95_MT4,2, #891-4839
- → Operating conditions: Vehicle-Endurance testing, Run time 100000km, Endurance testing-end
- → Investigation: Roller shoe start, C-layer, centric





Diesel Systems

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🖻 BOSCH 🐶 🍼	CR pump CP4 - Diag	nosis report	F	Report no. Date	2/3/20	011
Department: Person responsi	ble: Tele	ephone:		Date	internal	011
Non-responsive content removed			Use		external	x
	n -			Confident	iality note	
				Confic	lential	
no: Non-responsive c	ontent removed					
For information:						
Pump type:	Customer:	Project:		Project /	design patter	n ty
CP4.1S_398_2x6_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5		10	eries / Series	-
Part number (TTNo.):	Date of manufacture:	Serial numbe	r:	Manufa	cturing plant	- lin
0445010514	260309	0736			736 - 04	
				-	1997 - 1999 1	
Actual mileage is [h]	Fuel:				MAP-No.	
100023 km	EN590				DS-258419	
SAP-No.:	Samos no.:	Customer order	no.:	Engin	e/Vehicle nun	nber
30-102202-15	789477	731523		CGL0000	027 / AU416 -	1 11
Customer part number	DSBFD no.:	Endurance run		Endura	nce run condi	tion
03L 130 755 D	28992	[customer]: Vehicle endurance		Ehra varia	ole track for pa	isser
1.Subject						
Vehicle no.: AU416 -1 1138 Testing conditions: Ehra variable track to 2. Conclusion	for passenger cars					
Function:						
The pump function is within the specific	ation limits. There is no sigr	nificant drift in compa	arison to t	ne delivery m	easurement.	
Components Wear of the components is low and with	nout significant striking featu	ires.				
Result The pump has passed the endurance	run					
3. Results of diagnosis (visual find	n test	N		Гок	x	
· · · · · · · · · · · · · · · · · · ·		Legend	rating stag	ges duncritical		
3.1 Drive				Critical		X
No striking feature					x	
3.2 Drivetrain					x	
No striking feature						
3.3 High pressure					x	
No striking feature						
3.4 Bearing					X	
No striking feature						_
3.5 Shaft seal No striking feature					X	
3.6 Holes					x	
No striking feature						
No striking teature						

BOS	SCH CPA	CR pur	mp CP4 - Dia	gnosis report	Re	eport no.		
	SCH CPO	15.0 C		3		Date	2/3/2	011
Department:	Person	responsible:	Te	lephone:			internal	
	sive content ren				Use	85	external	l x
						Confidentia Confide	-	
No striking f		Metering Unit, Ov	erflow valve, Co	unting Point)				·
3.8 O-rings No striking f	eature						X	
3.9 Other							x	
No striking f	eature							
3.10 Images	6							
		he specification lim	its. There is no si	gnificant drift in com	parison to the	e delivery mea	asurement.	
4. Hydraulic f		he specification lim	iits. There is no si	Delivery rate [l/h]	Delivery	v rate [l/h]	asurement.	
4. Hydraulic f	unction is within t		[Delivery rate [I/h] of new part	Delivery	/ rate [l/h] testing	asurement.	
4. Hydraulic 1 The pump fu	Inction is within t] p_rail [bar]	IMU [A]	Delivery rate [I/h] of new part 3/26/2009	Delivery after 10/1	/ rate [l/h] testing /2009	asurement.	
4. Hydraulic f The pump fu ST LG	Inction is within t n[rpm 200 1000		[Delivery rate [I/h] of new part	Delivery after 10/1	/ rate [l/h] testing		
4. Hydraulic f The pump fu ST LG 5. Destiny of	Inction is within the neuronal system of the parts remain with the system of the parts of the parts remain with the parts remain wit] p_rail [bar] 200	I_MU [A] 0.4 0.4	Delivery rate [I/h] of new part 3/26/2009 4.6 20.1	Delivery after 10/1	/ rate [l/h] testing /2009 .9	x	
4. Hydraulic f The pump fu ST LG 5. Destiny of The pump p 6. Attachmen None	Inction is within t n[rpm 200 1000 the parts arts remain with nts] p_rail [bar] 200 1800 Robert Bosch Gmb	I_MU [A] 0.4 0.4 0H at the request o	Delivery rate [l/h] of new part 3/26/2009 4.6 20.1	Delivery after 10/1 4 20	/ rate [l/h] testing /2009 .9 D.6	x x	
4. Hydraulic f The pump fu ST LG 5. Destiny of The pump p 6. Attachmen None Tested:	Inction is within the neuronal system of the parts remain with the system of the parts of the parts remain with the parts remain wit	p_rail [bar] 200 1800 Robert Bosch Gmb	I_MU [A] 0.4 0.4	Delivery rate [l/h] of new part 3/26/2009 4.6 20.1	Delivery after 10/1	/ rate [l/h] testing /2009 .9	x x	respon

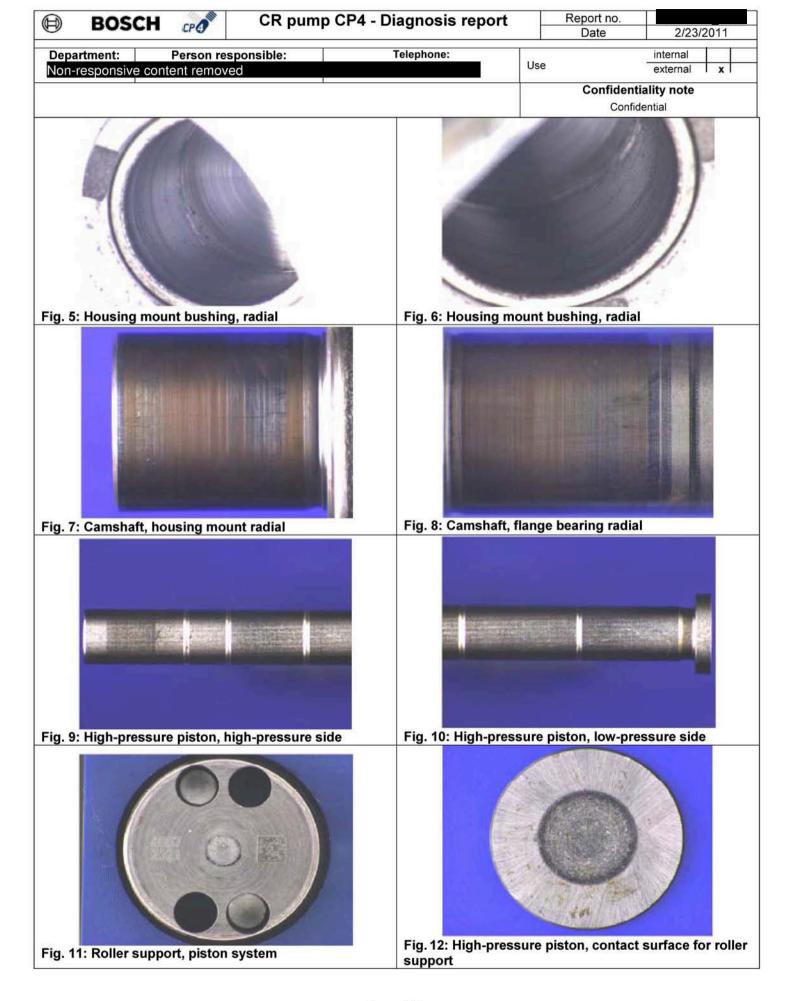
BOSCH CPO	CR pump CP4 - Dia	gnosis report	Re	eport no. Date	2/3/2011
Department: Person respons	ible: Te	lephone:	Use		internal x
Non-responsive content removed				Confidentia	
No.				Confide	ential
To: Non-responsive of For information:	content removed				_
Pump type:	Customer:	Project:		Project / d	lesign pattern type
CP4.1S_398_2x6_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5		Se	ries / Series
Part number (TTNo.):	Date of manufacture:	Serial numbe	r:	Manufac	turing plant - line
0445010514	260309	0736			736 - 04
Actual mileage is [h]	Fuel:				MAP-No.
100023 km	EN590			C	DS-258419
SAP-No.:	Samos no.:	Customer order	no.:	Engine	/Vehicle number
30-102202-15	789477	731523		CGL00000	027 / AU416 -1 1138
Customer part number	DSBFD no.:	Endurance run [customer]:	ype	Enduran	ce run conditions:
03L 130 755 D	28992	Vehicle enduranc	e run	Ehra variab	le track for passenger cars
		-			
1. Subject CP4 Customer returns without completengine no. CGL00000, 125 kW, Euro 5 Vehicle no.: AU416 -1 1138 Testing conditions: Ehra variable track	5				
2. Conclusion					
Function: The pump function is within the specific	cation limits. There is no sig	gnificant drift in compa	rison to the	e delivery me	asurement.
Components Wear of the components is low and wit	hout significant striking fea	tures.			
Result The pump has passed the endurance	run				
3. Results of diagnosis (visual find	54' 40	Legend	rating stage	OK s uncritical	x x
3.1 Drive				Critical	x
No striking feature					x
3.2 Drivetrain					x
No striking feature					x
3.3 High pressure No striking feature					
3.4 Bearing No striking feature					x
3.5 Shaft seal No striking feature					x
3.6 Holes					x
No striking feature					

