

Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[Full Text](#) [View at Publisher](#)Indonesian Journal of Electrical Engineering and Computer Science
Volume 11, Issue 2, August 2018, Pages 531-541

Non-contact capacitive technique for biomass flow sensing (Article)

Tasnim, R.^a , Khan, S.^b, Arshad, A.^b, Hussein, M.R.^c ^aDepartment of MTE, World University of Bangladesh, Dhaka, Bangladesh^bDepartment of ECE, International Islamic University Malaysia, Kuala Lumpur, Malaysia^cDepartment of CSE, University of Asia Pacific, Dhaka, Bangladesh

Abstract

[View references \(11\)](#)

To facilitate real-time flow measurement, this paper aims to realize biomass flow sensing through electronic non-contact capacitive means. Hardware implementation has been carried out using a modified OP-AMP-based bridge circuit, with one arm made of a standard capacitance while the other arm is made from two specifically designed capacitive electrodes fitted on a piping system sensing biomass flow. The experimental results are targeted to obtain data for given biomass types through a custom-developed biomass flow piping system. Several flow affecting parameters namely: electrodes' shapes, the location of electrodes on the piping system, biomass material type, and particle size have been considered in obtaining experimental data. Also, the circuit has been simulated to analyze flow sensing behavior for the proposed technique by evaluating the measurement data and assessing conformity between experimentally obtained and simulated data. © 2018 Institute of Advanced Engineering and Science. All rights reserved.

Author keywords

Biomass Electrodes Measurement Piping Sensing

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
RIGS 15-147-0147			

Funding text

Financial assistance for this research by the IIUM Research Management Center (RMC) via RIGS Grant No RIGS 15-147-0147 is highly acknowledged.

ISSN: 25024752

Source Type: Journal


Original language: English

DOI: 10.11591/ijeecs.v11.i2.pp531-541

Document Type: Article

Publisher: Institute of Advanced Engineering and Science

References (11)

[View in search results format >](#)
 All [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)
Metrics 

0 Citations in Scopus

0 Field-Weighted
Citation ImpactPlumX Metrics Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 0 documents

Inform me when this document
is cited in Scopus:[Set citation alert >](#)[Set citation feed >](#)

Related documents

A qualitative analysis of biomass
flow sensing behavior using
capacitive techniqueTasnim, R. , Khan, S. , Mohamud,
M.
(2016) *IIUM Engineering Journal*A study of pneumatic conveying
of gas-solid flow for industrial
applicationAl-Khateeb, K.A.S. , Tasnim, R. ,
Khan, S.
(2013) *IOP Conference Series:
Materials Science and
Engineering*Capacitive sensing in process
instrumentationFuchs, A. , Zangl, H. , Moser, M.J.
(2009) *Metrology and
Measurement Systems*View all related documents based
on referencesFind more related documents in
Scopus based on:[Authors >](#) [Keywords >](#)

-
- 1 Cui, H., Grace, J.R.
Pneumatic conveying of biomass particles: A review
(2006) *China Particuology*, 4 (3-4), pp. 183-188. Cited 12 times.
-
- 2 Qian, X., Yan, Y.
Flow measurement of biomass and blended biomass fuels in pneumatic conveying pipelines using electrostatic sensor-arrays
(2012) *IEEE Transactions on Instrumentation and Measurement*, 61 (5), art. no. 6126026, pp. 1343-1352. Cited 46 times.
doi: 10.1109/TIM.2011.2175034
[View at Publisher](#)
-
- 3 Bera, S.C., Mandal, H.
A flow measurement technique using a noncontact capacitance-type orifice transducer for a conducting liquid
(2012) *IEEE Transactions on Instrumentation and Measurement*, 61 (9), art. no. 6185673, pp. 2553-2559. Cited 15 times.
doi: 10.1109/TIM.2012.2192345
[View at Publisher](#)
-
- 4 Lucas, J., Holé, S., Bâtis, C.
Analytical capacitive sensor sensitivity distribution and applications
(2006) *Measurement Science and Technology*, 17 (9), art. no. 014, pp. 2467-2478. Cited 19 times.
<http://www.iop.org/EJ/journal/0957-0233>
doi: 10.1088/0957-0233/17/9/014
[View at Publisher](#)
-
- 5 Zangl, H., Bretterkieber, T., Holler, G.
On the Design of a Fully Differential Capacitive Sensor Front-End Interface Circuit
(2008) *Microelectronics Conference ME*, p. 132. Cited 6 times.
-
- 6 Bretterkieber, Th., Zangl, H., Holler, G., Hrach, D., Hammerschmidt, D., Motz, M.
Versatile programmable integrated interface for robust capacitive sensors
(2008) *Elektrotechnik und Informationstechnik*, 125 (4), pp. 132-137. Cited 8 times.
doi: 10.1007/s00502-008-0523-2
[View at Publisher](#)
-
- 7 Bretterkieber, T., Zangl, H., Motz, M., Werth, T., Hammerschmidt, D.
Versatile sensor front end for low-depth modulation capacitive sensors
(2008) *Conference Record - IEEE Instrumentation and Measurement Technology Conference*, art. no. 4547152, pp. 830-835. Cited 19 times.
ISBN: 1424415411; 978-142441541-0
doi: 10.1109/IMTC.2008.4547152
[View at Publisher](#)
-