Harnett COUNTY NORTH CAROLINA

Emergency Services Department
www.harnett.org

Reviewed for Fire Code Compliance
Harnett COUNTY
Leslie Jackson
01/29/2024 8:53:34 AM

Application for Plan Review

Application # _____-_____

Date Received: _____ **Received By:** _____

Name of Project: Armtec Defense Contracting

Physical Address of Project: 608 East McNeil St

Lillington, NC _____

Plans Submitted By: BFPE International

Project Phone: (_____)-_____-_____

Contact Person/Address: BFPE International

Brian S. Donnelly, PE

Contact Email: bdonnelly@bfpe.com

Contact Phone: (919)-550-2699 (_____)-_____-_____

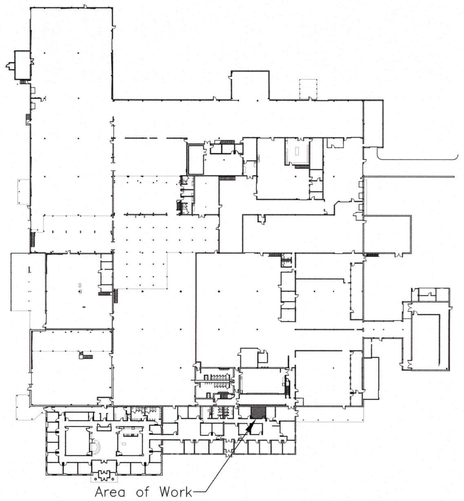
Contractor's Name/Info: BFPE International

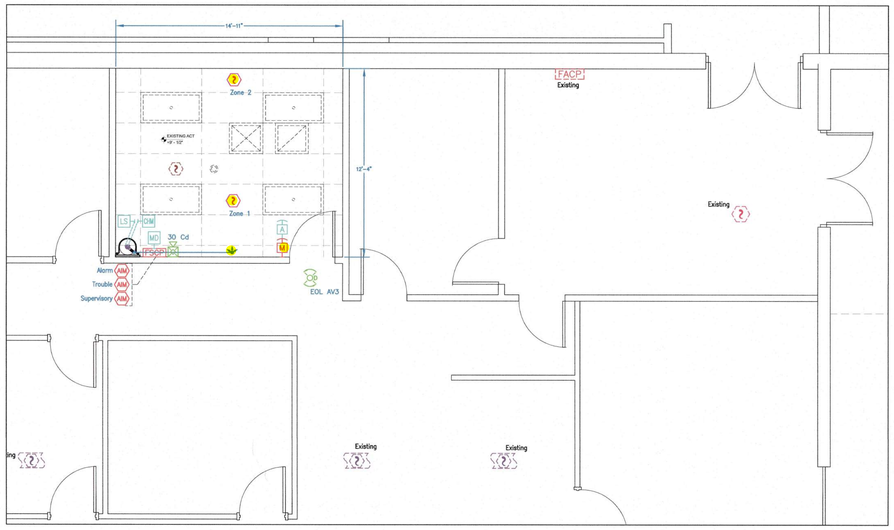
115 Bestwood Drive

Clayton, NC 27520

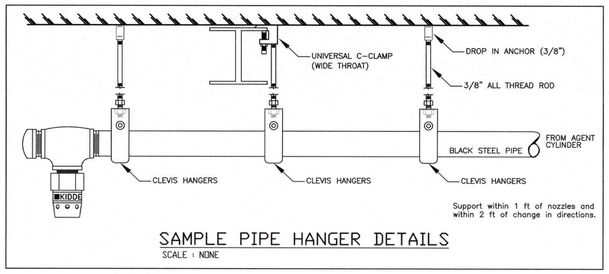
Contractor's Phone: (919)-550-2699

- Plans that are submitted will be reviewed as quickly as possible with an average time of review between 7-10 working days.
- Status checks may be conducted on plan reviews by visiting the website http://hteweb.harnett.org/Click2GovBP/Index.jsp or by calling the Harnett County Central Permitting Office (910-893-7525, Option #2), or the Harnett County Fire Marshal's Office (910-893-7580).
- Approved plans must be picked up from the Central Permitting Office and all fees paid before any required inspections can be conducted.

