FAAST FLEX™ ENGINEERING SPECIFICATIONS

FAAST FLEX

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Contents

1 General

1.1 Scope

This document provides specification details of the FAAST FLEX Aspirating Smoke Detector (ASD) product to assist in their installation and commissioning.

1.2 ASD System Information

1. FAAST FLEX is an Aspirating Smoke Detector which can offer early warning fire detection using a dedicated high sensitivity smoke sensor.
2. Air is drawn into the FAAST FLEX through a network of air sampling pipes by speed adjustable aspirator. The sampled air is filtered and passed into the detection chamber and analysed for the presence of very small amounts of smoke. After that air is exhausted from the detector and may be vented back into the protected zone.
3. The detector is designed to operate as a stand-alone device and performs required action as a consequence of action, alarm or fault, by using dedicated LED, relays and buzzer.

1.3 Approvals

- EN54-20: VdS, Germany.

1.4 Codes, Standards or Regulations

1. The product is designed to be compliant with EN54-20 Class C sensitivity requirements and with GB15631 like Smoke Alarm Detector.

   When used within the EU, the system shall be declared to the Construction Products Regulation (CPR) 305/2011 by a notified body such as VdS when tested to the EN54-20 standard.
2. Local codes and standards.

1.5 Quality Assurance

1.5.1 Manufacturer

1. The manufacturer shall have a minimum of 35 years production experience in the design and manufacture of high sensitivity air sampling smoke detection systems.
2. The manufacturer shall be certified as meeting ISO 9001:2008 for manufacturing.

1.5.2 Equipment Supplier

1. The equipment supplier shall be authorized and trained by the manufacturer to calculate/design, install, test and maintain the ASD system.
2. The equipment supplier shall be able to produce a certificate of training from the manufacturer.

1.5.3 Installer

1. The equipment installer shall be authorized and trained by the manufacturer and shall have the ability to design a system based on code requirements.
2. The installer shall be capable of providing calculations, design, and testing documents upon request.

1.5.4 Warranty

1. The manufacturer shall guarantee the product by warranty for a period of three years.
2. Any damage to the ASD due to poor handling or operating outside its operation limits will void its warranty.
3. The installation and programming of the ASD shall be completed by a factory-trained installer.

1.5.5 Training

The manufacturer and their representatives shall make available adequate accreditation training to all personnel involved in the supply, installation, commissioning, operation and maintenance of the ASD system.

1.6 Documentation

The following documentation shall be supplied:

1. Product data and site drawings shall be submitted and shall include pipe layout, operational calculations and performance criteria. Tools such as PipeIQ may be used to generate this material.
2. A copy of the manufacturer's installation, operation and maintenance manuals shall be supplied upon completion of the installation.
3. System commissioning data shall be supplied (in a format recommended by the manufacturer and per the instructions provided by the manufacturer) within 30 days of completion of the installation.

2 System Description

The ASD system shall:

1. Provide early warning detection using a dedicated medium sensitivity smoke sensor.
2. Come in two variants, one channel and two channels, based on system design.
3. Be modular, with simplified maintenance and installation.
4. Have a simplified and intuitive LEDs user interface for immediate status indication.
5. Consist of an air sampling pipe network to transport air to the detection system, supported by calculations from a computer-based design modelling tool or through the pre-engineered pipe network as specified in the product guide.
6. Be tested and approved to cover up to 1,600m² (17,200 sq.ft) for single channel and 2,000m² (21,527 sq.ft) for dual channel.
7. Be approved to provide Very Early Warning Fire Detection (VEWFD) / Class A, Early Warning Fire Detection (EWFD) / Class B and Standard Fire Detection (SFD) / Class C.
8. Provide three output levels corresponding to Action, Alarm and Fault. These levels shall be programmable and able to be set to the sensitivity ranges shown in the Sensitivity Ranges Table 1 below.
9. Report any fault on the detector by using configurable fault relay outputs and via the Bluetooth app on a mobile device
10. Be easy to maintain with all major internal components designed to be easily reachable, even in worst-case cabling conditions.

