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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) **Title:** EQUIPMENT PERFORMANCE MONITORING SYSTEM AND METHOD

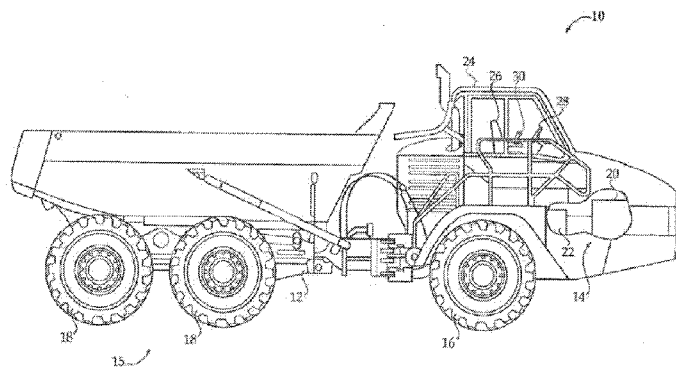


Fig. 1

(57) **Abstract:** Methods and systems are disclosed for evaluating performances of a piece of equipment and equipment operator. One disclosed method includes sensing a plurality of operating parameters of the equipment. The method then includes resolving a plurality of segments the equipment is sequentially performing from the sensed operating parameters to provide a sequence of resolved segments. The method then includes resolving what application the equipment is performing based upon the sequence of resolved segments to provide at least one resolved application. The method then includes applying at least one metric to the resolved application to provide at least one applied application metric. Then, the method includes evaluating the performance of the equipment and operator using the applied application metric. Various systems for installation on existing work equipments or new work equipments such as loaders and excavators are also disclosed.





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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/063418**A. CLASSIFICATION OF SUBJECT MATTER*****E02F 9/26(2006.01)i, E02F 9/20(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)

E02F 9/26; F15B 11/02; G06G 7/76; E02F 3/38; E02F 9/22; E02F 3/43

Documentation 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 models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: performance, controller, memory, sensor, algorithm, pressure, engine speed, program.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1403438 A1 (HUSCO INTERNATIONAL, INC.) 31 March 2004 See claims 1-3 and figures 2-3.	1-3,10-12
A	US 05941921A A (DASYS; ANDREW et al.) 24 August 1999 See claims 1-4 and figures 5-8.	1-3,10-12
A	US 2001-0007087 A1 (KENNETH A. BRANDT et al.) 05 July 2001 See claims 1-3 and figures 2-5.	1-3,10-12
A	EP 2101065 A1 (HITACHI CONSTRUCTION MACHINERY CO., LTD) 16 September 2009 See claims 1-2 and figures 2,4.	1-3,10-12



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 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

"&" document member of the same patent family

Date of the actual completion of the international search

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/063418**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 6,8,9,15
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
The claims refer to the unclear claims according to the second and third sentences of the Rule 6.4(a).
3. ☒ Claims Nos.: 4-5,7,13-14
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2011/063418

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