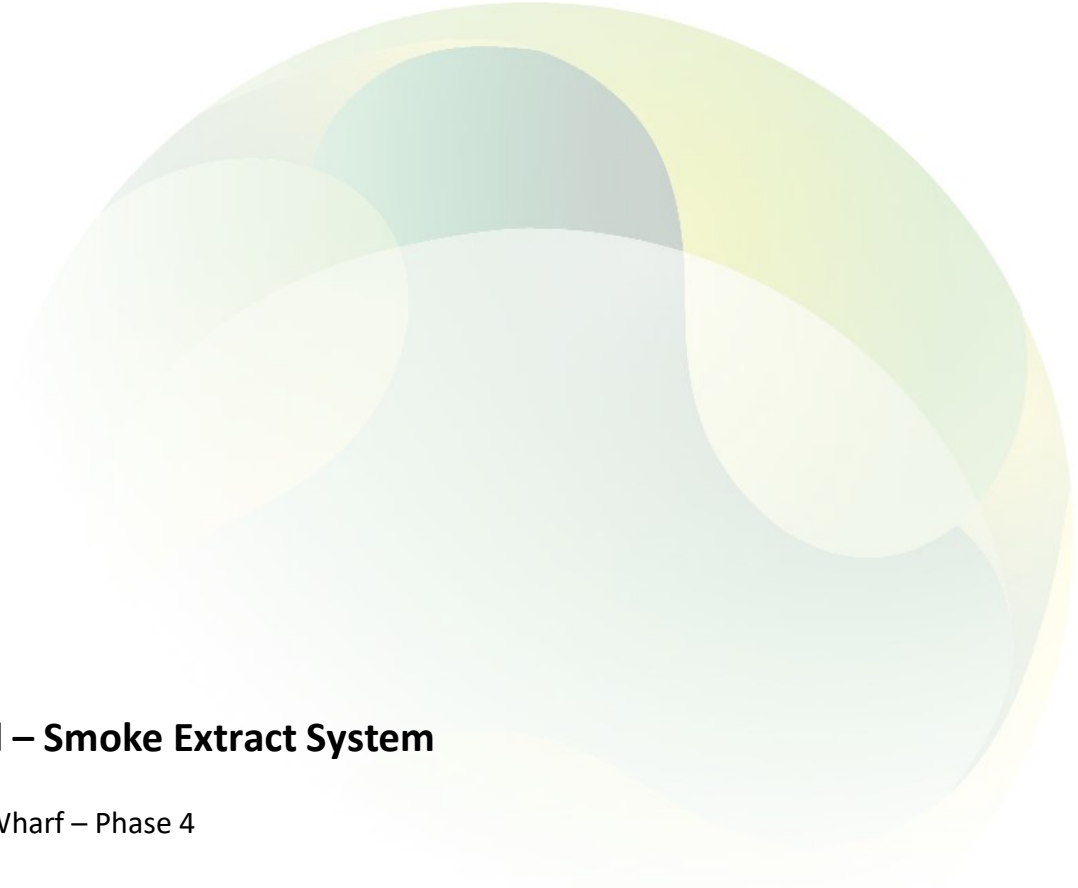




## Technical Submittal – Smoke Extract System

**Project:** Islington Wharf – Phase 4  
**Project No:** MC1155  
**TSM No:** IW4-AME-XX-XX-TS-M-  
**0021 Revision:** P02

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**AIAO05**

# **Islington Wharf Phase 4**

**Revision: P02**

**Technical Submission**

## Revision Record

| Issue | Date            | Reasons                                                                                                         | Created By |
|-------|-----------------|-----------------------------------------------------------------------------------------------------------------|------------|
| P01   | 27 October 2021 | Document number corrected. Statement included in section 2.2 to clarify 11 <sup>th</sup> level door AOV control | S. Long    |
| P02   | 08 March 2022   | Section 2.2 & 6.13 amended                                                                                      | S. Long    |
|       |                 |                                                                                                                 |            |
|       |                 |                                                                                                                 |            |

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## 1. INTRODUCTION

The purpose of this technical submittal is to provide the reader with an overview of the smoke ventilation scheme to be provided at the below mentioned site. It also provides details of the system makeup and the equipment to be used to achieve the smoke ventilation solution.

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|                      |                                     |
|----------------------|-------------------------------------|
| Project Name:        | Islington Wharf Phase 4             |
| Project Reference:   | AIA005                              |
| Basic Scheme Design: | Colt Shaft Constant, Environmental, |
| Ventilation Method:  | Mechanical                          |
| Quantity of Shafts:  | 1                                   |
| Quantity of Levels:  | 15                                  |

## 2. SYSTEMS DESCRIPTION

### 2.1. Ventilation of a residential common escape route using a Colt shaft constant

#### PDS:501-4

The Colt shaft constant system is specifically designed to ventilate common corridors in residential buildings and is usually designed to achieve two key objectives:

1. The first is to ensure the staircase is protected from smoke ingress so that vertical escape is smoke free for all occupants to escape and for the fire service to access the fire floor.
2. The second is to improve conditions in the common corridor to allow occupants to travel safely to the staircase. In general, this is often used to offset an extension in travel distance from the furthest apartment to the stair door. This is a trade off against the prescribed recommendations in Approved Document B.

The system needs a source of inlet air to allow a constant flow rate to be achieved, for this system an AOV in the corridor is utilised.

Mechanical shaft systems in residential buildings are described comprehensively in BS 9991 and the Smoke Control Association document 'Guidance on Smoke Control to Common Escape Routes in Apartment Buildings, (Flats and Maisonettes).

The system comprises:

- A run & standby fan system, CE marked to BS NE 12101-3, Class F300
- Lobby ventilators to each level served by the shaft. The top of the lobby ventilator should be located 50mm from the finished ceiling level
- Adjustable door closers
- Fan Control Panel
- Head of stairwell ventilator, CE marked to BS EN 12101-2
- OPV Control System
- Manual Control Point

The shaft passing through the building must be smooth internally and well-sealed. Maximum permissible leakage for the shaft is  $3.8\text{m}^3/\text{h}/\text{m}^2$  at 50Pa. Failure to meet this performance could result in a shortfall in the smoke extract volume flow rate.

### 2.2. System Operation

In the event of a fire in any apartment, it is accepted that smoke could migrate into the common corridors between the apartments and the staircase. This smoke would be picked up by the smoke detectors in the corridor, setting the system into fire mode.

On detection of smoke between level 01 – 10, the lobby ventilator on the appropriate floor will open and the primary smoke extract fan will activate. Any negative pressure created in the corridor will be alleviated by the corridor AOV.

On levels 11 – 15 smoke extraction is served via two AOV's located at either end of the corridor.

The smoke plant located on the level 11 roof is accessed through an actuated door which will be controlled by Colt. The door and actuator will be supplied by others.

The system can be overridden by use of the fire override switches on the OPV panel, located within the Fire fighters entrance.



### 3. SHAFT DETAILS

The shaft/riser passing through the building must be smooth internally, well-sealed, have a cross sectional area of at least **0.6m<sup>2</sup>** and an aspect ratio of no more than 2:1. Maximum permissible leakage for the shaft is 3.8m<sup>3</sup>/hr/m<sup>2</sup> at 50Pa. Failure to meet this performance could result in a shortfall in the smoke extract volume flow rate.

### 4. FAN/SHAFT VENTILATOR SIZING

Colt ventilators and fans are sized to meet the requirements of the individual systems. The size of the shaft and ventilator will dictate the overall resistance of the system which in turn will affect the fan requirements

The required nominal extract rate at each shaft ventilator is 4.0m<sup>3</sup>/s. This is the minimum duty to be achieved at each extract point. Higher figures are acceptable, providing the maximum door opening forces to or from the area being ventilated do not exceed 100N at the door handle.