Table 1: Sensitivity Range

Smoke Sensitivity Level	obs %/meter	obs %/feet	Note(s)
Level 0	70% of level 1	70% of level 1	Action if Alarm level configured as HIGH in Out of box Mode
Level 1	0.07 % obs/m	0.02 % obs/ft	Alarm if Alarm level configured as HIGH in Out of box Mode
Level 2	0.10 % obs/m	0.03 % obs/ft	Action if Alarm level configured as MEDIUM in Out of box Mode
Level 3	0.16 % obs/m	0.05 % obs/ft	Action if Alarm level configured as MEDIUM in Out of box Mode
Level 4	0.33 % obs/m	0.10 % obs/ft	Action if Alarm level configured as LOW in Out of box Mode
Level 5	0.66 % obs/m	0.20 % obs/ft	Action if Alarm level configured as LOW in Out of box Mode
Level 6	1.64 % obs/m	0.50 % obs/ft	Not approved under EN54-20 regulatory
Level 7	3.28 % obs/m	1.00 % obs/ft	Not approved under EN54-20 regulatory
Level 8	4.92 % obs/m	1.50 % obs/ft	Not approved under EN54-20 regulatory
Level 9	6.56 % obs/m	2.00 % obs/ft	Not approved under EN54-20 regulatory

2.1 Ordering Information

All versions available, according to the reference market and number of channels, are summarized into the following table:

Part Number	Description
FLX-010	FAAST FLEX 1-pipe Stand-alone
FLX-020	FAAST FLEX 2-pipe Stand-alone
FLX-SP-01	FAAST FLEX Sensing Module
FLX-SP-02	FAAST FLEX Metal Filter (pack of 6)
FLX-SP-03-EN	FAAST FLEX Front Cover (EN)
FLX-SP-04	FAAST FLEX Aspirator
FLX-SP-05-EN	FAAST FLEX Internal Cover Set (EN)
FLX-SP-06	FAAST FLEX Adaptor Set

2.2 Channel Variants

	Single Channel	Dual Channel	Note(s)
Inlets	1	2 (one per channel)	Diameter 27mm, can be used with 25mm pipe with the plug used like an adapter
Metallic Filter	2 (one on inlet + outlet)	3 (one per channel + outlet)	
Sensing Elements	1	2 (one per channel)	High sensitivity smoke detector
Aspirator	1	1	Common for all channel
Exhaust Outlet	1	1	Common for all channel

3 Products

3.1 Manufacturer

Aspirating Smoke Detection System: Acceptable Manufacturer.

Pittway Tecnologica S.r.l
Via Caboto, 19/3
IT 34147 Trieste

3.2 Manufactured Unit(s)

The FAAST FLEX ASD system can be supplied in the following configurations:

Part Number	Description
FLX-010	FAAST FLEX 1-pipe Stand-alone
FLX-020	FAAST FLEX 2-pipe Stand-alone

3.3 Detector Features

- Reliable smoke detection for consistent performance and minimum nuisance alarms
- Single & Dual channel variants with area coverage up to 1,600m² (17,200 sq.ft) for single channel and 2,000m² (21,527 sq.ft) for dual channel
- Double knock capability (Dual Channel) for coincident detection
- Pipe length up to 270m (886 ft) for single channel and 420m (1378 ft) for dual channel allowing extended coverage and convenient detector mounting
- Class A, B, C performance allowing:
  - 1 channel: 5, 15, 32 holes respectively
  - 2 channels: 8, 28, 56 holes respectively
- An ultrasonic flow sensing element per chamber for accurate and reliable flow detection
- A metallic mesh filter per chamber for optics protection and improved detector longevity
- Action, Alarm and Fault relays per channel for connection to FACP and BMS systems
- Simplified and intuitive LEDs user interface for immediate status indication
- Pre-engineered pipe networks for hassle-free and expedient design and installation
- Two configuration modes:
  - Out-of-box with built in user-friendly configuration and control mechanism for speedy commissioning
  - Extended for enhanced user experience
- Modular design with in-field replaceable chamber, filter and aspirator for ease of service and maintenance
- Installation template, different mounting orientations (upright, inverted) and ample wiring room to save time and effort
- Quiet operation (30db) with adjustable fan speed to suit various environments
- Suitable for cold storage environments with -40 °C (-40°F) operating temperature
- Bluetooth interface with mobile device App for extended configuration options and rapid diagnostics
- General Purpose Input (GPI) for remote Reset, Disable, External Fault
- Password protected access for secured detector operation, diagnostics and maintenance
- IP40 rating for protection against ingress of foreign bodies
- Onboard event log up to 2,100 events for user actions and smoke trends

3.4 Connections

Field wiring can be done by opening frontal plastic cover of the unit and connecting the wires to the electrical clamps.

