

## **SPECIFICATION FOR A MODULAR ASPIRATED SMOKE DETECTION (MASD) SYSTEM**

A high performance Modular Aspirated Smoke Detector (MASD) system shall be designed, supplied, installed and commissioned by a specialist Fire Alarm contractor trained and authorised by the detector Manufacturer. The MASD system protects areas indicated on the drawings and shall be in accordance with this specification and to the approval of the local Fire Brigade and relevant authorities.

### **KEY REQUIREMENTS FOR MASD SYSTEM**

The following key requirements shall be met in full by the proposed system. Any deviations or alternatives shall only be considered if permission in writing is granted by all parties including the Consultants, Contactors and End User for the project.

1. The MASD system shall consist of modular aspirated smoke detectors (MASDs) connected to sampling pipe networks designed to sample air from the protected areas.
2. MASD units shall be constructed in a modular extensible fashion deploying from one to eight detector modules and a display/control module. Each detector module shall have its own detection chamber, fan and be independently configurable so that adding further modules in future has no negative impact on the performance of the existing modules. All modules shall be manufactured in an ISO9000 quality certified factory environment and carry a manufacturers warranty of at least five years.

3. The MASD display control/modules shall incorporate a colour TFT display. In addition to local status indicators, they shall support TCP/IP connection to a local network. This shall support the sending of configurable email notifications of fault and other detector conditions. The TCP/IP connection shall also support operation of remote diagnostic software which can be used to examine the detector status in advance of a site visit.
4. All detector and display modules shall share a common back plane for first fix mounting and connection enabling individual modules to be replaced without disturbing other modules making up the MASD unit.
5. Smoke detector modules shall incorporate a high-performance laser-based particle detection chamber using the principal of forward light scatter and capable of sensing smoke density as low as 0.002%obs/m. They shall be certified to comply to European Standard EN54-20 and as minimum type approval certificates shall be available from certification bodies BRE/LPCB and VDS.
6. Each MASD unit shall support up to 2000 meters of pipe with 400 sampling holes while conforming to normal (class C) sensitivity alarm level. Each detector module shall support up to 250m pipe length and 50 sampling holes at class C sensitivity. Up to 160 sampling holes at high sensitivity (class A) shall be supported per MASD (up to 20 per detection module).
7. Each MASD shall have an input to the pipe network and an exhaust outlet and support either top or bottom entry connection without compromise to the clarity of alarm and fault indications on the MASD.

8. Performance of the MASD system shall be confirmed by use of certified pipe network simulation design software and by appropriate commissioning performance tests taken from local standards and codes of practice (such as: BS 5839 1988; BS 6266 1992; BFPSC Code of Practice for category 1 Aspirating Detection Systems).
9. Display/control modules shall incorporate a colour TFT display enabling all main programming and diagnostic functions to be performed locally at the MASD unit without need for external configuration software.
10. The MASDs shall be highly resistant to unwanted alarms making them suitable for deployment in a wide range of environments. Artificial intelligence techniques shall be used to learn and monitor the pattern of background smoke in the environment over time and automatically adjust detection sensitivity to avoid false alarms while maintaining optimum sensitivity. Integral replaceable air filters shall be fitted to make detection robust and suitable both polluted and clean air environments. Algorithms shall be capable of discriminating dust particle signature responses from smoke particles to further improve smoke alarm integrity.
11. Each detection module in a MASD shall incorporate a minimum of four (4) alarm levels. A minimum of one of these alarms and fault shall be connected to the main building Fire Alarm system. Other alarm levels shall be used either for pre-warning signals to the Fire Alarm system or to initiate local warning up to first stage alarm.
12. All alarm, fault and system events shall be logged by the MASD system. Each MASD shall support recording of up to 180,000 events through a capacity of 20,000 events at detector module and display module.

13. A Command Module unit shall be available to connect the system MASD units to in a secure RS485 communication ring network. The Command Module shall provide status information across all units in the system and remote connectivity to PC based configuration software using a TCP/IP connection.
  
14. Open Protocol connection of the system shall be available through the Command Module through MODBUS protocol communication for external systems and through Apollo Protocol loop interface for compatible fire alarm systems.
  
15. Approved manufacturer is Carrier Fire & Security with the AirSense ModuLaser range of Modular Aspirated Smoke Detectors