Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 17	EP/M 60 A 31 d	1.7 a
		x dated: Apr. 13th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1 000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	x 0.7–1.5			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.	Leak-Proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0+0.1	500–480	10	300	11.5	–	–	175 410 450 700 830	11.5 11.5 9–11.5 0.6–2.4 0	50 75 100 150	12.5–12.6 12.2–12.5 11.9–12.2 11.5–11.6

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/100 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/100 strokes	Adjustment of Idling r. p. m.	Adjustment of Idling Vacuum mm Water Col.	Adjustment of Idling Control Rod Travel from Full-Load to Idling mm
RS 17	1000 1000	300 180	27.5–28.5 27.5–28.5	500 x 750	50 x 125	29.5–32.5 x 27.5–30.5			

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Change: X

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 60	EP/M 60 A 31 d	**1.7 b**
		x dated: Apr. 13th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	x 0.9–1.5			
	12	x 2.3–2.8	0.3		
	18	x 4.6–5.3			
200	9	x 0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2		3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.		Time Min. sec.	Point of Adjustment Contr. Rod Travel Limit Vacuum mm Water Col.	Control Rod Travel mm	Control Rod Travel Test with Governor Design		Vacuum mm Water Col.	Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Control Rod Travel mm
1.0±0.1	500–480		10	300	11.5	–	–	175 410 450 700 830	11.5 11.5 9 –11.5 0.6– 2.4 0	50 75 100 150	12.5–12.6 12.2–12.5 11.9–12.2 11.5–11.6

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
RS 60	1000 1000	300 180	x 24.5–25.5 x 24.5–25.5	500 x 750	50 x 125	26.5–29.5 x 24.5–27.5			

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 S 17 or RS 17 or S 17 z	EP/M 60 A 30	1,7 c dated: Sept. 25th 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test		Point of Adjustment Control Rod Travel Limit		Control Rod Travel Test				Adaptation	
	Vacuum Drop mm Water Col.	Time Min. sec.	Vacuum mm Water Col.	Control Rod Travel mm	with Governor Design		Vacuum mm Water Col.	Control Rod Travel mm	Vacuum mm Water Col.	Control Rod Travel mm
—	500–480	10	—	—	–	–	100 200 400 600 800	20 –21 19 –20.5 10.5–13.5 1 – 3.5 0 – 2	—	—

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
S 17 or RS 17	1000		27.5–28.5						
S 17 z	1000		24.5–25.5						

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 17 or RS 50	EP/MZ 60 A 39 d or A 48 d or A 51 d or A 52 d	**1,7 d** dated: Oct. 1st 1952

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	1.3–1.7		0.8	
	12	2.5–2.8	0.3		
	18	4.8–5.3			
200	9	1.0–1.5			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0+0.1	500–480	10	300	12.0	–	–	* 410 470 600 1800 2800	12.0 8.9–12.0 4.7– 6.2 3.9– 5.8 2.0– 4.3	* 180 150 100 50	12.0 12.0–12.1 12.3–12.6 13.0–13.1

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m. * point of adjustment ⟶ observe correct sequence

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 17 or RS 50	1000 1000	300 180	27.5–28.5 27.5–28.5	500 750	50 125	29.5–32.5 27.5–30.5	0	0	7.8–8.0

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 60 or RS 68	EP/MZ 60 A 39 d or A 48 d or A 52 d	1,7 e dated: March 1st 1955

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5		0.8	
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
1.0+0.1	500–480	10	300	11.5	–	–	410 460 630 2000 2400	11.5 8.5–11.5 4.0– 4.5 3.1– 4.4 2.4– 3.8	175 150 100 75 50	11.5 11.5–11.6 11.9–12.2 12.2–12.5 12.5–12.6

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Adjustment of Full-Load Stop Screw: Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw: cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Testing of Feed Quantity Characteristics: Vacuum mm Water Col.	Testing of Feed Quantity Characteristics: cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Adjustment of Idling Stop: Vacuum mm Water Col.	Adjustment of Idling Stop: Control Rod Travel from Full-Load to Idling mm
RS 60 or RS 68	1000 1000	300 180	24.5–25.5 24.5–25.5	500 750	50 125	26.5–29.5 24.5–27.5			7.2–7.4

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 17 or RS 50	EP/MZ 60 A 57 d or A 58 d	1,7 f dated: Dec. 15th 1952

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	1.3–1.7		0.6	
	12	2.5–2.8	0.3		
	18	4.8–5.8			
200	9	1.0–1.5			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0+0.1	500–480	10	300	12.5	—	—	470 520 560 2000	8.6–12.5 6.5– 9.5 6.4– 8.3 2.3– 4.1	180 150 100 50	12.5 12.5–12.6 12.8–13.2 13.5–13.6

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 17 or RS 50	1000 1000	300 180	29–30 29–30	500 750	50 125	31–34 29–32	0	0	6.0–6.5

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RR 50z or RS 60 or RS 68	EP/MZ 60 A 57 d or A 58 d	1,7 g dated: Dec. 15th 1952

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	1.3–1.7		0.6	
	12	2.5–2.8	0.3		
	18	4.8–5.3			
200	9	1.0–1.5			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
1.0+0.1	500–480	10	300	12	—	—	470 520 560 2000	8.7–12 6.7– 9.5 6.5– 8.3 2.3– 4.1	180 150 100 50	12 12.0–12.1 12.3–12.6 13.0–13.1

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Adjustment of Full-Load Stop Screw: Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Testing of Feed Quantity Characteristics: Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Adjustment of Idling Stop: Vacuum mm Water Col.	Adjustment of Idling Stop: Control Rod Travel from Full-Load to Idling mm
RS 50 z RS 60 RS 68	1000 1000	300 180	24.5–25.5 24.5–25.5	500 750	50 125	26.5–29.5 24.5–27.5	0	0	5.1–5.6

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 or RS 17	EP/M 60 A 55 d or A 71 d	1,7 h dated: Sept. 1st 1953

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5		0.8	
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design	Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm		Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
1.0+0.1	500–480	10	300	12.3	. . A 55 d	410 470 700	12.3 8.6–12.3 0.7– 3.2		50 100 150	13.3–13.4 12.6–13 12.3–12.4
					. . A 71 d	410 450 600	12.3 7.8–12.3 0 – 2.7		50 100 150	13.3–13.4 12.6–13.0 12.3–12.4

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Adjustment of Full-Load Stop Screw: Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw: cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Testing of Feed Quantity Characteristics: Vacuum mm Water Col.	Testing of Feed Quantity Characteristics: cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Adjustment of Idling Stop: Vacuum mm Water Col.	Adjustment of Idling Stop: Control Rod Travel from Full-Load to Idling mm
RS 17 or RS 50	1000	300	29–30	500 750	50 125	31–34 29–32			

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 z or RS 68	EP/M 60 A 55 d or A 71 d	**1.7 i** dated: Sep. 1st 1953

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5		0.8	
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.	Leak-Proof Test Time Min. sec.	Point of Adjustment Contr. Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Contr. Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel r. p. m.	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0±0.1	500–480	10	300	12.3	. . A 55 d		410 470 700	12.3 8.6–12.3 0.7–3.2	50 100 150	13.3–13.4 12.6–13.0 12.3–12.4
					. . A 71 d		410 450 600	12.3 7.8–12.3 0–2.7	50 100 150	13.3–13.4 12.6–13.0 12.3–12.4

