



N & S SOLUTIONS PVT. LTD.

No: 37-38, Reliable Residency.

1st Main, 8th Cross, HSR Layout,

Harlur Bangalore – 560102

Website: www.nssolutions.in

E- mail : sales@nssolutions.in

NSSPT PART NO: NS1060.01 FIRELINK-25

RDSO SPEC. NO: RDSO/2008/CG-04(REV-5)

NS-HOCHIKI FDS SYSTEM

INSTALLATION AND MAINTENANCE MANUAL FOR NS-HOCHIKI FDS SYSTEM FOR TRAIN 18 COACHES (TC, MC, NTDC, DTC)

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DOC No: NSSPT/INSTALLATION&MAINTENANCE MANUAL/T18-002

PREPARED BY : M.G.D-Sr QAP

APPROVED BY :K.S.S.K-Dir-D.S



CONTENTS

PAGE NO

1 : ABSTRACT-----	1
2 : BLOCK DIAGRAM-----	2
3 : WIRING CHART-----	3
4 : INPUT & OUTPUT TERMINATION-----	4
5 : CONTROL PANEL DRAWING-----	5
6 : CONSEALED SAMPLING NOZZEL DRAWING-----	6
7 : HASP (HEAT ACTIVATED SAMPLING POINT) DRAWING-----	7
8 : LAYOUT DIAGRAM FOR TC COACH-----	8
9 : LAYOUT DIAGRAM FOR MC COACH-----	9
10 : LAYOUT DIAGRAM FOR NTDC COACH-----	10
11 : LAYOUT DIAGRAM FOR DTC COACH-----	11
12 : INSTALLATION PROCEDURE-----	12-15
13 : MAINTENANCE SCHEDULE-----	16-18
14 : REQUIRED TOOLS FOR INSTALLATION AND COMMISSIONING-----	19-20
15 : REQUIRED TOOLS FOR MAINTENANCE-----	21
16 : NOTES-----	22

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1: Abstract:

The aspirating smoke detector (ASD) is one of the most critical pieces of equipment for detecting smoke in a protected area when a fire occurs. It has more advantages than a conventional smoke detector because it can be used in extreme conditions, such as cold storage facilities or hot aisle containment areas.

ASD uses a fan to draw air from the protected area into the pipe network system via pipe holes. The sucked air is transported into the sensing chamber to detect smoke. If the obscuration in the sensing chamber is greater than the set point, the ASD will sound an alarm so that people realize there is a fire. For this reason, investigating the effect of the pipe hole network on obscuration in the ASD is critical. In this study, a Pipe Hole Network Program was developed to consider the pipe flow parameter.

A numerical study based on the program and an experimental study was performed. The results showed that the numerical results had the same trend as the experimental study.

The further the location of the fire source was, the lower the obscuration was. In addition, the correlation between the obscuration parameter and the fire source distance was also derived. It could be used to predict the fire source location in the aspirating smoke detection system.

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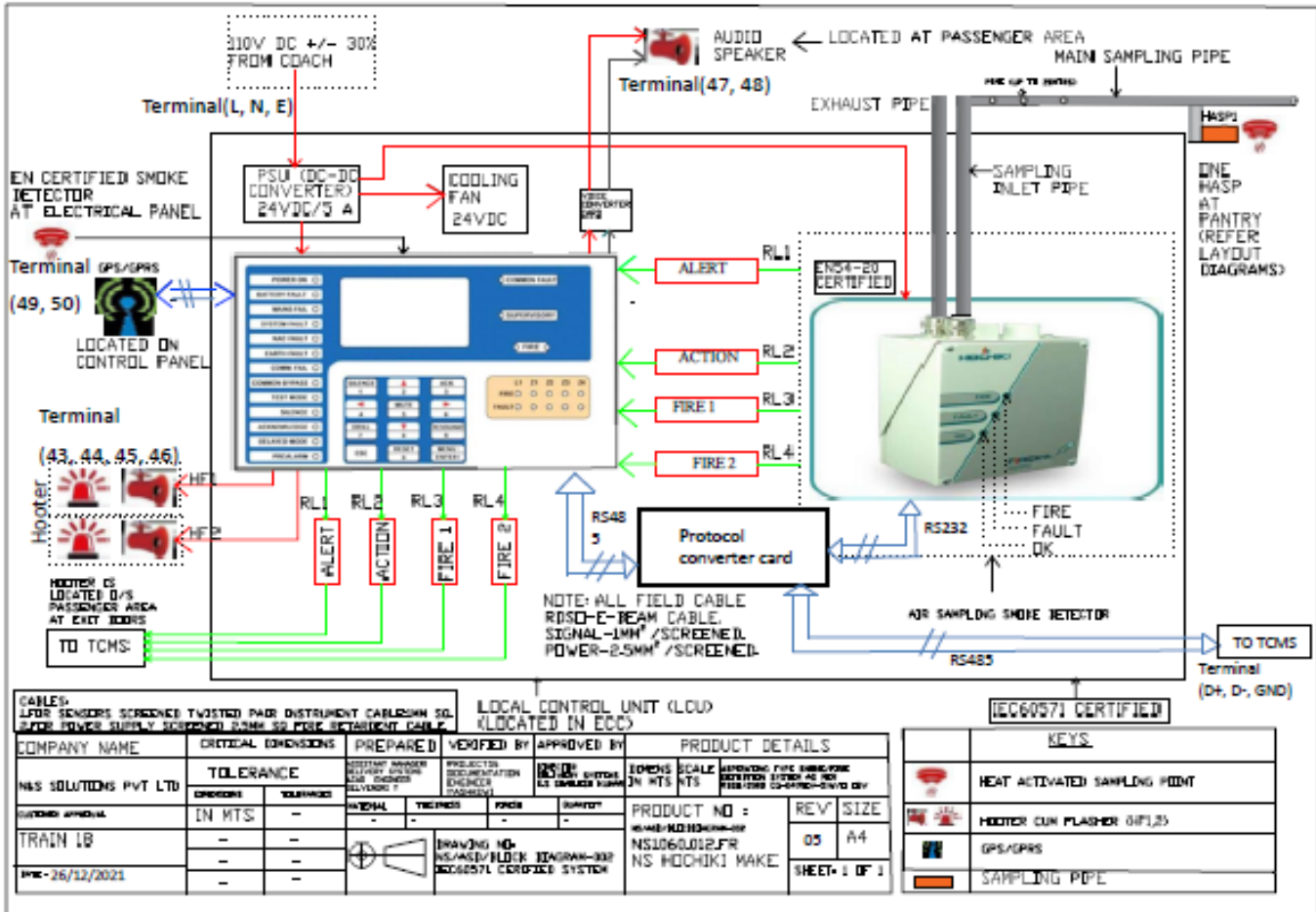
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2: BLOCK DIAGRAM



