Title (en)

METHOD FOR MONITORING AND CONTROLLING COMBUSTION IN COMBUSTIBLE GAS BURNERS AND SYSTEM FOR CONTROLLING COMBUSTION OPERATING ACCORDING TO SAID METHOD

Title (de)

VERFAHREN UND SYSTEM ZUR ÜBERWACHUNG UND REGELUNG DER VERBRENNUNG IN GASBRENNERN

Title (fr)

PROCÉDÉ ET SYSTÈME POUR LE RÉGLAGE ET LA SURVEILLANCE DE COMBUSTION

Publication

EP 3124866 B1 20180124 (EN)

Application

EP 16181377 A 20160727

Priority

IT UB20152534 A 20150728

Abstract (en)

[origin: EP3124866A1] A method is described for monitoring and controlling combustion in a burner of a premix combustible gas appliance (1) with fan, of the type comprising a sensor with at least one electrode (E) placed in the flame or in the proximity thereof and suitable for being powered by a voltage generator as well as being connected to an electronic circuit suitable for measuring the resulting potential at the electrode. The method comprises a first phase of acquisition and processing of data from a series of combustion conditions of the burner and a second phase of calculating the air number (») in a real operating condition of the burner. The first phase comprises the steps of: identifying a plurality of combustion conditions of the burner (1), applying in each of said conditions in the burner a power (P1, P2, ..., Pn) and applying for each power an air number value (»1, »2, ..., »m), said air number expressing the ratio between the quantity of air in the combustion process and the quantity of air for stoichiometric combustion, applying in each of the (n * m) test conditions (Pi, »j) a pulsed electrical voltage signal (S) to the electrode (E) and measuring the trend over time of the resulting electrical signal (S') at the electrode, once the application of the impulsed signal (S) has ceased, said signal (S) applied to the electrode (E) comprising, in the period of the signal (S), a first impulse (N1) with a positive amplitude, followed by a second impulse (N2) with a negative amplitude, identifying, for each of said combustion conditions, the curve of the trend over time of the response signal (S') at the electrode (E), said trend being expressed for each impulse (N1, N2) by an exponential function decreasing over time in absolute terms, calculating for a first section of the curve, relating to the first impulse (N1), as well as for a second curve section relating to the second impulse (N2), the respective first and second time constants (Ä 1 , Ä 2), characteristic of the exponential trend for the respective first and second curve sections, thus obtaining an interpolation function or correlation table (F), based on the acquired test data, suitable for unequivocally interpolating or correlating at least one significant parameter of the combustion characteristics (power or air number) with the respective time constants of the exponential functions characteristic of the trend in the response signal measured at the electrode, in the combustion process of the burner. The second phase of calculating the air number (») in a real operating condition of the burner comprises the steps of: acquiring in said operating condition the electrical response signal measured on the electrode after the application of the impulsed signal, calculating, for said operating condition of the burner, the first and second time constants (Ä 1 , Ä 2) characteristic of the respective curves sections relating to the trend of the resulting voltage signal at the electrode, following the application of the impulsed signal, calculating the estimated value of the air number (» stim) by using the interpolation function or correlation table (F) which correlates the power (P) and the air number (») with the time constants (Ä 1 , Ä 2) characteristic of the curve relating to the trend in the response signal (S') measured at the electrode (E).

IPC 8 full level

F23N 1/00 (2006.01); **F23D 14/02** (2006.01); **F23N 1/02** (2006.01); **F23N 1/04** (2006.01); **F23N 3/00** (2006.01); **F23N 5/12** (2006.01)

CPC (source: EP)

F23D 14/02 (2013.01); **F23N 1/002** (2013.01); **F23N 1/02** (2013.01); **F23N 1/022** (2013.01); **F23N 1/04** (2013.01); **F23N 1/042** (2013.01); **F23N 3/002** (2013.01); **F23N 5/12** (2013.01); F23N 2229/12 (2020.01)

Cited by

DE102017204030A1; US2019162408A1; EP3492812A3; EP3757456A1; US11940147B2; US11608983B2; US11441772B2; US10718518B2; US11608984B1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

EP 3124866 A1 20170201; **EP 3124866 B1 20180124**; ES 2663912 T3 20180417; IT UB20152534 A1 20170128

DOCDB simple family (application)

EP 16181377 A 20160727; ES 16181377 T 20160727; IT UB20152534 A 20150728