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/100 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/100 strokes	Adjustment of Idling Stop r. p. m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 50 z RS 68	1000	300	24.5–25.5	500 750	50 125	26.5–29.5 24.5–27.5			

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50, 50 z x 68, 68 z, 68 y x PES 4 A 50 C 410 RS 1010, 1010 z, y, x x 1026	EP/M 60 A 102 d x A 126 D	1.7 i 1 x dated: Apr. 13th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.	Leak-Proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Adjustment of additional Spring Vacuum mm Water col.	Adjustment of additional Spring Control Rod Travel mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0–0.1	500–480	10	300	12.3	—	—	430 500 700	12.3 8.3–11.6 1.5– 4	40 75 125	13.3–13.4 12.9–13.3 12.3–12.7

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/100 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/100 strokes	Adjustment of Idling Stop r. p. m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 50 RS 1010	1000	300	29–30	500 750	50 125	31–34 29–32			
RS 50 z RS 68 RS 1010 x	1000	300	24.5–25.5	500 750	50 125	26.5–29.5 24.5–27.5			
RS 68 z RS 1010 z RS 1026	1000	300	28–29	750 500	125 50	28.5–30.5 30.5–32.5			
RS 68 y RS 1010 y	1000	300	26–27	750 500	125 50	26.5–28.5 28.5–30.5			

With full load adjustment (col. 3 and 6) individual measurements 1000 strokes

Test Specifications for Injection Pump and Governor

Injection Pump	**with Governor**	**DAI Sheet**
PES 4 A 50 B 410 RS 50 68, 68 z	EP/M 60 A 121 d	**1.7 i 2** dated: Feb. 22nd 1961

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.	Leak-Proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Adjustment of additional Spring Vacuum mm Water col.	Adjustment of additional Spring Control Rod Travel mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0–0.1	500–480	10	300	12.4	–	–	430 500 550 600	12.4 5–11.5 1.5– 7.9 0– 4.5	40 75 125	13.3–13.4 12.9–13.3 12.4–12.7

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 50	1000	300	29–30	500	50	32–34			
RS 68	1000	300	23.5–24.5	500	50	25.5–28.5			
RS 68 z	1000	300	28–29	500	50	29.5–32.5			

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Change: Test Sheet new

Test Specifications for Injection Pump and Governor

Injection Pump	**with Governor**	**DAI Sheet**
PES 4 A 50 B 410 RS 50 C 410 RS 1010	EP/M 60 AV 887 A 138 D	**1.7 i 3** dated: Dec. 10th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-Proof Test Vacuum Drop mm Water Col.	Leak-Proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Adjustment of additional Spring Vacuum mm Water col.	Adjustment of additional Spring Control Rod Travel mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.0+0.1	500–480	10	300	12.3	–	–	300 500 570 750	12.3 12.3 8.7–11.8 0–3.7	30 75 125	13.3–13.4 12.9–13.3 12.3–12.6

For Testing Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 50 RS 1010	1000	300	29–30	500 700	50 125	31–34 29–32			

With full load adjustment (col. 3 and 6) individual measurements 1000 strokes

Test Specifications for Injection Pump and Governor

Injection Pump	**with Governor**	**DAI Sheet**
PES 4 A 50 B 410 RS 50 PES 4 A 50 C 410 RS 1010	EP/RSV 250 – 1625 A 2 AV 6841 EP/RSV 250 – 1625 A 2 B 60	**1.7 i 4** dated: Dec. 10th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-Stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Trave mm	r. p. m.	Control Rod Travel mm
approx. 68	1625 1680 1720	12 7.8 4.8	without additional springs			approx. 24	250	6	1600 500 300	0 0 1.2–1.8
	1680 1700 1750 1900	7–8.5 5–7.2 2.4–4 0–1	with additional springs				100 250 350 450 550	19–21 5.7–6.3 3–4.5 0–2.5 0–1		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the Stop screw
	r. p. m.	cm³/1000 strokes	r. p. m.	r. p. m.	cm³/1000 strokes	r. p. m.	cm³/1000 strokes	
RS 50 RS 1010	1600	31.5–32.5	1630–1650	1000	28.5–30.5	–	–	–

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144	EP/MZ 60 A 72 d	1,8 a dated: March 1st 1955

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5		0.8	
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
1.0+0.1	500–480	10	300	12.5	–	–	470 * 490 500 600 1800	12.5 12.5 10 –12.5 6 – 8.3 5.8– 6.8	50 125 200 300	13.5–13.6 12.9–13.1 12.5 12.5

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control rod spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Adjustment of Full-Load Stop Screw: Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw: cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Testing of Feed Quantity Characteristics: Vacuum mm Water Col.	Testing of Feed Quantity Characteristics: cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Adjustment of Idling Stop: Vacuum mm Water Col.	Adjustment of Idling Stop: Control Rod Travel from Full-Load to Idling mm
R 144	1000	300	29–30	500 750	50 125	31–34 29–32	0	0	7.8–8.3

After full-load adjustment, repeat check according to section B, columns 8, 9 and 2, 3!

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144 z	EP/MZ 60 A 72 d	1,8 b dated: March 10th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
1.0+0.1	500–480	10	300	11.3	–	–	470 * 500 600 1800	11.3 9 –11 5.7– 7.5 4 – 5.2	50 150 200 300	12.3–12.4 11.5–12 11.3 11.3

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Adjustment of Full-Load Stop Screw: Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw: cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Testing of Feed Quantity Characteristics: Vacuum mm Water Col.	Testing of Feed Quantity Characteristics: cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Adjustment of Idling Stop: Vacuum mm Water Col.	Adjustment of Idling Stop: Control Rod Travel from Full-Load to Idling mm
RS 144 z	1000	300	24–25	500 750	50 125	26.5–28.5 24.5–26.5	0	0	7.2–7.7

After full-load adjustment check begin of governing action, governing characteristics and check for leaks

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 204	EP/MZ 60 A 87 d	1,8 c

Special Characteristics:
Pump element with upper and lower helix (pitch of each helix: 7.5 mm) and starting groove.
Feed quantity differential is measured at 200 r. p. m. and control rod travel : 6.

dated: Sept.25th 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	6	0.6–1.0			
	12	2.1–2.5			
	15	3.0–3.8			
200	6	0.3–0.7	0.2		
	21	8.5–9.7			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.2±0.1	500–480	10	450	13.0	—	—	* 460 490 600 1800	13.0 10.3–12.5 6 – 8.5 1.6– 2.7	180 220 380	14.1–14.3 13.9–14.2 13.1–13.4

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 204	1500	375	29–30	900 500	175 0	28–30 28–30	0	0	8.5–8.9

After full-load adjustment check again acc to Section B No 8, 9 and 2, 3

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 41 I RS 50 or RS 68	RSV 250 – 775 A 1 or A 9	1,8 d dated: Nov. 18th 1957

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 42	775	16				approx. 15	250	6		
	800	10.2					100	18 –21	750	0
	830	4	without additional springs				250	5.7– 6.3	550	0
	800	8.5–12					350	1.5– 3.5	430	0.2–0.7
	825	3.5– 7.5					400	0 – 2.5	225	2.2–2.8
	850	0.5– 4	with additional springs				550	0		
	950	0								

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/1000 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 50	750	29–30	780–790					
RS 68	750	24.5–25.5	780–790					