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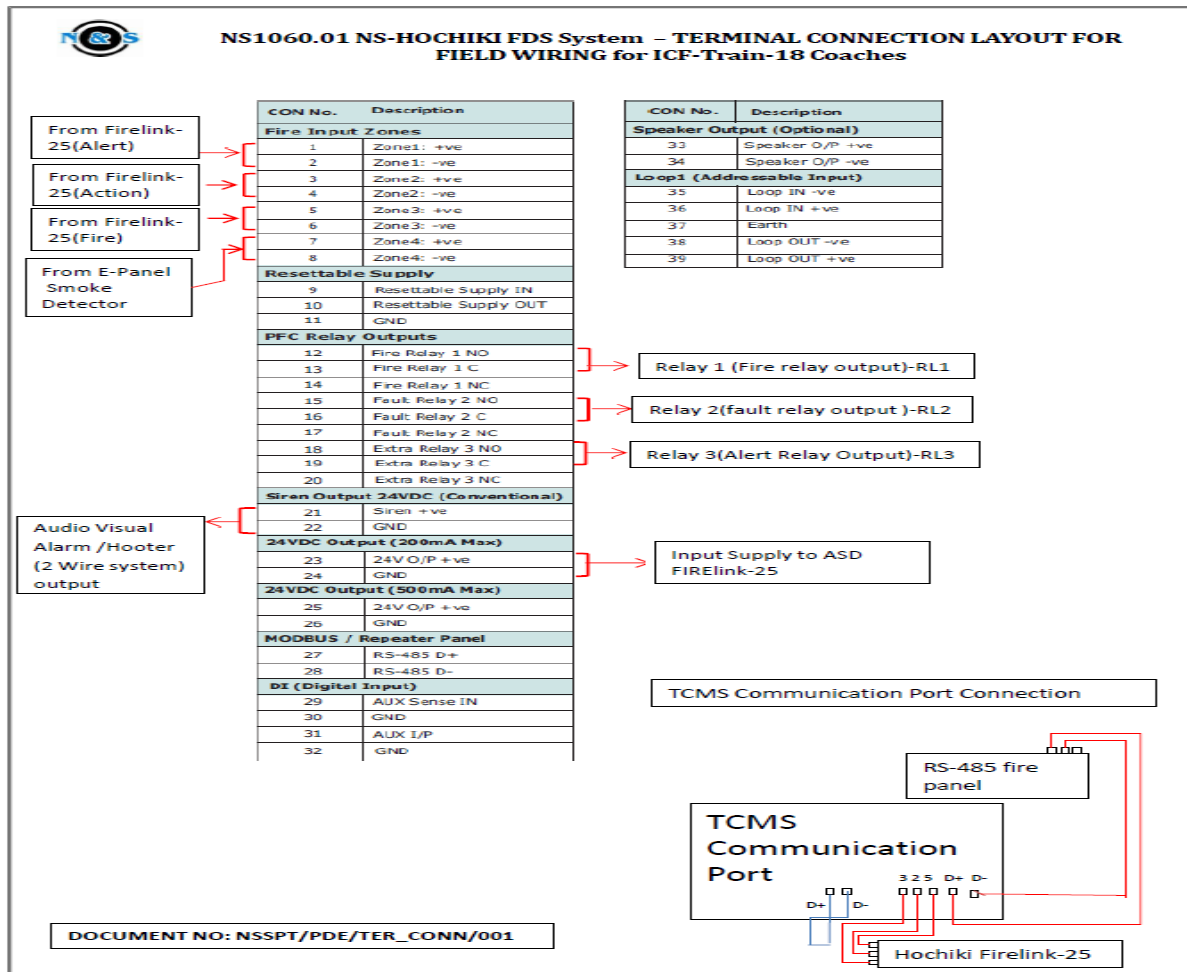
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3: WIRING CHART



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4: INPUT AND OUTPUT TERMINATION