The sizing calculations have been based on a [0.95]m<sup>2</sup> shaft. Additional leakage has been taken into account based on the number of ventilators within the shafts. The estimated fan duty will be 4m<sup>3</sup>/s at 400Pa.

Fans will be run and standby in series.

**Note:**

Final fan selection will be based on pressure drop calculation for the final client approved drawings. The current selection is therefore liable to change.

## 5. EQUIPMENT CONTROLS

This section details the controls philosophy for the smoke ventilation system; including controls voltages and control methods.

The ventilators forming part of this system are 230Vac and receive a maintained 230Vac supply from a Colt fan control panel.

Fans are 400Vac, 3 phase and are powered from a Colt fan control panel.

The ventilators utilise the Colt OPV network for control and operation. The OPV system gives individual control, status and fault indication of equipment on the *Apollo* addressable network. The networks include a number of manual call points (for remotely opening the head of stair vents) and Fire-fighters override switches (for overriding the pressure sensors and ramping the fans to full speed) to provide a signal to bring the smoke ventilation system into action. The network then relays signals back to individual equipment to open / close, start / stop as prescribed by the pre-programmed cause and effect.

Any Colt fan control panel receives an adequately rated, 400Vac, 3 phase power supply. A dual supply will be provided by the client to the Colt ATS (Automatic Transfer Switch), located adjacent to the Colt fan control panel. The ATS switches between primary and secondary supplies, providing a maintained supply.

All power supplies should be in accordance with the relevant British Standard.

### 5.1. Cable Types

Control Cables: Class PH120 to BS EN 50200.

Power Cables to Main Extract Fans: Class F120 to BS 7846.

The section: "Equipment in Detail" provides a more in-depth technical look at the individual components that make up the smoke ventilation scheme.

## 6. SCHEDULE OF EQUIPMENT

This section details equipment locations within the smoke ventilation scheme.

| Type                      | Description         | Location               | Quantity |
|---------------------------|---------------------|------------------------|----------|
| OPV Heart Module          | Control Panel       | Electrical Riser       | 1        |
| OPV Display Panel         | Control Panel       | Ground Floor Entrance  | 1        |
| OPV Display Expansion     | Control Panel       | Ground Floor Entrance  | 1        |
| OPV VFC Expansion         | Control Panel       | Electrical Riser       | 1        |
| MCC Constant External     | Control Panel       | Roof                   | 1        |
| ATS                       | Control Panel       | Roof                   | 1        |
| CSIO-AC L                 | Control Equipment   | Electrical Riser       | 16       |
| Fireman's Override Switch | Control Equipment   | Staircore              | 15       |
| Manual Call Point(Add)    | Control Equipment   | Ground Floor Staircore | 1        |
| Smoke Control Damper      | Shaft Ventilators   | Corridor / Lobby       | 10       |
| Coltlite CLT              | Natural Ventilators | Corridor / Lobby       | 19       |
| Seefire                   | Ventilators         | Staircore              | 1        |
| Smoke Fans                | Fans                | Roof                   | 1        |

**Note:**

- Volt Free Contact (VFC) for each level required to OPV Heart Module.
- Containment is not in Colt's scope of works.
- Smoke detection is not in Colt's scope of works.

## 6.1. Colt OPV Heart Module

### PDS: 308-2

The Colt OPV Heart Module control the overall OPV system. The module connects to the user interfaces such as the Display Panel, Display Expansion Panel and Firefighter's Override Panel across an RS485 network. It is a central input and output signalling point as communicates, via an Apollo network to various field devices, which may include CSIOs, smoke detectors, manual control points or temperature sensors and which provides a signal to bring the smoke ventilation system into action. The Heart Module is programmed to operate the overall smoke control scheme using a cause and effect matrix, which commands the devices to operate depending on which sensors have been triggered.

### Materials

- The enclosure is made from ABS plastic coloured grey
- Mounting
- Wall mounted with four fixing holes through the back of the unit. Fix using two screws in diagonal corners

### Technical data

- Dimensions: 396mm(W) x 316mm(H) x 128mm(D)
- Weight: 5kg
- IP56
- Temperature range: 0 - 50°C in normal operation conditions
- Limited to one per OPV system
- Back-up batteries: 2 x 3.6AH 12V batteries in series
- Battery standby time: Up to 72 Hours depending on the system
- Programmed using USB connection



### Operation

- 230Vac/1ph/50Hz/1.1A power supply required
- 12 VFC Inputs
- 4 x Single relay contact outputs (30VAC/DC 3A resistive & 1A Inductive Load)
- 1 x Apollo network spur is available to control up to 126 devices, further network spurs can be fitted to provide another 126 devices
- 1 x RS485 output for display panel, display extension and firefighter override panel connection
- 1 x RS485 output for VFC extension module (maximum of 10 extension supported)
- Limited to a total of 32 RS485 devices
- Status LED
- Mains failure detection

### Maintenance

- Isolate electrical supply before maintenance. Note: This panel has a 24V battery backup and potentially voltages from other sources
- Clean exterior of module. Do NOT use water
- Open the panel and clean any accumulated dust carefully
- Check connections for security
- Carry out functional test using smoke control display panel
- With batteries check battery voltage. Reconnect after test
- Batteries must be recycled at the end of their life in accordance with local and national laws/regulations

### Standards

- The Colt OPV Heart Module is CE marked
- Low Voltage Directive (LVD) 2006/95/EC
- EMC EN 61000-6-1:2007 - Generic Immunity For Residential, Commercial & Light-Industrial Environments
- EMC EN61000-6-3:2007 +A1:2011 Generic Emissions For Residential, Commercial & Light-Industrial Environments

## 6.2. Colt OPV Smoke Control Display Panel

### PDS: 305-2

The Colt Smoke Control Display Panel is the user interface for the Colt OPV system. This panel provides individual control, status and fault indication of devices connected to the OPV Heart Module unit via an Apollo network.

### Materials

- The main body of the casing is manufactured from plastic, off white RAL 9002

### Mounting

- Wall mounted with four fixing holes through the back of the unit. The fixing holes can be access by removing the side panels. Fix using two screws in diagonal corners

### Technical Data

- Dimensions: 270mm(W) x 200mm (H) x 48mm (D)
- Weight: 0.5kg
- IP40
- Temperature range: 0 - 50°C in normal operation conditions
- Limited to one per OPV 2015 Heart Module
- Fault warning alarm: Louder than 50dB at 1m for 0.5 sec every 5 sec
- LCD display 4 lines of 19 characters each
- Up to 12 Zones indicators
- Status LED
  - Fire Condition – Red
  - Test – Amber
  - Healthy – Green
  - Flashing LED indicates fault
- 12 zone LEDs
  - Fire or Override Active – Red
  - Override Inactive – Amber
  - Auto Inactive – Green
  - Flashing LED indicates fault
- LCD screen providing:-
  - Firefighter's Override
  - Fire Reset
  - Status of Devices & Sensors
  - Control of devices
  - Diagnostics
  - Configuration



### Operation

- Fire-fighter's control is enabled/disabled via a key-switch on the front fascia
- Operation of all zones via screen control using membrane touch panel buttons
- Some operations are password protected (i.e. time & date settings)

### Cabling & Connections

- 4 core + Screen RS485 daisy chain connection from Colt OPV 2015 Heart Module
- Connections are spring clamp type
- Maximum cable connection 2.5mm<sup>2</sup>

### Maintenance

- Isolate electrical supply at OPV Heart Module before maintenance
- Clean exterior of module. Do NOT use water
- Check connections for security
- Check indication lamps
- Navigate from the menu to Configure – Lamp test
- Carry out functional test

### Standards

- The Colt OPV Display Module is CE marked
- Low Voltage Directive (LVD) 2006/95/EC
- EMC EN 61000-6-1:2007 - Generic Immunity For Residential, Commercial & Light-Industrial Environments
- EMC EN61000-6-3:2007 +A1:2011 Generic Emissions For Residential, Commercial & Light-Industrial Environment



### 6.3. Colt OPV Display Extension

#### PDS: 306-2

The Colt OPV Display Extension Panel is for the expansion of the Colt OPV display panel. The panel can be programmed and labelled to indicate status of any network device connected to the Apollo network.