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50	EP/RSV 250 – 775 A 4 A 60	1,8 d 1 dated: June 3rd 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 44	775 815 835	16 10 6	} without additional springs			approx. 21	250	6	750 400 300	0 0 1.2–1.8
	820 850 880 950	7.2–10.2 3 – 5 1.2– 2.9 0 – 1	} with additional springs				100 250 300 350 450	13 –21 5.7– 6.3 4 – 5 1 – 3.5 0 – 1		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/100 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 50	750	29–30	780–790					

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50	RSV 250 – 1525 A 3 or A 10	1,8 e dated: March 10th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 56	1525	12.4	} without additional springs			approx. 13	250	6		
	1550	8.8					100	18 –21	1500	0
	1580	5					250	5.7– 6.3	475	0
	1525	11 –13	} with additional springs				350	4 – 4.8	420	0.3–0.7
	1550	7 –10					500	0 – 2.2	200	2.2–2.8
	1580	3.4– 6.4					620	0		
	1620	0 – 3								
	1680	0								

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/1000 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 50	1500	29–30	1530–1540					

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 or RS 68	RSV 250 – 950 A 1 or A 9	1,8 f dated: March 10th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 52	950 970 1020	16 9 3	} without additional springs			approx. 16	250	6	900 500 430 225	0 0 0.2–0.8 2.2–2.8
	975 1000 1025 1100	7 –11 3 – 7 0 – 3.8 0	} with additional springs				100 250 350 400 500	19 –21 5.7– 6.3 1.6– 3.6 0 – 2.4 0		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/100 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 68	900	24.5–25.5	960–980					
RS 50	900	29–30	960–980					

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 204	EP/MZ 60 A 89 d	1,8 g
Special Charakteristics: Pump element with upper and lower helix (pitch of each helix: 7.5 mm and starting groove.		dated: April 1st 1957

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	6	0.6–1.0			
	12	2.1–2.5	0.2		
	18	3.0–3.8			
200	6	0.3–0.7			
	21	8.5–9.7			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.2+0.1	500–480	10	580	13.0	—	—	* 580 620 700 1800	13.0 10.3–12.5 5.5– 8.5 1.9– 2.9	180 250 500	14.1–14.3 13.9–14.1 13.1–13.3

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control rod spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 204	1600	580	30–31	1200 900 250	360 180 * increase water column up to the max. feed quantity differential being: 1.5	30–32 30–32 7–9*	500	800	8.8–9.0

After full-load adjustment, repeat check according to section B, columns 8, 9 and 2, 3!

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 204	EP/MZ 60 A 91 d	1,8 h

Special Characteristics:
Pump element with upper and lower helix (pitch of each helix: 7.5 mm) and starting groove.

dated: March 21st 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	6	0.6–1.0			
	12	2.1–2.5	0.2		
	18	3.0–3.8			
200	6	0.3–0.7			
	21	8.5–9.7			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
1.2+0.1	500–480	10	440	13	—	—	* 450 480 580 800 2000	13.0 10.7–12.5 5.7– 7.9 4.7– 5.2 2.5– 3.4	180 220 380	14.1–14.3 13.9–14.1 13.1–13.3

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 204	1600	430	29–30	1200 900 250	270 175 * increase water column	29–31 29–31 7–9 *	0	0	9.0–9.2

up to the max. feed quantity differential being : 1.5

After full-load adjustment check again acc to Section B No 8, 9 and 2, 3

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 204z	EP/MZ 60 A 91 d	1,8 h 1

Special Characteristics:
Pump element with upper and lower helix (pitch of each helix: 7.5 mm) and starting groove.

dated: November 6th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Differental cm³/100 strokes	Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	6	0.6–1.0			
	12	2.1–2.5	0.2		
	18	3.0–3.8			
200	6	0.3–0.7			
	21	8.5–9.7			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test		Point of Adjustment Control Rod Travel Limit		Control Rod Travel Test				Adaptation	
	Vacuum Drop mm Water Col.	Time Min. sec.	Vacuum mm Water Col.	Control Rod Travel mm	with Governor Design		Vacuum mm Water Col.	Control Rod Travel mm	Vacuum mm Water Col.	Control Rod Travel mm
1.2+0.1	500–480	10	430	10.8	–	–	* 450 480 550 800 2000	10.8 8.5–10.3 5 – 7 4.7– 5.2 2.5– 3.4	180 220 380	11.9–12.1 11.7–11.9 10.9–11.1

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
RS 204 z	1600	430	24.5–25.5	1200 900	270 175	24.5–26.5 24.5–26.5	0	0	6.7–7.0

After full-load adjustment check again acc to Section B No 8, 9 and 2, 3

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 RS 68, RS 68 z	EP/RSV 250 – 950 A 4/15 A 4 A 60	**1.8 i**
x PES 4 A 50 C 410 RS 1010 x RS 1010 z, y, x	x A 4 B 60	x dated: Dec. 10th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel r. p. m.	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 70	950 1000 1050	16 10 2	without additional springs			approx. 24	250	6	930 420 300	0 0 1.2.–1.8
	1000 1040 1080 1150	8 –11 2.6–6 0 –2.5 0 –1	with additional springs				100 250 340 380 450	19 –21 5.7– 6.3 1.8– 3.8 0 – 2.6 0		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the Stop screw
	r. p. m.	cm³/100 strokes	r. p. m.	r. p. m.	cm³/100 strokes	r. p. m.	cm³/100 strokes	
RS 50 RS 1010	930	29–30	960–980	–	–	–	–	–
RS 68 z RS 1010 z	930	28–29	960–970	–	–			
RS 68 RS 1010 y	930	24.5–25.5	960–980	–	–			
RS 1010 x	930	23.5–24.5	960–980	–	–			

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Change: x

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 RS 68, RS 68 z	EP/RSV 250 – 1525 A 5/15 A 5 A 60	**1.8 k**
x PES 4 A 50 C 410 RS 1010 RS 1010 z, y, x	x A 5 B 60	x dated: Dec. 10th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

x B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 70	1525 1600 1660	16 10 4	without additional springs			approx. 22	250	6		
							100	19 –21	1500	0
							250	5.7– 6.3	500	0
	1600	8–11	with additional springs				300	4.5– 5.5	300	1.2–1.8
	1650	3– 7					450	0 – 3		
	1700	1– 3.5					550	0 – 1		
	1800	0– 1								

x C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the Stop screw
	r. p. m.	cm³/100 strokes	r. p. m.	r. p. m.	cm³/100 strokes	r. p. m.	cm³/100 strokes	
RS 50 RS 1010	1500	29–30	1540–1560	–	–	–	–	–
RS 68 RS 1010 y	1500	28–29	1540–1560	–	–			
RS 68 z RS 1010 z	1500	24.5–25.5	1540–1560	–	–			
RS 1010 x	1500	23.5–24.5	1540–1560	–	–			

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144	EP/MZ 60 A 93 d	1,8 I dated: Dec. 10th 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
0.6±0.1	500–480	10	430	13.0	—	—	* 470 500 600 2000	13.0 11 –12.6 7.5– 9.4 4.9– 5.5	200 250 320	13.5–13.7 13.4–13.7 13.1–13.4

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control spring.

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 144	1600	430	29–30	1200 900 250	270 175 app. 580	29–31 29–31 7–9 *	0	0	6.0–6.3

* feed quantity differential max. 1.5

After full-load adjustment, repeat check according to section B, clumns 8, 9 and 2, 3!