SL NO	ASD External Interface	Source			Destination			Wiring Details
		Terminal Connection/Components	Terminal /Pin No	Signal Name	Terminal Connection/Components	Number on terminals	Signal Name	
1	Control Panel To Flasher Hooter 1	Control Panel wago Terminal	21	FH1(+)(RED)	Direct Termination through lugs	43	FH1(+)(RED)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
			22	FH1(-)(BLACK)		44	FH1(-)(BLACK)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
2	Control Panel To Flasher Hooter2	Control Panel wago Terminal	21	FH2(+)(RED)	Direct Termination through lugs	45	FH2(+)(RED)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
			22	FH2(-)(BLACK)		46	FH2(-)(BLACK)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
3	Control Panel To Audio Announcement	Control Panel wago Terminal	3	SP(+)(Red)	Direct Termination through lugs	47	SP(+)(Red)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
			4	SP(-)(Yellow)		48	SP(-)(Yellow)	2C X 1.0 mm 2 Twisted Pair EBEAM Cable Length As Required
4	RS485 MODBUS	Control Panel wago Terminal	D+	RS1	TCMS			
			D-	RS2				
			GND	RS3				
5A	RL1	Control Panel wago Terminal	35	ALT 1				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
			36	ALT2				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
5B	RL2	Control Panel wago Terminal	37	ACT1				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
			38	ACT2				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
5C	RL3	Control Panel wago Terminal	39	FR1				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
			40	FR2				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
5D	RL4	Control Panel wago Terminal	41	FR3				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
			42	FR4				2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
6	Smoke Sensor	Control Panel wago Terminal	29	SS1	Direct Termination through lugs	49	SS1(RED)	2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required
			30	SS2		50	SS2(BLACK)	2C X 1.0 mm2 Twisted Pair EBEAM Cable Length As Required

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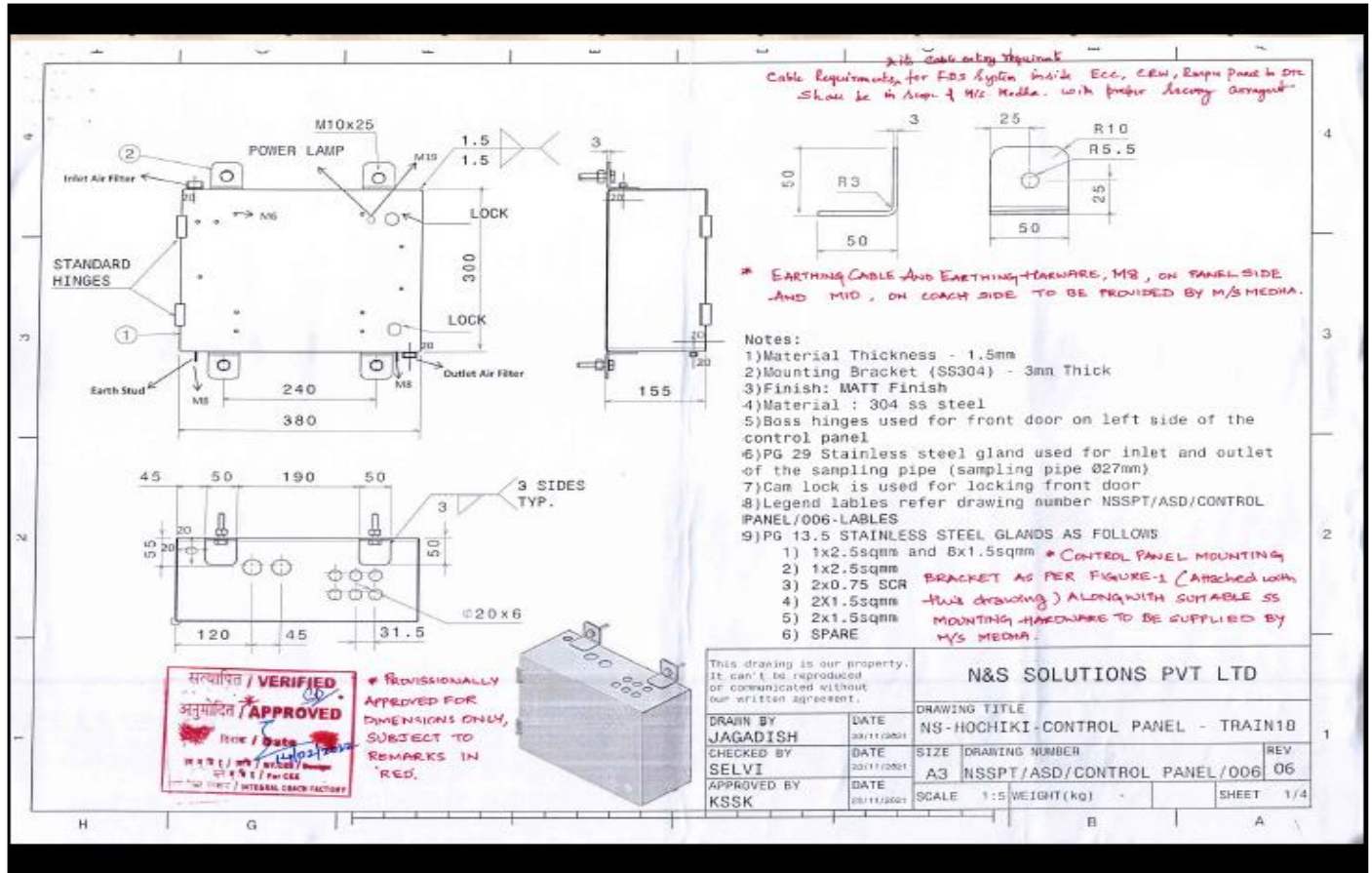
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5: CONTROL PANEL DRAWING