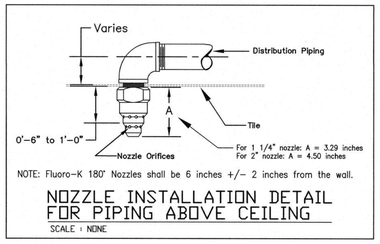




SYSTEM LAYOUT
SCALE: 1/4" = 1'-0"



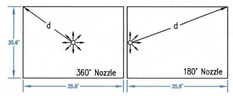
SAMPLE PIPE HANGER DETAILS
SCALE : NONE



NOTE: Fluoro-K 180° Nozzles shall be 6 inches +/- 2 inches from the wall.

NOZZLE INSTALLATION DETAIL
FOR PIPING ABOVE CEILING
SCALE : NONE

KIDDE FLUORO-K™ NOZZLE LIMITATIONS



Nozzle Type	"d" Dimension	Height Range
180°	39.8'	12" to 16'
360°	25.2'	12" to 16'

SOURCE: KIDDE FLUORO-K™ ECS 500 psi SERIES MANUAL
PN: 06-237585-001 PAGE 3-13
MAXIMUM HAZARD AREA COVERAGE
N.T.S.

LEGEND

	Agent Cylinder
	180° Discharge Nozzle – in/on Ceiling
	360° Discharge Nozzle – Above Ceiling System
	Agent Distribution Pipe – on/above Ceiling
FSCP	Suppression System Releasing Panel
	Photoelectric Smoke Detector
M	Manual Releasing Pull Station
A	Abort Switch
MD	Maintenance Disconnect Switch
LS	Cylinder Supervisory Low Pressure Switch
CHM	Electric Control Head w/ Monitor
	Releasing Solenoid Valve
xx Cd	Alarm Horn/Strobe – Candela As Noted
	Suppression System Discharge Light – ceiling mount
RL	Relay, Conventional (24 Volt)
FACP Ex	Fire Alarm Control Panel (Existing)
Existing	Photoelectric Smoke Detector (Existing)
Existing	Duct Detector (Existing)

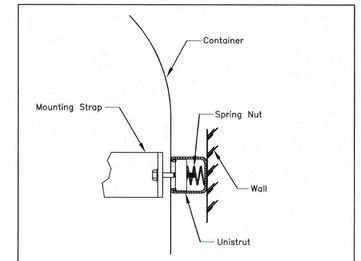
5' 0' 5' 10'

GRAPHIC SCALE
SCALE: 1/4" = 1'-0"

FLUORO-K™ PARAMETERS

Hazard	Server Rm	Temperature – at discharge	70 °F
Below Ceiling Height	9'-0.5"	Conc. – Minimum (Class C)	4.52%
Above Ceiling Height	4'-7.5"	Room Area – Sq. ft.	184.0
Fluoro-K™Required – Room	68.6 lbs	Volume added for duct	n/a
Fluoro-K™Supplied – Room	74.0 lbs	Total Vol. – cu. ft.	1,663.0
Fluoro-K™Required – Above	n/a	Discharge Time – Maximum	10.0 sec
Fluoro-K™Supplied – Above	n/a	Total Agent Supplied	74.0 lbs
Structural Strength Used	8 lb/ft	Relative Humidity	34 %
Required Outflow Leakage Area	0.1 ft²	Required Inflow Leakage Area	0.4 ft²

*See sheet FA301 for calculations.



CONTAINER MOUNTING DETAIL
SCALE : NONE

ENCLOSURE INTEGRITY NOTES

SEALING OF THE ENCLOSURE IS TO BE DONE BY OTHERS. BFPE INTERNATIONAL IS NOT RESPONSIBLE FOR THE LOSS OF FIRE EXTINGUISHING AGENT DUE TO IMPROPER ENCLOSURE INTEGRITY.

