DATA ACQUISITION AND HANDLING SYSTEMS

DATA SHEET

Fuji DAHS

Fuji Electric France has experience and expertise in two related fields: the reliable and certified measurement of air emissions with Fuji CEMS, and the European standardised data management/reporting with Fuji DAHS.

The Fuji CEM System^{v7} is the latest evolution of the Fuji DAHS data management tool. It is a standardised acquisition and handling system for emission measurement data.

It benefits from the latest technological advances in terms of digital, wireless, secure cloud communications (for GSM) and the ability to send alerts by e-mail or SMS.

It ensures strict compliance with current European regulations such as EN17255.

GENERAL FEATURES

1. Main features:
   - Local or remote management and control of the CEMS.
   - Measurement data acquisition.
   - Normative data management.
   - Emission report edition.
   - Automatic management of the QAL3 protocol.

2. Designed for:

   Boilers, engines and gas turbines.

3. Regulatory compliance:
   - Complies with European standard EN17255:2019.
   - Complies with French regulations.
   - Continuous development to meet changing to the evolution of the regulations.

4. Quantities managed:

   Concentrations of gaseous compounds:
   CO, CO_2, NOx, N_2O, SO_2
   NH_3, HCl, COVT, CH_4, O_2, H_2O

   Other quantities:

   Dust, Pressure, Temperature, Flow.

5. Fuji FBOX PLC:

   For remote control and maintenance.

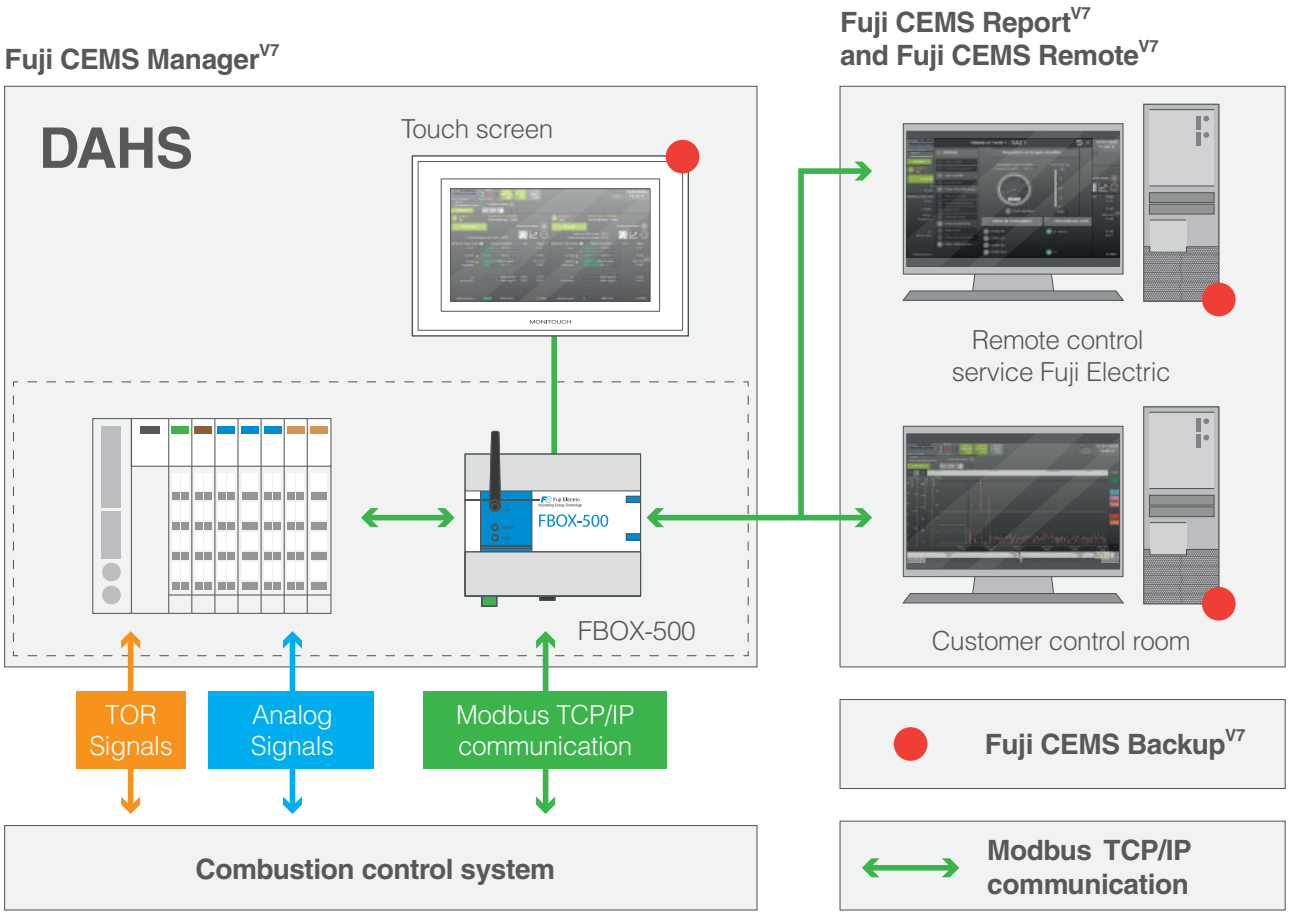
6. Fuji CEM System^{v7} software suite including:
   - Fuji CEMS Manager^{v7}
   - Fuji CEMS Remote^{v7}
   - Fuji CEMS Backup^{v7}
   - Fuji CEMS Report^{v7}
   - Fuji ACE Data^{QAL3} (option)

7. Adaptability:
   - Any brand of CEMS for combustion installations.
   - Any type of fuel.
   - One or more multiplexed stacks.

8. Design:
   - In close cooperation with TÜV, the French authorities (DREAL) and the professional associations (FEDENE, GIMELEC).
   - Development and maintenance by Fuji Electric engineers in France.
   - Hardware and software robustness proven for 18 years.