3.5 Power Supply

The unit needs an external 24 VDC power supply (EN54-4 compliant). Power Supply range is 18-30V.

The unit monitors the power supply. When supply voltage exceeds 31V the unit goes in PROTECTION mode, where all functionalities are turned off and POWER LED becomes steady RED ON. When supply voltage drops below 21V the unit gives a LOW POWER alert (POWER LED becomes steady RED ON). Moreover, the unit has a brown-out circuit, which operates nominally at 16.7V. When unit is turned off by brown-out hardware circuit, the fault relays are activated.

3.6 GPI (General Purpose Input)

One GPI is provided for remote Reset, Disable and External Fault.

In OUT OF BOX configuration, when a transition between normal state (open) and active state (short) is detected, the device will perform a single device RESET.

3.7 Relays

For all the versions single pole changeover not-supervised contacts for Action, Alarm and Fault are provided for each channel. Alarm and Action relays are normally de-energized. They are switched on by the unit command.

3.8 LEDs

The device has 6 three-colors (red/green/yellow) LEDs visible through the frontal cover: Power, Fault, Action channel 1, Alarm channel 1, Action channel 2, and Alarm channel 2.

Each LED can be independently driven and assigned the following four states: Off, On (steady), Fast Blink and Slow Blink.

3.9 Buttons

The ASD has four buttons:

- Silence / Normalize / Increment
- Log / Configuration Change
- Reset / Disable
- Test / Password Change / Decrement

3.10 USB (Memory Stick)

The USB Type-A connector allows the user to connect a USB stick, through which it’s possible to:

- Retrieve data (e.g., event log) from device
- Self-test result
- Connection with PipeIQ to configure device

To complete the download process properly, the USB stick needs to be FAT32 formatted, completely empty and with a name of no more than 7 digits.

The USB Type-A connector has two modes:

- **USB (PC – Service Mode):** The USB Type-A connector allows officially authorized Xtralis Technical Service team technicians to access low level functionalities to perform diagnostic operations. Required tools, procedure and operation details are anyway provided in separated technical document.
- **USB (PC – Firmware Update):** The USB Type-A connector allows officially authorized Xtralis Technical Service team technicians to upgrade device's MCU firmware. Required tools, procedure and operation details are anyway provided in separated technical document.

3.11 Buzzer

The FAAST FLEX has a buzzer that provides audible feedback for 0.5 seconds if:

- Cover is closed or reopened and there is a discrepancy between dip-switches position and device configuration.
- Normalize procedure is finished.
- The unit has finished to write log file on the USB stick.

The Buzzer is also used to generate acoustic Password for BT pairing.

3.12 Dipswitch

This device has one 10-lines dipswitch. In a two channels device the settings affect both channels. Configuration changes generate event log.

4 Working Modes

- **INITIALIZATION Mode** (steady yellow): The unit checks it supplies, tests all its peripherals and reads dip-switches positions.
- **NORMAL Mode** (steady green): The unit monitors its supply, aspirator, smoke levels, flows, cover status and signals and logs faults, actions, alarms.
- **WAIT Mode** (slowly blinks yellow): The unit is waiting for button(s) pressure or, if unable, a Bluetooth request.
- **SERVICE Mode** (blinks red): The unit switches off the aspirator, stops monitoring flows and sensing elements, doesn't report any alarm or fault through LEDs, relays or buzzer. No communications, USB or Bluetooth, are allowed during this mode
- **PROTECTION Mode** (steady red): The unit stops to work, switches off all peripherals and communications.
- **DISABLE Mode** (All 6 LEDs will blink yellow every 10 seconds): The unit does not report any alarm or fault via relays.