THIS ENCLOSURE IS TO BE SEALED BY MEANS INCLUDING (BUT NOT LIMITED TO):

1. WALLS MUST EXTEND FROM THE SLAB BELOW A RAISED FLOOR TO THE OVERHEAD DECK AND BE SEALED AT BOTH DECKS. ALL CRACKS, HOLES, AND PENETRATIONS LEADING OUT OF THE PROTECTED ENCLOSURE MUST BE SEALED.
2. ** WHERE WALLS DO NOT EXTEND TO THE OVERHEAD DECK AND THE CEILING IS NOT SOLID GYPSUM BOARD, VINYL-FACED GYPSUM CEILING TILES SHALL BE USED.
3. BLOCK WALLS MUST BE PAINTED WITH A MINIMUM OF 2-3 COATS OF PAINT.
4. WINDOWS SHOULD HAVE SILICONE SEALING PLACED AROUND THE GLASS AND AROUND THE FRAME.
5. DOORS MUST BE WEATHER-STRIPPED AND BE EQUIPPED WITH A DROP SEAL. BRUSH TYPE SEALS ARE GENERALLY NOT ADEQUATE. DOUBLE DOORS MUST HAVE AN ASTRAGAL SEAL. DOORS NORMALLY KEPT OPEN SHALL BE SELF-CLOSING AND BE EQUIPPED WITH A PANEL ACTUATED MAGNETIC RELEASE
6. BULKHEADS MUST BE IN PLACE BELOW DOORS WHERE THE RAISED FLOOR CONTINUES OUT OF THE PROTECTED ENCLOSURE. BULKHEADS MUST BE CAULKED AND SEALED AT BOTH LOWER SLAB AND UNDER RAISED FLOOR TILES. THE FLOOR TILES ABOVE THE BULKHEAD MUST BE OF GAS TIGHT CONSTRUCTION.
7. CEILING TILES ARE SUGGESTED TO BE CLIPPED AT A RADIUS OF 10'-0" AROUND NOZZLES (MIN).
8. FLOOR DRAINS MUST HAVE TRAPS WITH WATER IN TRAPS AT ALL TIMES.
9. EMPTY CONDUITS MUST BE SEALED AND ALL DUCTWORK AND DAMPERS SHOULD BE TIGHT FITTING.
10. ALL DAMPERS SHALL BE NEO-PRENE SEALED, POWERED OPEN FIRE/SMOKE DAMPERS.
11. ALL SEALING MATERIALS SHALL HAVE SAME FIRE RATING AS REQUIRED FOR WALL CONSTRUCTION.

FLUORO-K™ ECS-500 GENERAL PIPING NOTES

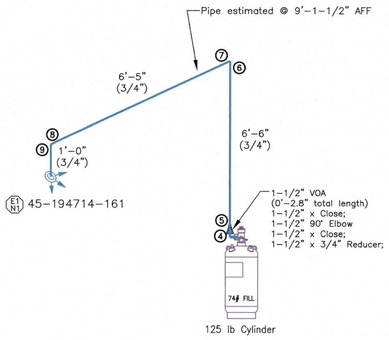
1. THE PIPING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 2001. PIPE FITTINGS SHALL COMPLY WITH STRENGTH REQUIREMENTS IN NFPA 2001.
2. NO CHANGES SHALL BE ALLOWED IN THE PIPE LAYOUT UNLESS APPROVED BY BFPE INTERNATIONAL.
3. MINIMUM WORKING PRESSURE OF COMPONENTS SHALL E 600 PSI.
4. MATERIALS:
   A. PIPE:
      SCHEDULE 40 BLACK PIPE CONFORMING TO ASTM A-53 SEAMLESS OR A-106, GRADE A OR B.
   B. FITTINGS:
      TO BE 300 LB. CLASS MALLEABLE OR DUCTILE, ANSI B-16.3 BLACK THREADED UP THRU 3 INCH PIPE. TO BE 1,000 LB. DUCTILE OR FORGED STEEL FITTINGS SHALL BE USED ON ALL LARGER SIZES.
      CUT-GROOVE FITTINGS ARE ACCEPTABLE WITH A MINIMUM RATING OF 620 PSIG WORKING PRESSURE. CLASS 150 LB AND ALL ORDINARY CAST IRON FITTINGS SHALL NOT BE USED.
5. ALL PIPE REDUCTION MUST BE MADE USING CONCENTRIC REDUCERS. REDUCING BUSHINGS SHALL NOT BE USED.
6. PIPE LENGTHS GIVEN ARE FROM CENTER TO CENTER OF FITTINGS.
7. ALL PIPE SECTIONS BEFORE AND AFTER A TEE SHALL BE A MINIMUM OF 10 PIPE DIAMETERS TO THE NEXT FITTING.
   EXCEPT: BACK TO BACK NOZZLES IN THE SAME HAZARD AREA.
8. ALL PIPE SHALL BE BLOWN CLEAR, AND SWABBED WITH SUITABLE SOLVENTS TO REMOVE BURRS AND CUTTING OIL BEFORE ASSEMBLY.
9. ALL PIPE TO BE RIGIDLY SUPPORTED BY U.L. HANGERS. PIPE HANGERS SHALL BE SPACED AS INDICATED IN THE CHART, NOT TO EXCEED 15 FEET.

