

**ZEXEL
COMBINATIONS**

Date: 25.10.12
Time: 18:52:44

Product: 104640-1040 9 461 620 736 FUEL-INJECTION PUMP

+ INJECTION-PUMP ASSEMBLY	104740-1041	9 460 612 084	
Manufacturer No.:	8941390760		
- FUEL-INJECTION PUMP	104640-1040	9 461 620 736	
- NAMEPLATE	146638-4700	9 461 621 192	
- PULSE GENERATOR	146672-1020	9 461 621 221	
-			
- ACTUATOR	146620-2220	9 461 611 196	
- NOZZLE AND HOLDER ASSY.	105141-2310	9 430 610 042	71-1380
Nozzle and Holder:	8-94106-275-0		
Open Pre:MPa(Kgf/cm2):	13.2{135}		
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- NOZZLE	105000-1770	9 432 610 021	NP-DN0SDN177

ZEXEL
ESPI Cross Reference

No.	ZEXEL No.	BOSCH No.	Manufacturer No.	Manufacturer Name	Zexel Alt. No.	Parts Name	Mark	Status	Sell Category	B-Code
1	104740-1041	9 460 612 084	8941390760	ISUZU	104740-1180	INJECTION-PUMP ASSEMBLY	*		K	103748

ZEXEL Ass'y No.	104740-1180
Bosch Ass'y No.	
Bosch Typecode	
Engine Type	4FC1-J
Manufacturer	ISUZU
Edition date	04.03.09

1 Adjustment conditions

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
	Test oil		ISO4113orSAEJ967 d				
		1404 Test oil					
P	Test oil temperature	degC	45	45	50		
	Nozzle		105000-2010				
	Bosch type code		NP-DN12SD12TT				
	Nozzle holder		105780-2080				
P	Opening pressure	MPa	14.7	14.7	15.19		
P	Opening pressure	kgf/cm2	150	150	155		
P	Injection pipe	mm	2-6-840				
		Inside diameter - outside diameter - length (mm)					
P	Transfer pump pressure	kPa	20	20	20		
P	Transfer pump pressure	kgf/cm2	0.2	0.2	0.2		
	Direction of rotation (viewed from drive side)		R				
		Right					

2 Adjustment specification**2.1 Full load delivery**

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	900	900	900		
P	Boost pressure	kPa	37.3	36	38.6		
P	Boost pressure	mmHg	280	270	290		
S	Average injection quantity	mm3/st.	47.5	47	48		
S	Difference in delivery	mm3/st.	4		4		
P	Basic		*				
P	Oil temperature	degC	50	48	52		
	Remarks	CBS					

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
S	Average injection quantity	mm3/st.	51.3	50.8	51.8		
S	Difference in delivery	mm3/st.	4		4		
P	Basic		*				
P	Oil temperature	degC	50	48	52		
	Remarks	Full					

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	550	550	550		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm3/st.	37.4	35.4	39.4		
		About					
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	900	900	900		
P	Boost pressure	kPa	37.3	36	38.6		
P	Boost pressure	mmHg	280	270	290		
C	Average injection quantity	mm3/st.	47.5	46.5	48.5		
C	Difference in delivery	mm3/st.	4		4		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
C	Average injection quantity	mm3/st.	51.3	50.3	52.3		
C	Difference in delivery	mm3/st.	4		4		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	39.7	37.7	41.7		
C	Difference in delivery	mm ³ /st.	3.5		3.5		
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	2150	2150	2150		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
C	Average injection quantity	mm ³ /st.	45.7	43.7	47.7		
		About					
C	Difference in delivery	mm ³ /st.	5.5		5.5		
P	Oil temperature	degC	52	50	54		

2.2 Governing

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	2600	2600	2600		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
S	Average injection quantity	mm ³ /st.	17.5	16.5	18.5		
S	Difference in delivery	mm ³ /st.	5.5		5.5		
P	Basic		*				
P	Oil temperature	degC	55	52	58		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	2800	2800	2800		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
C	Average injection quantity	mm ³ /st.	5		5		
P	Oil temperature	degC	55	52	58		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	2600	2600	2600		
P	Boost pressure	kPa	60	58.7	61.3		
P	Boost pressure	mmHg	450	440	460		
C	Average injection quantity	mm ³ /st.	17.5	14.5	20.5		
C	Difference in delivery	mm ³ /st.	5.5		5.5		
P	Oil temperature	degC	55	52	58		

2.3 Idle

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	375	375	375		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
S	Average injection quantity	mm ³ /st.	12.2	10.2	14.2		
S	Difference in delivery	mm ³ /st.	2		2		
P	Basic		*				
P	Oil temperature	degC	48	46	50		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	375	375	375		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	12.2	10.2	14.2		
C	Difference in delivery	mm ³ /st.	2		2		
P	Oil temperature	degC	48	46	50		

2.4 Start

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	100	100	100		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
S	Average injection quantity	mm ³ /st.	60	60			
P	Basic		*				
P	Oil temperature	degC	48	46	50		
	Remarks						
		Full					

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	100	100	100		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	60	60			
P	Oil temperature	degC	48	46	50		

2.5 Stop

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	375	375	375		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	0	0	0		
P	Oil temperature	degC	48	46	50		
	Remarks						
		Magnet OFF at idling position					

2.6 Overflow

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Overflow quantity	cm ³ /min	400	270	530		
P	Oil temperature	degC	50	48	52		

2.7 Pump chamber pressure

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
S	Pressure	kPa	441	421	461		
S	Pressure	kgf/cm ²	4.5	4.3	4.7		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Pressure	kPa	441	412	470		
C	Pressure	kgf/cm ²	4.5	4.2	4.8		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1750	1750	1750		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Pressure	kPa	598	569	627		
C	Pressure	kgf/cm ²	6.1	5.8	6.4		
P	Oil temperature	degC	50	48	52		