5 Test Mode

The ASD Device has a self-checking function:

- 10 steps which must be confirmed by user in a PASS/FAIL approach
- If user doesn't confirm the step within the timeout of 30 seconds, that step is considered failed
- At the end, user can download the test result into the connected USB stick, in a file named DIAGTEST.TXT

6 Resetting Alarms and Faults

To reset any alarm and/or fault conditions press the RESET button. You will be prompted to enter the passcode. Once the passcode has been successfully entered, all latched alarms and faults are reset (both LEDs and relays) and the device returns to WAIT mode.

7 Working Conditions

7.1 Normal Condition

The power LED is steady green, and this is a logical state used by device to notify a normal condition.

7.2 Action & Alarm Conditions

This is a logical state used by device to notify an alarm condition, which might take place during every working mode in which both sensing and notification systems are active.

7.3 Fault Conditions

This is a logical state used by device to notify a trouble condition, which might take place during every working mode in which both sensing and notification systems are active.

8 Application

8.1 Detection Alarm Levels

The system shall have these independently programmable alarm thresholds. The alarm levels may be used as follows:

Smoke Sensitivity Level	obs %/meter	obs %/feet	Note(s)
Level 0	70% of level 1	70% of level 1	Action if Alarm level configured as HIGH in Out of box Mode
Level 1	0.07 % obs/m	0.02 % obs/ft	Alarm if Alarm level configured as HIGH in Out of box Mode
Level 2	0.10 % obs/m	0.03 % obs/ft	Action if Alarm level configured as MEDIUM in Out of box Mode
Level 3	0.16 % obs/m	0.05 % obs/ft	Action if Alarm level configured as MEDIUM in Out of box Mode
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Level 9	6.56 % obs/m	2.00 % obs/ft	Not approved under EN54-20 regulatory

Notes!

- When used within the EU, alarm thresholds shall be configured to achieve the required sensitivity class (A, B or C).

8.2 Initial Detection Alarm Settings

Initial settings for the alarm levels shall be determined by the requirements of the protected environment. The default setting of the unit shall be:

- Alarm Level 0 (Action) 70% of level 1

8.3 Faults

The Detector Fault relay shall be connected to the appropriate alarm zone on the Fire Alarm Control Panel (FACP) in such a way that a Detector Fault would register a fault condition on the FACP. The Minor Fault and Isolate relays shall also be connected to the appropriate control system.

(Check local Codes, Standards or Regulations to determine whether compliance with this set up is required).

8.4 Power Supply and Batteries

The system shall be powered from a regulated supply of nominally 24V DC. The battery charger and battery shall comply with the relevant Codes, Standards or Regulations.

Local Power Supply Standards that may apply:

1. EN 54-4 approved power supply for use in Europe.
2. In accordance with AS 1670.1-2004 and NZS4512: 2003.

8.5 Sampling Pipe Design

8.5.1 Sampling Pipe

The sampling pipe shall comply with the following requirements:

1. The sampling pipe shall have an outside diameter (OD) of 27 mm or 25 mm with plug/adapter. To comply En54-20, pipe network used should be classified in accordance with EN 61386-1 to at least Class 1131.
2. If 25mm piping is used, an adapter is required. On the inlets, the pipe plugs can be used as an adapter by removing the center of the plug to open it up. On outlet piping, the screen can be used as an adapter with 25mm piping.
3. The pipe material should be suitable for the environment in which it is installed or should be the material as required by the specifying body. In the UK/most of Europe, the pipe material shall be ABS Grade SD-0150, tested to BS EN 61386-1:2004).
4. All joints in the sampling pipe must be air tight and made by using solvent cement, except at entry to the detector.
5. The pipe shall be identified as Air Sampling/Aspirating Smoke Detector Pipe (or similar wording) along its entire length at regular intervals not exceeding the manufacturer’s recommendation or that of local codes and standards.
6. All piping should be supported at centers of the lesser of 1.5m (5ft) apart or that specified by local codes or standards.