PIPE HANGERS

1. ALL PIPE HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH ASME B31.1 AND FSSA PIPE DESIGN HANDBOOK.
2. ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMAN LIKE MANNER. HANGING PIPES FROM OTHER PIPES, MECHANICAL, OR ELECTRICAL DEVICES SHALL NOT MECHANICAL, CHEMICAL, VIBRATION, OR OTHER DAMAGE.
3. ALL PIPING SHOULD BE SECURELY SUPPORTED WITH DUE ALLOWANCE FOR AGENT THRUST FORCES, THERMAL EXPANSION AND CONTRACTION, AND SHOULD NOT BE SUBJECTED TO MECHANICAL, CHEMICAL, VIBRATION, OR OTHER DAMAGE.
4. ALL PIPING MUST BE SOLIDLY ANCHORED TO WALLS, CEILING STRUCTURE, FLOORS, OR COLUMNS WHERE LONGITUDINAL OR LATERAL SWAY MAY OCCUR.
5. RIGID PIPE SUPPORTS ARE REQUIRED AT EACH DIRECTIONAL CHANGE, FITTING, TEE, AND NOZZLE. ALL DROPS TO 180° NOZZLES REQUIRE BACK BRACING IN THE OPPOSITE DIRECTION OF DISCHARGE.
6. "C" CLAMPS AND CONDUIT CLAMPS ARE NOT ACCEPTABLE FOR SUPPORTING ROD HANGERS.
7. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR LINE WITH STEEL PIPE CLAMPS.
8. A PIPE HANGER SHALL BE PLACED WITHIN ONE (1) FOOT OF EACH DISCHARGE NOZZLE.
8. RETAINER STRAPS SHALL BE USED WITH ALL BEAM CLAMPS.
9. MAXIMUM DISTANCE BETWEEN PIPE SUPPORTS.

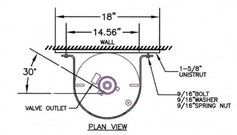
PIPE SIZE	MAX. SPACING (FT)	MIN. ROD DIAMETER
1/2"	7'-0"	3/8"
UP TO 1 1/4"	7'-0"	3/8"
1 1/2"	9'-0"	3/8"
2"	10'-0"	3/8"
2 1/2"	11'-0"	1/2"
3"	12'-0"	1/2"
4"	14'-0"	5/8"

*INFORMATION FROM FSSA PIPE DESIGN HANDBOOK

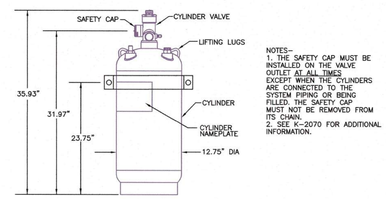


125 lb Cylinder

PIPING ISOMETRIC
SCALE: NONE



PLAN VIEW



NOTES-
1. THE SAFETY CAP MUST BE INSTALLED ON THE VALVE OUTLET AT ALL TIMES EXCEPT WHEN THE CYLINDERS ARE CONNECTED TO THE SYSTEM PIPING OR BEING FILLED. THE SAFETY CAP MUST NOT BE REMOVED FROM ITS CHAIN.
2. SEE K-2070 FOR ADDITIONAL INFORMATION.

