

Title (en)  
Method and apparatus for the early detection of failures in a centrifugal pump

Title (de)  
Verfahren und Vorrichtung zur Störungsfrüherkennung bei Kreiselpumpen

Title (fr)  
Méthode et dispositif pour la détection anticipée de pannes dans une pompe centrifuge

Publication  
**EP 1422424 A3 20090520 (DE)**

Application  
**EP 03021880 A 20030927**

Priority  
DE 10254041 A 20021120

Abstract (en)  
[origin: EP1422424A2] During the operation of the pump starting from the pump characteristic of the pump and the spring constant of the spring element (10, 14) the deformation of the spring element is measured and reference made to the current operating point of the pump. Base measurements are taken for each type of pump to be monitored and the medium to be delivered to set the axial force, relief force and pressure distribution in the wheel side chamber with operating points in relation to the characteristic of the pump. Independent claim describes device where cardan ring (10) is used as spring element dimensioned so that it is deformed through defined residual axial force predetermined by relief device to adjust axial gap (6,7).

IPC 8 full level  
**F04D 15/02** (2006.01); **F04D 29/04** (2006.01); **F04B 49/10** (2006.01); **F04D 15/00** (2006.01)

CPC (source: EP US)  
**F04D 15/0088** (2013.01 - EP US); **F04D 29/0413** (2013.01 - EP US)

Citation (search report)

- [A] EP 0971212 A1 20000112 - SULZER ELECTRONICS AG [CH], et al
- [A] US 5104284 A 19920414 - HUSTAK JR JEROME F [US], et al
- [A] US 3542494 A 19701124 - SATO RYUICHI, et al

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DE102018210842A1; DE102018210842B4; WO2020007838A1; CN104121179A; CN106907337A; CN103629121A; US11536274B2

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

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AL LT LV MK

DOCDB simple family (publication)  
**EP 1422424 A2 20040526; EP 1422424 A3 20090520; EP 1422424 B1 20160810**; DE 10254041 A1 20040603; DE 10254041 B4 20110707; JP 2004169704 A 20040617; JP 4093949 B2 20080604; US 2004151581 A1 20040805; US 6877947 B2 20050412

DOCDB simple family (application)  
**EP 03021880 A 20030927**; DE 10254041 A 20021120; JP 2003390257 A 20031120; US 71583103 A 20031119