9. Data protection :
   - Multiple redundant storage.
   - Highly secure exchanges with the cloud (encrypted VPN).

Fuji CEM System^{V7} overall architecture



Fuji FBOX description

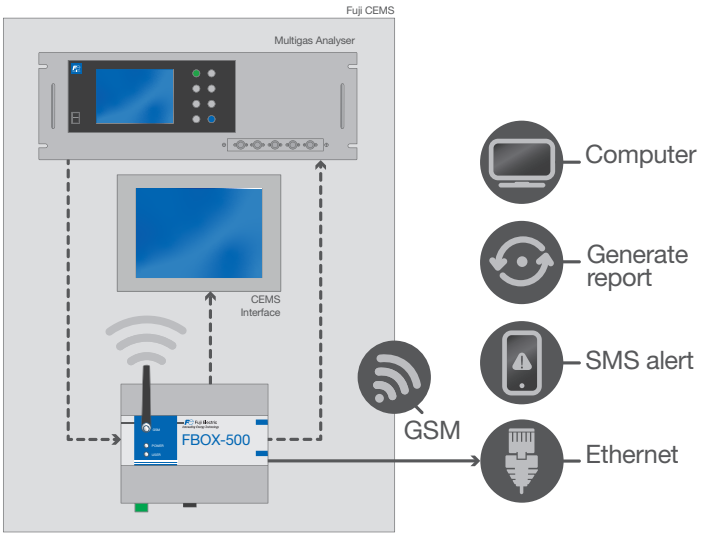
Features :

- Control and automation of CEMS.
- Combined with the necessary input/output modules.
- Remote Machine-To-Machine controller:

- Ethernet/Internet or GSM communication.
- File exchange, e-mail and SMS.

Functions :

- Sending alarms (SMS, e-mail):
  CEMS fault, ELV exceedance, etc.
- Allows remote diagnosis and maintenance.
- Remote CEMS control, updates,
  preparation of maintenance operations.
- VPN for secure remote management of emission reports.



Maximum setup

Number of analytical loops(1)	Maximum number of units(2)	Number of units operating simultaneously
1	8	4
2	8	8
3	8	8

Notes : (1) The Fuji DAHS can be used to process data from several CEMS or from one CEMS equiped with several analysers.
(2) The Fuji DAHS can be used to manage the flue gas emissions data from multiple stacks.

Continuous or multiplexed sampling method

The Fuji DAHS is designed to handle data from CEMS operating either in "continuous analysis" or in "multiplexed analysis". In the latter case, the stacks are "scanned" in turn.

Number of analytical loops	Number of units operating simultaneously	Sampling method
1	1	Continuous
1	2 to 4	Multiplexing
2	1 or 2	Continuous
2	3 to 8	Multiplexing
3	1 to 3	Continuous
3	4 to 8	Multiplexing

The 4 modules of the Fuji CEM System^{v7} suite

Fuji CEMS Manager^{v7} :

Consisting mainly of the Fuji FBOX and the touch interface, the Fuji CEMS Manager^{v7} is the HMI of the CEMS and provides control and automation. It is also its communication centre.

Functions performed by the Fuji CEMS Manager^{v7} :

CEMS configuration and operation control with the Fuji FBOX.

Data display (numerical and graphical) and security (1st level storage).

Alarm/status display and output via Modbus® communication and/or digital outputs.

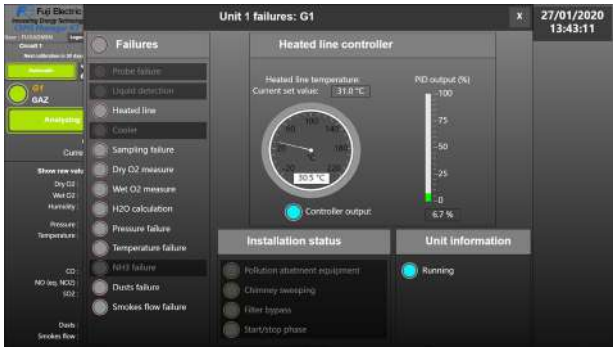
Mode selection: maintenance, calibration, QAL2, QAL3.

Data management compliant with European environmental regulations, including EN17255.

Main screen

Trends display

Fault management



Fuji CEMS Remote^{v7} :

All operations that are possible locally from the Fuji CEMS touchscreen interface are also available from a remote PC.

Basic: Ethernet/Internet communication, web interface.

Optional: GSM communication.

Fuji CEMS Backup^{v7} :

- Start automatic backups.
- Management of the history of the backups.
- Data security for a period of > 10 years and on 3 media simultaneously:
  1. FBOX internal memory.
  2. PC's internal operational hard disk.
  3. Internal PC backup SSD.

In the event of loss of communication between the analysis cabinet and the PC, or in the event of failure of the PC, the data is saved both in the FBOX (cabinet) and in the PC (SSD and HDD), thus enabling this triple data security to guarantee continuous issue of emission reports to the authorities.