MATERIAL:
VALVE BODY: BRASS
CYLINDER: STEEL, PAINTED RED

CYLINDER AND VALVE ASSEMBLY
125 LB. (56.7 KG.) CAPACITY
SCALE : NONE

MARK	REVISIONS:	BY	DATE

Seal

Seal

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028412 ENGINEER BRIAN S. DONNELLY 1/23/24

Clean Agent Fire Suppression System
Armtec Defense Technologies
608 East McNeil Street
Lillington, North Carolina 27546

BFPE INTERNATIONAL
FIRE SAFETY SECURITY
115 BESTWOOD DRIVE
CLAYTON, NC 27520
Ph: 919-550-8699 Web: www.bfpe.com
BFPE International NC Firm License No. O-0205

DRAWN BY: BSD
CHECKED BY:
SCALE: As Noted
SHEET NO. 1 OF 4 SHEETS
DATE: 1-23-24
PROJECT NO: RA-A7132-A-23

Sheet Contents:
Clean Agent Suppression System
System Layout
Mechanical Installation Notes
w/ Piping Isometric

DRAWING NO.:
FP101

Armtec Defense Technologies
608 East McNeil St
Lillington, NC

Fluoro-K™ Suppression System Sequence of Operation Matrix

	SMOKE DETECTOR; FIRST IN ALARM	SMOKE DETECTOR; SECOND IN ALARM	MANUAL PULL STATION; RELEASING	ABORT SWITCH - BUTTON BEING HELD	DISCHARGE COUNTDOWN - BUTTON BEING HELD	MAINTENANCE SWITCH ACTIVATION	TIMER REACHES ZERO	CYLINDER SUPERVISORY LOW PRESSURE SWITCH	CONTROL HEAD MONITOR	TROUBLE CONDITION ON FACP	AC POWER LOSS	GROUND FAULT	OPEN CIRCUIT
ACTIVATE LED ON AEGIS PANEL ALM1, ALM2, OR ALM3 ZONE	X	X											
ACTIVATE LED ON AEGIS PANEL MAN REL ZONE			X										
ACTIVATE LED ON AEGIS PANEL ABORT ZONE				X									
ACTIVATE LED ON AEGIS PANEL SUP1 ZONE						X	X						
ACTIVATE LED ON AEGIS PANEL SUP2 ZONE							X						
ACTIVATE SYSTEM PRE-RELEASE LED ON AEGIS PANEL	X												
ACTIVATE SYSTEM RELEASING LED ON AEGIS PANEL			X		X								
ACTIVATE SYSTEM ALARM LED ON AEGIS PANEL	X	X	X		X								
SEND ALARM SIGNAL TO FACP	X	X	X		X								
ACTIVATE SYSTEM TROUBLE LED ON AEGIS PANEL				X						X	X	X	X
SEND TROUBLE SIGNAL TO FACP				X						X	X	X	X
ACTIVATE SYSTEM SUPERVISORY LED ON AEGIS PANEL					X	X	X	X	X				
SEND SUPERVISORY SIGNAL TO FACP					X	X	X	X	X				
ACTIVATE SUPPRESSION SYSTEM HORN - SLOW PULSING *	X												
ACTIVATE SUPPRESSION SYSTEM HORN - FAST PULSING *		X											
ACTIVATE SUPPRESSION SYSTEM HORN - STEADY TONE *			X		X								
ACTIVATE DISCHARGE LIGHT			X		X								
BEGIN DISCHARGE TIMER COUNTDOWN - 30 SECONDS		X											
PAUSE AGENT DISCHARGE COUNTDOWN AT 10 SECONDS				X									
ACTIVATE SUPPRESSION SYSTEM AGENT RELEASE (10 SEC DELAY)			X										
ACTIVATE SUPPRESSION SYSTEM AGENT RELEASE					X								
PREVENT AGENT DISCHARGE							X						
CLOSE DAMPERS		X	X										

* VISUAL ALARM IS BY EXISTING BUILDING FA HORN/STROBE IN ROOM.

