

MATERIAL REQUISITION FOR A FULLY AUTOMATIC FIRE DETECTION & HIGH-FLOW, ROBOTIC NOZZLE SUPPRESSION SYSTEM

System Overview:

General System Description

The specifications herein are for a fully automatic fire detection and high-flow fire suppression system. The system shall be capable of rapid flame detection and accurate suppression by means of a high-flow robotic nozzle or fire water monitor.

The system shall be comprised of:

- i) a flame detection system capable of rapidly identifying the presence of fire and providing its location information to the system's PLC; and
- ii) a high-flow robotic nozzle or fire water monitor; and
- iii) a valve that automatically opens during fire suppression and closes after the fire has been completely extinguished; and
- iv) a PLC with electronic hardware and software capable of:
 - triangulating the three-dimensional size and position of a fire based on the data provided by the flame detectors,
 - automatically guiding the robotic nozzle and valve to dynamically suppress the detected fire accurately at its source,
 - performing self-tests and communicating any errors or faults of the electronic components when detected, and
 - allowing authorized firefighting personnel in a control room and/or other remote location to take over manual, remote control of the robotic nozzle and valve over a secure, user-friendly Human User Interface (HUI).

System Capabilities

The system shall be capable of rapidly detecting a fire, locating the fire's position in three-dimensional space, and rapidly and fully automatically reacting to suppress the detected flame with a high volume of water, aimed directly at the fire by means of a robotic nozzle or firefighting monitor.

Fire detection shall be achieved by means of two or more infrared array flame detectors. The system shall be capable of detecting up to four fires simultaneously.

In the event the one or more fires are detected by both detectors simultaneously, the robotic nozzle shall automatically aim directly and accurately at the fire(s), water shall begin flowing by opening of a valve supplying the nozzle, and the nozzle shall begin suppressing the fire(s) at its source with a high volume of water.

The system shall be dynamic and capable of adjusting to the fire's (or fires') position(s) in real time. After all fire has been suppressed, the water shall automatically shut off and the robotic nozzle shall go back to stand-by position. The flame detectors shall remain actively detecting for fire at all times, and the suppression system shall reactivate any time a flame is detected.

The system shall be modular and designed to maximise ease of installation.

Minimum Technical Specifications:

Flame Detection System:

The flame detection system shall be comprised of two infrared array flame detectors with the following features and capabilities:

- each detector shall be capable of detecting and pinpointing the location of fire within its field of view on a coordinate system;
- have a high false alarm immunity;
- have a long range and consistent field of view;
- have a CCTV camera built in to view the protected area and highlight the location of the fire;
- have a stainless steel housing;
- be FM approved;
- have IECEx Certificate - BAS07.00488X; and
- RS485 serial data port suitable for network connection using a MODBUS protocol.

Electronics & Software Capabilities

The system's PLC shall meet the following minimum requirements:

- be capable of taking in signals from two IR array flame detectors and triangulating the three-dimensional characteristics (size and location) of up to four fires simultaneously; and
- increase false alarm immunity by requiring independent flame detection from both IR array flame detectors simultaneously; and
- be capable of controlling a valve for automatic opening during a fire, and closing automatically after all fire is suppressed; and
- be capable of automatically and dynamically aiming the robotic nozzle directly at the detected fire (or fires) until suppressed; and
- have a web server and be capable of allowing manual remote control from one or more secure, authorized remote locations; and
- be capable of self-testing and provide the real-time status of all electronic components (e.g., motors and valves), and send alerts in the event of any malfunction of such components.

Robotic Nozzle Specifications

The system's robotic nozzle (or firefighting monitor) shall meet the following minimum specifications:

- be capable of flows of water of not less than 1000 liters per minute;
- be capable of operating effectively at pressures ranging from 5 to 12 bars;
- the chassis shall be made of stainless steel 316L and shall be modular for easy replacement of all major components and pipe sections;

- the robotic nozzle shall have fully enclosed electric, 24 Volt brushless DC (BLDC) motors for controlling its horizontal rotation and vertical movements;
- shall have a maximum horizontal range of movement of not less than 360°, and a maximum vertical range of movement of not less than 180°
- shall have an adjustable jet/fog firefighting nozzle tip made of stainless steel 316L with 24 Volt brushless DC (BLDC) motor, with a continuously adjustable spray angle from straight stream to 140° spray;
- shall have fully integrated and enclosed stainless steel worm gears, with Bronze (CuSn12) gear wheels;
- shall require minimal maintenance and not require re-greasing;
- shall be CE marked, manufactured at DS/EN ISO 9001:2008 certified facilities, and have one or more third party type approval certifications (e.g., Bureau Veritas, UL, Lloyd's or equivalent).