Fuji CEMS Report^{v7} :

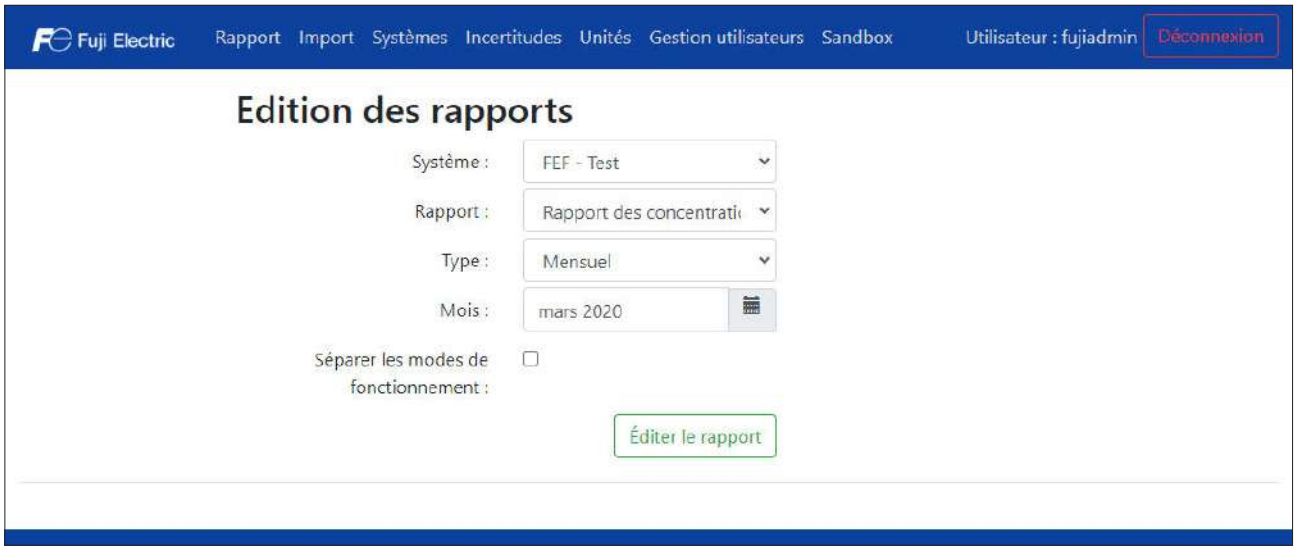
The Fuji CEMS Report^{v7} module allows the generation and edition of emission reports. The hardware (PC + mouse + screen) is part of the supply. This unit is assembled, programmed, parameterised and tested by Fuji Electric France. It communicates with the Fuji CEMS through Ethernet.

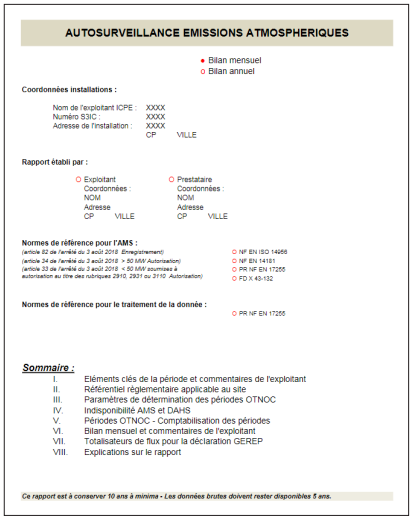
Fuji CEMS Report^{v7} complies with European and local (France) regulations:

1. **European standard EN 17255 including compliance with the following rules:**
   - Full management of NOC/OTNOC modes (signals provided by the operator).
   - Clock time synchronisation with a precision clock, and "soft" catch-up algorithm (max 5s / min), requiring a GSM subscription (optional), or a wired Internet connection.
   - Acquisition of negative values for processing.
   - Recording of FLDs (First Level Data from the instruments) with indicators affected to themeasurements to determine the validity of the reports.
   - Respect of a specific order for the calculations (QAL2 calibration lines and corrections in particular).
   - Tracing of all changes made to parameters (who, when, what, value before, value after).
   - Use of default values for peripheral measurements in case of temporary unavailability of these measurements.
2. **Emission reports developed in accordance with current legislation:**
   - Orders of 3 August 2018.
   - FEDENE / GIMELEC 2020. "Combustion Plant" Practical Guide.
   - Combustion Technical Sheets 2019.

Daily, monthly and yearly reports, in concentrations and flows, and including NOC/OTNOC periods are generated on request.

Report editing :




AUTOSURVEILLANCE EMISSIONS ATMOSPHERIQUES

• Bilan mensuel
○ Bilan annuel

Coordonnées installations :

Nom de l'exploitant ICPE : XXXX
Numéro S3IC : XXXX
Adresse de l'installation : XXXX
CP VILLE

Rapport établi par :

○ Exploitant
Coordonnées :
NOM
Adresse
CP VILLE

○ Prestataire
Coordonnées :
NOM
Adresse
CP VILLE

Normes de référence pour l'AMS :

(article 23 de l'arrêté du 2 août 2010 (Enregistrement))
(article 24 de l'arrêté du 2 août 2010 > 50 MW Autorisation)
(article 25 de l'arrêté du 2 août 2010 < 50 MW soumises à autorisation au titre des rubriques 2910, 2931 ou 3110 Autorisation)

○ NF EN ISO 14956
○ NF EN 14181
○ PR NF EN 17255
○ FD X 43-132

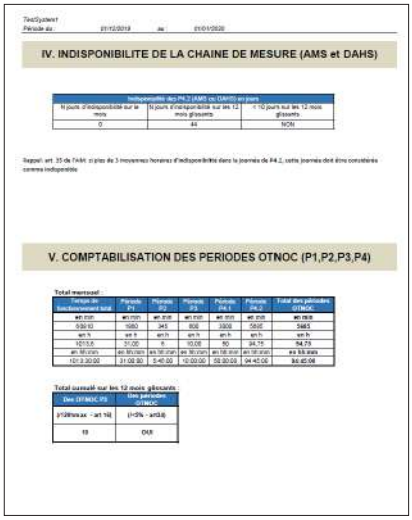
Normes de référence pour le traitement de la donnée :

○ PR NF EN 17255

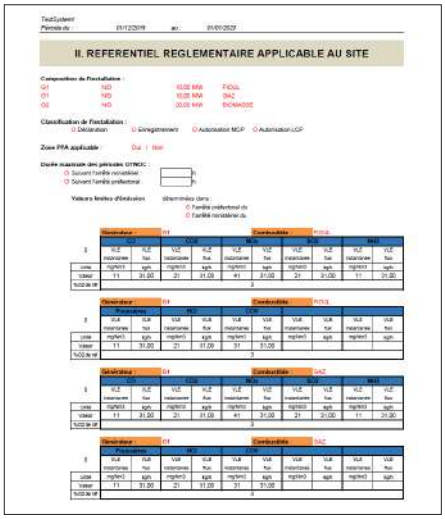
Sommaire :