B	SCH CPO	📍 CR p	ump CP4 - Dia	gnosis report	R	eport no.	2/2/	0011
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						Confidentia Confide	and the second s	
1212 200 14				104 EE 8 198		0.001201020202	x	
		(Metering Unit,	Overflow Valve, Co	unting Point)				
No striking	feature							
3.8 O-ring	s						X	
No striking	feature							
							x	i i
3.9 Other								
No striking	feature							
Hydraulio The pump		the specification	limits. There is no si	gnificant drift in comp Delivery rate [l/h]	na haire saines e dai	e delivery me	asurement	•
				of new part		testing		
	n[rpn	n] p_rail [bai	r] I_MU [A]	3/26/2009		1/2010		
ST	200	200	0.4	4.6		1.9	X	
LG	1000) 1800	0.4	20.1	2	0.6	×	
550		Robert Bosch G	mbH at the request	of the customer				
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epartment	emoved	Telephone:		Date: 2	2/14/2011	Signatur		

	R pump CP4 - Dia	gnosis report	Re	eport no. Date	2/23/2011
Department: Person responsib	le: Te	lephone:		Dato	internal
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				Confid	ential
Non-responsive co	ontent removed				
For information:					
Pump type:	Customer:	Project:		Project /	design pattern ty
C P4.1 S_348_2x 5,2 5_R E C_3,3_I, 95_ M T4,2	vw	R4 2.0 EU5		s	eries / Series
Part number (TTNo.):	Date of manufacture:	Serial numbe	er:	Manufa	cturing plant - lin
0445010507	150609	0365		5150 Jhi	O (Jihlava plant) - 0
Actual mileses is [h]	Eirali	rethic brim.		- 1400 - 1707 I.C	MAD No
Actual mileage is [h]	Fuel:				MAP-No.
22400 km	Others				DS-259908
SAP-No.:	Samos no.:	Customer order	no.:	Engine	e/Vehicle number
30-101745-50	791254	VN817-8-0164 (RP	U) EU5		
Customer part number	DSBFD no.:	Endurance run	tuno	Endurar	nce run condition
Customer part number	29202	[customer]:		201 EV	
	29202	Vehicle endurance	e run	Profile	e Argentina diesel
1.Subject CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, data of manufacture: 06.1					
CP4 Customer returns without complaint	5.2009, SN: BPT0356, 000616	Ĩ			
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0	5.2009, SN: BPT0356, 000616				
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d	5.2009, SN: BPT0356, 000616				
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km		no longer (possible.	
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components:	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul	ic back measurement			
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup	ic back measurement port and cam track in a	addition to	material fati	· · · · · · · · · · · · · · · · · · ·
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most	ic back measurement port and cam track in a	addition to	material fati	· · · · · · · · · · · · · · · · · · ·
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca	ic back measurement port and cam track in a components (bearing im track, roller support	addition to s, tappet he t and the ro	material fati	· · · · · · · · · · · · · · · · · · ·
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this	addition to s, tappet he t and the ro damage.	material fati oles, contac Iler	t area of HP pist
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no da is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the ho result of drivetrain damage and overload	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pusing and flange bearing , see Figures 5 and 6	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see	addition to s, tappet h t and the ro damage. Figures 7 a	material fati oles, contac Iler and 8; bearii	t area of HP pist
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the ho	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pusing and flange bearing , see Figures 5 and 6	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see	addition to s, tappet h t and the ro damage. Figures 7 a	material fati oles, contac Iler and 8; bearii	t area of HP pist
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the ho result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result:	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pusing and flange bearing , see Figures 5 and 6 ss and discoloration that o	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see	addition to s, tappet h t and the ro damage. Figures 7 a	material fati oles, contac Iler and 8; bearii	t area of HP pist
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the hor result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result: - The pump has failed the endurance rur	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pousing and flange bearing , see Figures 5 and 6 as and discoloration that o	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see can occur during grind	addition to s, tappet he and the ro damage. Figures 7 a ling under o	material fati oles, contac Iler and 8; beari certain circu	t area of HP pist ng damage as a mstances, see
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the hor result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result: - The pump has failed the endurance rur The pump is released for EN590 accordin Argentina diesel were carried out outside	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul orasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pousing and flange bearing , see Figures 5 and 6 ss and discoloration that of n. ing to TCD (technical cus e this release.	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see can occur during grind	addition to s, tappet h and the ro damage. Figures 7 a ing under o	material fati oles, contac Iler and 8; beari certain circu	t area of HP pisi ng damage as a mstances, see
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the hor result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result: - The pump has failed the endurance run The pump is released for EN590 accordi	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul orasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pousing and flange bearing , see Figures 5 and 6 ss and discoloration that of n. ing to TCD (technical cus e this release.	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see can occur during grind	addition to s, tappet h and the ro damage. Figures 7 a ing under o	material fati oles, contac ller and 8; bearin certain circun	t area of HP pist ng damage as a mstances, see onditions with
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves t and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the hor result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result: - The pump has failed the endurance rur The pump is released for EN590 accordi Argentina diesel were carried out outside	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pousing and flange bearing , see Figures 5 and 6 as and discoloration that of a figures 5 and 6 as and discoloration that of h. ng to TCD (technical cus e this release. nation is air, water in fuel,	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see can occur during grind tomer documentation) foam or Argentina die	addition to s, tappet he and the ro damage. Figures 7 a ling under o). The endu	material fati oles, contac ller and 8; beari certain circu rance run co rance run co occorritical	t area of HP pist ng damage as a mstances, see onditions with
CP4 Customer returns without complaint BD 0 445 010 507 HP pump CP4.1, Design status, date of manufacture: 06.1 Engine no. VN817-8-0164 (RPU), CDC0 EU5 emission standard with Argentina d 2. Conclusion Function: Pumps were already opened by the cust Components: Drivetrain damage category 1 (global, at the roller), see Figures 1 to 4 As a result, particle marks and grooves to and roller support, etc.), see Figs. 11 to Due to the progression of damage, no de is possible any longer. Argentina-diesel of Brown discoloration due to fuel on the hor result of drivetrain damage and overload The high-pressure piston shows wavines Figures 9 and 10 Result: - The pump has failed the endurance run The pump is released for EN590 accordi Argentina diesel were carried out outside One possible reason for the deposit form	5.2009, SN: BPT0356, 000616 iesel, mileage 22,400 km omer. Therefore, hydraul prasive wear of roller sup hrough particles on most 14 etailed analysis on the ca cannot be ruled out as a pousing and flange bearing , see Figures 5 and 6 as and discoloration that of a figures 5 and 6 as and discoloration that of h. ng to TCD (technical cus e this release. nation is air, water in fuel,	ic back measurement port and cam track in a components (bearing m track, roller support possible cause of this g of the camshaft, see can occur during grind tomer documentation) foam or Argentina die	addition to s, tappet he and the ro damage. Figures 7 a ling under o). The endu	material fati oles, contac ller and 8; bearin certain circun rrance run co	t area of HP pist ng damage as a mstances, see onditions with

