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(54) **Fuel injection control device, engine and straddle type vehicle**

(57) A fuel injection control device provides improvements in engine output, fuel efficiency and throttle response while reducing smoke emissions. If a throttle opening exceeds a prescribed value (a) and an engine load is in a prescribed high load range, an in-pipe injection by an in-pipe injector is used together in addition to an in-cylinder injection by an in-cylinder injector. In a low load range, in which an engine load is smaller than in the high load range, only the in-cylinder injection by the in-cylinder injector is used.

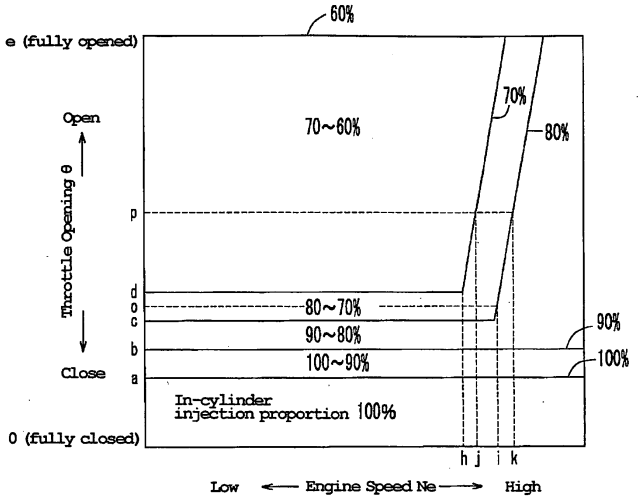

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 09 00 4419

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/144365 A1 (MIYASHITA SHIGEKI [JP]) 6 July 2006 (2006-07-06) * paragraph [0014]; figure 2 *	1-9	INV. F02D41/30
X	US 2006/207240 A1 (ARAKI KOJI [JP] ET AL) 21 September 2006 (2006-09-21) * paragraphs [0011], [0012]; figures 4-7 *	1-9	
X	US 2006/005812 A1 (MASHIKI ZENICHIRO [JP]) 12 January 2006 (2006-01-12) * paragraphs [0014], [0015]; figure 3 *	1-9	
X	WO 2006/079172 A (ORBITAL ENG PTY [AU]; CALEY DAVID JAMES [AU]) 3 August 2006 (2006-08-03) * page 5, line 29 - page 6, line 5; figure 3 *	1-9	
X	US 7 159 568 B1 (LEWIS DONALD J [US] ET AL) 9 January 2007 (2007-01-09) * column 2, line 15 - line 21; figure 43 *	1-9	

TECHNICAL FIELDS SEARCHED (IPC)

F02D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	4 May 2012	Jackson, Stephen

CATEGORY OF CITED DOCUMENTS

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04-05-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006144365 A1	06-07-2006	CN 101151446 A	26-03-2008
		EP 1834072 A1	19-09-2007
		EP 2110534 A1	21-10-2009
		JP 4492351 B2	30-06-2010
		JP 2006188973 A	20-07-2006
		US 2006144365 A1	06-07-2006
		US 2008208439 A1	28-08-2008
		WO 2006073062 A1	13-07-2006
US 2006207240 A1	21-09-2006	CN 101142387 A	12-03-2008
		EP 1859140 A1	28-11-2007
		JP 2006258027 A	28-09-2006
		US 2006207240 A1	21-09-2006
		WO 2006100836 A1	28-09-2006
US 2006005812 A1	12-01-2006	CN 1981125 A	13-06-2007
		EP 1766217 A1	28-03-2007
		JP 4428160 B2	10-03-2010
		JP 2006022732 A	26-01-2006
		US 2006005812 A1	12-01-2006
		WO 2006006345 A1	19-01-2006
WO 2006079172 A	03-08-2006	NONE	
US 7159568 B1	09-01-2007	CN 1975136 A	06-06-2007
		CN 101975117 A	16-02-2011
		US 7159568 B1	09-01-2007

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82