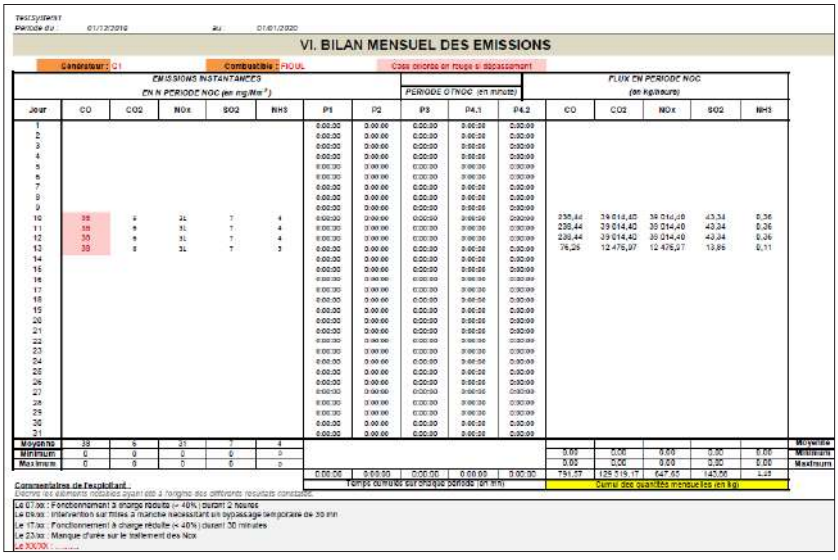
I. Eléments clés de la période et commentaires de l'exploitant
II. Référentiel règlementaire applicable au site
III. Paramètres de détermination des périodes OTNOC
IV. Indisponibilité AMS et DAHS
V. Périodes OTNOC - Comptabilisation des périodes
VI. Bilan mensuel et commentaires de l'exploitant
VII. Totalisateurs de flux pour la déclaration GEREP
VIII. Explications sur le rapport

Ce rapport est à conserver 10 ans à minima - Les données brutes doivent rester disponibles 5 ans.


IV. INDISPONIBILITE DE LA CHAINE DE MESURE (AMS et DAHS)

V. COMPTABILISATION DES PERIODES OTNOC (P1,P2,P3,P4)


II. REFERENTIEL REGLEMENTAIRE APPLICABLE AU SITE


VI. BILAN MENSUEL DES EMISSIONS

Générateur : G1 | Combustible : FIOUL | Cases devenir en rouge si dépassement

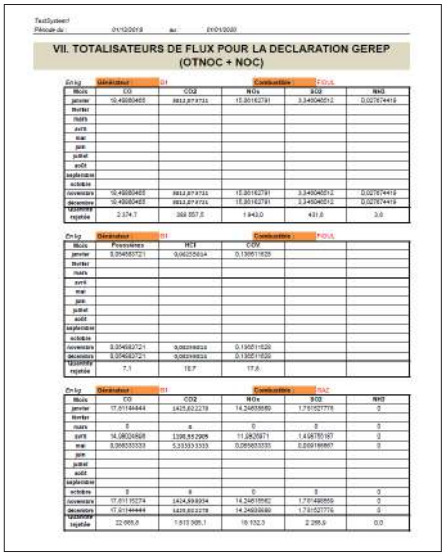
EMISSIONS INSTANTANEES EN N PERIODE NOC (en mg/Nm³) | PERIODE OTNOC (en minute) | FLUX EN PERIODE NOC (en kg/heure)

Jour	CO	CO2	NOx	SO2	NH3	P1	P2	P3	P4.1	P4.2	CO	CO2	NOx	SO2	NH3
1						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
2						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
3						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
4						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
5						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
6						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
7						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
8						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
9						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
10	38	6	31	7	4	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	236,44	39 014,40	39 014,40	43,34	0,26
11	38	6	31	7	4	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	236,44	39 014,40	39 014,40	43,34	0,26
12	38	6	31	7	4	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	236,44	39 014,40	39 014,40	43,34	0,26
13	38	6	31	7	3	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	76,26	12 476,97	12 476,97	13,89	0,11
14						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
15						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
16						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
17						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
18						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
19						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
20						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
21						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
22						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
23						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
24						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
25						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
26						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
27						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
28						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
29						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
30						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
31						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00					
Moyenne	38	6	31	7	4										Moyenne
Minimum	0	0	0	0	0						0,00	0,00	0,00	0,00	0,00	Minimum
Maximum	0	0	0	0	0						0,00	0,00	0,00	0,00	0,00	Maximum
						0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	751,57	129 518,17	647,65	140,06	1,45	
						Temps cumulés sur chaque période (en hhh)					Cumul des quantités mensuelles (en kg)				

Commentaires de l'exploitant :

Décrire les éléments notables ayant été à l'origine des différents résultats constatés.

Le 01/xx : Fonctionnement à charge réduite (< 40%) durant 2 heures
Le 05/xx : Intervention sur filtres à manche nécessitant un bypassage temporaire de 30 min
Le 17/xx : Fonctionnement à charge réduite (< 40%) durant 30 minutes
Le 23/xx : Marque d'arrêt sur le traitement des Nox
Le XX/XX : [illegible]


VII. TOTALISATEURS DE FLUX POUR LA DECLARATION GEREP (OTNOC + NOC)

Fuji ACE Data^{QAL3} (Optional)

Context and general description:

The QAL3 procedure is the 3rd quality assurance criterion of the EN 14181 standard, and therefore of the European regulation. Operators of combustion plants are also required to implement this procedure.