BOSCH CR pump CP4 - D	iagnosis report	Report no. Date	2/23/2011
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		Confid	ential
3.2 Drivetrain			X
Drivetrain damage category I (global, abrasive wear)			
3.3 High pressure		525	X
Piston base up to 4 mm diameter damaged by particles indenta the entire piston guidance.	ations. High-pressure pisto	on, waviness over	
3.4 Bearing			x
Bearing damage due to drivetrain damage and overload			
3.5 Shaft seal			X
No striking feature			
3.6 Holes			x
As a result of drivetrain damage, particle marks and particles an	re in the metering hole.		
3.7 Attached components (metering unit, overflow valve, co	ounting point)		X
As a result of drivetrain damage, there are particles on the MU	(metering unit).		9
3.8 O-rings			X
No striking feature			
3.9 Other			x
No striking feature			
3.10 Images			
		NY I	
Fig. 1: Roller, running surface	Fig. 2: Roller suppo	t. running surface	
Fig. 1: Roller, running surface	Fig. 2: Roller suppo	ort, running surface	
Fig. 3: Camshaft, cam track running surface TDC (top dead center)	Fig. 4: Camshaft, ca (bottom dead cente		urface BDC

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B BOS	CH CPO	CR pur	np CP4 - Diagnosis repor	rt Re	port no.		-
y 003	CPC		,		Date	2/23/	2011
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	e content remov	The Research of the second second second		Use		external	x
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	ig unit, screen		Fig. 14: Housing	g, metering u	nit hole		
 Hydraulic fu The pumps we Destiny of the 	Inction The already opened The parts	-	Fig. 14: Housing er. Therefore, hydraulic back measu H at the request of the customer				
 4. Hydraulic fu The pumps we 5. Destiny of th The pump part 6. Appendix None 	Inction The already opened The parts The remain with Rob	bert Bosch Gmb	er. Therefore, hydraulic back measu	urement no long	ger possible.		-respor
 4. Hydraulic fu The pumps we 5. Destiny of th The pump part 6. Appendix None Tested: No ve 	Inction The already opened The parts The remain with Rob	elephone:	er. Therefore, hydraulic back measu			e: Nor	n-respon

EA11003EN-00921[0]

	BOSCH	CPO	CR pump CP4	- Diagnosis	Rep	port no.	
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	Pump type:		Customer:	Project:		Proje	ct / design pattern type
CP4.1S_3	348_2x5,25_REC_3,3_1,95_M	1T4,2	VW	R4 2.0 EU5		. tojo	Series / Series
	Part number (TTNo.):		Date of manufacture:	Serial number:		Man	ufacturing plant - line
	0445010507		150709	0060		5150	JhP (Jihlava plant) - 03
	Actual mileage is [h]		Fuel:				MAP-No.
	62106 km SAP-No.:		Others Samos no.:	Customer order no.:		En	DS-259910 gine/Vehicle number
	30-101745-50		791254			นตามจะเองกับ	9-0359 (RPU) EU5,120kW
	ustomer part number		DSBFD no.:	Endurance run type [custo	morl	Endu	rance run conditions:
	03L 130 755		29203	Vehicle endurance run	- CC		ra variable track for passenger
			2752.0245		2 	cars	s with Argentina diesel
Fu Pu Co Thu in 0 Sig Bro We Th Thu Thu	mponents: e high-pressure pisto China. (Rating 4), see gnificant deposits on t own discoloration due ear of the other compo- sult: e pump has passed f	n shows wa e Figures 1 a he right side to fuel on t onents is low the endurator or EN590 ac	viness and discoloration and 2 e of the roller support due he roller. (Rating 5), see w and without significant nce run.		ding und	ler certain o	rcumstances
			t formation is air, water ir	n fuel, foam or Argentina d	iesel fue	1.	ок х
	sults of diagnosis	(visual fii	ndings)	Legend	d rating s	ages ≺	Uncritical X Critical X
3.1	Drive No striking feature						×
3.2	2 Drivetrain						x
			side of the roller support on the roller. (Rating 5),	due to fuel. (Rating 5), se see Figure 4	e Figure	3	

EA11003EN-00921[1]

	BOSCH	CP O	CR pump CP4	4 - Diagnosis	Re	port no.	
0	200011	LPC	report		Da	te	2/23/2011
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ģ	3.3 High pressure The high-pressure p circumstances. (Rati	iston shows ing 4), see Fi	waviness and discolora gures 1 and 2	ation that can occur during g	rinding	under certair	
	3.4 Bearing No striking feature						×
8	3.5 Shaft seal No striking feature						×
	NO SURANY REALITE						
	3.6 Holes No striking feature						
3	3.7 Attached compone No striking feature	nts (Meterin	g Unit, Overflow Valv	e, Counting Point)			×
3	3.8 O-rings No striking feature						×
20	3.9 Other						×
	No striking feature 3.10 Images						
	Fig. 1: High-pressure p	iston, high-pre	ssure side (rating 4)	Fig. 2: High-pressure piston	lo	w-pressure sid	e (rating 4)
					-		

Fig. 3: Roller support, running surface (rating 5)

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Fig. 4: Roller, running surface (rating 5)

EA11003EN-00921[2]

BOSCH	CR pump CP4 report	- Diagnosis	Rep	port no.		
BUSCH CP	4 report		Dat	e 2	2/23/2011	
Department:	Person responsible:	Telephon	ie:	Use	intern al	
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					identiality Confidential	note
4. Hydraulic function Pumps were already open	ed by the customer. Therefore,	hydraulic back measu	irement no l	longer possible	L.c	
111	ed by the customer. Therefore,	hydraulic back measu	irement no l	longer possible	L.	
111	ed by the customer. Therefore,	hydraulic back measu	irement no l	longer possible	kc	
Pumps were already open 5. Destiny of the parts	ed by the customer. Therefore,	20		longer possible		
Pumps were already open 5. Destiny of the parts	°	20		longer possible		
Pumps were already open 5. Destiny of the parts The pump parts remain wi	°	20		longer possible		
Pumps were already open 5. Destiny of the parts The pump parts remain wi 6. Attachments	°	request of the custome		longer possible	a: No	n-responsi