608 East McNeil St
Lillington, Nc

RA-A7132-CA-23
1/24/2024

AEGIS 2.0 Control Panel

Current Draw Required

Device	Quantity	Current	Total Current
Control Panel	1.0	3.2	3.2

AC Branch Current Required (Amps) **3.2**

Regulated Load in Standby

Device Type	Module/System	Current (Amps)	Total Current
AEGIS	1	0.100	0.100
Auxiliary Output 1	1	0.050	0.050
Conventional Detectors	2	0.0001	0.000
Duct Detector, SD2W		0.0002	0.000
		Standby Load Current	*0.150*

Required Standby Time (hours) 48
Standby Amp-Hrs Required **7.208**

AUXILIARY POWER

	Quantity	Standby	Net Current	Alarm	Net Alarm (Amps)
Maintenance Switch	1	0.01	0.010	0.01	0.010
R20E	1	0.04	0.040		0.000
			0.000		0.000
		Total Standby Current	0.050	Total Alarm	0.010
			Alarm Load Available = 1.5 A		LOAD OK

NAC 1

	Quantity	Current (Amps)	Net Current	Alarm Load Available = 1.5 A
ELMTSR (30Cd)	1	0.138	0.138	
	0	0	0.000	
	0	0	0.000	
		Total Current	0.138	LOAD OK

NAC 2

	Quantity	Current (Amps)	Net Current	Alarm Load Available = 1.5 A
	0	0	0.000	
	0	0	0.000	
	0	0	0.000	
		Total Current	0.000	LOAD OK

NAC 3

	Quantity	Current (Amps)	Net Current	Alarm Load Available = 1.5 A
		0	0.000	
		0	0.000	
VSS Light	1	0.096	0.096	
		Total Current	0.096	LOAD OK

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608 East McNeil St
Lillington, Nc

RA-A7132-CA-23
1/24/2024

RELEASE 1

Quantity	Current (Amps)	Net Current
1	0.24	0.240

RELEASE 2

Quantity	Current (Amps)	Net Current
1	0.24	0.240

Regulated Load in Alarm

Device Type	Module/System	Current (Amps)	Total Current
AEGIS	1	0.240	0.240
Auxiliary Output 1	1	0.010	0.010
Relays in use	1	0.020	0.020
NAC 1	1	0.138	0.138
NAC 2	1	0.000	0.000
NAC 3	1	0.096	0.096
RELEASE 1	1	0.2400	0.240
RELEASE 2	0	0.2400	0.000
Conventional Detectors	2	0.0600	0.120
Duct Detector, SD2W	0	0.1000	0.000
		Alarm Load Current (Amps)	*0.864*

