

### Gasoline Injection Pump with Mechanical Mixture Control Governor

0 408 126 . .  
PED 6 KL 60/120 R 3 . .

Modifications to the mixture control governor EP/RLA...  
for Porsche 2.4 liter engines.

A wider 3-D cam and, instead of the roller lever with  
follower roller, a follower lever with follower ball is  
fitted in the above mixture control governor.

A guide groove has been milled into the collar of the  
follower lever. When installed, a guide bolt pressed into  
the pump housing engages this groove. In this way, the  
center position of the follower lever is precisely located  
and cannot be altered.

The retainers on the lever shaft, the spring and the  
adjusting screw previously installed in connection with  
the roller lever have been eliminated.

When repairing this type of governor, the steps described  
in the Repair Instructions VDT-WJP 711/1 B Ed. 2  
(12.70) for Figures 30, 31 and 32 do not have to be  
carried out.

In this case, the following text is valid for Fig. 33: Screw  
out the screw plug.

Take the lever shaft out through the screw plug opening  
and remove the follower lever.

The repair step for Fig. 57 does not have to be carried  
out.

Differing from Fig. 59 and its text, the follower lever is  
so fitted that the guide bolt pressed into the pump  
housing engages in the collar guide groove.

Insert the lever shaft into the governor housing and the  
follower lever collar. Screw the screw plug into the  
governor housing.

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### Modifications to the Mixture Control Governor EP/RLA..

#### 1. Adjusting Eccentric on Correction Lever

With governors fitted with an adjusting eccentric on the correction lever the sequence of testing steps given in Test Instructions VDT-WPP 711/1 B and in Supplement No. 1 thereto, Sections 4.7. and 4.8., is changed as follows:

##### 1.1.

Set dimension "C":

Fit measuring device 1 687 011 001 – EFEP 455 and dial indicator holder 1 680 320 021 – EFEP 414/2 with the dial indicator in place (according to Section 4.8.). Set the dimension "C" with washers under the tested aneroid or with the setting device 1 688 132 004 – EFEP 417.

##### 1.2.

Set control rack travel difference:

Check the control rack travel difference as described in Section 4.7. Adjustment of eccentric on correction lever.

When the lock nut on the eccentric is loosened, insert a pin of 6 mm diameter and about 90 mm long between the governor housing and the rocker because otherwise the transmission shaft – to the aneroid – will be bent.

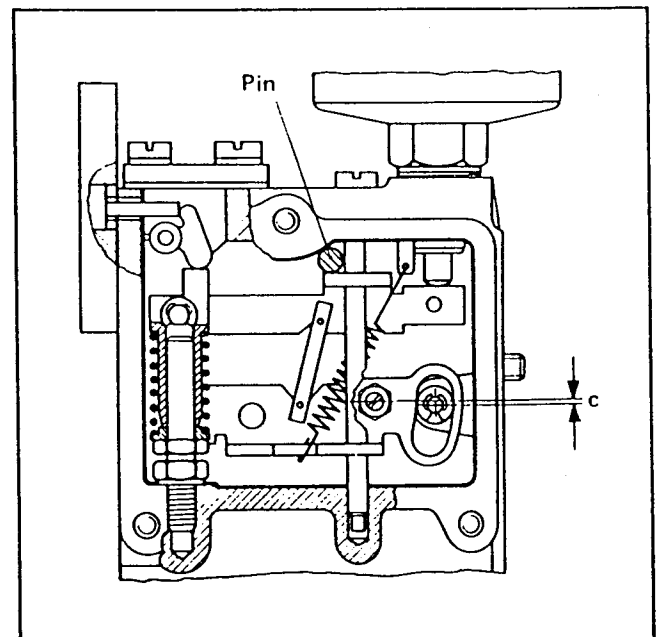
#### 2. Modified 3-D Cam and Follower Lever instead of Roller Lever

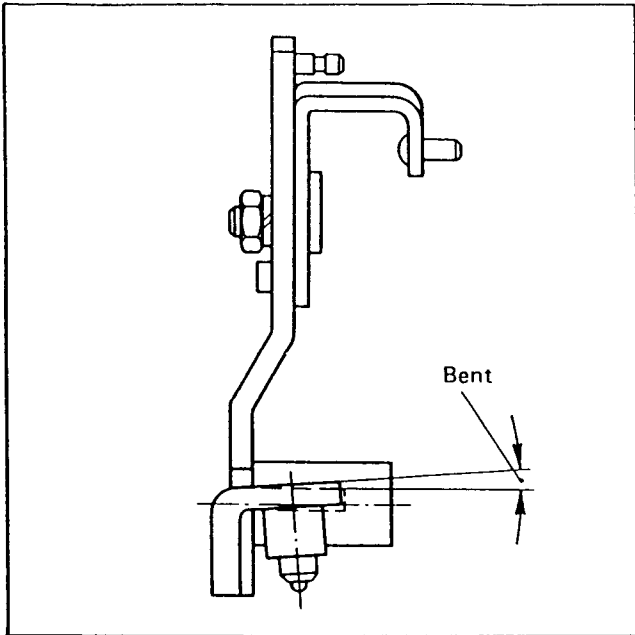
A wider 3-D cam, and instead of the previous roller lever with follower roller, a follower lever with follower ball is fitted in the mixture control governor for Porsche 2.4 liter engines.