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	9 report		Date	2/23/2011
partment:	Person responsible:	Telephone:	Use	internal
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rma :				
Pump type:	Customer:	Project:	Proie	ect / design pattern type
CP4.1S_348_2x5,25_REC_3,3_1,95_MT4,2	vw	R4 2.0 EU5		Series / Series
Part number (TTNo.):	Date of manufacture:	Serial number:	Mai	nufacturing plant - line
0445010507	150709	0060	5150) JhP (Jihlava plant) - 03
Actual mileage is [h]	Fuel:			MAP-No.
62106 km	Others			DS-259910
SAP-No.: 30-101745-50	Samos no.: 791254	Customer order no.:	100 0048-0000	gine/Vehicle number -9-0359 (RPU) EU5,120kW
	and a second		End	urance run conditions:
Customer part number	DSBFD no.:	Endurance run type [custome	Profile of El	hra variable track for passeng
03L 130 755	29203	Vehicle endurance run	car	s with Argentina diesel
CP4 Customer returns without Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion	PU) 120 kW, CDC 630, er		el	
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h	nger cars with Argentina dies	no longer possibl	
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components:	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 It side of the roller support du el on the roller. (Rating 5), se	nger cars with Argentina dies ydraulic back measurement r n that can occur during grindir le to fuel. (Rating 5), see Figu e Figure 4	no longer possibl ng under certain	
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump is released for EN5 Argentina diesel were outside of this rele	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du el on the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (T echni wase.	nger cars with Argentina dies nydraulic back measurement r n that can occur during grindir ne to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance	circumstances
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump has passed the en The pump is released for EN5 Argentina	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du el on the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (T echni wase.	nger cars with Argentina dies nydraulic back measurement r n that can occur during grindir ne to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance	circumstances
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump is released for EN5 Argentina diesel were outside of this rele	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du of the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (Techni ease. eposit formation is air, water i	nger cars with Argentina dies ydraulic back measurement r n that can occur during grindir te to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance	circumstances e run conditions with
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump is released for EN5 Argentina diesel were outside of this relea One possible reason for the de	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du of the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (Techni ease. eposit formation is air, water i	nger cars with Argentina dies ydraulic back measurement r n that can occur during grindir te to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance sel fuel.	circumstances e run conditions with
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened to Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump is released for EN5 Argentina diesel were outside of this rele One possible reason for the de	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du of the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (Techni ease. eposit formation is air, water i	nger cars with Argentina dies ydraulic back measurement r n that can occur during grindir te to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance sel fuel.	circumstances
Engine no. VN817-9-0359 (RF Mileage: 62,106 km, profile of 2. Conclusion Function: Pumps were already opened b Components: The high-pressure piston show in China. (Rating 4), see Figur Significant deposits on the righ Brown discoloration due to fue Wear of the other components Result: The pump has passed the en The pump has passed the en The pump is released for EN5 Argentina diesel were outside of this relea One possible reason for the de 3. Results of diagnosis (visu 3.1 Drive	PU) 120 kW, CDC 630, er Ehra variable track for passe by the customer. Therefore, h vs waviness and discoloration es 1 and 2 it side of the roller support du of the roller. (Rating 5), se is low and without significan durance run . 90 according to TCD (Techni ease. eposit formation is air, water i	nger cars with Argentina dies ydraulic back measurement r n that can occur during grindir te to fuel. (Rating 5), see Figu e Figure 4 t striking features. cal Customer D ocumentation	no longer possibl ng under certain ure 3). The endurance sel fuel.	circumstances e run conditions with

EA11003EN-00922[1]

	BOSCH	CP O	CR pump CP4 -	Diagnosis	Report no.	
9		LP CF	report		Date	2/23/2011
	Department:		Person responsible:	Telephone:	Use	internal
	Non-responsive cor	ntent removed				external x
						Confidentiality note Confidential
3	3.3 High pressure					x
	The high-pressure p circumstances. (Rat	biston shows ting 4), see Fi	waviness and discoloration gures 1 and 2	that can occur during grir	nding under certa	in
3	3.4 Bearing					x
	No striking feature					
1	3.5 Shaft seal					x
	No striking feature					
	3.6 Holes					×
	No striking feature					
3	3.7 Attached compone No striking feature	ents (Meterir	ig Unit, Overflow Valve, C	Counting Point)		×
ŝ	3.8 O-rings					x
	No striking feature					
3	3.9 Other					×
	No striking feature					
	3.10 Images					
	and a shirt shall be	THE REAL	Pit North Pit	a desident for	RECEIPTION	
	And a second	Manual Products	and the second		The second second	
	Fig. 1: High-pressure p	oiston, high-pre	essure side (rating 4) Fig. 2	2: High-pressure piston, low-p	pressure side (rating	3 4)
				and the second se		
			A DESCRIPTION OF	1 BIOLEMAN		THE OWNER WHEN
	The name				5 8 1	
					19 TEN	Contraction of the
	al martine	-	Self A			the second second
			1000			
		de A				
	Fig. 3: Roller support,	running surfac		TOUR CENTERING	r, running surface (r	ating 5)
	BOSCH	CDA	CR pump CP4 -	Diagnosis	Report no.	

EA11003EN-00922[2]

	report		Date	е	2/23/2011
Department:	Person responsible:	Telepho	one:	Use	internal
Non-responsive content remov	/ed				external x
				Co	nfidentiality note
					Confidential
5. Destiny of the parts	by the customer. Therefore, hyd			onger possib	le.
None					
Tested: Non-responsiv e content rem oved	Non-responsive c ontent removed	Date:	2/28/2011	Signat	Non-responsive content removed
Department	phone:	Date:	3/1/2011	Signat	ure:

EA11003EN-00923[0]

	1111	CR pump CP4	- Diagnosis	Report no.	
BOSCH	CP O M	report	g	Date	3/3/2011
Department: Non-responsive content remov		rson responsible:	Telephone:	Use	internal external x
					Confidentiality note Confidential
™ Non-responsive con	ntent re	moved			
For informa tion:					
Pump type:		Customer:	Project:	Proje	ect / design pattern type
CP4.1S_398_2x6_REC_3,3_1,95_MT4,2		VW	R4 2.0 EU5		C/C
Part number (TTNo.):		Date of manufacture:	Serial number:	100 C	nufacturing plant - line
0445B21137_05		989	4491	011M	FeP (Feuerbach plant)-M -
Actual mileage is [h] 950 h		Fuel: EN590			MAP-No. DS-260833
SAP-No.:		Samos no.:	Customer order no.:	E.	
30-102939-09		791448	03LT/20819, 103 kW		ngine/Vehicle number 03LT/20819, 103 kW
Customer part number		DSBFD no.:	Endurance run type [custor		lurance run conditions:
03L 130 755 F		29265	Engine endurance run	1998 - CO	file of ÖVL + PZD + ÖVL
1. Subject CP4 customer returns with Engine no. 03LT/20819, 10 Mileage: 950 h with ÖVL + 2. Conclusion Function: The pump function in the sp fuel-quantity drift is detectal Components: Fretting wear on the high-pu (See 3.10 Figures 1 and 2,	3 kW, em + PZD + (becified te ble. ressure se	ission standard: EU5 ÖVL esting point meets the re			
Fuel deposits on the outer e 3) Wear of the other compone Result: The pump has passed th Deposit formation is due to 3. Results of diagnosis (vi	edges of t ents is low e endurar fuel. Rob	and without significant nce run. ert Bosch GmbH requir	striking features. es further information from		
3.1 Drive					Critical
No striking feature					×
3.2 Drivetrain No striking feature					×
Fuel deposits on the out 2, rating 3)	h-pressur ter edge o	e seal in contact with the high-pressure sea	re. (Rating 4, Figure 1). ne intake valve (Rating 4, F aling surfaces of the intake al of the intake valve. (See	valve. (See 3.10 Fi	