#### Materials

- The main body of the casing is manufactured from plastic, off white RAL 9002

#### Mounting

- Wall mounted with four fixing holes through the back of the unit. The fixing holes can be access by removing the side panels. Fix using two screws in diagonal corners.

#### Technical Data

- Dimensions: 270mm(W) x 200mm (H) x 48mm (D)
- Weight: 0.5kg
- IP40
- Temperature range: 0 - 50°C in normal operation conditions
- Requires an OPV Display Panel
- Fault warning alarm: Louder than 50dB at 1m for 0.5 sec every 5 sec
- Configurable title display
- Up to 12 Zones indicators
- Status LED
  - Fire Condition – Red
  - Test – Amber
  - Healthy – Green
  - Flashing LED indicates fault
- 12 zone LEDs
  - Fire or Override Active – Red
  - Override Inactive – Amber
  - Auto Inactive – Green
  - Flashing LED indicates fault

#### Cabling & Connections

- 4 core + Screen RS485 daisy chain connection from Colt OPV Display Panel
- Connections are spring clamp type.
- Maximum cable connection 2.5mm<sup>2</sup>

#### Maintenance

- Isolate electrical supply at OPV Heart Module before maintenance
- Clean exterior of extension. Do NOT use water
- Check connections for security
- Check indication lamps using lamp test on display panel

#### Standards

- The Colt OPV Display Module is CE marked
- Low Voltage Directive (LVD) 2006/95/EC
- EMC EN 61000-6-1:2007 - generic immunity for residential, commercial and light-industrial environments
- EMC EN61000-6-3:2007 +A1:2011 generic emissions for residential, commercial and light-industrial environments



## 6.4. Colt OPV VFC Expansion

### PDS: 309-2

The Colt OPV VFC Expansion provides additional volt free contact inputs and single relay contact outputs.

#### Materials

- The enclosure is made from ABS plastic coloured grey

#### Mounting

- Wall mounted with four fixing holes through the back of the unit. Fix using two screws in diagonal corners

#### Technical data

- Dimensions: 198mm(W) x 152mm(H) x 79mm(D)
- Weight: 0.5kg
- IP56
- Temperature range: 0 - 50°C in normal operation conditions
- Limited to 10 VFC extensions per OPV Heart module

#### Operation

- 12 VFC Inputs
- 4 x Single relay contact outputs (30VAC/DC 3A resistive & 1A Inductive Load)
- Cabling & Connections
- 4 core + Screen RS485 daisy chain connection from Colt OPV Heart Module or VFC unit
- Connections are spring clamp type
- Maximum cable connection 2.5mm<sup>2</sup>

#### Maintenance

- Isolate electrical supply at OPV Heart Module before maintenance
- Clean exterior of extension. Do NOT use water
- Check connections for security
- Check indication light is green on PCB

#### Standards

- The Colt OPV Display Module is CE marked
- Low Voltage Directive (LVD) 2006/95/EC
- EMC EN 61000-6-1:2007 - generic immunity for residential, commercial and light-industrial environments
- EMC EN61000-6-3:2007 +A1:2011 generic emissions for residential, commercial and light-industrial environments



## 6.5. Fan Control (MCC) Panel Constant External

### PDS: 313-2

The Colt MCC control panel is the panel which distributes the power supply for the Colt system. Typically it will provide switching and power to the Colt fans and associated Colt ventilators, dampers, etc. Typically MCC panels are double door panels with an interlocked isolator.

### Materials

- Panel enclosures that are designed for external use will be constructed from corrosion resistant aluminium
- External panels are polyester powder coated in RAL 7035

### Technical data

- Approved enclosure dimensions: W: 600 x H: 1200 x D: 400 (not including plinth or canopy)
- Weight: 60kg
- Rating: 3KW – 7.5KW
- Protection rating: IP54 + rain canopy
- Supply: 400Vac 3ph + N (4 wire) 50Hz via maintained supply from the client or a dual supply from the client via a Colt ATS unit
- Cable entry bottom
- Plinth 100mm
- Rain canopy included

### Maintenance

- Clean exterior of panel
- Check for signs of corrosion, clean and touch-up as necessary
- Isolate electrical supply
- Open the panel and clean any accumulated dust
- Check connections for security
- Carry out functional test

### Standards

- All panels are tested before they are dispatched from Colt.
- Panels conform to the low voltage directive, are built to Form 2 and use BS7671 as a guide for wiring standards.



## 6.6. Automatic Transfer Switch

### PDS: 314-2

Colt Automatic Transfer Switches (ATS) are available for switching supplies up to 160A. The unit will detect the loss of the primary supply and automatically break the primary switch before making the secondary switch when transferring between three phase sources. It comprises two mechanical and one electrical interlock as well as control relays, timers and test functions to manage the switching operation. The switch can be locked in “zero” position to isolate the supply and aid maintenance.

### Materials

- The enclosure is made from 1.2mm thick steel sheet
- The finish is polyester powder coated in RAL 7035 (grey)

### Technical data

- Dimensions: 400mm(W) x 600mm(H) x 210(D) (excluding 75mm wall brackets)
- Weight: 20kg
- Available as 40A, 63A, 100A, 125A & 160A (size based on full load current)
- Cabling via a bottom gland plate
- 4 x wall mounted brackets
- Locking system: 3 mm double-bar key
- Selection between two grid supplies or one grid and one generator supply
- Generator start/stop bi stable output 30VDC 2A max
- External option also available in a GRP enclosure
- 4 pole with switched neutral isolators
- Dip switch selection
- Ingress protection rating: IP55

### Operation

- Primary source failure detected
- Delay to allow primary source to recover
- Output to generator start (If secondary source is from generator)
- Secondary source available
- Switch to secondary source
- Primary source available
- Delay to check that primary source is stable
- Switch over to primary source
- Output to generator stop (If secondary source is from generator)

### Maintenance

- Isolate both incoming electrical supplies.
- Clean exterior of panel with a soft cloth or brush
- Check for corrosion. Repair and touch up as necessary
- Check electrical connections
- Clean interior of panel with a soft brush
- Re-instate power and check switch over by isolating primary supply
- Repair any faults found.

### Standards

- IEC 60947-3  
Low-voltage switchgear and control gear. Switches, disconnectors, switch-disconnectors and fuse-combination units
- IEC 60947-6-1  
Low-voltage switchgear and control gear. Multiple function equipment. Transfer switching equipment
- IEC 60439-1  
Low-voltage switchgear and control gear assemblies. Type-tested and partially type-tested assemblies



## 6.7. Colt Standard Input/Output unit (CSIO)

### PDS: 303-3

The Colt CSIO is an individually addressable relay/IO that forms part of the Colt OPV control system. Once signalled by the OPV panel, via the Apollo network, the unit will switch to actuate the controlled equipment. Typically one CSIO is supplied per floor or piece of equipment, depending upon the layout, to allow individual and accurate control of the smoke ventilation scheme. The unit is mounted inside an ABS plastic enclosure to protect it from the risks of mechanical damage, unauthorised modification or interference and exposure to moisture, dust and foreign bodies.