2.8 Timer

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
S	Timer stroke	mm	2.6	2.4	2.8		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	840	740	940		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Timer stroke	mm	0.5	0.5	0.5		
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Timer stroke	mm	2.6	2.4	2.8		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1750	1750	1750		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Timer stroke	mm	5.2	4.8	5.6		
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	2250	2250	2250		

P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Timer stroke	mm	7.8	7.5	8.2		
P	Oil temperature	degC	52	50	54		

2.9 Magnet

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
C	Max. applied voltage	V	8	8	8		
P	Test voltage	V	13	12	14		

2.10 Compensator**2.10.1 Load-timer adjustment**

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
S	Average injection quantity	mm ³ /st.	30	29	31		
S	Timer stroke TA	mm	1.6	1.6	1.6		
		About					
S	Timer stroke variation dT	mm	1	0.8	1.2		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	30	29	31		
C	Timer stroke variation dT	mm	1	0.6	1.4		
P	Basic		*				
P	Oil temperature	degC	50	48	52		

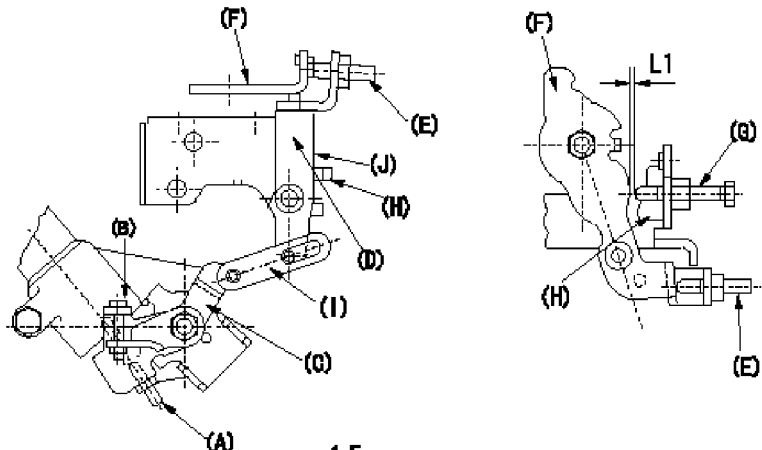
CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
P	Pump speed	r/min	1250	1250	1250		
P	Boost pressure	kPa	0	0	0		
P	Boost pressure	mmHg	0	0	0		
C	Average injection quantity	mm ³ /st.	25	24	26		
C	Timer stroke variation dT	mm	1.55	1.15	1.95		
		About					
P	Oil temperature	degC	50	48	52		

2.11 Additional device adjustment

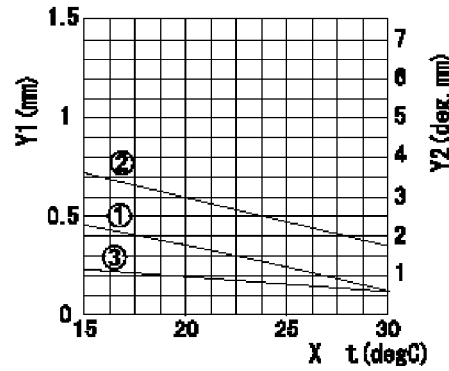
2.11.1 Additional device 1

Name W-CSD ADJUSTMENT

N1=500r/min
 a=20degC
 b=-20degC
 c=2.9+-1deg
 d=8+-3deg
 O1=0.3+-0.4mm
 O2=1.2+-0.6mm
 Q1=0.93+-0.3mm
 Q2=2.62+-1mm



① $TA = -0.0215t + 0.75$
 ② $\theta = -0.1285t + 5.43$
 ③ $L = -0.04225t + 1.775$



(W)

(S)	(R)	(O)	(P)	(Q)	
N=N1	a	O1	c	Q1	(M)
	b	O2	d	Q2	

L1=0.93+-0.05mm

Adjustment of the W-CSD

- Adjustment of the timer stroke
Adjust screw (A) so that the timer stroke is the value determined from the graph.
 - Adjustment of the position of the intermediate lever.
(1) Insert a shim L1 between the control lever (F) and the idle set screw (G).
(2) Set intermediate lever (D) adjusting screw (E) so that adjusting screw (E) contacts control lever (F), and so that when intermediate lever is at right angles to pump center, intermediate lever and idle stopper bracket (H) overlap at position (J).
 - W-CSD adjustment
Insert a shim L1+-0.05 between the control lever (F) and the idle set screw (G).
Use adjusting screw (B) to fix the CSD lever (C) in the position where it operates the intermediate lever (D) via the rod (I).
X: Temperature t (deg C)
Y1: Timer stroke TA (mm)
Y2: Control lever position at theta L (deg, mm)
- (W) Cold advancer
 (R) Cooling water temperature (deg C)
 (S) Cooling water temperature: increase direction
 (O) Timer piston stroke (mm)
 (P) Lever position (deg)
 (Q) lever position (mm)
 (M) standard point
 N: Pump speed

3 Assembly dimension

CAT	Designation	Unit	Set value	min.	max.	Actual values	OT
S	K dimension	mm	3.3	3.2	3.4		
S	KF dimension	mm	5.8	5.7	5.9		
S	MS dimension	mm	1.3	1.2	1.4		
S	BCS stroke	mm	3.5	3.3	3.7		
S	Control lever angle alpha	deg.	23	19	27		
S	Control lever angle beta	deg.	39	34	44		