EA

	BOS	SCH	CPO		P4 - Diagnosis	Report	no.	
			LFG	report		Date	3/3	/2011
	Departm	ent:		Person responsibl	le: Telep	hone:		nternal
Nc	n-responsiv		removed				Use — e	external x
								lentiality note
2	.4 Bearing						Co	onfidential
	No striking	feature						X
	3.5 Shaft sea	d.						×
	No striking							
	2	56						6730-1731 - 83
	3.6 Holes							×
	No striking	g feature						
	3.7 Attached	componer	nts (Meterin	g Unit, Overflow V	alve, Counting Point)			×
	No striking		1999-199 8					
	3.8 O-rings							
	No striking	g feature						
į	3.9 Other							x
	No striking	a feature						
	3.10 Imag							
	and an other states of the					And the second second second	and the second se	
	Fig. 1: Intak	e valve of fre	etting wear (Re	ating 4)	Fig. 2: Fr	etting wear at station	ery seal ring (Ra	ating 4)
3	Fig. 1: Intak			ating 4)	Fig. 2: Fr	etting wear at station	ery seal ring (Ra	ating 4)
The	4. Hydraulio	c function i in the spea omparison t	cified testing o the deliver	point meets the y measurement,	Fig. 2: Fr Delivery rate [I/h] New part	etting wear at station Delivery rate [l/ After testing		ating 4)
The	4. Hydraulic pump function rements. In co	c function i in the spea omparison t	cified testing o the deliver	point meets the y measurement, etectable.	Delivery rate [I/h]	Delivery rate [l/		ating 4)
The	4. Hydraulic pump function rements. In co	c function i in the spec omparison t nt fuel-quar	cified testing o the deliver tity drift is de	point meets the y measurement, etectable.	Delivery rate [I/h] New part	Delivery rate [l/ After testing		ating 4)
The	4. Hydraulio pump function rements. In co no significar	t in the spect omparison to the fuel-quaring n[rpm]	cified testing o the deliver tity drift is de p_rail [t	point meets the y measurement, etectable. par] I_MU [A] 0.4	Delivery rate [I/h] New part 9/17/2009	Delivery rate [l/ After testing 11/8/2010		
The requi	4. Hydraulid pump function rements. In co no significan ST LG 5. Destiny c	the function omparison to nt fuel-quar n[rpm] 200 1000 of the part	cified testing o the deliver tity drift is de p_rail [t 200 1800 s	point meets the y measurement, etectable. bar] I_MU [A] 0.4 0.4	Delivery rate [I/h] New part 9/17/2009 4.4	Delivery rate [l/ After testing 11/8/2010 4.5 20.5		×
The requi	4. Hydraulid pump function rements. In co no significan ST LG 5. Destiny c	c function in the spectomparison to omparison to full-quar n[rpm] 200 1000 of the part parts remaind	cified testing o the deliver tity drift is de p_rail [t 200 1800 s	point meets the y measurement, etectable. bar] I_MU [A] 0.4 0.4	Delivery rate [I/h] New part 9/17/2009 4.4 20.4	Delivery rate [l/ After testing 11/8/2010 4.5 20.5		×
The requi	4. Hydraulio pump function rements. In co no significan ST LG 5. Destiny c The pump	c function in the spectomparison to omparison to full-quar n[rpm] 200 1000 of the part parts remaind	cified testing o the deliver tity drift is de p_rail [t 200 1800 s	point meets the y measurement, etectable. bar] I_MU [A] 0.4 0.4	Delivery rate [I/h] New part 9/17/2009 4.4 20.4	Delivery rate [l/ After testing 11/8/2010 4.5 20.5		×
The requi	4. Hydraulid pump function rements. In co no significan ST LG 5. Destiny c The pump 6. Attachme None	c function in the spectomparison to omparison to full-quar n[rpm] 200 1000 of the part parts remaind	cified testing o the deliver tity drift is de p_rail [t 200 1800 s	point meets the y measurement, etectable. par] I_MU [A] 0.4 0 0.4 0 0.4 ert Bosch GmbH at	Delivery rate [I/h] New part 9/17/2009 4.4 20.4 the request of the custo	Delivery rate [l/ After testing 11/8/2010 4.5 20.5		×

EA11003EN-00924[0]

1-00		110. 11	CR pump CP4	- Diagnosis	Report no.	
9	BOSCH	CPO	report	Blaghosis	Date	3/10/2011
epartmer ON-res	nt: ponsive content rem		erson responsible:	Telephone:	Use	internal external x
						Confidentiality note Confidential
or Iorma	lon-responsive c	ontent re	moved			
n:	Pump type:	T	Customer:	Project:	Pro	ject / design pattern type
CP4.	1S_398_2x6_REC_3,3_1,95_MT	4,2	vw	R4 2.0 BIN5		Series / Series
	Part number (TTNo.):		Date of manufacture:	Serial number:	Ma	anufacturing plant - line
	0445010514		250310	0449	5	150 JhP (Jihlava plant) -
	Actual mileage is [h]		Fuel:			MAP-No.
	890 h		EN590			DS-265015
	SAP-No.:		Samos no.:	Customer order no.:		ingine/Vehicle number
	30-101933-06 Customer part number		796025 DSBFD no.:	Endurance run type [custom	orl: E-	C3LF / 21493 durance run conditions:
	03L 130 755 D		29797	Engine endurance run	erj: En	TTHS/SRT
C V F	Components: Wear of the components Result: The pump has passed	s is low and v	vithout significant strikin	no significant drift in compa ng features.		אין וווסמסטופווופווג.
	Results of diagnosis 3.1 Drive No striking feature	(visual fin	dings)	Legend r	ating stages	OK X Uncritical X Critical X
3	3.1 Drive	(visual fin	dings)	Legend r	ating stages	
3	 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 	(visual fin	dings)	Legend r	ating stages	
3	3.1 Drive No striking feature 3.2 Drivetrain	(visual fin	dings)	Legend r	ating stages	
3	 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure 	(visual fin	dings)	Legend r	ating stages	
3	 3.1 Drive No striking feature 3.2 Drivetrain No striking feature 3.3 High pressure No striking feature 3.4 Bearing 	(visual fin	dings)	Legend r	rating stages	

	SCH			P4 - Diagnosis	Re	port no.		
		CP () re	eport	6763 to	Dat	te	3/10/2011	
	artment:		erson responsible	e: Telep	hone:	Use	internal	
Non	-responsive conte	ent removed				030	external	x
							Confidentiality n Confidential	ote
	ned component king feature	s (metering ur	nit, overflow va	lve, counting point)		1		X
3.8 O-ring	IS							x
5-03 (La 10	king feature						1.	
110 511	king feature							
	ulic function	thin the specific	cation limits. The	ere is no significant drift Delivery rate [I/h] New part	Delivery ra	te [l/h]	very measureme	ent.
4. Hydra	ulic function	1		Delivery rate [I/h] New part	Delivery ra After tes	te [I/h] ting	very measureme	ent.
4. Hydra The pur	ulic function np function is wi n[rpm]	p_rail [bar]	I_MU [A]	Delivery rate [I/h] New part 3/25/2010	Delivery ra After tes 11/8/20	te [I/h] ting		ent.
4. Hydra	ulic function	1		Delivery rate [I/h] New part	Delivery ra After tes	te [l/h] ting 110	very measureme	ent.
4. Hydra The pur ST LG 5. Destin	ulic function np function is wi n[rpm] 200 1000 ny of the parts ump parts remain	p_rail [bar] 200 1800	I_MU [A] 0.4 0.4	Delivery rate [I/h] New part 3/25/2010 4.6	Delivery ra After tes 11/8/20 4.7 20.5	te [l/h] ting 110	×	ent.
4. Hydra The pur ST LG 5. Destin The pu 6. Attach None	ulic function np function is wi n[rpm] 200 1000 ny of the parts ump parts remain	p_rail [bar] 200 1800	I_MU [A] 0.4 0.4	Delivery rate [I/h] New part 3/25/2010 4.6 20.6 he request of the custo	Delivery ra After tes 11/8/20 4.7 20.5	te [l/h] ting 110		ent.

EA11003EN-00925[0]