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 68	EP/RSV 250 – 1550 A 5/307 or A 5 A 333	1,8 m dated: March 10 th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 74	1550 1620 1740	16 10 2	} without additional springs			approx. 22	250	6	1530 490 320	0 0 1.2–1.8
	1620 1660 1750 1800	9–12 4–8 0–2.6 0–1	} with additional springs				100 250 350 470 550	19 –21 5.7– 6.3 3 – 4.5 0 – 2 0 – 1		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/1000 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 68	1530	24.5–25.5	1560–1580					

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144	EP/MZ 60 A 94 d or A 99 d	1,8 n dated: Dec. 10th 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test		Point of Adjustment Control Rod Travel Limit		Control Rod Travel Test				Adaptation	
	Vacuum Drop mm Water Col.	Time Min. sec.	Vacuum mm Water Col.	Control Rod Travel mm	with Governor Design		Vacuum mm Water Col.	Control Rod Travel mm	Vacuum mm Water Col.	Control Rod Travel mm
0.6±0.1	500–480	10	575	12.8	—	—	* 600 630 720 2000	12.8 10.9–12.4 6.5– 8.5 3.8– 4.7	300 350 450	13.3–13.5 13.2–13.5 12.9–13.2

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 X below the control rod spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
RS 144	1600	580	29–30	1200 900 250	360 180 *increase water column	29–31 29–31 7–9*	0	0	6.3–6.6

up to the max. feed quantity differential being: 1.5

After full-load adjustment, repeat check according to section B, columns 8, 9 and 2, 3!

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144 z	EP/MZ 60 A 93 d	**1,8 o** dated: Nov. 28th 1956 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test Vacuum Drop mm Water Col.	Leak-proof Test Time Min. sec.	Point of Adjustment Control Rod Travel Limit Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit Control Rod Travel mm	Control Rod Travel Test with Governor Design		Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Rod Travel mm	Adaptation Vacuum mm Water Col.	Adaptation Control Rod Travel mm
0.6±0.1	500–480	10	430	11.9	—	—	* 470 500 560 2000	11.9 9.9–11.6 7.5– 9.4 4.6– 5.2	200 250 320	12.4–12.6 12.3–12.6 12 –12.3

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 × below the control rod spring

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r.p.m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r.p.m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r.p.m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Rod Travel from Full-Load to Idling mm
RS 144 z	1600	430	24.5–25.5	1200 900 250	270 175 * Increase water column up to the max. feed quantity differential being: 1.5	24.5–26.5 24.5–26.5 7–9*	0	0	4.9–5.2

After full-load adjustment, repeat check according to section B, columns 8, 9 and 2, 31

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 144z	EP/MZ 60 A 94 d or A 99 d	1,8 p dated: March 12 th 1957 and/or Aug. 1st 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–1.2			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2		3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test			Point of Adjustment Control Rod Travel Limit		Control Rod Travel Test				Adaptation	
	Vacuum Drop mm Water Col		Time Min. sec.	Vacuum mm Water Col.	Control Rod Travel mm	with Governor Design		Vacuum mm Water Col.	Control Rod Travel mm	Vacuum mm Water Col.	Control Rod Travel mm
0.6±0.1	500–480		10	575	11.7 *	—	—	* 600 630 680 2000	11.7 9.7–11.3 7.1– 8.9 3.8– 4.6	300 350 450	12.2–12.4 12.1–12.4 11.8–12.1

* Exactly adjust these values by placing washers WMS 22 S 18 . . . 19 X below the control spring.

For Testing Control Rod Travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
RS 144z	1600	580	24.4–25.5	1200 900 250	360 180 * increase water column up to the max. feed quantity differential being: 1.5	24.5–26.5 24.5–26.5 7–9 *	0	0	5.2–5.5

After full-load adjustment, repeat check according to section B, columns 8, 9 and 2, 3!

The values in col. 3 and 6 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 68	EP/RSV 250 – 1150 A 4/307 or A 4 A 333	1,8 q dated: March 28 th 1958

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differental cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Lower Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm				Adjusting Lever Range degrees	r.p.m.	Control Rod Travel mm	r.p.m.	Control Rod Travel mm
approx. 71	1150	16	without additional springs			approx. 24	250	6		
	1190	10					100	19 –21	1130	0
	1210	6.2					250	5.7– 6.3	450	0
	1180	10.3–12.6	with additional springs				300	3.8– 5.9	300	1.2–1.8
	1220	3.6– 6.6					420	0 – 1		
	1260	0.6– 2.9								
	1300	0 – 1								

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r.p.m.	cm³/100 strokes	r.p.m.	r.p.m.	cm³/1000 strokes	r.p.m.	cm³/1000 strokes	
RS 68	1130	24.5–25.5	1160–1180					250 RW 6

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Change: x

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50 x PES 4 A 50 C 410 RS 1010 RS 1025	x EP/RSV 250 1275 A 5 A 152* 1275 A 5 A 60** 1425 A 5/15** 1425 A 5 A 60***	**1.8 r** x dated: Apr. 13 th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 65	1425	16	without additional springs			approx. 21	250	6		
	1500	9.8					100	19–21	1400	0
	1550	4.2					250	5.7–6.3	500	0
	1480	10–12.5	with additional springs				350	3–4.5	300	1.2–1.8
	1500	8–11					450	0–2.2		
	1550	3–7					550	0–1		
	1600	0.8–3.4								
	1700	0–1								

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r. p. m.	cm³/1000 strokes	r. p. m.	r. p. m.	cm³/1000 strokes	r. p. m.	cm³/1000 strokes	
RS 1010***	1400	29–30	1430–1450	–	–	–	–	–
RS 50**	1250	29–30	1280–1290	–	–			
RS 1025*	1250	24.5–25.5	1280–1290	–	–			
–	–	–	–	–	–			

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 50	EP/RSV 250 – 1275 A 5 A 60	**1.8 r 1** dated: May 15th 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.2		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed (not applicable)			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 54	1275 1320 1380	16 11.6 5	} without additional springs			approx. 18	250	6		
	1330 1360 1400 1450 1500	9–12 5–9 2.5–5 0.5–2.8 0	} with additional springs				100 250 350 450 550	19–21 5.7–6.3 3–4.5 0–2.2 0–1	1250 500 340	0 0 1.2–1.8

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r. p. m.	cm³/1000 strokes	r. p. m.	r. p. m.	cm³/1000 strokes	r. p. m.	cm³/1000 strokes	
RS 50	1250	29–30	1280–1290	–	–			

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Change: Test Sheet overleaf new

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 68	EP/RSV 250 – 1200 A 5 A 333	**1.8 r 2** dated: May 1st 1961

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	(not applicable) r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 51	1200 1250 1300	16 11 5.6	without additional springs			ap. 18	250	6		
							100	19 –21	1180	0
							250	5.7– 6.3	500	0
	1250	10 –12					350	3 – 4.4	310	1.2–1.8
	1300	3.8– 7.5					450	0 – 2.2		
	1350	1.8– 3.6	with additional springs				550	0 – 1		
	1450	0 – 1								

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r. p. m.	cm³/1000 strokes	r. p. m.	r. p. m.	cm³/1000 strokes	r. p. m.	cm³/1000 strokes	r. p. m.
RS 68	1180	24.5–25.5	1210–1230	–	–	–	–	n 250 RW 6

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 A 50 B 410 RS 1025 RS 68	EP/RSV 650–1200 A 5 A 388 A 387 B 388 B 387	**1.8 r 3** dated: Apr. 13th 1962