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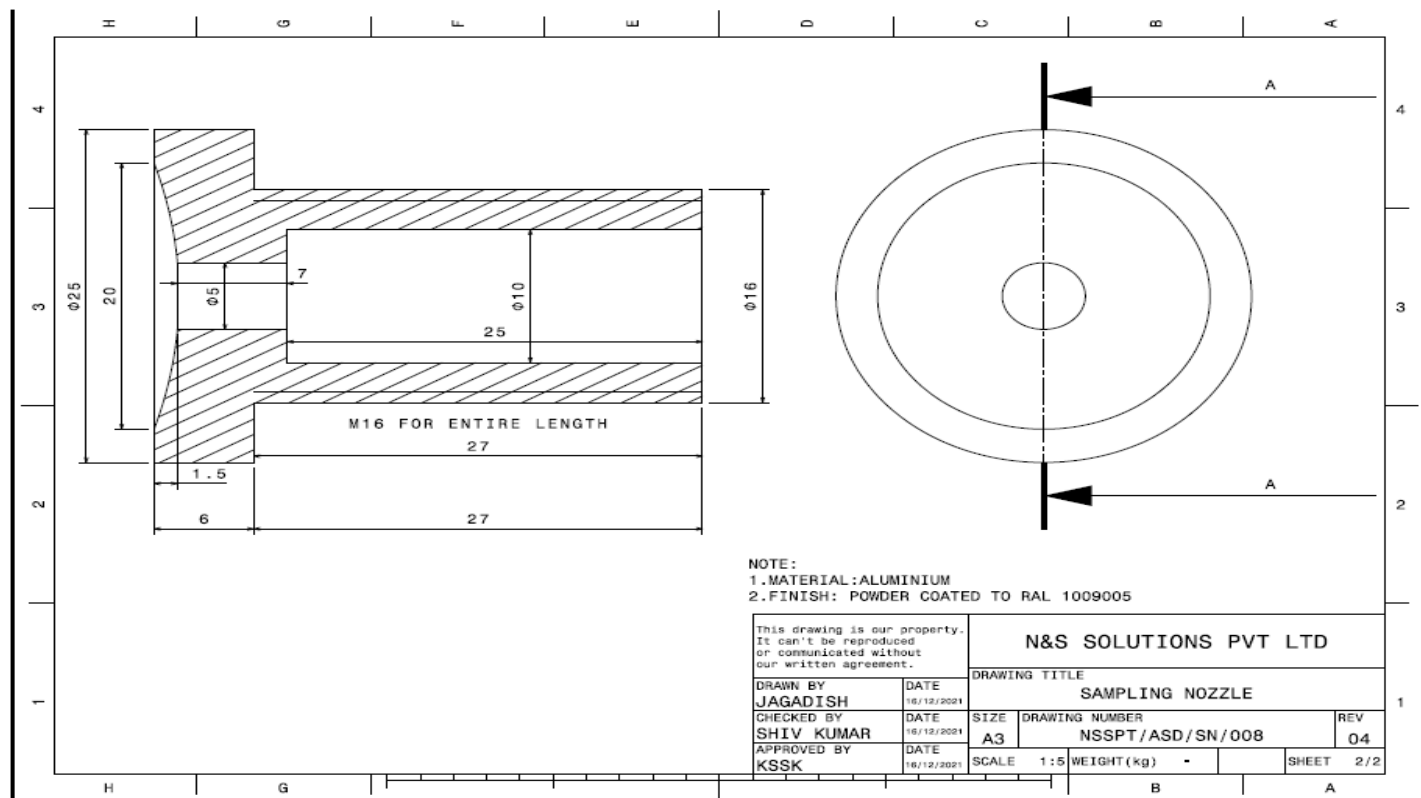
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6: CONCEALED SAMPLING NOZZEL DRAWING



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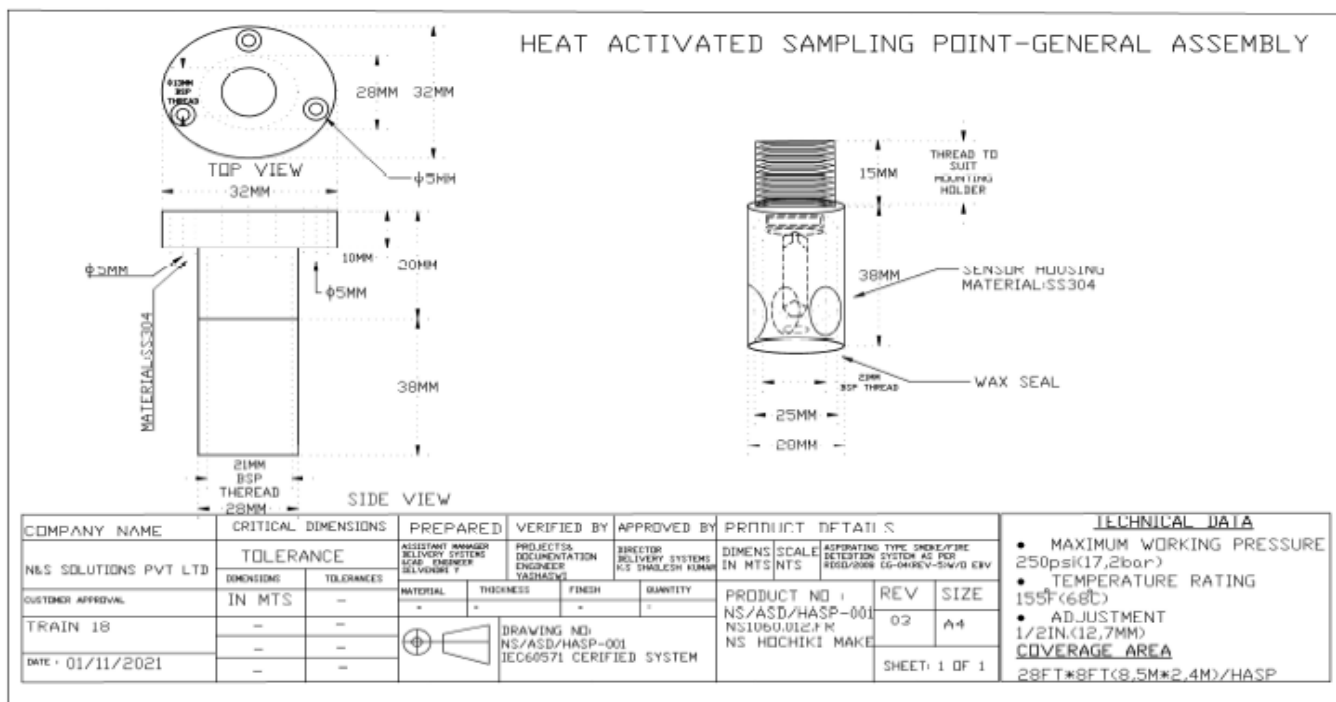
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7: HASP (HEAT ACTIVATED SAMPLING POINT) DRAWING