v	BOSCH	CDA	CR pump CP4			
		CP O	report		Date	9/22/2011
	_Department:		Person responsible:	Telephone:		internal
	Non-responsive	content re	moved		Use	external x
					Co	onfidentiality note
						Confidential
Ν	Ion-responsive c	ontent re	moved			
na						
	Pump type:	T	Customer:	Project:	Project	/ design pattern type
CP4.2	HS_747_2x5,63_REC_3,3_1,3_1	MT4,2	AUDI	W36 2000bar (Q7)		D/D
	Part number (TTNo.):		Date of manufacture:	Serial number:	349870-73548232544	acturing plant - line
	0445B20249_08		990	4011	011M Fe	P (Feuerbach plant)-M
	Actual mileage is [h] 160565 km		Fuel: India EU3			MAP-No. DS-276680
	SAP-No.:		Samos no.:	Customer order no.:	Engi	ne/Vehicle number
	30-101921-06		813822			/36 586 / AU641 04046
	Customer part number		DSBFD no.:	Endurance run type [customer]:	Endura	ance run conditions:
	059 130 755 AK		31082	Vehicle endurance run	3-zone endu	rance run (NK6, cool1, hot
1 1 2. C	CP4 Customer returns Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function:	nce run end ability test 586 / Vehicle nout				
2. CC	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two co - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl	nce run end ability test 586 / Vehicle nout iny durance run p side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increas	e No.: AU641 04046 or test without significa e) shows increased wea tical. ing with slight noticeable ing with slight noticeable wand without significan most likely due to redu	e grooves (see Figures 1 and 2) ot affect the function.	cates a reduced	
2. C 1 - - - - - - - - - - - - - - - - - -	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two co - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl - The pump has passed	nce run end ability test 586 / Vehicle nout iny durance run p side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increas the enduran	e No.: AU641 04046 or test without significa e) shows increased wea tical. ing with slight noticeable in ot critical and does no w and without significan most likely due to redu sed proportion of free wance run	ar (see Figure 3). e grooves (see Figures 1 and 2) ot affect the function. nt striking features. ced lubricity of the fuel. This indi	cates a reduced imes.	
2. C 1 - - - - - - - - - - - - - - - - - -	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two co - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl - The pump has passed	nce run end ability test 586 / Vehicle nout iny durance run p side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increas the enduran	e No.: AU641 04046 or test without significa e) shows increased wea tical. ing with slight noticeable in ot critical and does no w and without significan most likely due to redu sed proportion of free wance run	ar (see Figure 3). e grooves (see Figures 1 and 2) ot affect the function. nt striking features. ced lubricity of the fuel. This indi ater or gasoline from the fuel at	cates a reduced imes.	Viscosity of the fuel. OK X Uncritical X
2. C	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two cc - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl - The pump has passed Results of diagnosis 3.1 Drive No striking feature 3.2 Drivetrain	ability test ability test 586 / Vehicle hout any durance run ap side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increased the enduran b (visual fin	e No.: AU641 04046 or test without significa e) shows increased weatical. ing with slight noticeable not critical and does no w and without significant work likely due to redu sed proportion of free wance run	ar (see Figure 3). e grooves (see Figures 1 and 2) ot affect the function. nt striking features. ced lubricity of the fuel. This indi ater or gasoline from the fuel at Legend ratin	cates a reduced imes. g stages	Viscosity of the fuel. OK X Uncritical X
2. C	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two cc - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl - The pump has passed Results of diagnosis 3.1 Drive No striking feature 3.2 Drivetrain	ability test ability test 586 / Vehicle hout any durance run ap side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increased the enduran b (visual fin	e No.: AU641 04046 or test without significa e) shows increased weatical. ing with slight noticeable not critical and does no w and without significant work likely due to redu sed proportion of free wance run	ar (see Figure 3). e grooves (see Figures 1 and 2) ot affect the function. nt striking features. ced lubricity of the fuel. This indi ater or gasoline from the fuel at	cates a reduced imes. g stages	Viscosity of the fuel. OK X Uncritical X
2. C	Diagnosis after endurar 160,565 km vehicle dur Engine no. 059.H W36 Anti-wear package: with Testing country: Germa Conclusion Function: - Delivery rates after en Components: - The shaft seal on pum However, this is classi - Both spring plates sho The wear of the two cc - Wear of the other com Result: - Wear of the shaft seal Maybe, there was a sl - The pump has passed Results of diagnosis 3.1 Drive No striking feature 3.2 Drivetrain	ability test ability test 586 / Vehicle hout any durance run ap side (inside fied as uncrit w smootheni omponents is ponents is lo is increased ightly increased the enduran b (visual fin	e No.: AU641 04046 or test without significa e) shows increased weatical. ing with slight noticeable not critical and does no w and without significant work likely due to redu sed proportion of free wance run	ar (see Figure 3). e grooves (see Figures 1 and 2) ot affect the function. nt striking features. ced lubricity of the fuel. This indi ater or gasoline from the fuel at Legend ratin	cates a reduced imes. g stages	Viscosity of the fuel. OK X Uncritical X

EA11003EN-00925[1]

BOS	СН		pump CP4 -	Diagnosis	Report r	10.		
		rep.	ort		Date		9/22/2011	_
Departme	nt:	Pers ntent remove	on responsible:	Telephone:		Use	internal	
Non-re	sponsive co	niem remove	0				external x	
						Cor	nfidentiality note Confidential	
3.5 Shaft seal Shaft seal		reased wear (s	ee Figure 3).		1			x
3.6 Holes No striking	feature						×	
254 50 - 1874 - 1860 - 1874 - 187	components	Metering Unit,	Overflow Valve,	Counting Point)			×	
3.8 O-rings No striking	feature						×	
3.9 Other								Т
No striking fea	ature						X	1
3.10 Images								
Fig. 1: Spring	plate to the left,	piston system	Fig	ure 2: Spring plate to the righ	ıt, piston syst	em		
	eal, pump-side							
ydraulic function				Delivery rate [l/h] of new part		rate [l/h] testing		
[n[rpm]	p_rail [bar]	I_MU [A]	11/17/2009	3/10	/2001	21	
ST	200	200	0.4	8.5	8	.5	x	1
LG	1000	2000	0.4	35.9	36	6.4	×	-
significant volumetr chnical customer do	ic efficiency cl	nange, the volur	netric efficiency is	within the tolerance spec	cified in the	тср		

EA11003EN-00925[2]

(n-n)	BOSCH		CR pump CP4 - Diagnosis		Report no	p.		
			report		Date	9/22/2	2011	
	Department:		Person responsible:	Telephone		Use inte	rnal	
							ernal x	
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						Confi	dential	
Tł	ne pump will be scrappe	ed at the rec	juest of Audi.					
<u>6.</u>	Attachments							
0.00	Attachments 1: Diagnosis images of	drivetrain						
0.00	1: Diagnosis images of	drivetrain Telepho	one: Non-responsive con	Date:		Signature:		

EA11003EN-00925[3]

Appendix 1 to process 2011-CP4_0203

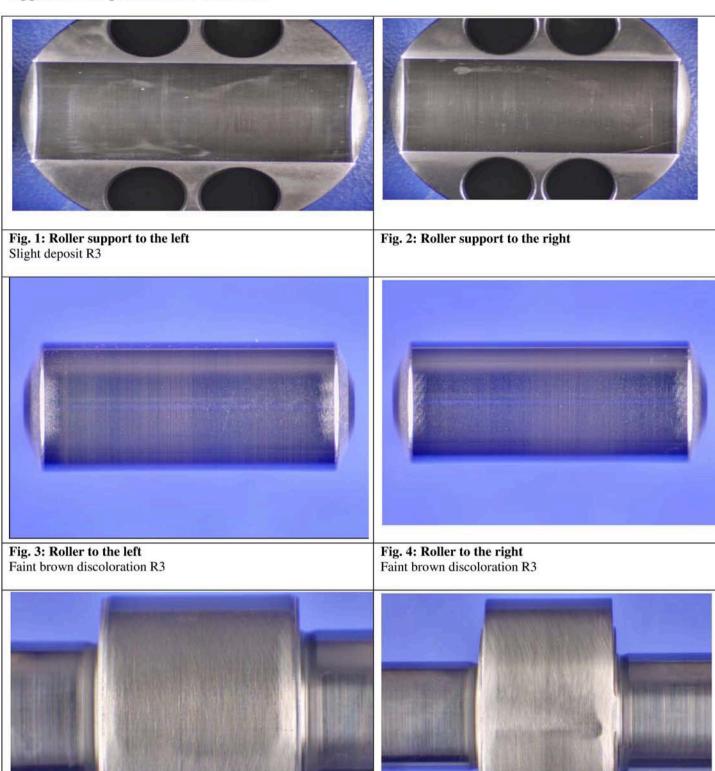


Fig. 5: Camshaft, running surface US1

Fig. 6: Camshaft, running surface LS1

EA11003EN-00926[0]