QAL3 contains two main principles:

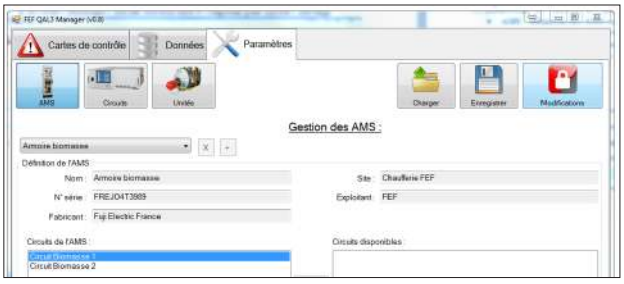
- The operator must maintain the CEMS in optimal metrological condition.
- The operator must also be able to prove to the competent authorities that the metrological performance is maintained at all times.

The first step is therefore simply to perform the maintenance operations recommended by the manufacturer, and to systematically record the maintenance operations performed. As in any quality assurance process: do what is written and write what is done. These operations are as much the responsibility of the operator (see documents set handed over on delivery / commissioning of the system), as those carried out by our maintenance services during monthly, quarterly or semi-annual preventive interventions according to the maintenance contracts in place, and corrective interventions if necessary. Calibration checks are an integral part of this maintenance.

The second stage of QAL3 consists of monitoring the analyser's drift on a very regular basis. For each component, every week (the frequency required for effective integration into a statistical control chart), the zero gas measurement is recorded in a statistical control table, and the span gas measurement in another table. Each control point is recorded and the control chart uses the current and previous points to alert the operator to any abnormal drift or loss of measurement accuracy.

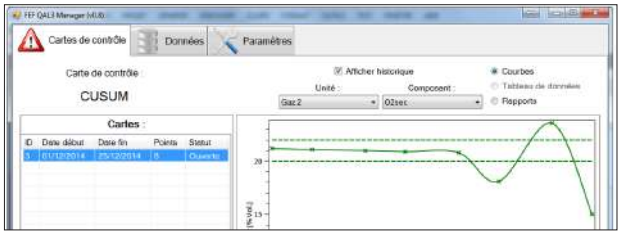
Fuji ACE Data^{QAL3} software:

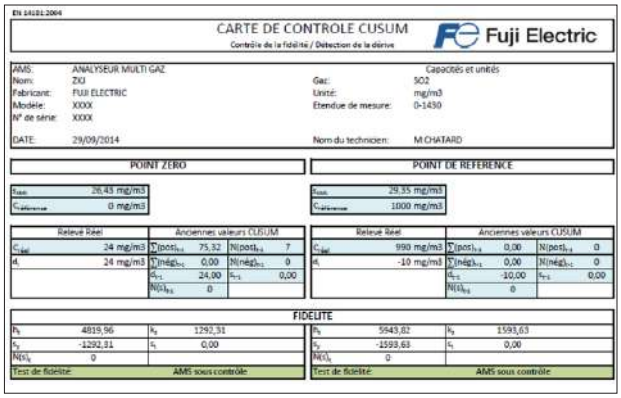
To assist combustion plant operators in carrying out the entire QAL3 procedure, Fuji Electric has developed the Auto Check Extensive (ACE) Data software.



QAL3 software functions according to EN14181:

- **Acquisition**
  manual or automatic acquisition of verification measurements
- **Integration**
  of measurements in the CUSUM control table
- **Drift alarm**
  in case of drift above the SAMS
- **Loss of fidelity alarm**
  in case of abnormal deviation of the control point
- **Display**
  of control tables and general dashboard
- **QAL3 Reports**
  edited on demand





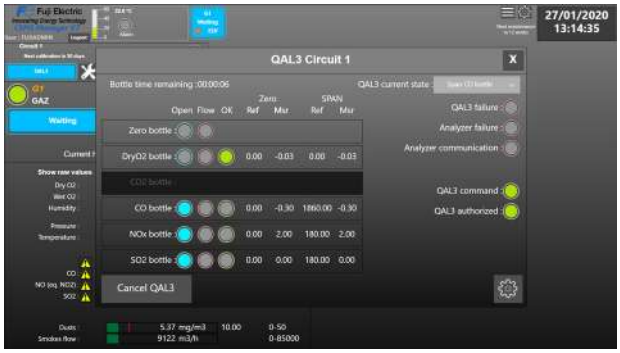
The software has also been designed to support the largest combustion plants in terms of number of boilers or other Combustion Units (CU). Licences and services are issued on the basis of supported CUs (maximum 20 boilers).

Architecture and hardware support:

When the QAL3 option is enabled in the Fuji CEM System^{v7} software suite, the Fuji CEMS Manager^{v7} interface incorporates this function and provides access to the additional corresponding interface.

The control points that can be automated are then programmed and the Fuji CEMS will inject the standard gases accordingly. The QAL3 data is then transmitted to the Fuji ACE Data^{QAL3} software installed in the PC for processing, alarms, possible actions and generation of QAL3 reports on demand.

Non-automated zero and span check points are managed by manual data entry into the Fuji ACE Data^{QAL3} software.



The PC + software package is pre-configured in Fuji Electric France factory. The following are required for this preconfiguration:

- Number, name and type (fuel) of each boiler.
- For each boiler
  - ELV for each pollutant.
  - Scale of measurement of each analyser for each pollutant.
  - Standard gas concentration for each pollutant.

Fuji ACE Data^{QAL3} general specifications

- Adaptable to any type of combustion unit.
- Combustion plant with almost unlimited number of boilers.
- Measurands that can be supported:
  - CO, CO_2, NOx, N_2O, SO_2, NH_3, HCl, CH_4, VOCT, O_2 dry, O_2 wet, dust.
  - Flow rate, pressure, temperature.
- Configuration by Fuji Electric.
- Operation by Fuji Electric and/or operator after training.