Alarm Load Available = 5.4 A Per Power Supply
LOAD OK

Required Alarm Time (MIN) 5
Alarm Amp-Hrs Required **0.072**

SUBTOTAL AMP-HOURS *7.280*
DERATING FACTOR 1.2
TOTAL AMP-HOURS REQUIRED **8.737**

REQUIRED BATTERY SIZE ***12.0 Amp-Hours***

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BATTERY CALCULATIONS

SCALE : NONE

ITEM	QTY	PART NO.	MATERIAL DESCRIPTION	MANU
1	1	45-550121-901	125 lb Fluoro-K™ Cylinder w/ (74 lb Fill)	*KFS*
2	74	n/a	Fluoro-K™	*KFS*
3	1	85-486500-020	Electric Control Head, Stackable, w/ Control Head Monitor	*KFS*
4	1	06-235317-001	125 lb Cylinder Mounting Strap	*KFS*
5	1	06-118262-001	Cylinder Low Pressure Switch	*KFS*
6	1	WK-283904-000	1-1/2" Valve Outlet Adapter	*KFS*
7	1	45-194714-161	3/4" 180° Pendant Nozzle, 0.3008 sq. in.	*KFS*
8	1	85-909300-001	Entrance Warning Sign	*KFS*
9	1	85-909300-002	Exit Warning Sign	*KFS*
10	1	84-878752-010	Abort Switch	*KFS*
11	1	84-732001-901	Aegis 2.0 Agent Release Control Panel	*KFS*
12	1	84-330001-001	Agent Release Pull Station, 3300 Double Action	*KFS*
13	2	KC2-OS-CD	Photoelectric Smoke Detector	*KFS*
14	2	KC2-SB	Detector Base	*KFS*
15	1	06-220023-001	In-Line Releasing Diode	*KFS*
16	1	ELMTSR	Candela Selectable Horn/Strobe, Wall Mount	*Eaton*
17	1	IAVFLM24R	V33 Flashing Incandescent Light	*SpAE*
18	1	IGP1R	Red Plate and Lens	*SpAE*
19	1	GEM MAINT	Keyed Maintenance Switch, 3 Pole	*Gemcom*
20	2	PRB1212	12 AmpHour, 12 VDC Battery	*PRite*
21	1	R20E	24V Relay	*PRite*
22	3	FMM-1	Addressable Monitor Module	*Not*

SIGNS

WARNING

This area is protected by a
Clean Agent Fire Suppression System.
Do not enter area when alarm is sounding.
Area must be purged prior to re-entry.

PART NO. 85-909300-001

WARNING

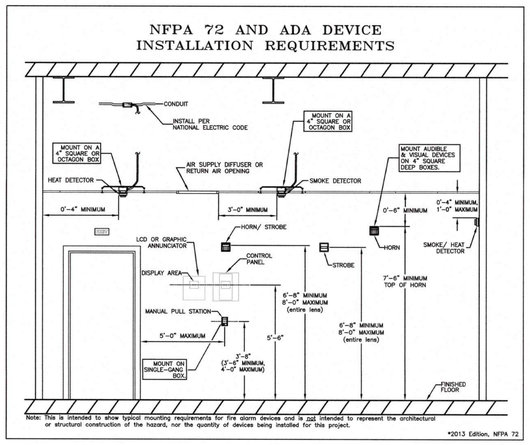
This area is protected by a
Clean Agent Fire Suppression System.
Leave area immediately when alarm sounds.
Do not enter area after
the system is discharge unless purged.

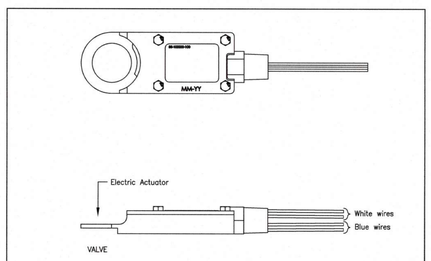
PART NO. 85-909300-002

SIGN NOTES:
1. SEE DATA SHEETS IN SUBMITTAL BOOK FOR EXAMPLES.

Component Sizes

Component	Width (in.)	Height (in.)	Depth (in.)	Junction Box
FSCP	14.25	19	5	n/a
Pull Station	4.25	3.25	1.081	single gang
Abort Switch	4.5	4.5	3.05 total (1.70 contacts)	4" square
Maintenance Switch				4" square
Horn/strobe	4.5	5	2.5	4" square
Discharge Light	1.71	3.33	1.5	single gang





CONTROL HEAD MONITOR INSTALLATION

SCALE : NONE

PROJECT SPECIFIC INSTALLATION NOTES

A.) FLUORO-K 180° NOZZLES SHALL BE 6 INCHES ± 2 INCHES FROM ANY SIDE WALL.

B.) ALL EQUIPMENT MUST BE LABELD AS TO THEIR INTENDED USE AND LABELED FOR THE NOVEC 1230 SUPPRESSION SYSTEM.

C.) VERIFY LOCATIONS OF ALL EQUIPMENT.

D.) THIS CLEAN AGENT FIRE SUPPRESSION SYSTEM IS DESIGNED IN ACCORDANCE WITH NFPA 72(2013), NFPA 2001(2015) AND HAS BEEN DESIGNED USING ALL UL LISTED AND FM APPROVED EQUIPMENT.