	BOSCH	CR pump CP4 report	- Diagnosis	Report no. Date	7/11/2011				
	Department:	Person responsible:	Telephone:		internal I				
	Non-responsive content		Telephone.	Use	external I x I				
-				-	Confidentiality note				
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то: NO	on-responsive content	removed							
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For informa tion:									
	Pump type:	Customer:	Project:	Proje	ct / design pattern type				
CP4.15	5_398_2x6_REC_3,3_1,95_MT4,2	vw	R4 2L EA189 Gen2 BIN5	(A-22) (A-2)	C/C				
	Part number (TTNo.):	Date of manufacture:	Serial number:	Man	ufacturing plant - line				
	0445B21210_01	006	4327	011M F	FeP (Feuerbach plant)-M -				
	Actual mileage is [h]	Fuel:			MAP-No.				
	101180 km	North China fuel			DS- 280121				
	SAP-No.: 30-104330-20	Samos no.: 819666	Customer order no.: 03L130755 AB		gine/Vehicle number				
	Customer part number	DSBFD no.:	Endurance run type [customer]		16_BW088-0S, 103 kW				
	731325	31512	Vehicle endurance run	- Children	radial run-out North China				
Dia 101 Ant Eng Tes 2. Co FL - 1 ne Co - 1 - 1	1. Subject CP4 customer returns without complaint Diagnosis after endurance run end 101180km vehicle durability test Anti-wear package for the roller support: AWP1 Anti-wear package for the high-pressure piston: AWP0 Engine no. VW316_BW088-0S Testing country: 2. Conclusion Function: - The hydraulic delivery rates after endurance run or trial are without significant drift of quantity in comparison with the new state. Components: - The roller support shows a groove due to particle draft (see 3.10, Figure 1). - The spring plate shows noticeable grooves and smoothening over large area (see 3.10, Figure 2). - The above-mentioned striking feature should be classified as uncritical.								
Tr <u>3. Re</u>	esult: ne pump has passed the endu esults of diagnosis (visual 1 Drive		Legend rati	ng stages	OK > Uncritical > Critical >				
	No striking feature								
	2 Drivetrein								
3.	2 Drivetrain Roller support to the right: Pa	rticle draft (see 3.10, Figure	9 1).						
3.:	3 High pressure No striking feature								
	4 Bearing o striking feature								

EA11003EN-00926[1]

BO	SCH		R pump C	mp CP4 - Diagnosis		no.	
	эсп	CPO re	port		Date		7/11/2011
Departe			erson responsib	le: Telepl	none:	in Use —	ternal I I
Non-res	ponsive conter	nt removed				577	kternal I x I
							entiality note nfidential
3.5 Shaft se	al					19 - C	>
No strikir	ng feature						
3.6 Holes							2
No strikir	ng feature						
		ts (Metering Un	it, Overflow V	alve, Counting Point)			
No strikir	ng feature						
3.8 O-rings							1
	ng feature						
3.9 Other							x
No striking	g feature						
2 10 Imagar	- 22						
3.10 Images	3				_	17	
Partic	ele draft			Noticeable groove	Y		
Fig. 1: Rolle	er support to the	e right, running su	Irface	Image 2: Spring plate to	the right, piston system	n	
4 Hydraul	ic function						
<u>4. 11yulau</u>	<u>ic function</u>			Delivery rate [I/h] of	Delivery rate [l/h]		
				new part	after testing		
r	n[rpm]	p_rail [bar]	I_MU [A]	6/29/2010	7/5/2011		
		1800	0.4	21.0	21.0		
LG	1000	/ 4.5×752 (A/61)					
ST	200	2	0.4	4.4	4.4		x
ST	200	2	Con Carloux	4.4 ne tolerance specified in	100-100	rts.	>
ST The volum <u>5. Destiny</u>	200 netric efficienc of the parts	2 cy was checked	l and is within th	728.2877	100-100	rts.	> >
ST The volum <u>5. Destiny</u> The pum	200 netric efficienc of the parts np will be scrap	2 cy was checked	l and is within th	728.2877	100-100	rts.	· · · · · · · · · · · · · · · · · · ·
ST The volum <u>5. Destiny</u> The pum 6. Attachm	200 netric efficienc of the parts op will be scrap nents	2 cy was checked	l and is within th	728.2877	100-100	rts.	· · · · · · · · · · · · · · · · · · ·
ST The volum <u>5. Destiny</u> The pum 6. Attachm No appe	200 netric efficienc of the parts op will be scrap nents ndices.	2 cy was checked	and is within th	l ne tolerance specified in	100-100	tts.	Non-responsive c
ST The volum <u>5. Destiny</u> The pum 6. Attachm No appen	200 netric efficienc of the parts of will be scrap nents ndices. n-responsive ntent remov	2 cy was checked 2 pped at the requ	l and is within th	l ne tolerance specified in	the TCD for new par		Non-responsive c

1003EN-00927[0]					Report no.		
BOS	CH CPO	CR pump	o CP4 - Dia	ignosis report	C	Date	7/12/2011
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Pump t	The second second second second	Custome	er:	Project:		Project / d	design pattern ty
CP4.1S_398_2x6		VW		R4 2L EA189 Gen2 B			C/C
5_MT	4,2	VVV		R4 2L EA189 Genz E	CUIR		BNUS
Part numbe	r (TTNo.):	Date of manuf	facture:	Serial number:			turing plant - lir
0445B212	210_01	006		4331		011M FeF	P (Feuerbach plar M -
Actual m	ileage	Fuel:	1				MAP-No.
60000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	North China	a fuel			(DS-280122
SAP-N	ło.:	Samos n	no.:	Customer order no	o.:	Engine	Vehicle number
30-1043	30-20	819666	6	VW316_BW090-0S		VW316_I	BW090-0S, 103 k
Customer pa	irt number	DSBFD n	no.:	Endurance run typ			ce run condition
7313	25	31513	8	[customer]: Vehicle endurance run		Profile ra	adial run-out Nort China
Anti-wear pac Engine no. VV Testing count <u>2. Conclusion</u> Function	<u>n</u>	pressure piston	: AWP0	without significant drif	ft of quan	tity in comp	parison with the n
-The above-m Result		feature is yet to		ning (see 3.10, Figure as uncritical .	1).		
3. Results of	diagnosis (vi	sual		ñ	ſ	OK	X
findings)				Legend rating st	ages {	Incritical Critical	x
3.1 Drive							
No striking	5 Pumper (10 27 20 32)						x
3.2 Drivetrai		50 M	a. 55				x
	-	pothening over a	a large area (s	ee 3.10, Figure 1)			
3.3 High pre							X
No striking	g teature						
3.4 Bearing	- faatur-						X
No strikinę	gieature						

EA11003EN-00927[1]

BOSC	H CPO				. R	eport no.	
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						Confidentia	25.0
		21			-	Confide	ential
3.5 Shaft seal No striking							x
3.6 Holes	lealure						x
No striking	feature						
		(metering ι	unit, overflow v	alve, counting	point)		x
No striking	feature						
3.8 O-rings	foaturo						X
No striking 3.9 Other	lealuie						x
No striking	feature						
3.10 Images							
Smoothi Fig. 1: Spring p 4. Hydraulic fur		grou	iceable ove	Delivery rate [I/h] of new part		rate [l/h] after esting	
Ĩ	n[rpm]	p_rail [bar]	I_MU [A]	6/29/2010	7/	5/2011	-
LG	1000	1800	0.4	21.1	26	21.2	x
ST	200	200	0.4	4.5		4.4	X
The volumetric effic	ciency was cheo	ked and is w	vithin the tolerance	e specified in the	CD for new	v parts.	
5. Destiny of the The pump will be s 6. Attachments No appendices.		equest of VV	V.				
	n-responsive tent remov	Phone N	on-responsive c tent removed	o Date:	7/15/2011	Signatu	re: Non-responsi ve content r emoved
Department:		Phone		Date:	7/15/2011	Signatu	