Configuration and training:

The factory pre-configuration will have to be finalised on site. This will be done with a Fuji Electric technician on site, and support from the operator.

At the end of the configuration, a training session will be provided to discover the software and get used to it. This service must allow to check that all the necessary elements are available (data and standard gases), then to allow the operator to carry out the QAL3 operations in an autonomous way if required.

The Fuji ACE Data^{QAL3} solution is therefore more than a software package, but a global protocol including:

- Licence adapted to the combustion plant.
- Configuration according to the characteristics of the site and the CEMS.
- Training.

Inputs / Outputs of the Fuji DAHS

Analog inputs:

Measure	Type of input	Requires
O_2 dry	4-20mA	-
O_2 wet or H_2O		-
Pressure		-
Temperature		-
CO_2		O_2 dry
CO		O_2 dry
SO_2		O_2 dry
NOx		O_2 dry
NH_3		P, T, H_2O, O_2 dry
Dust		P, T, H_2O, O_2 dry
Flue gas flow or fuel 1		P, T, H_2O, O_2 dry
Fuel flow 2 or flue gas		P, T, H_2O, O_2 dry
Reserves		-
Analysis cabinet temperature	PT-100 ou 4-20mA	-
Wind velocity	4-20mA	-
Wind direction		-
Heated line temperature probe type	PT-100	-

Analog outputs:

Measure	Type of output	Requires
O_2 dry	4-20 mA	-
H_2O		-
O_2 wet		-
CO_2 raw		-
CO raw		-
SO_2 raw		-
NOx raw		-
NH_3		-
Dust raw		-
FLow raw		-
CO_2 corrected		O_2 dry
CO corrected		O_2 dry
SO_2 corrected		O_2 dry
NOx corrected		O_2 dry
NH_3 corrected		P, T, H_2O, O_2 dry
Dust corrected		P, T, H_2O, O_2 dry
Flue gas flow corrected		P, T, H_2O, O_2 dry

Digital inputs:

Item	Group
on/off	Operation per combustion unit
Fuel 1	
Mixed fuel	
Sample probe passive backflush	
Chimney sweep / bypass	
Type of operation normal / degraded	
O_2 dry range selection	Operation per analytical loop
CO_2 range selection	
CO range selection	
NOx range selection	
SO_2 range selection	
Zero calibration	
Calibration Channel 1	
Calibration Channel 2	
Calibration Channel 3	
Calibration Channel 4	
Calibration Channel 5	
Sampling probe	Fault per combustion unit
Heated line	
Liquid detection	
Cooling unit	
Multi-gas analyser	Fault per analytical loop
NO/NOx converter	
O_2 analyser (if separate)	
Low sample flow	
Cabinet air conditioning	System fault (cabinet)
Cabinet air conditioning Remote sampling 1	
Cabinet air conditioning Remote sampling 2	
Cabinet air conditioning Remote sampling 3	
Cabinet air conditioning Remote sampling 4	
Cabinet air conditioning Remote sampling 5	
OTNOC P1	Operation per analytical loop
OTNOC P2	
OTNOC P3	
OTNOC P4.1	
OTNOC P4.2	

Digital outputs:

Item	Group
Loop 1 solenoid valve (SV) control	Operation per analytical loop
Loop 2 (SV) control	
Loop 3 (SV) control	
Cabinet backflush SV control	
Probe backflush SV control	
Heated line MV PID	
CO ELV alarm	
SO_2 ELV alarm	
NOx ELV alarm	
NH_3 ELV alarm	
Dust ELV alarm	
Sampling unit fault summary	Fault per sampling unit
Combustion Unit fault summary	Fault per combustion unit
Measurement mode	Operation per analytical loop
Calibration mode	
Maintenance mode	
Zero calibration SV control	
Span calibration SV control	
Sample pump	
Purge SV control	
Extractive analyser calibration request	
Analytical loop fault summary	Fault per analytical loop
System fault summary	System operation (Cabinet)
General fault summary	
Fast loop pump control	
Cylinder 1 calibration SV	
Cylinder 2 calibration SV	
Cylinder 3 calibration SV	
Cylinder 4 calibration SV	
Cylinder 5 calibration SV	
ELV alarms summary	

Elements of the Fuji DAHS

INPUT/OUTPUT BOARDS

The I/O boards are connected to a network coupler. Each component is DIN rail mounted.

Coupler:	63 slots max / Power supply 24 Vdc / 10A max
Analog inputs:	8-channel 4-20 mA 16-bit board
Analog outputs :	8-channel 4-20 mA 16-bit board
Digital inputs:	8-channel 24 VDC board
Digital outputs:	8-channel 24 VDC board
Pt100 inputs:	Pt100 channel board (-200 ~ 850°C) 2 or 3 wires

TOUCH DISPLAY

Processor:	Broadcom BCM2837B0
Micro controller:	Cortex-A53 (ARMv8) 64-bit SoC
Frequency:	1.2GHz (Compute Module 3+)
Screen size:	10.1" LCD (1024 × 600) (500 candela)
Interface:	Pressure sensitive touch (resistive film type)
Ram:	1GB
Microcontroller:	Built-in RTC GPIO x 22 (includes ESD protection circuit), 40-pin header socket
Power:	DC12 ~ 24V input
USB ports:	x 3 (USB2.0)
Ethernet ports:	x1 (10/100 Mbps)
Cables:	RS-232C x 1 RS-485 x 1 I2C x 1
Piézo horn:	x1

Stereo audio output: x1

Panel:	Water resistant front panel (IP65)
WiFi:	USB dongle required

Operating temperature: -10°C ~ 70°C

Storage temperature: -20°C ~ 80°C

PC + MONITOR + MOUSE PACKAGE (OPTIONAL)

Minimum configuration provided: PC with windows10, core I5, SSD 50GB, 8GB Ram, backup key, 22" FHD screen, mouse.