A. Adjustment of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC)

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.5			
	12	2.3–2.8	0.3		
	18	4.6–5.3			
200	9	0.7–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Upper Rated Speed			Medium Rated Speed			Lower Rated Speed			Adaptation	
Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	(not applicable) r. p. m.			Adjusting Lever Range degrees	r. p. m.	Control Rod Travel mm	r. p. m.	Control Rod Travel mm
approx. 51	1200 1250 1300	16 11.2 5.6	without additional springs			ap. 29	650	6		
	1270 1300 1400 1500	7 –10 4.7– 7 0.5– 3 0 – 1	with additional springs				100 650 700 800 900	19 –21 5.7– 6.3 4 – 5 0.5– 3 0 – 1		

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8
Injection Pump	Adjustment of Full-Load Quantity at Control Rod Stop		Limit of RPM at the Governor Adjusting Lever	Testing of Feed Quantity Characteristics		Testing of Starting Quantity		Idle run Adjustment by means of the STOP screw
	r. p. m.	cm³/1000 strokes	r. p. m.	r. p. m.	cm³/1000 strokes	r. p. m.	cm³/1000 strokes	
RS 1025 RS 68	1180	29–30	1210–1230	—	—	—	—	n 650 RW 6

The values in col. 2 and 5 are obtained by dividing the total quantity through the number of pump elements

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50/320 R 1 or R 1/2 or R 1/24 or R 4/24	EP/MN 60 M 3 d or 4 d	1,9 a dated March 10, 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.2			
	15	3.0–3.7	0.2		
	18	4.0–4.7			
200	9	0.8–1.1			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
2.2+0.1	500–480	10	—	—	—	—	590 600 * 625 750	12.7 12.7 9.8–12.5 2 – 5.5	25 150 500 580	14.9–15 14.4–14.7 12.8–13.2 12,7

* Exactly adjust begin of governing between 600–620 mm WG by placing washers WMS 22 S 18 . . . 19 X below the control spring.

For checking control travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
R 1 u. R 1/2 u. R 1/24 u. R 4/24	2000	590	30.50–31.5	1000 500 250	190 0 app. 650	30.5–32 30.5–32 to 6–8 *	—	** see page over-leaf	

* the max. feed quantity differential being : 1.5

With full load adjustment (columns 3 and 6) individual measurement 1000 strokes

All test values are valid only for BOSCH injection pump test stands.

**) Adjustment of idling stop

At 500 r.p.m. and disengaged governor stop cam set control rod to full load position by increasing the WG to 590 mm (exactly keep to this value) and then measure the control rod travel obtained. Further increase WG until the control rod has adjusted to 3.0 mm less travel as compared to full load position, measured at WG 590 mm. In this position slowly press the stop cam to the end position observing the control rod.

Provided the position of the spring capsule is correct, the control rod will now adjust to a travel which is by 2.0 ± 0.5 mm less than that in full load position, measured at WG 590 mm.

If the adjustment travel value is too high or too low, the position of the stop pin (7) in the spring capsule housing (2) should be varied by placing washers (5) between stop pin shoulder and lock ring (6) (see Figure 07–1/1).

Caution! This variation also varies the pre-tension in the spring capsule. This should be compensated for by placing washers (4) between additional spring (3) and stop pin bottom in order to obtain the specified pre-tension of 50–90 grams.

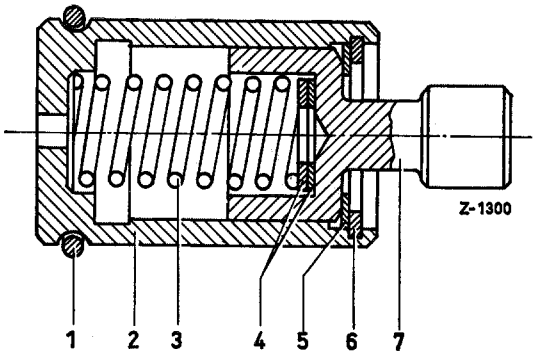

Figure 07–1/1

Spring capsule EPMK 52 P 1 Z

1 Snap ring NMR 50/11 X
2 Spring capsule housing EPMK 52 P 1 X
3 Spring WSF 11 P 186 X
4 Washers WMS 2040 P 28 or 29 X
5 Washer WMS 25 P 125 X
6 Lock ring NMR 33/3 X
7 Stop pin EPBO 202 P 1 X

With the cam in initial lift position and pressing the governor lever in direction STOP, the control rod should move to zero.

The control travel of 12.7 in section B), column 9, is an approximate value. Because of the different adjusting mechanism of this pump, the full load control travel may fluctuate. Accordingly, ascertain therefore the control travel which is required to obtain the full load quantity, section C), column 3. Then also the values in section B), column 9 and 11 vary upwards or downwards by the amount deviating from the control travel of 12.7 mm.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50/320 R 1/2 z or R 4/24 z	EP/MN 60 M 3 d or 4 d	1,9 b dated July 10, 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.2			
	15	3.0–3.7	0.2		
	18	4.0–4.7			
200	9	0.8–1.1			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
2.2+0.1	500–480	10	—	—	—	—	590 600* 625 750	12.7 12.7 9.8–12.5 2 – 5.5	25 150 500 580	14.9–15 14.4–14.7 12.8–13.2 12.7

* Exactly adjust begin of governing between 600–620 mm WG by placing washers WMS 22 S 18 . . . 19 X below the control spring.

For checking control travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
R 1/2 z u. R 4/24 z	2000	590	27.5–28.5	1000 500 250	190 0 app. 650	27.5–29 27.5–29 to 6–8*	—	** see page over-leaf	

* the max. feed quantity differential being: 1.5

With full load adjustment (columns 3 and 6) individual measurement 1000 strokes

All test values are valid only for BOSCH injection pump test stands.

**) Adjustment of idling stop

At 500 r.p.m. and disengaged governor stop cam set control rod to full load position by increasing the WG to 590 mm (exactly keep to this value) and then measure the control rod travel obtained. Further increase WG until the control rod has adjusted to 2.0 mm less travel as compared to full load position, measured at WG 590 mm. In this position slowly press the stop cam to the end position observing the control rod.

Provided the position of the spring capsule is correct, the control rod will now adjust to a travel which is by 1.0 ± 0.5 mm less than that in full load position, measured at WG 590 mm.

If the adjustment travel value is too high or too low, the position of the stop pin (7) in the spring capsule housing (2) should be varied by placing washers (5) between stop pin shoulder and lock ring (6) (see Figure 07–1/1).

Caution! This variation also varies the pre-tension in the spring capsule. This should be compensated for by placing washers (4) between additional spring (3) and stop pin bottom in order to obtain the specified pre-tension of 50–90 grams.

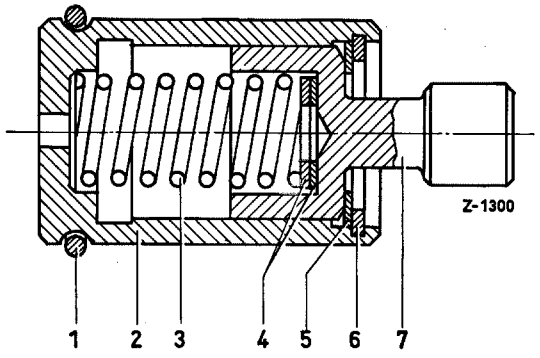

Figure 07–1/2

Spring capsule EPMK 52 P 1 Z

1 Snap ring NMR 50/11 X
2 Spring capsule housing EPMK 52 P 1 X
3 Spring WSF 11 P 186 X
4 Washers WMS 2040 P 28 or 29 X
5 Washer WMS 25 P 125 X
6 Lock ring NMR 33/3 X
7 Stop pin EPBO 202 P 1 X

With the cam in initial lift position and pressing the governor lever in direction STOP, the control rod should move to zero.