### Materials

- The enclosure is made from ABS plastic coloured grey

### Technical data

- Dimensions: 200mm(W) x 245mm(H) x 95mm(D)
- Weight: 1kg
- Individually addressable on the Apollo network

### Operation

- Available for 230Vac and 24Vdc systems

### Maintenance

- Isolate electrical supply
- Clean exterior of enclosure
- Check for signs of corrosion, clean and touch-up as necessary
- Open the enclosure and clean any accumulated dust
- Check connections for security



## 6.8. Fireman's Override Switch

### PDS: 334-2

Colt Switches are designed as localised controls for the Colt system and equipment. A variety of different switches are available depending on the system type and the equipment used. These include Fireman's Override Switches, Reset Switches, Roof Access Hatch switches and Manual Control Points.

The Fireman's Override Switch or Fireman's Override Electrical (FOE) is a two position, double pole, 'rocker' type switch with a clear plastic 'flap' hinged over the facia to prevent malicious operation.

The switch is typically positioned at the bottom of a stairwell or at the fire and rescue service access level to allow actuation of smoke ventilators within a smoke clearance or smoke control scheme.

The switch comprises a main housing and escutcheon plate. The switching device is fitted to the plate, which simply snaps into the main housing and is permanently held in place by fixing screws.



### Materials

- All Colt switches are made from ABS plastic

### Technical data

- Dimensions: 90mm(W) x 90mm(H) x 45mm(D)
- Weight: 0.18kg
- Operating temperature: -10°C - +55°C
- Ingress Protection rating: IP24

### Switch type

- Fireman's Override Switch:
  - Colour: orange (RAL 2011)
  - Operation: 2 position switch labelled Auto/Extract
  - Location: stairwell, 1 per fire zone

### Maintenance

- Check for visible damage
- Check incoming power supply
- Check operation of switch
- Clean the switch and ensure it is clearly visible

### Standards

- Colt Manual Control Points and Fireman's Override Switches are colour Orange (RAL 2011) in accordance with BS EN12101.



## 6.9. Manual Call Point (Addressable Break glass) Switch

### PDS: 336-2

Colt Switches are designed as localised controls for the Colt system and equipment. A variety of different switches are available depending on the system type and the equipment used. These include firefighter's override switches, reset switches, roof access hatch switches and manual control points.

A manual call point is installed within a colt control system to allow occupants to signal that fire or smoke exists within the building. Manual call points are connected to the Colt OPV panel via the Apollo network. Each manual call point (MCP) is individually addressable and the address of each call point is pre-set at commissioning stage.

When activated, the MCP not only interrupts the polling cycle to indicate to the control panel that it has been operated, but also reports its address and thus location.

A single bi-coloured LED is provided on the MCP. This LED is controlled, independently of the MCP, by the control panel. The red LED is lit when the MCP has been activated, and an amber/yellow LED indicates a fault.

### Materials

- All Colt switches are made from ABS plastic

### Technical data

- Dimensions: 90mm(W) x 90mm(H) x 57mm(D)
- Weight: 0.18kg
- Operating temperature: -10°C - +55°C
- Ingress Protection rating: IP24

### Switch type

- Manual Call Point (Addressable Break glass):-
  - Colour: orange (RAL 2011)
  - Operation: deformable element switch
  - Location: stairwell at ground floor level

### Maintenance

- Check for visible damage
- Check incoming power supply
- Check operation of switch
- Clean the switch and ensure it is clearly visible

### Standards

- Colt manual control points and firefighter's override switches are colour orange (RAL 2011) in accordance with BS EN12101



## 6.10. Smoke Control Damper

### PDS: 050-1

The Smoke Control Damper (26SSD series) is a motorised smoke damper suitable for use in mechanical and natural smoke control systems. It has been designed to prevent the passage of fire and smoke from one area to another while in the closed position and to allow efficient smoke ventilation when open. Suitable for many industrial, commercial and residential buildings where smoke ventilation is required.

The damper can be provided with a K15 (15° deflection) or K40 (40° deflection) grille.

### Materials

- Blades & Frame: Galvanised steel.
- Bearings: Stainless Steel (to suit 600°C).

### Finishes

- Grille: RAL 9010 (Pure White) 50% gloss.
- Damper (front face): RAL 9005 (Jet Black) 30% gloss.
- Damper (other areas): Mill finish.

### Fixing Options

- Suitable for installation in Class A drywall, concrete, masonry or ductwork lined builders work shafts.
- Minimum wall thickness: 130mm.
- Damper and sleeve supplied separately for installation on site.

### Technical Data

- Structural opening dimensions for a single unit:
  - Width: 523mm (minimum) to 1013mm (maximum)
  - Height: 600mm (minimum) to 1998mm (maximum)

### Operation

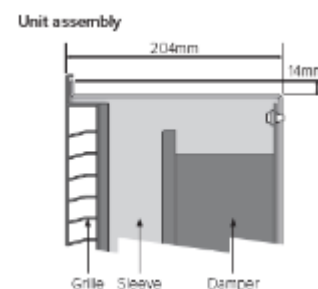
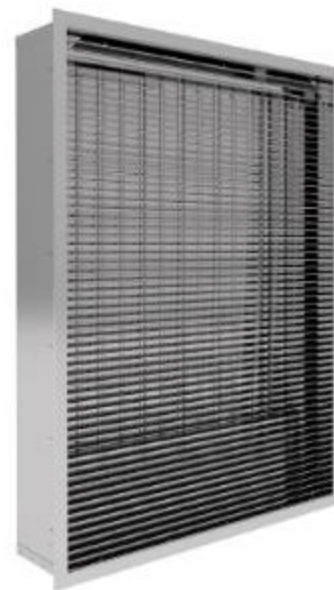
- 230Vac or 24Vdc electric actuator, drive open, drive closed operation.
- Actuators with micro switches for position monitoring are available.

### Maintenance

- Isolate the electrical supply before working on the damper.
- Check for visible damage.
- Check damper fixing.
- Clean damper with a soft brush or damp cloth.
- Clean and lubricate all bearings and pivots.
- Check operating mechanism for wear, chafing, damage, loose fixings and leakage.
- Check incoming power supply.
- Check operation of the damper.
- Adjust limit switches or restrictors if necessary.
- Repair any faults found.

### Standards

- The unit is tested and certified in accordance with BS EN 12101-8.
- Tested to BS EN 1366-10 in both directions for 10,000 cycles.
- Tested to BS EN 1366-2 in both directions in the closed position.
- Classification to BS EN 13501-4:
  - E120 VeW (i→o) S500 C10000 AA Multi
  - E90 VeW (i↔o) S500 C10000 AA Multi
- The smoke damper can be used without a grille or either the K15 or K40 grilles supplied with the unit. The use of other grilles will void the certification to BS EN 12101-8.
- Any other covering must be at least 200mm in front of the unit.
- 



## 6.11. Coltlite CLT

### PDS: 012-2

The Coltlite CLT is a thermally broken glass louvred ventilator available with a wide range of sizes, louvre options and control options. It is suitable for many industrial, commercial and residential buildings where day-to-day ventilation and/or smoke ventilation is required. Suitable for natural ventilation as air inlet / extract. It must be installed vertically. Double glazed louvres sealed into the frames with 28mm overall glass thickness. Available in mill finish or polyester powder coated to a standard Colt RAL colour. Some or all louvres can be fixed closed (to special order). Ventilators can be double or triple breasted, with a single mullion between louvre banks. An external actuator is available. The ventilator is Power Open / Power Close, therefore no "failsafe" version is available.