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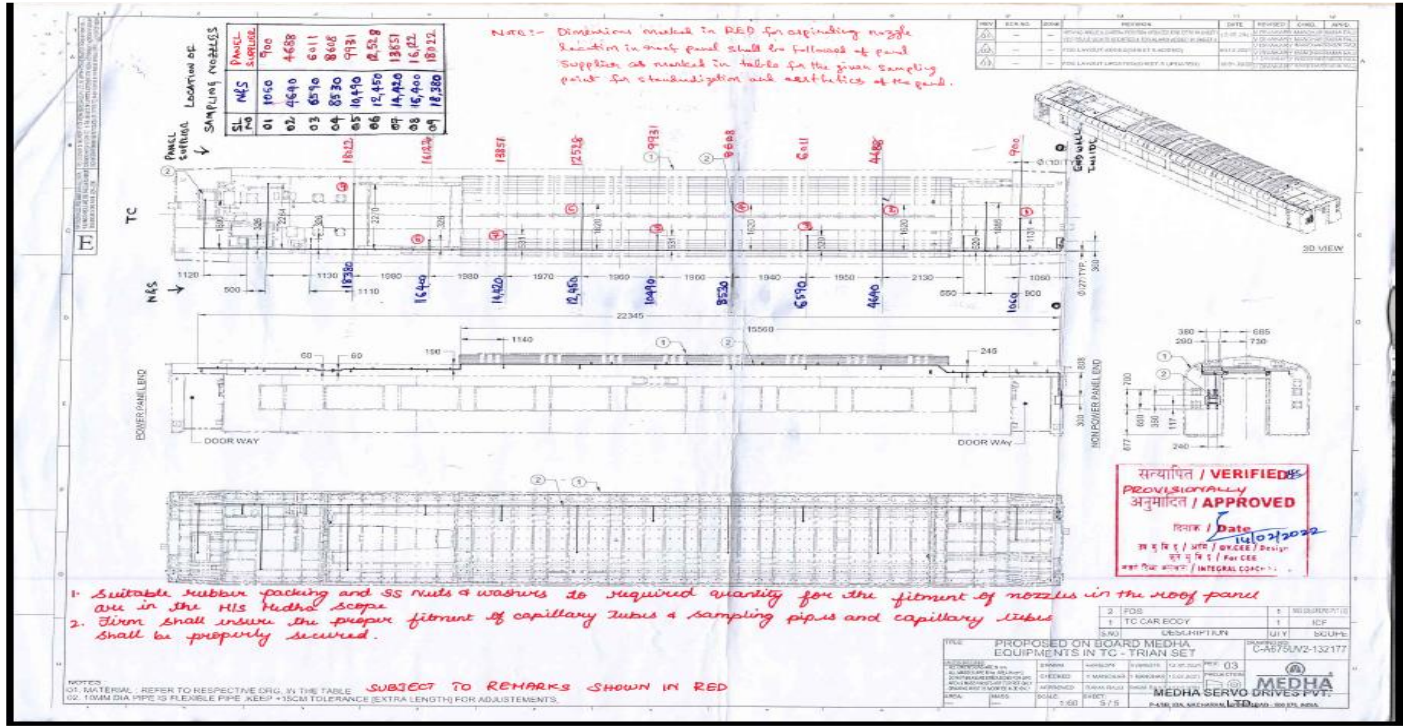
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8: LAYOUT DIAGRAM FOR TC COACH



- Aspirating Sampling Points (Non-Visible) :11
- Aspirating Sampling Points (Visible) : 2
- Heat activated sampling points : 1