The control travel of 12.7 in section B), column 9, is an approximate value. Because of the different adjusting mechanism of this pump, the full load control travel may fluctuate. Accordingly, ascertain therefore the control travel which is required to obtain the full load quantity, section C), column 3. Then also the values in section B), column 9 and 11 vary upwards or downwards by the amount deviating from the control travel of 12.7 mm.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50/320 R 3 or R 3/24	EP/MN 60 M 4 d	1,9 c.

Special characteristics: injection pump with double control helix
Helix pitch 5/12 mm.

dated July 10, 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC)

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3.0–3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
2.2+0.1	500–480	10	—	—	—	—	590 600* 625 750	12.7 12.7 9.8–12.5 2 – 5.5	25 150 500 580	14,9–15 14.4–14.7 12.8–13.2 12.7

* Exactly adjust begin of governing between 600–620 mm WG by placing washers WMS 22 S 18 . . . 19 X below the control spring.

For checking control travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
R 3 u. R 3/24	2000	590	30.5–31.5	1000 500 250	190 0 app. 650	30.5–32 30.5–32 to 6–8*	—	** see page over-leaf	

* the max feed quantity differential being: 1.5

With full load adjustment (columns 3 and 6) individual measurement 1000 strokes

All test values are valid only for BOSCH injection pump test stands.

**) Adjustment of idling stop

At 500 r.p.m. and disengaged governor stop cam set control rod to full load position by increasing the WG to 590 mm (exactly keep to this value) and then measure the control rod travel obtained. Further increase WG until the control rod has adjusted to 3.0 mm less travel as compared to full load position, measured at WG 590 mm. In this position slowly press the stop cam to the end position observing the control rod.

Provided the position of the spring capsule is correct, the control rod will now adjust to a travel which is by 2.0 ± 0.5 mm less than that in full load position, measured at WG 590 mm.

If the adjustment travel value is too high or too low, the position of the stop pin (7) in the spring capsule housing (2) should be varied by placing washers (5) between stop pin shoulder and lock ring (6) (see Figure 07–1/1).

Caution! This variation also varies the pre-tension in the spring capsule. This should be compensated for by placing washers (4) between additional spring (3) and stop pin bottom in order to obtain the specified pre-tension of 50–90 grams.

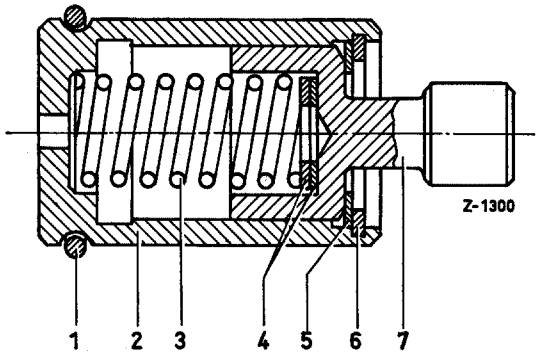

Figure 07–1/3

Spring capsule EPMK 52 P 1 Z

1 Snap ring NMR 50/11 X
2 Spring capsule housing EPMK 52 P 1 X
3 Spring WSF 11 P 186 X
4 Washers WMS 2040 P 28 or 29 X
5 Washer WMS 25 P 125 X
6 Lock ring NMR 33/3 X
7 Stop pin EPBO 202 P 1 X

With the cam in initial lift position and pressing the governor lever in direction STOP, the control rod should move to zero.

The control travel of 12.7 in section B), column 9, is an approximate value. Because of the different adjusting mechanism of this pump, the full load control travel may fluctuate. Accordingly, ascertain therefore the control travel which is required to obtain the full load quantity, section C), column 3. Then also the values in section B), column 9 and 11 vary upwards or downwards by the amount deviating from the control travel of 12.7 mm.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50/320 R 3 z or R 3/24 z	EP/MN 60 M 4 d	1,9 d

Special characteristics: injection pump with double control helix
Helix pitch $^{5}/_{12}$ mm.

dated July 10, 1959

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7 + 0.1 mm (from BDC) with CRT 18

1	2	3	4	5	6
Speed r.p.m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r.p.m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3.0–3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment Data of the Governor

1	2	3	4	5	6	7	8	9	10	11
Travel of Adaptation mm	Leak-proof Test: Vacuum Drop mm Water Col.	Leak-proof Test: Time Min. sec.	Point of Adjustment Control Rod Travel Limit: Vacuum mm Water Col.	Point of Adjustment Control Rod Travel Limit: Control Rod Travel mm	Control Rod Travel Test: with Governor Design		Control Rod Travel Test: Vacuum mm Water Col.	Control Rod Travel Test: Control Rod Travel mm	Adaptation: Vacuum mm Water Col.	Adaptation: Control Rod Travel mm
2.2+0.1	500–480	10	—	—	—	—	590 600* 625 750	12.7 12.7 9.8–12.5 2 – 5.5	25 150 500 580	14.9–15 14.4–14.7 12.8–13.2 12.7

* Exactly adjust begin of governing between 600–620 mm WG by placing washers WMS 22 S 18 . . . 19 X below the control spring.

For checking control travel (column 4–11) n = 500 r.p.m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics: r.p.m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop: r.p.m.	Vacuum mm Water Col.	Control Rod Travel from Full-Load to Idling mm
R 3 z u. R 3/24 z	2000	590	27.5–28.5	1000 500 250	190 0 app. 650	27.5–29 27.5–29 to 6–8*	—	** see page over-leaf	

* the max feed quantity differential being : 1.5

With full load adjustment (columns 3 and 6) individual measurement 1000 strokes

All test values are valid only for BOSCH injection pump test stands.

**) Adjustment of idling stop

At 500 r.p.m. and disengaged governor stop cam set control rod to full load position by increasing the WG to 590 mm (exactly keep to this value) and then measure the control rod travel obtained. Further increase WG until the control rod has adjusted to 2.0 mm less travel as compared to full load position, measured at WG 590 mm. In this position slowly press the stop cam to the end position observing the control rod.

Provided the position of the spring capsule is correct, the control rod will now adjust to a travel which is by 1.0 ± 0.5 mm less than that in full load position, measured at WG 590 mm.

If the adjustment travel value is too high or too low, the position of the stop pin (7) in the spring capsule housing (2) should be varied by placing washers (5) between stop pin shoulder and lock ring (6) (see Figure 07–1/4).

Caution! This variation also varies the pre-tension in the spring capsule. This should be compensated for by placing washers (4) between additional spring (3) and stop pin bottom in order to obtain the specified pre-tension of 50–90 grams.

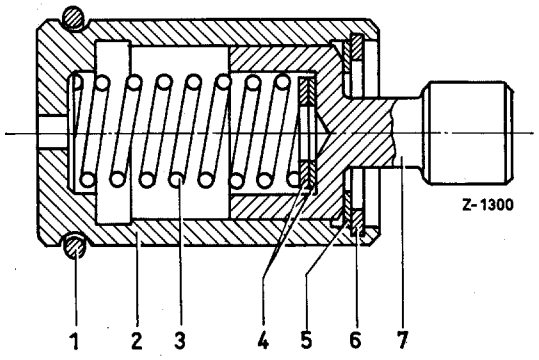

Figure 07–1/4

Spring capsule EPMK 52 P 1 Z

1 Snap ring NMR 50/11 X
2 Spring capsule housing EPMK 52 P 1 X
3 Spring WSF 11 P 186 X
4 Washers WMS 2040 P 28 or 29 X
5 Washer WMS 25 P 125 X
6 Lock ring NMR 33/3 X
7 Stop pin EPBO 202 P 1 X

With the cam in initial lift position and pressing the governor lever in direction STOP, the control rod should move to zero.

