



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 460 250 A8**

(12) **CORRECTED EUROPEAN PATENT APPLICATION**

published in accordance with Art. 158(3) EPC

Note: Bibliography reflects the latest situation

(15) Correction information:

**Corrected version no 1 (W1 A1)**  
**INID code(s) 72**

(51) Int Cl.7: **F02D 19/06**

(86) International application number:

**PCT/JP2001/011364**

(48) Corrigendum issued on:

**19.01.2005 Bulletin 2005/03**

(87) International publication number:

**WO 2003/056159 (10.07.2003 Gazette 2003/28)**

(43) Date of publication:

**22.09.2004 Bulletin 2004/39**

(21) Application number: **01275100.4**

(22) Date of filing: **25.12.2001**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE TR**

(72) Inventor: **GOTO, Satoru**

**c/o Niigata Power Systems Co., Ltd.  
Tokyo 104-0028 (JP)**

(71) Applicant: **Niigata Power Systems Co., Ltd.**

**Tokyo 104-0028 (JP)**

(74) Representative: **Bérogin, Francis**

**Cabinet Plasseraud  
65/67 rue de la Victoire  
75440 Paris Cedex 09 (FR)**

(54) **DUAL FUEL ENGINE**

(57) The present invention aims to allow an arbitrary selection to be made between gas operation and diesel operation, to achieve a reduction in NO<sub>x</sub> even when in diesel operation, to allow the compression ratio to be adjusted and altered in accordance with the operating state when in gas operation, to allow quick starting, and to perform operations at a high combustion efficiency over the entire load range. The dual fuel engine of the present invention is provided with a precombustion chamber unit, which is located in the cylinder head of the dual fuel engine, having a precombustion chamber and an electromagnetic fuel injection valve (a liquid fuel injection valve) and also with a compression ratio control valve. The compression ratio control valve opens and closes an air passage that connects the main combustion chamber with an intake port. In gas operation, the valve opening time of the compression ratio control valve is adjusted in accordance with the operating state, and the compression is adjusted by allowing a portion of the air gas mixture inside the main combustion chamber to escape to the intake port. Fuel gas is ignited by a pilot quantity of liquid fuel from the electromagnetic fuel injection valve and is then combusted. In diesel operation, the compression ratio control valve is closed and liquid fuel injected at a high compression ratio from the electromagnetic fuel injection valve is combusted by a precombustion method.

FIG. 1