8.5.2 Sampling Holes

The sampling holes shall comply with the following requirements:

1. Sampling holes shall not be separated by more than the maximum distance allowed for conventional point detectors as specified in the local codes and standards. Intervals may vary according to calculations.
2. Each sampling hole shall be identified in accordance with Codes or Standards.
3. Consideration shall be given to the manufacturer's recommendations and standards in relation to the number of sampling holes and the distance of the sampling holes from the ceiling or roof structure and forced ventilation systems.
4. Sample point size and indeed the entire pipe design and installation design shall be supported by PipeIQ calculations.

9 Execution

9.1 System Installation

The contractor shall install the entire detection system in accordance with the national and local codes and manufacturer's Product Guide.

9.1.1 ASD Detector Mounting

The FAAST FLEX is mounted on any wall or flat surface that is conveniently located for access to the piping and electrical connections:

1. The detector shall be capable of vertical mounting with sample air inlet port(s) directed up toward the ceiling (normal mounting) or down towards the floor (inverted mounting).

9.1.2 Air Sampling Pipe Network Calculations

Air Sampling Pipe Network Calculations shall be provided by Air Sampling Pipe Network modelling program such as PipeIQ. Pipe network calculations shall be supplied with the proposed pipe layout design to indicate the following performance criteria.

9.1.2.1 Transport Time

Wherever possible the transport time (i.e. the time taken by smoke sampled to reach the detector) for the least favorable sampling point shall be less than 60 seconds for open hole sampling. Longer transport times may be tolerated where long pipe runs are required and local codes and standards permit.

When used within the EU the maximum transport times shall be in accordance with the limits approved under EN54-20.

9.2 System Commissioning

9.2.1 Detector commissioning

The detector shall incorporate dipswitch commissioning:

1. DIPSWITCH, where the unit is completely configured using the 10-lines dipswitch;
2. and the EXTENDED mode, where configuration data stored in EEPROM are used (factory default configuration, all dipswitch lines set to 1).

The Out of the box configuration is with all DIPSWITCH lines set to 1 and this means:

- DIPSWITCH configuration
- Low fan speed
- Alarm Level High (Alarm lev 1, Action 70% lev 1)
- EN54 Alarm/Action/Fault Unlatched
- Alarm Mode Instantaneous
- Flow fault threshold follow codes (EN-54 ±20%)
- Flow fault delay 30s
- Detector orientation Upright
- Bluetooth Disable

9.2.2 Normalize

Normalize procedure is used to adjust the flow reference to the current flow aspirated by the device.

9.2.3 Dipswitch Configuration Mode

This procedure is the simplest one but provides very limited customization possibilities. Typical installation layouts are grouped into tables, according to their approval's requirements, pipes layout, number and position of holes and their diameters. Such tables provide information about how the dipswitch must be set to comply with target requirements, so that it's enough for the final user/installer to properly set the dipswitch according to their installation parameters and install the unit.

9.2.4 Extended Configuration Mode

This configuration mode allows the user/installer to take advantage of the device's full flexibility in terms of sensitivity range, fan speed, etc. to guarantee a more robust fine-tuning of the system for that particular installation site and layout.

9.2.5 Commissioning Tests

1. The contractor shall allow for the manufacturer's representative to attend commissioning of the entire installation in the presence of the owner and/or their representative.
2. All necessary instrumentation, equipment, materials and labor shall be provided by the Contractor.
3. The Contractor shall record all tests and system configuration and a copy of these results shall be retained on site in the System Log Book.

9.2.6 System Checks

Visually check all pipes to ensure that all joints, fittings, bends, sampling points, etc., comply with the Specification.

Check the system to ensure the following features are operational and programmed in accordance with the specification.

1. Alarm threshold levels,
2. Pipes in use,
3. Progress,
4. Clock time and date,
5. Temperature,
6. Smoke Level,
7. RPM blower,
8. Review event report,
9. Review diagnostics report.

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9.2.7 Final Tests

The contractor shall:

1. Introduce smoke into the detector assembly to provide a basic Go / No-Go functional test.
2. Clean the filters after the test is complete for ultimate performance.
3. Activate the appropriate channel's fire alarm and advise all concerned that the system is fully operational.

www.xtralis.com

Honeywell Products & Solutions Sarl
Z.A. La Pièce 16
1180 ROLLE (SWITZERLAND)

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