Computer:	PC SSD
Screen:	FHD 22"
Backup:	USB stick
Software:	Fuji CEMS software modules Report-Remote-Backup v7

FBOX-500

Power supply: 18-36V DC / 500 mA / 12W

Dimensions: 91 x 106 x 61mm

Weight: 300 gr

Operating temperature: From 0°C to 50°C

Storage temperature: From -20°C to 80°C

Features:
- ARM Cortex A53 1.2GHz processor 64 bit quad-core.
- 1 Go LPDDR RAM
- 4 GB eMMC Flash memory
- PSTN clock

Communications:
- 2 RS232 or RS485 serial ports
- 1 CAN bus
- 1 1-Wire interface
- 4 ToR inputs 0-5V DC
- 4 ToR outputs 0-30 V DC (max. load 500 mA)
- 4 configurable ToR inputs/outputs (max. load 500 mA)
- 4 analogue inputs 0-10V DC (18bits)
- 1 10/100 Mbps LAN port
- 1 USB port
- 1 GSM GPRS/3G/LTE modem

Applications :
- AProgrammable Logic Controller (I/O extensions possible)

1. Very high performance
2. Real time available
3. IEC 61131-3 programming

- Remote management (GSM/Ethernet modem)
- Remote assistance (VPN)
- Data logging 2GB (expandable to 64 GB)
- Embedded HMI (WEB)

Data processing

Measured values

For each multiplexed analyser if several boilers :

- O_2
- CO
- CO_2
- NOx
- SO_2

For each Combustion Unit*

- O_2 wet / H_2O
- NH_3
- Dusts
- Temperature
- Pressure
- Flow

* If the measurement is faulty, the invalidation tag is set. If the boiler is in maintenance or blowback mode, all disabling tags are set.

Flow measurement

The flue gas flow measurement can be performed directly on the stack or calculated from the fuel flow measurement.

1- Flue gas flow measurement directly on the chimney:

Measurement in m^3/h corrected in P&T / H_2O / O_2 dry.

2- Flue gas flow measurement directly on the chimney:

Measurement in Nm^3/h to be corrected in H_2O / O_2 dry.

3- Measurement from the fuel flow:

It is defined for the 2 fuels if it is a GAS flow measurement, OIL flow in l/h or OIL flow in kg/h. The 2 fuels can be used simultaneously, in which case the PLC calculates the smoke flow of the 2 fuels and adds them to obtain the total smoke flow.

- Gas fuel:

Conversion of the gas flow rate into smoke flow rate depending on the gas composition.
Measurement of the gas flow in m^3/h.

- Fuel Oil:

Conversion of the oil flow rate into smoke flow rate depending on the composition of the fuel oil.
- Measurement of the oil flow in kg/h:
No additional conversion.
- Measurement of oil flow in l/h :
Conversion of oil flow from l/h to kg/h with density.

Normal or degraded operation

The legislation defines periods during which measurements are recorded, but are not taken into account for reporting. These are known as OTNOC measurements.

NOC : Normal Operating Condition

OTNOC : Other Than Normal Operating Condition

These periods are separated into 4 groups called:

P1 / P2 / P3 / P4.

P1: Start-up and shut-down period

P2: Fuel unavailability period

P3: Period of failure or malfunction or bypass of an emission reduction device

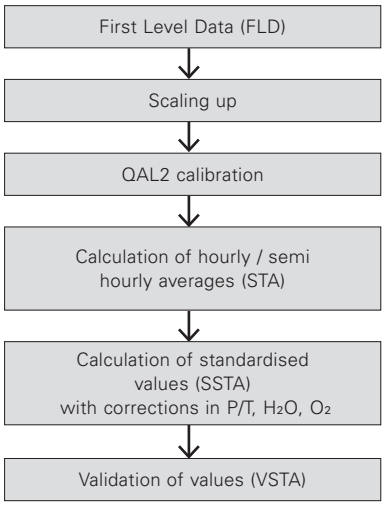
P4.1: Periods of testing / adjustment / maintenance after repair of engines

P4.2 : Testing/adjustment/maintenance period of the AMS or the DAHS (managed by DAHS).

Substitution values

EN17255 states that if a peripheral measurement (O_2, H_2O, Pressure, Temperature) is no longer available (fault or malfunction of the AMS) a substitute value can be used. This substitute value can be a constant value, the last measured value, or an average calculated value over the last 48h.