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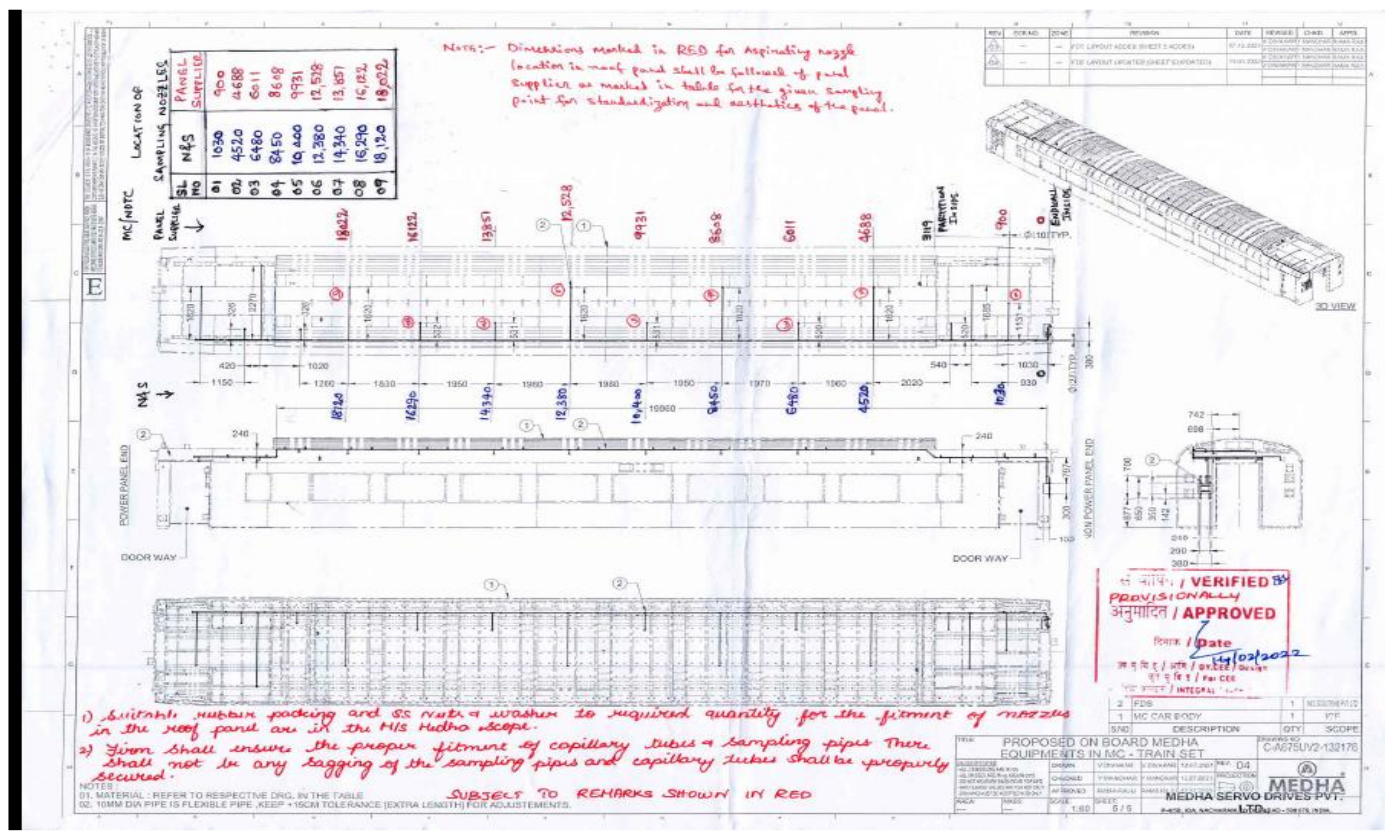
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9: LAYOUT DIAGRAM FOR MC COACH



Aspirating Sampling Points (Non-Visible) :11

Aspirating Sampling Points (Visible) : 2

Heat activated sampling points : 1

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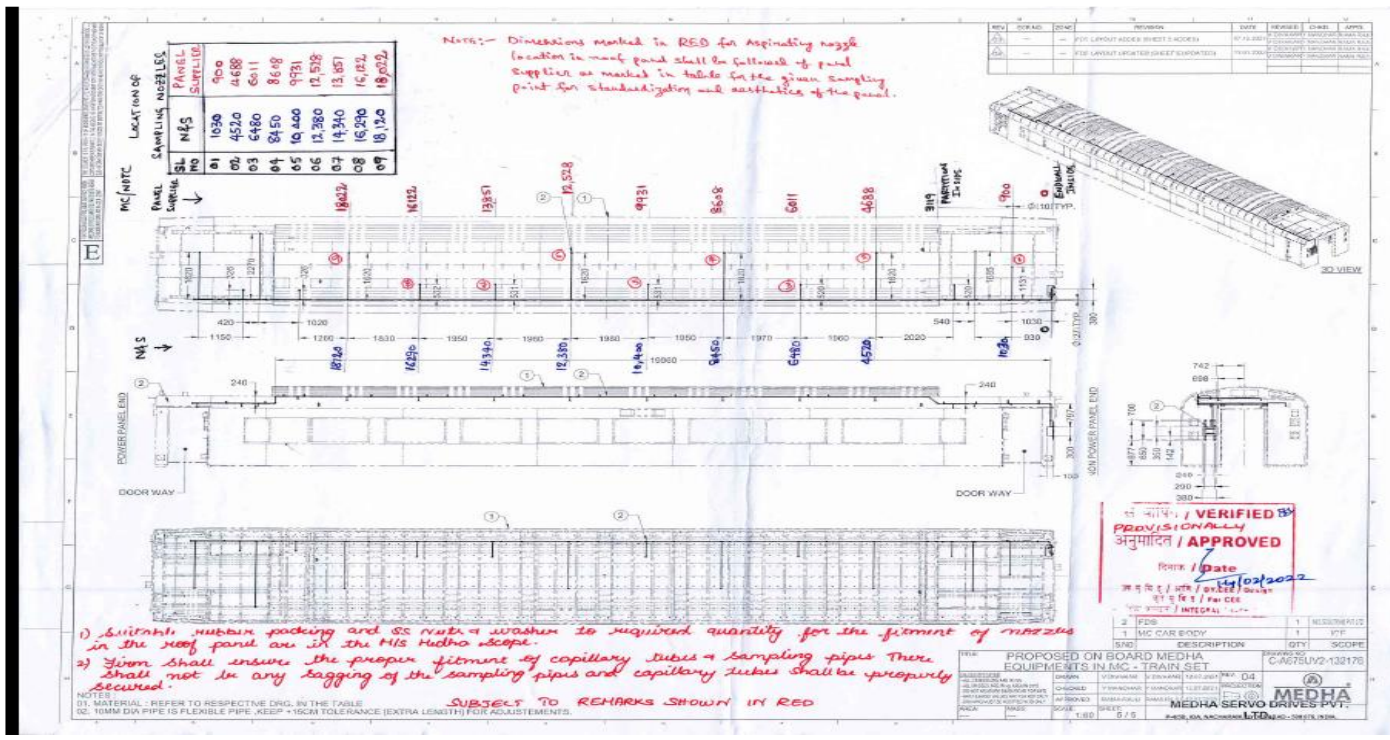
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10: LAYOUT DIAGRAM FOR NTDC COACH