The center position of the follower lever is located by a guide bolt in the pump housing and a guide groove in the collar of the follower lever, and cannot be changed.

When adjusting a governor of this type the step "Center the follower roller" under Section 4.6. of Test Instructions VDT-WPP 711/1 B (3.68) and Supplement No. 1 (3.69) is omitted.

For adjusting this relationship (Section 4.10), an adjustment bushing (see Test Specifications Sheet VDT-WPP 001/5-POR 2.4 a, Edition No. 2, Page 4), which is inserted into the bushing of the measuring ring, is required in addition to the setting device 1 688 130 077 – EFEP 555.





2

In order to insert the measuring ring, the guide piece of the setting device must be unscrewed from the camshaft cone. Finally fit the measuring ring in place with swivel lever connected and with the follower ball engaged. Then insert the guide piece into the measuring ring and bolt both parts together onto the camshaft cone.

The follower lever can be bent if too much pressure is applied to the control rack (for example when adjusting the concentration of CO in the vehicle's exhaust gases).

This bending can result in changes in the transmission ratio (control rack travel difference). Examination of an injection pump for which a complaint has been registered, therefore, must always include a check of the transmission ratio. If the prescribed value (see Test Specifications Sheet) at the eccentric on the correction lever can no longer be set, the follower lever must be replaced.

**Note:**

With an incorrect transmission ratio, i.e., if the follower lever has been bent, the operating characteristics of the engine will be seriously degraded even though all fuel delivery test values according to the Test Specifications Sheet have been reached on the test stand.

## Injection Pump and Regulator

PED 6 KL 60/120 R 3 EP/RLA 1/41 R  
 PED 6 KL 60/120 R 3 Z EP/RLA 1/42 R  
 PED 6 KL 60/120 R 3 Y EP/RLA 1/43 R

publ. 1.72

Firm: Porsche  
 Motor: 911S,E,T

Please observe notes on Page 4!

All test values are only for BOSCH injector pump test benches and equipment.

### R3 with 1/41

Measurement "b" bearing assembly	= 15.2 ± 0.1 mm
Target value mass 58 ± 2.5°	= 23.52 ± 0.03 mm
Gearing RW-differential	= 3.95 ± 0.02 mm
Measurement "c"	= 0.8 ± 0.05 mm
Angle "α"	= 59°
Measurement "g"	= 44.6 ± 0.2 mm
Angle "β"	= 45.0 ± 0.2°

### Warm-running correction 400 rpm, VH 0°

+15° - -15°C "f" = 19.60 - 16.90	RW-differential = 1.35 - 1.65 mm
+50° - +20°C "f" = 22.75 - 20.05	RW-differential = 0.45 - 0.50 mm
Delivery mass-differential from +20° - +53° = 4.5 ± 0.75 cm <sup>3</sup> / 1000H	

Adjustment arm in degrees	RPM	Adjustment distance in mm	Delivery volume in cm <sup>3</sup> / 1000H	Differential cm <sup>3</sup> / 1000	Adjustment
A) Control spring pre-adjustment					
max.	2000	7.00	-	-	Control arm head 1. Spring 2. Spring 3. Spring
0	400	4.45	-	-	
8.3	800	4.25	-	-	
29.5	2000	4.75	-	-	
B) Full load values					
max.	700	6.25	33.5 - 34.5	2.5	
max.	900	6.75	39.5 - 40.5	2.5	
max.	2000	7.00	47.0 - 48.5	2.5	
max.	3000	7.30	52.0 - 54.0	2.5	
C) Part load values					
0	300	4.70	15.5 - 16.5	1.0	1. Spring and equal delivery
0	400	4.45	13.5 - 14.5	1.0	
0	900	3.85	10.5 - 11.5	1.5	
0	3000	3.55	13.0 - 15.0	1.5	
8.3	800	4.25	14.0 - 15.0	1.5	2. Spring
16	600	-	20.0 - 21.0	1.5	
16	900	4.60	18.5 - 19.5	1.5	
16	1200	4.25	16.5 - 17.5	1.5	3. Spring
29.5	1000	5.40	26.0 - 27.5	2.0	
29.5	1150	5.00	23.5 - 24.5	2.0	
29.5	2000	4.75	24.0 - 25.0	2.0	
D) Stop loss					
-	-	1.0 - 1.5	-	-	Dome nut (Stop magnet)