Processing of measured values



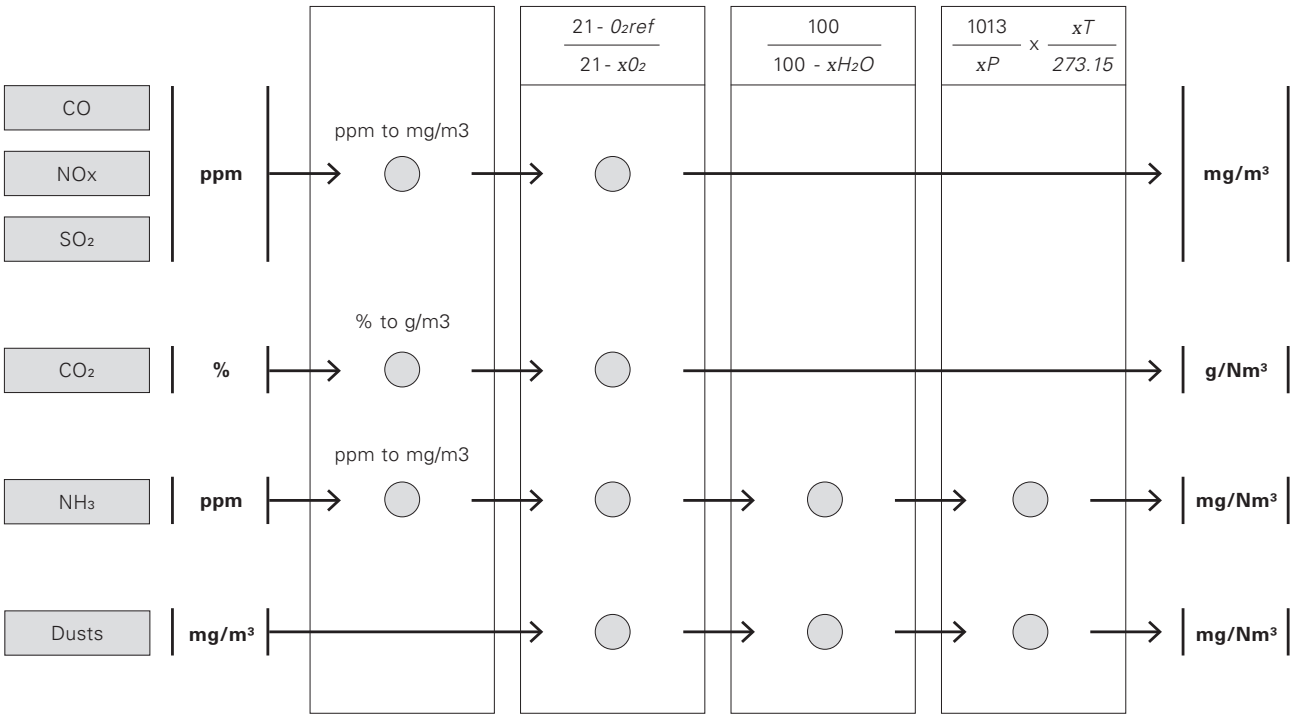
Correction of values

Peripheral measures :

O(%)	H_2O (%)	Pressure (abs)	Temperature (K)
xO_2	xH_2O	xP	xT

Emissions measurements :

Range conversion x Correction O_2(%) x Correction H_2O(%) x Correction PT



Management default

If one or more peripheral measurements are not available due to a fault in one or more AMS, a substitute value is used:

- Freeze the measurement just before the fault occurs if possible.

- Otherwise, use the average value of the last 48 hours if available.

- Otherwise, use the constant value defined by the configuration.

If none of these alternative can be used, the value is declared as unavailable and the following processing is performed:

- Display the raw values on the interfaces.

- Store the raw values and define the invalidation tag oof the values whoch could not be corrected by the unavailable peripheral measurements.

Fuji CEM System^{V7} complies with the following European standards legislation:

- EN14181
- EN15267
- EN17255

Notions

- CEMS
  Continuous Emission Monitoring System
- AMS
  Automated Measuring Systems
- DAHS
  Data acquisition and Handling System
- FLD (First Level Data) :
  Raw data or average value calculated from raw data, both including status signals.
- SFLD (Standardised First Level Data):
  First level data calibrated and converted to normal conditions using peripheral first level data.
- STA (Short-Term Average):
  Average for the shortest period used for reporting.
- SSTA (Standardised Short-Term Average):
  Short-term average adjusted to normal conditions using short-term averages of peripheral peripheral parameters.
- CSSTA
  (Cumulated Standardised Short-Term Average):
  Value defined according to the calculation of a standardised short-term average, but determined as a cumulative average calculated over a shorter period.
- VSTA (Validated Short-Term Average):
  Normalised short-term average, after subtracting the relevant confidence interval to meet the reporting requirements of the European Directives.

Values status flags			
Bit	Wording	Valeurs possibles	Description
0	Valid	True/False	The value is valid and can be used to calculate a ratio value.
1	Overscaling	True/False	The value corresponds to an over-range measurement (high or low).
2	Substituted value	True/False	The value has been substituted by a held/average/constant value due to a fault or lack of AMS. The FLD remains valid.
3	Fault	True/False	The measurement was taken during a system (loop/unit/cabinet) fault. The FLD is invalid.
4	QAL3 fault	True/False	The measurement was taken while the AMS is declared as drifting or out of control by the automatic QAL3. FLD is invalid.
5	Calibration	True/False	The relevant AMS is under calibration and the measurement is therefore not valid. FLD is invalid.
6	Maintenance	True/False	The relevant AMS is under maintenance and therefore the measurement is not valid. FLD is invalid.
7	QAL2/AST	True/False	The relevant AMS is in maintenance and therefore the measurement is not valid. The FLD is invalid.
8	QAL3	True/False	The relevant AMS is in QAL3 control mode. The FLD is invalid.
9	Waiting	True/False	The measurement cannot be performed because the combustion unit is waiting for the AMS to be available. FLD is invalid.

Confidence interval

CO	10%
NOx	10%
SO_2	20%
CO_2	10%
Dusts	30%
NH_3	30%
Flow	0%

Averages per block

Period of averaging period	Starting times
≤ 1h for STA	Hourly averages start at the beginning of the first minute of the hour. Averages of less than 1 hour start at the beginning of the first minute of the hour and subsequent intervals, for example, for a period of 10 minutes, at 0 min, 10 min, 20 min, etc.
24 hours	Daily averages start at at 00:00:00 on the relevant day.
1 month	Monthly averages start at 00:00:00 on the first day of the calendar month.
1 year	Yearly averages start at 00:00:00 on the first day of the calendar year.

Moving averages

Averaging period	Frequency of calculation
Multiples of periods of less than than 1h, i.e. 10 min	Every period of FLD
1 hour	Every period of FLD
1 day	Every period of STA
48h	Every period ofSTA
1 month	Daily
1 year	Daily or monthly

Fuji Electric

Fuji Electric France S.A.S.

46, rue Georges Besse - Zl du Brézet- 63039 Clermont-Ferrand Cedex 2 - France
Tél. France 04 73 98 26 98 - Fax. 04 73 98 26 99 -Tel. international +33 4 73 98 26 98 - Fax. +33 4 73 98 26 99
Email : sales.dpt@fujielectric.fr - Web : www.fujielectric.fr