Aspirating Sampling Points (Non-Visible) :11

Aspirating Sampling Points (Visible) : 2

Heat activated sampling points : 1

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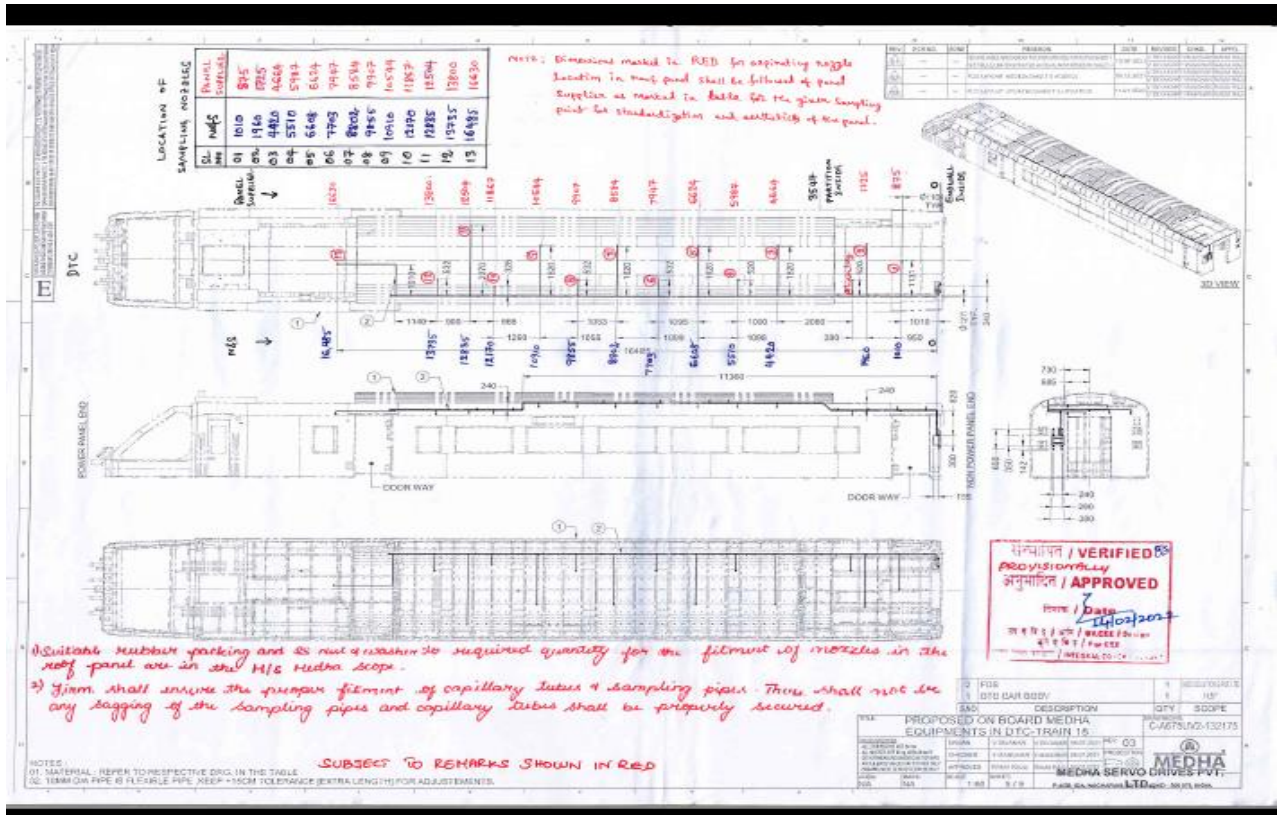
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11: LAYOUT DIAGRAM FOR DTC COACH



- Aspirating Sampling Points (Non-Visible) :13
- Aspirating Sampling Points (Visible) : 1
- Heat activated sampling points : 1

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12: INSTALLATION PROCEDURE

General Description: The aspirating smoke detector draws air from the protected area using a network of sampling pipes. The sampled air is then passed through a high sensitivity detector for analysis and alarm indications raised when required. Aspirating systems are ideal for use in areas where early warning is critical or where individual smoke detectors offer a limited service, such as:▪Areas of limited access where the installation of and/or maintenance of individual detectors may be difficult (tunnels, ventilation systems, excessively high areas etc.).▪Areas so large that protection with individual detectors would require an extremely expensive installation (commercial centres, storage areas etc.

12.1 INSTALLATION GUIDE FOR CONTROL PANEL

12.1.2 Fixing the Control panel to the wall

The panel must be installed in a clean, dry place free from vibrations with a temperature between 0° and 60° C. The relative humidity must not exceed 95%. There should be no condensation. The panel should be installed where the risk of fire is minimal and the place is protected by the fire detection system. Risk of mechanical damage must be avoided. Fix the panel to the wall at an approximate height of 1.5 metres from the floor, in a place with easy access. The panel LED indicators should be at eye-level. Do not perforate the panel in places other than those indicated. Avoid dropping shavings or pieces of removed casing inside the panel as this may damage the electronic circuits. The ventilation outlet in the base of the panel housing must not be blocked or obstructed. Ensure the panel installation provides a minimum space of 10cm beneath the outlet to ensure proper ventilation of the panel.

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Control Box Dimensions and Weight

a) Dimensions

- 1: Height - 300±1
- 2: Width - 380±1
- 3: Depth - 155±1

b) Weight:18KG

12.2 Pipe Network Installation

Read the following carefully before attempting installation of the pipe network.

The pipe network will require:

- 1 x set of standard pipe lengths (25mm diameter) with sampling holes. Pipe lengths and sampling holes will depend on the type of installation used.
- 1 x set of standard pipe fittings (25mm diameter) and accessories (Elbows, T-Joints, Connectors, C Clamps etc.).

