



(12) **United States Patent**
Cornu et al.

(10) **Patent No.:** **US 9,411,357 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **CHARGE TO VOLTAGE CONVERSION
CIRCUIT FOR WIM SENSOR AND WIM
SENSOR WITH SAME**

(58) **Field of Classification Search**
CPC H03F 3/347; H03F 3/70; G01L 1/16;
G01G 3/13; G01G 19/024; G05F 5/00;
G01D 3/036; G01D 18/004
See application file for complete search history.

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(56) **References Cited**

U.S. PATENT DOCUMENTS

3,569,747 A * 3/1971 Siegel B06B 1/0651
310/319
3,749,946 A 7/1973 Von Rüti
(Continued)

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 106 days.

FOREIGN PATENT DOCUMENTS

EP 0965827 A1 * 12/1999 G01D 18/004

(21) Appl. No.: **14/385,587**

OTHER PUBLICATIONS

(22) PCT Filed: **Mar. 26, 2013**

"Zener Diodes" article downloaded from the "All About Circuits"
webpage (<http://www.allaboutcircuits.com/textbook/semiconductors/chpt-3/zener-diodes/>) on Feb. 26, 2016.*

(86) PCT No.: **PCT/CH2013/000051**

§ 371 (c)(1),
(2) Date: **Sep. 16, 2014**

(Continued)

(87) PCT Pub. No.: **WO2013/143013**

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PCT Pub. Date: **Oct. 3, 2013**

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(65) **Prior Publication Data**

US 2015/0042304 A1 Feb. 12, 2015

(57) **ABSTRACT**

(30) **Foreign Application Priority Data**

Mar. 26, 2012 (CH) 0424/12

An electronic circuit that changes a charge signal into a voltage signal within a sensor suitable for direct installation in a roadway can be connected to two single-core cables that need not be highly insulating yet can realize the required power supply of the electronics. The circuit includes an integrated impedance converter (IEPE) at the output to a two-core cable and a charge amplifier with an IC1 that has two inputs. A capacitor Cc is connected in series to the signal output of the sensor at one input of the IC1. A Zener diode D is arranged between the ground output of the sensor and the second input of the IC1 and can be supplied with power by a resistor R1 in conjunction with a power supply arranged on the output side in order to adapt the potential at the second input of the IC1.

(51) **Int. Cl.**
G01G 3/13 (2006.01)
G01G 19/02 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC .. **G05F 5/00** (2013.01); **G01G 3/13** (2013.01);
G01G 19/024 (2013.01); **G01D 3/036**
(2013.01); **G01D 18/004** (2013.01); **G01L 1/16**
(2013.01); **H03F 3/347** (2013.01); **H03F 3/70**
(2013.01)

14 Claims, 3 Drawing Sheets

