



**A. CLASSIFICATION OF SUBJECT MATTER****E21B 33/064(2006.01)i, E21B 41/00(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**Minimum documentation searched (classification system followed by classification symbols)  
E21B 33/064; E21B 34/04; G06F 17/30; G05B 23/02; G06F 3/0484; G01V 1/40; E21B 41/00Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean utility models and applications for utility models  
Japanese utility models and applications for utility modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKOMPASS(KIPO internal) & Keywords: BOP, monitoring, sensor, model, health index, future condition**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2016-0237773 A1 (TRANSOCEAN INNOVATION LABS LTD) 18 August 2016 See paragraphs [0010]-[0074]; and figure 1.	1-20
Y	US 2014-0231075 A1 (NATIONAL OILWELL VARCO, L.P.) 21 August 2014 See paragraph [0052]; claim 26; and figures 1-4.	1-20
A	WO 2012-102775 A2 (BP CORPORATION NORTH AMERICA INC. et al.) 02 August 2012 See paragraphs [0019]-[0070]; and figures 1-8.	1-20
A	US 2016-0306831 A1 (HYDRIL USA DISTRIBUTION LLC) 20 October 2016 See paragraphs [0022]-[0062]; and figures 1-6.	1-20
A	US 2015-0177403 A1 (GENERAL ELECTRIC COMPANY) 25 June 2015 See paragraphs [0020]-[0050]; and figures 1-4.	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

26 February 2018 (26.02.2018)

Date of mailing of the international search report

**26 February 2018 (26.02.2018)**

Name and mailing address of the ISA/KR

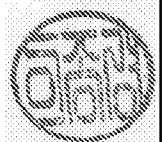
International Application Division  
Korean Intellectual Property Office  
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

LEE, Jong Kyung

Telephone No. +82-42-481-3360



## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/US2017/061418**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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