### Materials

- Thermally broken extruded aluminium surround frame and louvre frame, 40mm deep
- The louvres are enclosed with aluminium sections which have two overlapping weather seals for excellent air-tightness

### Louvre Types / U Values

- 28mm overall clear toughened, float or laminated glass thickness / maximum  $1.46\text{W/m}^2/\text{K}$
- 28mm overall insulated metal skinned panel infill
- Fixing Options
- Fixing to curtain walling using 24 to 44mm thermally broken glazing frame adaptor
- Fixing to structural opening using either through frame or strap fixings

### Technical Data

- Approximate aerodynamic coefficient ( $C_v$ ) 0.58
- Air permeability  $1.89\text{m}^3/\text{h/m}^2$  @ 50Pa,  $0.37\text{m}^3/\text{h/m}$  of seal
- Watertight at 150Pa
- Minimum wind rating:  $0.5\text{kN/m}^2$
- Acoustic rating (closed) up to 41dB (Rw)
- Height: Minimum 250mm
- Width: 300mm – 2000mm
- Louvre height: 150mm – 300mm

### Operation

- Hand Control – Lever handle control installed directly onto the frame
- Electric Motor – 230Vac or 24Vdc (1.2Amps), two actuators are required for larger sizes
- Pneumatic controls, two actuators are required for larger sized vents

### Maintenance

- Check for visible damage
- Check ventilator fixing and weathering
- Clean ventilator
- Clean and lubricate all bearings, pivots and hinges
- Check operating mechanism for wear, chafing, damage, loose fixings and leakage
- Check incoming power supply
- Check operation of the ventilator
- Adjust limit switches or restrictors if necessary
- Repair any faults found

### Standards

- Coltlite LWT28 with electric control is CE marked in accordance with EN 12101-2

Project specific sizes will be shown on construction issue drawings.



**COLT**

## 6.12. Seefire

### PDS: 001-2

The Seefire is a louvred natural ventilator, available with a wide range of sizes, louvre options and control options. Suitable for many industrial, commercial and residential buildings where day-to-day ventilation and/or a smoke ventilation system is required. For day to day ventilation a rain detection system can be added to close the louvres automatically during precipitation. There is also an option of a fusible link. In case of fire the link will melt at a pre-selected temperature (68oC to 182oC) and permit the ventilator to open or close automatically. Installation angle of 0o to 90o. The option of polycarbonate or glass louvres permits daylight entry. Available in mill finish or polyester powder coated to a standard Colt RAL colour.



### Materials

- Principal components are manufactured from corrosion resistant aluminium alloy grade 3005 in accordance with EN573-3, with stainless steel fixings.
- The use of polypropylene pile weather seal on aluminium louvres, or EPDM rubber flipper weather seal on polycarbonate and glass louvres, reduces the loss of warm air when the louvres are closed.

### Louvre Types / U Values

- Single skin aluminium louvre, with or without pile weather seals / 5.42W/m<sup>2</sup>K
- Double skin aluminium louvre, with or without pile weather seals / 3.49W/m<sup>2</sup>K
- Double skin polycarbonate louvre (clear or opaque), with rubber weather seals / 3.2W/m<sup>2</sup>K
- Glass louvre (wired, toughened or toughened and laminated) with rubber weather seals / 5.4W/m<sup>2</sup>K



### Fixing Options

- Glazing
- Sheeting
- Curbs / Upstands
- Brickwork



### Technical Data

- Air permeability with pile or rubber seals is 130-230m<sup>3</sup>/h/m<sup>2</sup> at 50Pa, depending on width of unit
- Aerodynamic coefficient (Cv) 0.65 – 0.68, depending on size of unit
- Acoustic rating (closed) up to 13dB (Rw) (double skin with pile weather seals)
- For dimensional data please see table

### Operation

- Hand Control – External cable, internal cable or internal cable with latch or winch
- Electric Motor – 230Vac (0.15Amps) or 24Vdc (0.65 Amps), two actuators are required for larger sized vents
- Pneumatic controls, two actuators are required for larger sized vents

### Maintenance

- Check for visible damage
- Check ventilator fixing and weathering
- Clean ventilator, paying special attention to drain and weathering channels
- Wash polypropylene pile weather seal (if fitted)
- Clean and lubricate all bearings, pivots and hinges
- Check operating mechanism for wear, chafing, damage, loose fixings and leakage
- Check incoming power supply
- Check operation of the ventilator
- Adjust limit switches or restrictors if necessary
- Repair any faults found

Note: where ventilators are subjected to a high level of debris it may be necessary to clean channels more often to maintain performance and weather resistance.

### Standards

- Ventilators used as smoke and heat exhaust ventilators are CE marked in accordance with EN 12101-2: 2003.
- The Seefire is manufactured under the ISO 9001 quality standard. Each unit is given a functional test before despatch.

Project specific sizes will be shown on construction issue drawings.



## 6.13. Smoke Extract Fans

### PDS: 101-2

Colt Smoke Extract fans are long case axial fans that have been designed and tested in accordance with EN12101-3. A central metric foot mounted motor, totally enclosed, is wired via a flexible cable system to an externally located IP55 protected terminal box on the fan casing. The fan motors have 'sealed for life' bearings and have a standard industrial paint finish.

### Materials

- Outer casing is constructed from heavy gauge steel sheet, roll formed and welded and hot dipped galvanised after fabrication
- Blades are pressure die cast aluminium (natural finish)

### Technical Data

- Sizes from Ø315mm – Ø1250mm
- Volume flow rates up to 30m<sup>3</sup>/s
- Motor protection IP55
- Temperature rated at 300°C for 2 hours
- Project specific data will be shown on the construction issue drawings
- The following ancillaries are available, dependant on application:
  - Feet for free standing fan arrangements
  - Anti-Vibration mountings
  - Flexible connections for reducing vibration to structure/ ductwork
  - Wire guards
  - Non-return dampers
  - Attenuators

### Operation

- Electric – 400Vac, 3 phase, 50Hz

### Maintenance

- Isolate using the local isolator switch prior to any maintenance works
- Ensure the impeller is at rest prior to any maintenance
- Check for visible damage
- Check fan fixings
- Check all electrical connections and interfaces
- Check all current/voltage/frequency are as stated on the nameplate
- Check for and remove any dirt and/or debris
- Bearings are 'sealed for life' and do not need a detailed inspection
- Check, clean and replace components as necessary
- Check for wear, chafing, damage, loose fixings and leakage
- Check operation of the fan
- Repair any faults found