12.2.1 Design and installation guidelines

- The pipe network is best installed in the same area as the detector panel to avoid pressure differences.
- The pipe used should be CPVC Pipe.
- Each sampling hole should monitor an area no larger than 30m².
- The distance between sampling holes should not exceed 5m.
- The pipe network must be airtight - leaks will affect the accuracy and performance of your system.
- Variable sampling hole sizes (with the smallest holes closest to the detector panel) are used to ensure uniform air sampling across the pipe length / protected area. The actual diameter of each sampling hole is defined by the number of sampling holes used in the system.
- Pipe network sampling holes are critical to detector sensitivity: hole size and spacing guidelines for each type of installation should be followed carefully to ensure maximum performance from your system.

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Specification of Sampling Pipe:

- 1: Pipe Length - 25 mtr per Coach
- 3: Capillary Tube Length - 2 or 2.5 mtr per one Sampling point

12.2.2 Air Flow Checking in Sampling Holes

Check all sampling points by giving the pneumatic air through the sampling pipe.

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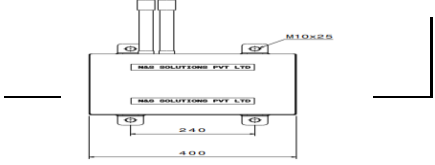
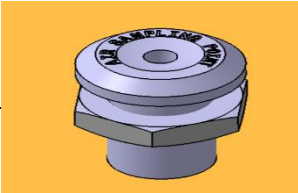

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12.3 FITMENT CHART FOR THE INDIVIDUAL PARTS OF ASD SYSTEM

ITEM OF ASD SYSTEM	Fasteners	QTY	REFERENCE DRGS /PICTURES /DATA SHEET
CONTROL PANEL	SS304 M10x25 (BOLT & NUT)	4	
SAMPLING NOZZLE PRESS FIT /ADHESIVE	SUPREME ADHESIVE	TYPICAL	
AUDIO/VISUAL ALARAM	SS304 -M3- SELF TAPING SCREWS	2	

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13: MAINTENANCE SCHEDULE

In ASD, there are 2 different parts of maintenance schedule. mentioned as bellows,

- a) Maintenance of Control Panel
- b) Maintenance of Sampling Nozzles

13.1 Maintenance of Control Panel

General Cleaning: NS Make Control Panel is basically SS Material, we can easily clean outer side of the control panel by using cotton cloth with IP liquid. Inside of the control panel we should clean by using air blower.

Technical Maintenance:

- a) Check Power LED is Glowing or Not
- b) Check SMPS
- c) Check any Cable burning is there or Not
- d) Check PCB Condition
- e) Check HOCHIKI FIRELINK-25 Condition
- f) Check Functional Condition of the system

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13.2 Maintenance of Sampling Nozzles

General Cleaning: NS Make ASD System having a 25 mtr Sampling pipe with minimum 12 sampling points. Sampling nozzles having a very small hole. We should maintain carefully that is nothing can go inside the nozzle. Simply check all Nozzles hole are open or not.

Technical Maintenance:

- a) Check all Sampling holes by Giving Smoke
- b) Find Which sampling Hole is not open and take Hole Suction Gun or Air Compressor Gun for Cleaning the Blockage Nozzle

13.3 Maintenance of HOCHIKI FIRELINK-25

FIRElink-25 is a very low maintenance detection system. If required, external cleaning of the unit should be performed using a damp (not wet) cloth. Do not use solvents as these may mar the front panel label. The only part that may require field replacement during servicing is the dust separator assembly. The dust separator condition can be checked using the Dust Separator test in the Miscellaneous tab of the remote software 'Detector settings' screen which gives a percentage reading of dust separator efficiency. When this level drops to 80% the detector will signal a fault and the dust separator will need replacing. To replace the filter, simply remove the front cover and pull the filter out from the main unit. Slide the replacement filter in so that the 'Direction of flow' arrow printed on the carton duplicates that on the 'Direction of flow' label beside the filter slot.

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As dust contained in the dust separators may expose maintenance personnel to a 'Nuisance Dust 'hazard as defined by the 'Control of Substances Hazardous to Health '(COSHH), it is strongly recommended that suitable masks and protective clothing be worn when changing filters.

Used separators are not intended for re-use and should be disposed of.

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14: REQUIRED TOOLS FOR INSTALLATION AND COMMISSIONING

14.1 Required tools for Installation

- 1)Spanners-14-15,16-17,18-19
- 2)Star Screw Driver
- 3)Minus Screw Driver
- 4)Axel Blade with Frame
- 5)Cutting Tool with Blades
- 6)Drilling Gun with Different Bits
- 7)Measuring Tape
- 8)Measuring Scale
- 9)Vernier Callipers
- 10)Wrench Set

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14.2 Required tools for Commissioning

- 1)Laptop with CLASSIFIRE Software-1 no
- 2)RS 485 To USB Converter for HOCHIKI FIRELINK Calibration-1 no
- 3)PICKIT for PCB Calibration-1 no
- 4)Artificial Smoke – 1 Pack
- 5)Multimeter-1 no
- 6)230v – 6V Stepdown Transformer- 1 no
- 7)Anemometer-1 no
- 8) PVC -Coated Wire - Length: 800mm, Thickness: 0.3mm, Cross section area of conductor 0.078mm²- 1 no
- 9) Stop Watch-1 no
- 10) Hot Plate-Min 2KW, Temp-500 Deg Max-1 no
- 11)Digital Thermometer with probe-1 no
- 12)Measuring Tape-1 no

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15: REQUIRED TOOLS FOR MAINTENANCE

a) NS HOLE SUCTION GUN-WET



b) NS HOLE SUCTION GUN-DRY



c) NS MINI AIR COMPRESSOR-DRY CLEAN



Above Tools Required for cleaning the sampling holes.

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