## R3 Z with 1/42

Measurement "b" bearing assembly	= 15.2 ± 0.1 mm
Target value mass 58 ± 2.5°	= 23.52 ± 0.03 mm
Gearing RW-differential	= 3.95 ± 0.02 mm
Measurement "c"	= 0.8 ± 0.05 mm
Angle "α"	= 59°
Measurement "g"	= 44.6 ± 0.2 mm
Angle "β"	= 45.0 ± 0.2°

Warm-running correction 400 rpm, VH 0°

+15° – -15°C "f" = 19.60 – 16.90	RW-differential = 1.35 – 1.65 mm
+50° – +20°C "f" = 22.75 – 20.05	RW-differential = 0.45 – 0.50 mm
Delivery mass-differential from +20° – +53° = 4.5 ± 0.75 cm <sup>3</sup> / 1000H	

Adjustment arm in degrees	RPM	Adjustment distance in mm	Delivery volume in cm <sup>3</sup> / 1000H	Differential cm <sup>3</sup> / 1000	Adjustment
A) Control spring pre-adjustment					
max.	2000	7.00	–	–	Control arm head
0	400	4.40	–	–	1. Spring
8.3	800	4.25	–	–	2. Spring
29.5	2000	4.55	–	–	3. Spring
B) Full load values					
max.	750	6.40	33.5 – 34.5	2.5	
max.	900	6.65	38.0 – 39.0	2.5	
max.	2000	7.00	46.0 – 47.5	2.5	
max.	3000	7.05	48.5 – 50.0	2.5	
C) Part load values					
0	300	4.80	13.5 – 14.5	1.0	1. Spring and equal delivery
0	400	4.40	12.5 – 13.5	1.0	
0	900	3.80	10.5 – 11.5	1.5	
0	3000	3.55	12.5 – 13.5	1.5	
8.3	800	4.25	13.0 – 14.0	1.5	2. Spring
16	600	–	20.0 – 21.5	1.5	
16	900	4.82	18.5 – 19.5	1.5	
16	1200	–	15.0 – 16.0	1.5	
29.5	1000	5.55	27.5 – 28.5	2.0	3. Spring
29.5	1150	5.10	24.0 – 25.5	2.0	
29.5	2000	4.55	21.5 – 22.5	2.0	
D) Stop loss					
–	–	1.0 – 1.5	–	–	Dome nut (Stop magnet)

### R3 Y with 1/43

Measurement "b" bearing assembly	= 15.2 ± 0.1 mm
Target value mass 58 ± 2.5°	= 23.52 ± 0.03 mm
Gearing RW-differential	= 4.05 ± 0.03 mm
Measurement "c"	= 0.8 ± 0.05 mm
Angle "α"	= 59°
Measurement "g"	= 44.6 ± 0.2 mm
Angle "β"	= 45.0 ± 0.2°

Warm-running correction 400 rpm, VH 0°

+15° - -15°C "f" = 19.60 - 16.90	RW-differential = 1.35 - 1.65 mm
+50° - +20°C "f" = 22.75 - 20.05	RW-differential = 0.45 - 0.50 mm
Delivery mass-differential from +20° - +53° = 4.5 ± 0.75 cm <sup>3</sup> / 1000H	

Adjustment arm in degrees	RPM	Adjustment distance in mm	Delivery volume in cm <sup>3</sup> / 1000H	Differential cm <sup>3</sup> / 1000	Adjustment	
A) Control spring pre-adjustment						
max.	2000	7.00	-	-	Control arm head 1. Spring 2. Spring 3. Spring	
0	400	4.40	-	-		
8.3	800	4.30	-	-		
29.5	2000	4.50	-	-		
B) Full load values						
max.	750	6.55	36.0 - 37.5	2.5		
max.	900	6.70	39.0 - 40.5	2.5		
max.	2000	7.00	47.0 - 48.5	2.5		
max.	3000	6.45	43.0 - 45.0	2.5		
C) Part load values						
0	250	4.80	15.5 - 16.5	1.0	Equal delivery and 1. Spring  2. Spring  3. Spring	
0	400	4.40	13.5 - 14.5	1.0		
0	900	3.85	10.5 - 11.5	1.5		
0	3000	3.45	12.0 - 14.0	1.5		
8.3	800	4.30	14.0 - 15.0	1.5		
16	600	5.15	22.0 - 23.0	1.5		
16	900	4.70	19.5 - 20.5	1.5		
16	1200	4.20	16.0 - 17.0	1.5		
29.5	1000	5.65	29.5 - 30.5	2.0		
29.5	1150	5.20	26.0 - 27.0	2.0		
29.5	2000	4.50	21.5 - 22.5	2.0		
D) Stop loss						
-	-	1.0 - 1.5	-	-		Dome nut (Stop magnet)