003EN-00928	11. 8	0.0		Rep	port no.	
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Pump t	The second se	Customer:	Project:		Project / c	design pattern
CP4.1S_398_2x6 5_MT4	21.222	VW	R4 2L EA189 Gen2	BIN5		C/C
	12 Aug = 102-83 - 100				Manufac	turing plant -
Part number	2 2	Date of manufactur				P (Feuerbach p
0445B212	210_01	006	4329			`М-
Actual m		Fuel:				MAP-No.
101077		North China fuel		10.000		DS-280123
SAP-N 30-10433		Samos no.:	Customer order	-3/26/28		Vehicle numb
Customer pa	33 =0	819666 DSBFD no.:	VW316_BW077- Endurance run t			BW077-0S, 103 ce run conditi
7313	STREET AN AMADDRANAS	31514	[customer]:	ype		adial run-out No
/010/	20	51514	and the second	Vehicle endurance run		
1,01,077km ve Anti-wear pack Anti-wear pack Engine no. VV	kage for the high V316_BW077-05	run r support: AWP1 -pressure piston: AWP	0			
Testing country	y: North China					
2. Conclusion	<u>1</u>					
state. Components		after endurance run or t	trial are without significant d	rift of quan	itity in comp	parison with the
Result		and without significan	a summy realures.			
	as passed the e	ndurance run.				
3. Results of findings)	diagnosis (v	isual	Legend rating	stages {	OK Uncritical Critical	x x
3.1 Drive				L	·	
No striking	feature					x
3.2 Drivetrail	5					x
No striking						
3.3 High pres						X
No striking	feature					
3.4 Bearing						X
No striking	g feature					

	CH CPO			oeie rono			
			or i blugi	iosis repoi	' [Date	7/12/20
Department:	Person resp	onsible:	Telephon	e:	Use		internal external
Non-responsive co	ntent removed				5	Confidential Confider	
3.5 Shaft se No strikin							x
3.6 Holes No strikin							X
3.7 Attached No striking		(metering unit	, overflow valv	e, counting	ooint)		X
3.8 O-rings No strikin	g feature						x
3.9 Other No striking 3.10 Images							X
	unation						
<u>4. Hydraulic f</u>	unction			Delivery rat [l/h] of new part		ery rate [l/h] er testing	
<u>4. Hydraulic f</u> i	unction n[rpm]	p_rail [bar]	I_MU [A]	[l/h] of new	afte		
LG	n[rpm] 1000	1800	0.4	[l/h] of new part 6/29/2010 21.1	afte	/5/2011 21.2	X
2-	n[rpm] 1000 200	1800 200	0.4	[l/h] of new part 6/29/2010 21.1 4.4	2 afte 7/	/5/2011 21.2 4.4	x
LG ST The volumetric ef 5. Destiny of th	n[rpm] 1000 200 fficiency was chea	1800 200	0.4 0.4 the tolerance sp	[l/h] of new part 6/29/2010 21.1 4.4	2 afte 7/	/5/2011 21.2 4.4	
LG ST The volumetric ef 5. Destiny of th	n[rpm] 1000 200 ificiency was chee ne parts be scrapped at t	1800 200 cked and is withir	0.4 0.4 the tolerance sp	[l/h] of new part 6/29/2010 21.1 4.4	2 afte 7/	/5/2011 21.2 4.4	
LG ST The volumetric ef <u>5. Destiny of th</u> The pump will <u>6. Attachments</u> No appendic Tested:	n[rpm] 1000 200 fficiency was chee ne parts be scrapped at t be scrapped at t	1800 200 cked and is withir he request of VW Phone Non-	0.4 0.4 the tolerance sp	[I/h] of new part 6/29/2010 21.1 4.4 ecified in the T	2 afte 7/	/5/2011 21.2 4.4	

CP4 – Diagnos	sis 17858				BOSCH
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					Page 1 of 1 Appendix 0 page (s)
То:	Non-responsive	e content remov	ved		
For information:					
Customer:	vw		IBAS number:	105	225 862
Component:	CP4.1S-34	48-2X5.25-REC	SaMOS:	0560	0399
Project:	R4 2.01 Te	ji	Customer order / M no.:	KV	
Engine / block no.:			Parts receipt at dep PC/EDI:	ot. DS- 5/7/2	2007
TTNo.:	0 445 B21	058 02	Manufacturing site:	0110	(Feuerbach plant)

Pattern type:

Complaint:

Running time:

С

605 h

Endurance run end

Add-on parts:	Metering Unit
Operating conditions:	KRT (customer information)

685

0044

1. Description of problem

The pump should be diagnosed and assessed according to the durability trial.

2. Diagnosis result

Leak-tightness:

The pump was seal-tight in the immersion test (air with 6 bar_rel, 10 min).

Function:

DoM:

Serial no .:

Quantity is within test tolerance for new parts at all testing points. The seal-tightness of the HP valve is OK. No hydraulic defects were found.

Parts visual findings:

The drivetrain parts (camshaft, roller, roller support, HP pistons, bearings) are in very good condition. The machining marks on the cam track are still visible. No striking feature present.

3. Conclusion

The pump does not show any striking feature in the function and wear. The pump has passed the test.

4. Destiny of the parts

The parts are returned to the customer.

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Department	oved	Telephone:	emoved	Date:	6/11/2007	Signature:	oved
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CP4 – Diagnos		BOSCH				
From:	Persons responsible	Phone extension	n	Phone extension		Feuerbach
Non-responsive co	ontent removed					6/22/2007
						Page 1 of 2 Appendix 0 page (s)
То:	Non-responsive	content remov	ved			
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information:	,					
Customer:	vw		IBAS nu	umber:	105 2	225 852
Component:	CP4.1S-34	8-2X5.25-REC	Samos:		0560	377
Project:	P4 2 01 Td	i	Custom	ner order / MKV		

Project:	R4 2.01 Tai	no.:	
Engine / block no.:	03LD/16351	Parts receipt at dept. DS- PC/EDI:	5/7/2007
TTNo.:	0 445 B21 043_02	Manufacturing site:	0110 (Feuerbach plant)
DoM:	681	Pattern type:	B3.3
Serial no.:	4768	Running time:	950h
Add-on parts:	Metering Unit	Complaint:	Endurance run end
Operating conditions:	Application		

1. Description of problem

The pump should be diagnosed and assessed according to the durability trial.

2. Diagnosis result

Leak-tightness:

The pump was seal-tight in the immersion test (air with 6 bar_rel, 10 min).

Function:

Quantity is within test tolerance for new parts at all testing points. The seal-tightness of the HP valve is OK. No hydraulic defects were found (see Table 1)

Parts visual findings:

The drivetrain parts (camshaft, roller, roller support, HP pistons, bearings) are in very good condition. The machining marks on the cam track are still visible. No striking feature present.

3. Conclusion

The pump does not show any striking feature in the function and wear. The pump has passed the test.

4. Destiny of the parts

The parts are returned to the customer.

				Delivery measurement	Back measurement
	n[rpm]	p [bar]	iMetering Unit [A]	1/30/2006	5/9/2007
KL1-S	3375	500	0.40	77.9	78.1
LG	1000	1800	0.40	20.4	20.4
ST	200	200	0.40	4.5	4.5



Date:

6/27/2007

Signature:

Report passed on to the customer: yes

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E. dept .:

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Telephone:





HPFP - Assessment

Manufacturer	Bosch	Date	26.01.10
Series	CP4.1	Person in charge	And a second second a particular and a second
VW - part number	03L130755	Project	RPU
Manufacturer part no.	0445010507	Engine no.	CDC 000002
Serial no. / DoM	BPT 1451 / 260109	Output:	
Drawing no. / pattern		Fuel	
Revision index	0007	Vehicle / test rig	
Plant	515	Running time /	100000 km
Complaints / comments	RPU verification engine		

Component	Assessment		Remark
	OK	Not OK	
housing			
Drive shaft	X		
Roller support	X		
Roller	X		
Tappet hole	X		
HP piston	X		
Spring washer / anti-friction paint coating	X		
Shaft seal / seal-tightness	X		
Corrosion	X		
Bearing	X		
LP ports	X		
HP ports	X		
MU / MU hole	X		
Hydraulic function			
Delivery rate			
Injection pressure			
Drive power			
Seal-tightness under load			
Pressure valves	X		
Overflow valve			
Dirt / chips	X		
Electrical function			
Plug contacts	X		
Metering Unit			

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