

Title (en)  
STARTING DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Title (de)  
STARTVORRICHTUNG ZUM STARTEN EINER BRENNKRAFTMASCHINE

Title (fr)  
DISPOSITIF DE DEMARRAGE POUR MOTEUR A COMBUSTION INTERNE

Publication  
**EP 0808420 B1 19990407 (DE)**

Application  
**EP 96900269 A 19960109**

Priority

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- DE 19532484 A 19950902

Abstract (en)  
[origin: US6148781A] PCT No. PCT/DE96/00030 Sec. 371 Date Nov. 2, 1998 Sec. 102(e) Date Nov. 2, 1998 PCT Filed Jan. 9, 1996 PCT Pub. No. WO96/23970 PCT Pub. Date Aug. 8, 1996The starting device for starting an internal combustion engine includes a starter motor (12) with a pinion for cranking the internal combustion engine; a voltage source (40) for the starter motor; a starter relay (14) for connecting and disconnecting the voltage source to and from the starter motor and an electronic relay (32) for triggering the starter relay according to control signals from the motor controller (50). The electronic relay (32) is mounted on the starter motor or in the starter relay. The electronic relay (32) includes a power module (34) with a redundancy circuit including two transistors (144', 144'') coupled with each other by a logic circuit for preventing starter operation when one of the two transistors is defective.

IPC 1-7  
**F02N 11/08**

IPC 8 full level  
**F02N 11/08** (2006.01)

CPC (source: EP US)  
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Cited by  
WO03040551A2; EP1446576B1

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DE FR GB IT

DOCDB simple family (publication)  
**US 6148781 A 20001121**; BR 9607600 A 19980609; CN 1077227 C 20020102; CN 1172520 A 19980204; EP 0808420 A1 19971126; EP 0808420 B1 19990407; JP H11502579 A 19990302; MX 9705876 A 19971231; WO 9623970 A1 19960808

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**US 89999197 A 19970724**; BR 9607600 A 19960109; CN 96191723 A 19960109; DE 9600030 W 19960109; EP 96900269 A 19960109; JP 52315096 A 19960109; MX 9705876 A 19960109