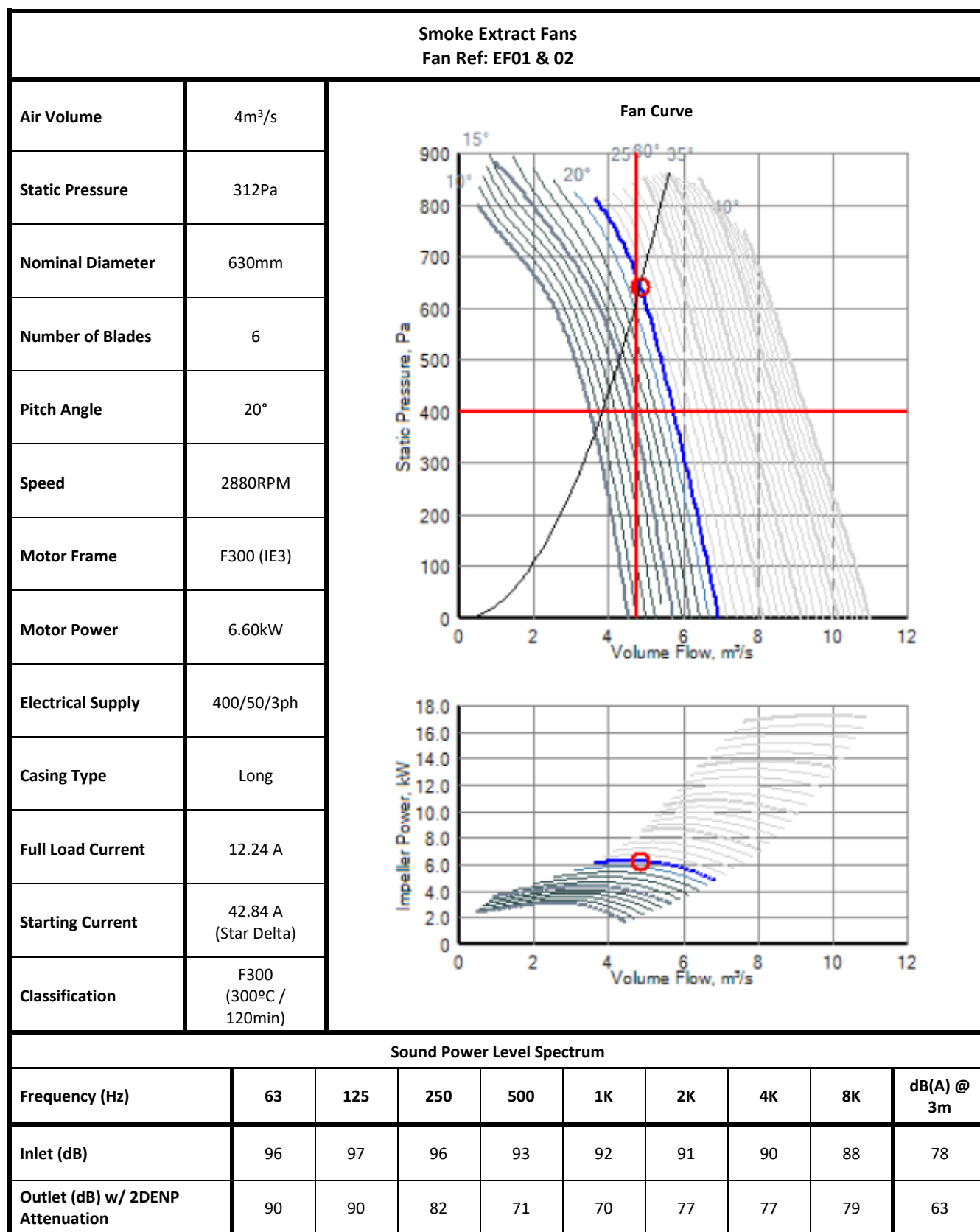
### Standards

- Fans providing extract of hot smoke are high temperature rated at a minimum of 300°C for 2 hours and are CE marked in accordance with EN 12101-3:2002 (F300 Classification)
- All accessories comply with the same EN 12101-3:2002 standard

Fans are tested to ISO 5801:1997 (Airside Performance) and BS 858-2:1985 (Sound Performance)



Typical "Colt Shaft" fan set



Note: Levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

## **7. MCC SHAFT CONSTANT SYSTEM LED INDICATORS**

### **7.1. Control Status LED Panel**

- Mains Healthy three phase supply LED light Green and constantly illuminated whilst three phase supply healthy.
- 24VDC Healthy LED light Green and constantly illuminated whilst internal 24VDC supply healthy.
- When Fire Condition activated LED light illuminated Red.

### **7.2. Fan Status LED Panel**

- When Duty Fan Running LED light illuminated Red.
- When Duty Fan Fault LED light illuminated Yellow.
- When Standby Fan Running LED light illuminated Red

Note if the LED lights are not illuminated as described above there may be a fault with the system, please contact Colt Services whose details are provided within this document.

## **Appendix B: Colt Technical Specifications**

This section details the Colt technical specifications for electrical site wiring and control panel specification.

COLT CTS 1947      Specification for Electrical Site Wiring

|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

## 1.0 Description

- 1.1 This specification covers on site electrical wiring and installation of Colt electrical equipment by Colt staff or Colt electrical sub-contractors.
- 1.2 Compliance with the relevant sections of this specification for electrical wiring and installation of Colt electrical equipment by the electrical contractor is strongly recommended where on site wiring is not part of the Colt contract.

## 2.0 Standards

- 2.1 All installations shall be carried out to a standard no less than that laid down in the current edition of BS 7671 and any other standards and regulations which may be applicable to the building in which the installation is carried out.
- 2.2 All equipment shall meet appropriate British or IEC standards and be CE marked as appropriate.
- 2.3 All life safety and firefighting Installations should meet the requirements of BS 8519 where relevant
- 2.4 Installations in apartment buildings shall conform to the requirements of Approved Document P.

## 3.0 Personnel

- 3.1 All Colt or sub-contractor's staff carrying out electrical installations shall be suitably qualified. The supervisor should understand the requirements of BS7671 and this specification and a copy of both documents shall be available to the installers.
- 3.2 The supervisor shall be the on-site contact with the client's engineer. It is his/her responsibility to obtain and disseminate any special site safety or other requirements requested by the client and in particular methods of isolating any electrical equipment interconnected to the Colt system. This will be in accordance with the Colt Electrical System of Work.

## 4.0 Materials and Components

- 4.1 Where the temperature of air round the installed cable does not exceed 600°C under service conditions, the installation shall be carried out in accordance with BS7671 using one of the following systems:
  - a. LSOH/SWA/LSOH copper cable;
  - b. LSOH insulated copper cable including separate earth conductor, all in HFT conduit;
  - c. LSOH insulated copper cable in steel conduit (normally only when requested by client);
  - d. LSOH Insulated LSOH sheathed copper cable may be used for extra low voltage circuits (max50Vac, 100Vdc), clipped directly to the wall, subject to client's agreement;
  - e. LSOH/SWA/LSOH or LSOH insulated copper cable in cable tray.
- 4.2 For installations which need to continue to operate under high temperature conditions, such as smoke ventilation systems, fire resisting cable must be used to the relevant category. Suitable cable types are:
  - a. MICC to EN 60702-1;

|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

- b. cables to relevant category of BS 7846 or BS EN 50200;
- c. lower rated fire resisting cables where routed through an area providing protection against exposure to any significant fire risk, as permitted in BS 9999.

NOTE 1: LS0H cable in HFT plastic or steel conduit or LS0H/SWA/LS0H cable is not suitable when fire resistance is required.