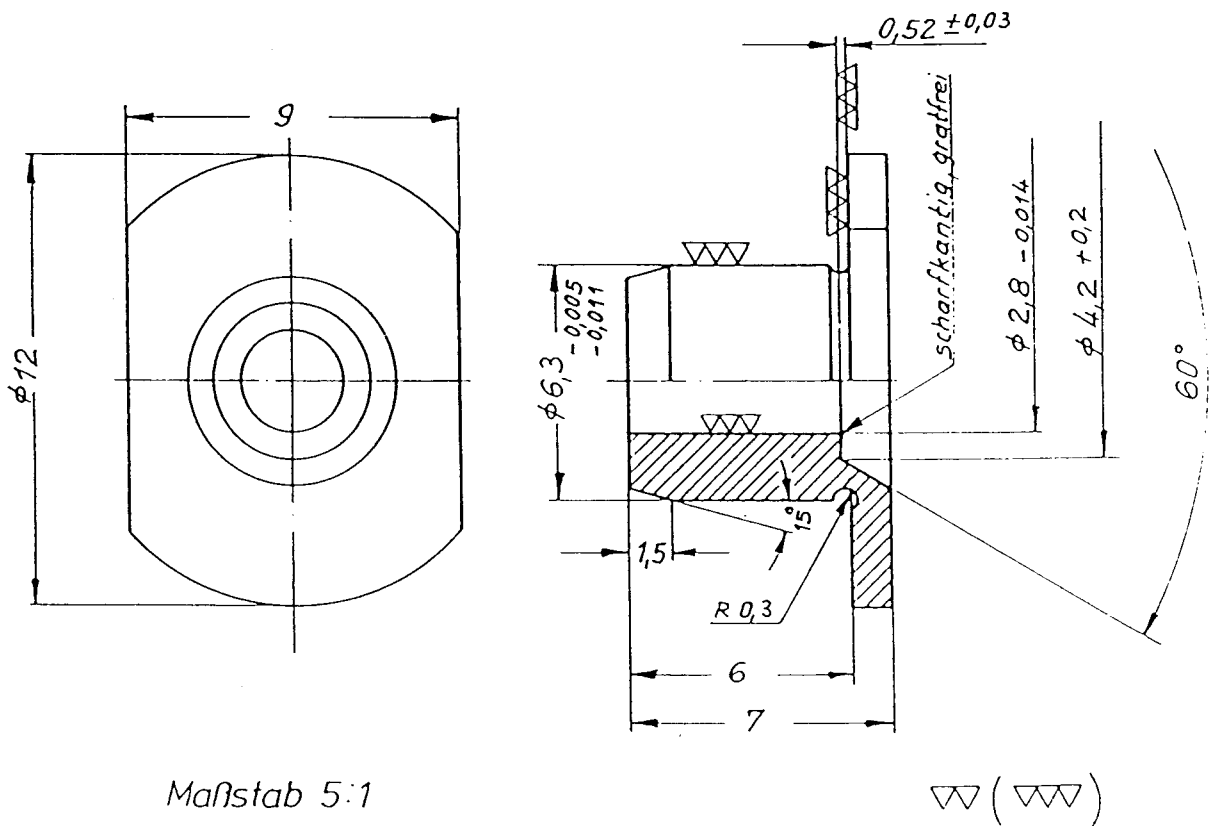
By observing previous test values one can test and adjust the injection pumps.

If only testing or adjustment is required, no additional tools are required.

If however, the regulator has been disassembled for repair, or rather, the external adjusting lever is lost, you must utilize a new measuring ring tool prior to any further adjustment.

This measuring ring originally is fitted in position.

Until this ring is obtained from a supplier, a suitable diagram below is supplied for manufacturing an adjustment bushing. It is used in connection with the existing measuring ring 1 687 969 004, by inserting into the bushing of the measuring ring (see VDT-WPP 711/1B Suppl.2).