The control travel of 12.7 in section B), column 9, is an approximate value. Because of the different adjusting mechanism of this pump, the full load control travel may fluctuate. Accordingly, ascertain therefore the control travel which is required to obtain the full load quantity, section C), column 3. Then also the values in section B), column 9 and 11 vary upwards or downwards by the amount deviating from the control travel of 12.7 mm.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50 A 320 RS 14	EP/MN 60 M 7 d M 8 d	**1.9 e**
Control Edge Gradient 5/12 mm		x dated: Aug. 3rd 1961

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplementary Spring Vacuum mm Water C.	Adjustment Supplementary Spring Control Path mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Path mm	Compensation Vacuum mm Water Col.	Compensation Control Path mm
1.0+0.1	500–480	10	—	—	—	—	565* 595 670	13.3–13.6 8.5–12.8 3.2– 5.6	100 300 380 540	14.9–15 14.9–15 14.4–14.7 13.4–13.7

* Begin of governing between 560–590 mm Water Col. by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Adjustment of Full-Load Stop Screw Vacuum mm Water Col.	Adjustment of Full-Load Stop Screw cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Testing of Feed Quantity Characteristics Vacuum mm Water Col.	Testing of Feed Quantity Characteristics cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Adjustment of Idling Stop Vacuum mm Water Col.	Adjustment of Idling Stop Control Path from Full Load to Idling Load mm
RS 14	2150	560	32–33	1400 500	310 0	31.5–33.5 30–32	–	** please turn over	

At full load setting (col. 3 and 6) individual measurements 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control to full load position by increasing WG to 560 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.0 mm less control rod travel than at full load position measured at 560 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 2.0 $\pm$ 0.5 mm less than in full load position measured at 560 WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

With cam in contact position and the governor adjusting lever set in direction STOP the control rod should move to Control Rod Travel 0.

Change: Test sheet new

Test Specifications for Injection Pump and Governor

Injection Pump	**with Governor**	**DAI Sheet**
PES 4 M 50 A 320 RS 14	EP/MN 60 M 9 d	**1.9 f**
		dated: Aug. 3rd 1961

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplement. Spring Vacuum mm Water col.	Adjustment Supplement. Spring Control Path mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Path mm	Compensation Vacuum Water Col. mm	Compensation Control Path mm
2.5+0.1	500–480	10	–	–	–	–	440* 475 550	12.4–12.7 8.2–12.2 0–5	50 200 400	14.9–15 14.1–14.4 12.7–13

* Begin of governing between 450–470 mm WG by adding washers WMS 22 S 18 . . 19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14	2000	440	30–31	1400 800	300 95	29 –31 32.5–34.5		** please turn over	
				250	ap. 480	5–11			
				deviation max. 1.5					

At full load setting (col. 3 and 6) individual measurements 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control rod to full load position by increasing WG to 445 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.0 mm less control rod travel than at full load position measured at 445 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 2.0 $\pm$ 0.5 mm less than in full load position measured at 445 WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

With cam in contact position and the governor adjusting lever set in direction STOP the control rod should move to Control Rod Travel 0.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50 A 320 RS 14 RS 14 z Special Features: Control Edge Gradient 5/12 mm	EP/MN 60 M 11 d	**1.9 g** dated: Oct. 6th 1961

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplementary Spring Vacuum mm Water C.	Adjustment Supplementary Spring Control Path mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Path mm	Compensation Vacuum mm Water Col.	Compensation Control Path mm
2.1+0.1	500–480	10	–	–	–	–	520 560 600 700	11.9* 10.2–11.5 7.8–9.5 2.6–5.4	100 200 400	13.9–14 13.6–13.9 12.2–12.6

* Begin of governing between 530–550 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum Water Col. mm	Control Path from Full Load to Idling Load mm
RS 14	1900	510	28.5–29.5	1000 500	150 0	29.5–31.5 28.5–30.5	–	** please turn over	
				250	ap. 610	5 –11			
				deviation max. 1.5					

At full load setting (col. 3 and 6) individual measurements 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control rod to full load position by increasing WG to 510 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.0 mm less control rod travel than at full load position measured at 510 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 1.5 ± 0.5 mm less than in full load position measured at 510 WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

With cam in contact position and the governor adjusting lever set in direction STOP the control rod should move to Control Rod Travel O.

RS 14 z with . . . M 11 d

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path	Tightness		Adjusting Point Control Rod Travel		Adjustment Supplementary Spring		Control Rod Travel Test		Compensation	
	Vacuum drop	Time red.	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path
mm	mm Water Col.	sec.	mm Water Col.	mm	mm Water C.	mm	mm Water Col.	mm	mm Water Col.	mm
2.1+0.1	500–480	10	—	—	—	—	520 560 600	11.0* 9.2–10.5 7 – 8.5	100 200 400	13.1–13.2 12.7–13 11.4–11.7

* Begin of governing between 530–550 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14 z	1900	510	25.5–26.5	1000 500	150 0	26.5–28.5 25.5–27.5		** please see above	
				250	ap. 590	5–11			
				deviation max. 1.5					

At full load setting (col. 3 and 6) individual measurements 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50 A 320 RS 14 RS 14 z (please turn over)	EP/MN 60 M 12 d M 13 d	**1.9 h** dated: Feb. 15th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum Drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplementary Spring Vacuum mm WC	Adjustment Supplementary Spring Control Path mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Path mm	Compensation Vacuum mm Water Col.	Compensation Control Path mm
1.2+0.1	500–480	10	–	–	–	–	435 465 500 570	13.7* 8.2–13.3 3.1–9.5 0–3.6	150 250 350	14.9–15 14.5–14.8 13.8–14.2

* Begin of governing between 440–460 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14	2000	430–435	33.5–34.5	1600 1000	300 100	32–34 32.5–34.5		** please turn over	
				250	ap. 480	5–11			
				deviation max. 1.5					

At full load setting (col. 3 and 6) individual measurements 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control rod to full load position by increasing WG to 430–435 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.5 mm less control rod travel than at full load position measured at 430–435 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 2.0 ± 0.5, with RS 14 z to 2.0 ± 0.5 mm, resp., less than in full load position measured at 430–435 mm WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

RS 14 z with .. M 12 d ... M 13 d

Adjust delivery of equal quantities within outlined ☐ limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path	Tightness		Adjusting Point Control Rod Travel		Adjustment Supplementary Spring		Control Rod Travel Test		Compensation	
	Vacuum Drop	Time	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path
mm	mm Water Col.	sec.	mm Water Col.	mm	mm WC	mm	mm Water Col.	mm	Water Col. mm	mm
1.2+0.1	500–480	10	–	—	–	–	430 465 500 575	12.8* 7.2–12 2.8–8.2 0–2.5	150 250 350 430	14.0–14.1 13.6–13.9 12.9–13.3 12.8

* Begin of governing between 440–460 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14 z	2000	430–435	30.5–31.5	1600 1000	300 100	29–31 29.5–31.5		** please see above	
				250	ap. 480	5–11 deviation max. 1.5			