NOTE 2: Current Colt practice is to use cables to the following minimum categories of BS 7846 or BS EN 50200:

NOTE 3: Where the cables are installed within a car park, this must be routed to avoid locations above parking places as far as is practicable in accordance to BS 7346, 6.10.2.

| System                       | Control & Single Phase                                      | Three Phase                                        |
|------------------------------|-------------------------------------------------------------|----------------------------------------------------|
| Shaft systems                | PH120 <sup>1</sup>                                          | F60 <sup>4</sup> + protection or F120 <sup>5</sup> |
| Car park smoke clearance     | PH60 <sup>2</sup>                                           | F60 <sup>4</sup>                                   |
| Car park smoke control       | PH120 <sup>1</sup>                                          | F120 <sup>5</sup>                                  |
| Natural SHEVS (failsafe)     | PH30 <sup>3</sup>                                           |                                                    |
| Natural SHEVS (non-failsafe) | PH60 <sup>2</sup> or PH120 <sup>1</sup> (for fire fighters) |                                                    |
| Powered SHEVS                | PH60 <sup>2</sup> or PH120 <sup>1</sup> (for fire fighters) | F60 <sup>4</sup> + protection or F120 <sup>5</sup> |

<sup>1</sup> control cables meeting the PH120 classification when tested in accordance with BS EN 50200 and the 120min survival time when tested in accordance with Annex B BS 8519:2010

<sup>2</sup> control cables meeting the PH60 classification when tested in accordance with BS EN 50200 and the 120min survival time when tested in accordance with BS 8434-2

<sup>3</sup> control cables meeting the PH30 classification when tested in accordance with BS EN 50200 and the 30min survival time when tested in accordance with Annex E of BS EN 50200

<sup>4</sup>Power cables meeting the 60 minute survival time when tested in accordance with BS 8491

<sup>5</sup>Power cables meeting the 120 minute survival time when tested in accordance with BS 8491.

4.3 Fire rated cables shall not have a red outer sheath unless used for connection of an Automatic Fire Detection (AFD) system.

4.4 Fire rated cables mounted externally shall have a white outer sheath to avoid UV degradation, unless the manufacturer specifically allows or recommends other colours for use in outdoor applications. (Prysmian for example currently allow black to be used for FP400 and FP600S in external environments).

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|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

4.5 MICC cable shall not be used for any output circuit from an inverter.

Note: Inverter manufacturers do not recommend the use of MICC cables due to capacitance issues.

4.6 Where manufacturer's instructions for equipment specify a wiring system for compliance with the EMC Directive, this shall be used unless there is an overriding technical reason not to.

4.7 Switchgear, i.e. switch fuses, bus bars, switches, fuse boards etc. shall be of a reputable manufacture and comply with appropriate British or IEC Standards and be appropriate to the type of installation proposed.

## 5.0 Design

5.1 The wiring installation design shall be carried out by the electrical installer from loading and other relevant information such as layout and wiring connection diagrams supplied by Colt. It is the responsibility of the installer to obtain all relevant information to inform that design decision.

5.2 Selection of the wiring system and cables employed shall be by the Colt engineer, taking into account any client specification. This shall be specified in the Colt quotation to the client and in the electrical schematic drawings.

NOTE: Any subsequent change to the system type at the client's instruction shall be at the client's cost.

5.3 For calculation purposes, the design ambient temperature shall be taken as 30°C unless advised otherwise by the Colt engineer.

5.4 Where a supply is taken from a switch or other outlet provided by the client, the voltage drop calculation shall include the cable from this point back to the mains intake position and the current taken by any other equipment on this line.

5.5 The voltage drop to any point on the system from the mains intake position shall not exceed the recommended voltage drops set out in BS7671. This will be dependent on the equipment used.

5.6 Protective conductor (earth wire) in conduit shall not be less than 2.5mm<sup>2</sup>.

5.7 All switchgear shall be suitable for the fault levels present at the point in the system where they are installed.

5.8 Motor fuses required on shaft system is Motor Protection Circuit Breaker MPCB. HRC type BS88 in use in system other than shaft and where specified.

5.9 All equipment installed in hazardous areas shall be selected to comply with ATEX regulations.

## 6.0 General Installation

6.1 General

|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

6.1.1 All installation shall be carried out to a good commercial standard by competent personnel to the satisfaction of the Colt engineer and client's own electrical inspector (where appointed).

6.1.2 Before commencing installation, confirmation must be received in writing from client or main contractor that the proposed load can be accepted into the system. Values of fault level and earth loop at the start of the Colt installation must be provided or measured.

6.1.3 Equipment shall be fitted in position as specified in layout and connection diagrams by Colt. Ensure that the current version of all drawings is used.

6.1.4 Thermostats, smoke detectors, CO detectors or similar equipment shall be sited in the specific positions indicated on drawings to ensure correct system operation.

Where thermostats or temperature sensors are to be mounted on external walls or building steel work they shall thermally insulated from the structure.

Where low voltage sensors are fitted these shall be wired in screened cable unless otherwise indicated in the manufacturer's instructions.

Thermostats, temperature sensors and CO sensors should be mounted at a nominal 1.5m above floor level unless specified by the Colt engineer.

Smoke, heat or fire detectors should be ceiling mounted unless otherwise specified.

If positions are not shown on drawing, these must be obtained from the Colt engineer in writing. Any changes to location must be agreed by the Colt engineer prior to commencement.

6.1.5 Cables, unless laid loose in conduit or horizontal containment, shall be straight and parallel.

6.1.6 Fixings shall be sufficient with spacing not exceeding that laid down in BS 7671 and/or manufacturer's instructions.

6.1.7 All terminals shall be fitted within sealed enclosures appropriate to local conditions. Minimum IP40. Minimum IP55 if external.

6.1.8 Where flexible/LSOH sheathed cables are brought into enclosures / trunking / conduit, entry shall be via a compression gland rated to equal or exceed the enclosure IP rating.

6.1.9 All cables shall be installed strictly to manufacturer's recommendations, including all recommended fixing spacings, metal clip/tie spacings, bend radii, connectors, terminations, suppressors, jointing methods, etc.

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|  | Colt Technical Specification |                        |                       |                    | No: 1947 |       |
|-----------------------------------------------------------------------------------|------------------------------|------------------------|-----------------------|--------------------|----------|-------|
|                                                                                   | Title:                       | Electrical Site Wiring |                       |                    | Mod.     | Issue |
| Category<br>X                                                                     | Owner<br>R. Diaper           | Checked<br>T. Waters   | Accepted<br>R. Diaper | Date<br>22/09/2020 | -        | 09    |

6.1.10 All cores shall be identified in relation to their terminations and all multicore cables shall have a unique reference at both ends, fixed to the outer sheath. So far as is reasonably practicable, wiring shall be so arranged or marked that it can be identified for inspection, testing, repair or alteration. Any bare conductors shall be suitably sleeved with the appropriate colour as prescribed in table 51 (BS7671).

6.1.11 Where holes are made in the building fabric, these shall be made good upon completion of wiring installation. Where the construction is fire resisting an approved sealing method shall be used to maintain the fire resistance of the construction.

6.1.12 'Danger' and other appropriate warning labels shall be fitted where required. Warning Notices and labels shall include:

- Voltage Warning.
- Isolation Notice.
- Periodic test & Inspection Notice.
- Earthing and Bonding Connections
- Non-standard Colours (alterations to existing)
- Alternative Supplies Warning Notice.

6.1.13 Isolators shall be fitted as required by regulations and:

- a. Where more than one supply enters a piece of equipment, all supplies (including control circuits) in excess of 48 Volts shall be switched by one common isolator.
- b. Every heater, fan or other similar equipment shall have means of isolation.
- c. All isolators shall be capable of accepting a padlock to lock the isolators in the off position.
- d. Semi-conductor devices (solid state switches) may not be used as isolators.
- e. Fused spurs or plugs and sockets may be used to isolate low power equipment. These shall not include switches. NOTE: Switches are likely to be misused.

6.1.14 All distribution systems shall include fuse charts specifying circuit description, fuse type, manufacturer and size.

6.1.15 Cables to Weatherbeater sensing heads and similar low current sensors shall be run in separate conduits and/or screened from mains cables. Requirements for particular items shall be checked with suppliers of the equipment. (Minimum size 16/0.5mm<sup>2</sup>).