FED 6 KL 60/120 R 1 Z (1) EP/RLA 1/21 R \* (2)

Firma: Porsche

Besondere Merkmale: \*Mit Nocken 38 - bis ca.FD 809-Seite 1  
 Mit Nocken 41 - ab ca.FD 810-Seite 2  
 Prüfonleitung (Ausführung 41 ist unter dem Typen-  
 VDI-WPP 711/1 schild mit "41" bezeichnet).  
 und 1. Nachtrag

Motor-Typ: 911 E

Sämtliche Prüfwerte gelten nur für BOSCH-Einspritzpumpen-Prüfstände und BOSCH-Prüfgeräte

Maß	"b"	Lagerpaket	* Nocken 38 (3)	41
Absteuerung Menge		35 + 2,5 ° Maß f	= 15,2 ± 0,1 mm	←
Übersetzung		RW-Differenz	= 21,4 ± 0,05 mm	←
Maß "c"			= 4,10 - 4,20 mm	4,15 - 4,25 mm
Winkel "k"			= 0,8 + 0,3 mm	←
Maß "g"			= 59°	←
Winkel "g"			= 44,6 ± 0,2 mm	←
Warmlaufkorrektur 400 U/min RW Differenz			= 45 ± 0,5	46,5 ± 0,5°
Ausgangspunkt 0° C Maß f			= 1,7 - 1,9 mm	←
Endpunkt 30° C Maß f			= 18,25 mm	←
			= 20,95 mm	←

\* Nocken 38 - ohne Bezeichnung

(4)	(5)	(6)	(7)	(8)	(9)
Verstell- hebel °	Drehzahl U/min	Regelweg mm **	Fördermenge cm <sup>3</sup> /1000 Hub	Streuung cm <sup>3</sup> /1000 H.	Einstellung
A) Regelfedern-Voreinstellung (10)					
max.	1500	7,0	-	-	Regelstangenkopf
0	400	4,7-4,9	-	-	1. Feder
8,3	750	4,7-4,9	-	-	2. Feder
29,5	2000	5,0-5,2	-	-	3. Feder
B) Volllastmengen (11)					
max.	750	-	32,5 - 34,5	2,5	Gleichförderung
max.	1500	7,0	37,5 - 39,5	2,5	
max.	3000	-	46,0 - 46,0	2,5	
max.	3500	-	43,0 - 46,0	2,5	
C) Teillastmengen (12)					
0°	400	-	9,0 - 10,0	1,5	1. Feder (13)
0°	750	-	5,5 - 7,5	2,0	
4,3°	500	-	11,5 - 12,5	2,0	
8,3°	500	-	14,5 - 15,5	2,0	
8,3°	750	-	12,0 - 13,0	2,5	2. Feder *** (14)
16°	1000	-	14,5 - 15,5	2,5	***
16°	1500	-	14,0 - 15,5	2,5	***
29,5°	1000	-	23,5 - 26,0	2,5	
29,5°	2000	-	20,0 - 21,0	2,5	3. Feder (15)
D) Startmenge und Stopanschlag (16)					
-	60	0,5 v.max.	mind. 110		Hutmutter (Startmag.)
-	-	1,0 - 2,0			Hutmutter (Stopmag.)

\*\* Regelwegmeßuhr ist bei abgeschraubtem Startmagnet auf RW=0 r.m einzustellen.

\*\*\* Nur Einstellpunkt, kann zur Mengenkorrektur der beiden übrigen Punkte über-  
 schritten werden.

Fuel-injector specification sheet for a Bosch injector No. PED 6 KL 60/120 R 1 Z, with regulator No. EP/RLA 1/21 R for use on a Porsche 911E. Because Bosch is a German firm, the specification sheets are in German, and it is necessary to learn the terms in order to use the sheets properly. To assist you, circled numbers were added to the chart, and the following explanations will help you to understand it. 1. Bosch pump model number, stamped on the pump plate; 2. regulator number of the governor, stamped on the governor housing; 3. nocken 38 is the cam, stamped 38 on its surface; 4. control lever movement in degrees; 5. injection pump speed; 6. rack movement; 7. amount of fuel injected per 1,000 strokes; 8. tolerance per 1,000 strokes; 9. adjuster; 10. rack travel tests, which are made first, in which the pump speed and the control lever position are varied; 11. injection tests made with the control lever at its maximum position; 12. major test and adjusting section in which the pump speed and control lever are changed, but note that the adjustments to No. 1, 2 and 3 feders (springs) are made at specific test values; 13. No. 1 feder (spring) adjustment for low-speed operation; 14. No. 2 feder (black springs) adjustment for partial load operation; 15. No. 3 feder (white springs) adjustment for top speed range; 16. starting and fuel cut-off solenoids, the adjustment being at the hutmutter (hexagon nut) on the solenoids.