At full load setting (column 3 and 6) individual measurement 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

Change: Test sheet new

Test Specifications for Injection Pump and Governor

Injection Pump	**with Governor**	**DAI Sheet**
PES 4 M 50 A 320 RS 14 RS 14 z	EP/MN 60 M 14 d	**1.9 i** dated: Jan. 19th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplementary Spring Vacuum mm Water C.	Adjustment Supplementary Spring Control Path mm	Control Rod Travel Test Vacuum mm Water Col.	Control Rod Travel Test Control Path mm	Compensation Vacuum mm Water Col.	Compensation Control Path mm
2.6+0.1	500–480	10	–	–	–	–	405 * 435 450 500	12.7–12.9 8–12 5–10 0–5.6	75 180 350	15.3–15.4 14.5–14.9 13–13.4

* Begin of governing between 410–430 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14	1850	420	29.5–30.5	1400 800	300 95	29–31 32.5–34.5	–	** please turn over	
				250	ap. 450	5–11			
				deviation max. 1.5					

At full load setting (column 3 and 6) individual measurement 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control rod to full load position by increasing WG to 405 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.0 mm less control rod travel than at full load position measured at 405 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 2.0 ± 0.5 mm less than in full load position measured at 405 mm WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

RS 14 z with . ..M 14 d
Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path	Tightness		Adjusting Point Control Rod Travel		Adjustment Supplementary Spring		Control Rod Travel Test		Compensation	
	Vacuum drop	Time red.	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path
mm	mm Water Col.	sec.	mm Water Col.	mm	mm Water C.	mm	mm Water Col.	mm	mm Water Col.	mm
2.6+0.1	500–480	10	–	–	–	–	405 *	11.8–12	75	14.4–14.5
							435	6.6–11.1	180	13.6–14.1
							450	4–9.6	350	12–12.5
							500	0–5.5		

* Begin of governing between 410–430 mm WG by adding washers WMS 22 S 18 . . 19 X under governor spring.
During Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14 z	1850	405	26.5–27.5	1400	300	26–28		** please see above	
				800	95	29.5–31.5			
				250	ap. 440	5–11			
				deviation max. 1.5					

At full load setting (column 3 and 6) individual measurement 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

. . . Increase WG until control rod measure has set to 2.0 mm less control rod travel than at full load position and WG 405 mm.
. . . At the correct adjustment of spring cage the control rod travel should be 1.1 ± 0.5 mm less.

Test Specifications for Injection Pump and Governor

Injection Pump	with Governor	DAI Sheet
PES 4 M 50 A 320 RS 14 RS 14 z (please turn over)	EP/MN 60 M 15 d M 16 d	**1.9 k** dated: Jan. 19th 1962

A. Adjustment Data of the Injection Pump

Feed Begin at a Pre-stroke of 1.7+0.1 mm (from BDC) at Control Rod Travel 18

1	2	3	4	5	6
Speed r. p. m.	Control Rod Travel mm	Feed Quantity cm³/100 strokes	Feed Quantity Differential cm³/100 strokes	Feed Quantity Drop (between 1000 and 200 r. p. m.) cm³/100 strokes	Pre-tension of Spring (Adaptation Valve) mm
1000	9	0.9–1.3			
	15	3 –3.5	0.2		
	18	3.8–4.4			
200	9	0.8–1.2			

Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path mm	Tightness Vacuum drop mm Water Col.	Tightness Time red. sec.	Adjusting Point Control Rod Travel Vacuum mm Water Col.	Adjusting Point Control Rod Travel Control Path mm	Adjustment Supplementary Spring Vacuum mm Water col.	Adjustment Supplementary Spring Control Path mm	Control Rod Travel Test Vacuum Water Col. mm	Control Rod Travel Test Control Path mm	Compensation Vacuum Water Col. mm	Compensation Control Path mm
1.2+0.1	500–480	10	–	–	–	–	480 * 525 560 625	13.7 7.7–13.3 2.7–9.2 0–4	150 275 375	14.9–15 14.5–14.9 13.9–14.2

* Begin of governing between 500–520 mm WG by adding washers WMS 22 S 18..19 X under governor spring.
During Control Rod Travel Test (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full-Load Stop Screw r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Testing of Feed Quantity Characteristics r. p. m.	Vacuum mm Water Col.	cm³/1000 strokes	Adjustment of Idling Stop r. p. m.	Vacuum mm Water Col.	Control Path from Full Load to Idling Load mm
RS 14	2000	480	33.5–34.5	1600 1000	330 100	32–34 32.5–34.5		** please turn over	
				250	ap. 540	5–11			
				deviation max. 1.5					

At full load setting (column 3 and 6) individual measurement 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

** Adjustment of Idling Stop

At 500 rpm and with governor stop cam disengaged set control rod to full load position by increasing WG to 480 mm (accurately) and measure control rod travel obtained. Increase control rod travel still further until control rod has adjusted to 3.5 mm less control rod travel than at full load position measured at 480 mm WG. In this position move stop cam slowly up to end position watching control rod during the process.

With spring cage correctly set the control rod should now adjust to a control rod travel 2.7 ± 0.5 mm less than in full load position measured at 480 mm WG. If the adjusted value is higher or lower the position of the spring bolt in the spring cage should be changed by placing the required washers between the spring bolt collar and the lock washer.

Attention please: This change will also change the pre-tension in the spring cage. By placing washers between spring and spring bolt bottom end the pre-tension will be brought back to the specified value of 50–90 grams.

RS 14 z with . . M 15 d, . . M 16 d
Adjust delivery of equal quantities within outlined [ ] limits

B. Adjustment of Governor

1	2	3	4	5	6	7	8	9	10	11
Compensating Path	Tightness		Adjusting Point Control Rod Travel		Adjustment Supplementary Spring		Control Rod Travel Test		Compensation	
	Vacuum drop	Time red.	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path	Vacuum	Control Path
mm	mm Water Col.	sec.	mm Water Col.	mm	mm WC	mm	mm Water Col.	mm	mm Water Col.	mm
1.2+0.1	500–480	10	–	–	–	–	500 *	12.8	150	14–14.1
							525	7.5–12.5	225	13.8–14.1
							550	3.6–9.5	375	13–13.3
							625	0–3.4	480	12.8

* Begin of governing between 500–525 mm WG by adding washers WMS 22 S 18 . . 19 X under governor spring.
During Control Rod Travel (Column 4–11) n = 500 r. p. m.

C. Adjustment of Injection Pump with Mounted Governor

0	1	2	3	4	5	6	7	8	9
Injection Pump	Adjustment of Full Load Stop Screw			Testing of Feed Quantity Characteristics			Adjustment of Idling Stop		
		Vacuum			Vacuum			Vacuum	Control Path from Full Load to Idling Load
	r. p. m.	Water Col. mm	cm³/1000 strokes	r. p. m.	mm Water Col.	cm³/1000 strokes	r. p. m.	mm Water Col.	mm
RS 14 z	2000	480	30.5–31.5	1600	300	29–31		** please see above	
				1000	100	29.5–31.5			
				250	ap. 540	5–11			
				deviation max. 1.5					

At full load setting (column 3 and 6) individual measurement 1000 strokes
All test values apply only for BOSCH Injection Test Stands.

. . . Increase WG until control rod measure has set to 3.0 mm less control rod travel than at full load position and WG 480 mm.

. . . At the correct adjustment of spring cage the control rod travel should be 2.0 ± 0.5 mm less.