6.1.16 Extra low voltage (ELV) circuits shall be segregated from normal mains voltage circuits and equipment unless the insulation is rated to that of the highest voltage in the adjacent cables. Cables rated for ELV may be used, but these cables require sleeving where they enter mains equipment. This sleeving may not be coloured yellow/green.

|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

6.1.17 The use of flying leads with flameproof motors should be avoided. The motor should be wired to a suitable terminal box mounted externally on the fan casing by the fan manufacturer.

6.1.18 All terminals shall be retightened before final closing of enclosures.

6.1.19 All unused holes in electrical enclosures shall be properly blanked to the appropriate standard, minimum IP 40 internal, IP55 external. All lids and stop ends shall be fitted to trunking boxes.

6.1.20 All damage to surface finish shall be made good with appropriate paint, including exposed conduit threads.

## 6.2 Powered Smoke Ventilation

6.2.1 Installations shall comply with all relevant parts of section 6.1 as well as with this section. The requirements of this section are more detailed in some areas than those of BS 9999. The requirements of BS 9999 may be accepted as an alternative, if specified by the client.

6.2.2 Circuits of safety services shall be selected in accordance with Chapter 56 (BS7671), BS5819, EN 12101-10.

Circuits for safety services must be independent of other circuits so that any electrical fault or any intervention or modification in one system must not affect the correct functioning of the other.

6.2.3 HRC fuses shall be used in suitable high temperature holders to provide cable overload and short circuit protection. It will be necessary, as well as carrying out normal voltage drop calculations, to first size the fuse to carry motor starting current and then check to ensure that the cable is large enough to be protected against overload by that fuse

NOTE: This is because the motors are not fitted with overload protection and are run to destruction to obtain maximum operating time under emergency conditions.

6.2.4 Magnetic MCB are acceptable as an alternative to HRC fuses but thermal MCB units shall not, in any circumstances, be used to protect smoke and heat exhaust ventilators.

6.2.5 Independent primary and secondary power supplies shall be provided to BS8519. These shall be kept separate up to an automatic transfer switch (ATS) which should be located in or close to the Colt control panel. The power supplies shall conform to the requirements of BS 9999. The ATS shall conform to the requirements of BS EN 60947-6. Where required, the ATS should be fitted with a bypass in accordance with BS 8519.

|                                                                                   |                                     |                             |                              |                           |                 |              |
|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

NOTE: All cabling and connections providing power up to the ATS or a local junction box are normally by others.

- 6.2.6 All cables (from the building supply intake through to the ventilators) shall comply with 4.2.
- 6.2.7 All smoke ventilation wiring circuits shall be regarded as Category 3 Circuits to BS 7671. Where this is not possible, such as the thermal cut-out on the motor, arrangements shall be made to isolate these circuits under hazard conditions. Colt control panels are arranged to provide this feature.
- 6.2.8 Wiring systems including cables shall be supported in such a way that they will not be liable to premature collapse in the event of a fire. Steel or copper clips, saddles or ties suitably spaced, in accordance with the manufacturer's instructions, are examples that will meet this requirement. Non-metallic cable clips or ties shall not be used as the sole means of support, although may be used for supplementary support or to dress cables on metallic cable tray/ basket.
- 6.2.9 Isolators fitted at the extract ventilator position shall be lockable in both off and on positions and be temperature rated to match the fan rating. If no suitable isolator is available to match the fan fire rating the isolator should be located outside or in a protected area, but not mounted onto the fan or duct or in the smoke discharge path.
- 6.2.10 Junction boxes shall be metal with ceramic terminals, where required.

### 6.3 Natural Smoke Ventilation

- 6.3.1 Electrical systems for power/pressure to open (PTO) and drive open/drive closed ventilators shall comply with Sections 6.1 and 6.2.
- 6.3.2 Electrical systems for PTC ventilators shall comply with section 6.1. They shall also comply with section 6.2 if it is required that ventilators outside the fire zone remain closed under fire conditions.

NOTE: pressure to close (PTC) natural smoke ventilators will fail to the open position in case of control failure and therefore the electrical requirements are less onerous.

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|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
|  | <b>Colt Technical Specification</b> |                             |                              |                           | <b>No: 1947</b> |              |
|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

#### 6.4 OPV

6.4.1 Power cable to smoke ventilators controlled by the OPV system shall comply with the requirements of section 6.2 or 6.3.

6.4.2 Data cable is SELV (17 - 28 Vdc). Equipment is daisy chain connected to the control panel.

OPV data cable should be screened or be separated from power cables.

6.4.3 Data cable for smoke control systems shall be fire resistant. See 4.2 for suitable cable specification.

NOTE: 1.5 mm<sup>2</sup> cable is normally suitable for up to 1.25km with 126 devices on Apollo systems.

6.4.4 6.4.4 RS 485 connection cable to fireman's override panels is SELV (24 Vdc). 4 core & screen (as 4.2. c) is recommended.

NOTE: The cable does not need to be separated from power cables (if suitably voltage rated). 1.5 mm<sup>2</sup> cable is normally suitable for up to 650m with 8 fire override panels (at 100 mA each).

#### 7.0 Testing

7.1 Every electrical installation shall, during erection and on completion before being put into service, be inspected and tested to verify, so far as reasonably practicable, that the requirements of the current regulations have been met. Including:

- a. Inspection, as per section 642 (BS7671)
- b. Continuity of conductors
- c. Insulation resistance
- d. All fan installations shall have the insulation resistance tested with isolators both in the "On" and "Off" positions.
- e. During the above tests all low voltage electronic equipment must be disconnected.
- f. Testing shall be carried out with all lids/covers in place and the system completed.
- g. All networks addresses shall set and clearly marked on the equipment.
- h. All networks addresses will be tested and verified by the installer.
- i. All test equipment should be calibrated with calibration certification available upon request.
- j. A schedule of circuit details and test results must be used to record the above results.
- k. All required details must be established in order that an electrical installation certificate can be issued on completion.

#### 8.0 Commissioning

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|-----------------------------------------------------------------------------------|-------------------------------------|-----------------------------|------------------------------|---------------------------|-----------------|--------------|
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|                                                                                   | <b>Title:</b>                       | Electrical Site Wiring      |                              |                           | <b>Mod.</b>     | <b>Issue</b> |
| <b>Category</b><br>X                                                              | <b>Owner</b><br>R. Diaper           | <b>Checked</b><br>T. Waters | <b>Accepted</b><br>R. Diaper | <b>Date</b><br>22/09/2020 | -               | 09           |

- 8.1 All smoke and heat ventilation systems, and other systems where necessary, shall be commissioned on completion by a Colt commissioning engineer following the relevant Colt commissioning guidance and procedures. Commissioning should not commence until the relevant circuits have been completed, inspected and tested and the relevant electrical certificate and supporting test sheets issued.
- 8.2 Upon completion of commissioning, all lockable switches and isolators shall be padlocked into the 'on' position.
- 8.3 Attendance by the electrician who carried out the wiring may be required for the first day of commissioning.

## 9.0 Documentation

- 9.1 Full documentation as required by BS 7671 shall be provided in duplicate (one copy for client, one copy for Colt retention) immediately on completion of the wiring and testing. This documentation is required for contract completion.
- 9.2 9.2 Documentation shall include:
- relevant electrical certificate
- 9.3 This shall include, or be accompanied by, sufficient information to allow the system design and installation to be checked for compliance with the regulations and to allow for design modifications at a later date if required, i.e. line diagram with cable sizes, fuse size and type, unit type and currents, drawings showing as installed wiring routes.