E.) ALL PROJECT SPECIFIC NOTES SHALL TAKE PRECEDENCE OVER ANY AND ALL NOTES CONTAINED WITHIN THESE PLANS.

CLASS 'B' WIRING NOTES

1.) ALL WIRING SHALL BE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES, INCLUDING NFPA 72 (2013 EDITION), NEC, AND ADA.

2.) ALL WIRING FROM CONTROL PANEL TO ANY DEVICE SHALL BE RUN IN MINIMUM 1/2" CONDUIT. SURFACE METAL RACEWAY IS ACCEPTABLE. PENETRATIONS IN RATED WALLS SHALL BE MADE IN CONDUIT PER APPROPRIATE U.L. SYSTEM.

3.) DETECTORS ARE TO BE MOUNTED ON A STANDARD 4" OCTAGON BOX, SEE TYPICAL SUBFLOOR MOUNTING DETAILS IF APPLICABLE.

4.) NO PARALLEL BRANCHING OF WIRES ON SUPERVISED CIRCUITS IS PERMISSIBLE, AND POLARITY MUST BE OBSERVED. NO SPLICES SHALL BE MADE OTHER THAN AT TERMINAL BLOCKS. WIRE NUTS AND CRIMP SPLICES SHALL NOT BE PERMITTED.

5.) ALL FIELD WIRING SHALL BE CHECKED FOR SHORTS, OPENS, AND GROUNDS BEFORE CONNECTING TO THE CONTROL PANEL.

6.) A.C. WIRES SHALL BE RUN IN SEPARATE CONDUIT FROM D.C. WIRING, SUCH THAT A SYSTEM ALARM DOES NOT DE-ENERGIZE THE CONTROL PANEL. MINIMUM SIZE WIRE TO BE AWG 12 THHN. PROTECTION AGAINST VOLTAGE TRANSIENTS AND SURGES SHALL BE INSTALLED AT THE ELECTRICAL PANELBOARD AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL AC POWER TO FIRE ALARM EQUIPMENT (i.e. CONTROL PANEL, REMOTE POWER SUPPLY, ETC.) SHALL BE A DEDICATED CIRCUIT.
CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED BY THE SYSTEM TYPE:
i.e. 'FIRE ALARM', 'EMERGENCY COMMUNICATIONS', 'FIRE ALARM/ECS'.

7.) NO POWER, INCLUDING EMERGENCY BATTERY SUPPLY, SHALL BE CONNECTED TO THE CONTROL PANEL UNTIL BFPE INTERNATIONAL'S TECHNICIAN IS ON THE JOB SITE.

8.) SEE MANUFACTURER'S DATA SHEETS FOR MOUNTING DETAILS.

9.) ALL JUNCTION BOX COVERS SHALL BE RED IN COLOR. THOSE IN FINISHED AREAS ARE PERMITTED TO MATCH THE FINISH COLOR.

10.) ALL NON-ADDRESSABLE WIRE SHALL BE AWG 14 MINIMUM SOLID OR STRANDED COPPER, TYPE THHN/THWN.

11.) ALL INITIATING DEVICE CIRCUITS SHALL BE A CLASS "B" PATHWAY AS DEFINED IN TABLE A.12.3 (a) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. THIS CONDITION AS WELL AS A SINGLE OPEN SHALL SIGNAL A TROUBLE CONDITION AT THE FACP AND A SINGLE SHORT SHALL SIGNAL AN ALARM.

12.) THE AUDIBLE EVACUATION SIGNAL SHALL BE THE ANSI S3.41 THREE-PULSE TEMPORAL PATTERN AS DESCRIBED IN NFPA 72.

13.) ALARM NOTIFICATION CIRCUITS SHALL BE A CLASS 'B' PATHWAY AS DEFINED IN TABLE A.12.3 (c) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. A SINGLE OPEN, SINGLE GROUND, OR A WIRE TO WIRE SHORT SHALL SIGNAL A TROUBLE CONDITION AT THE FACP. EACH CIRCUIT SHALL NOT EXCEED ITS RATED OUTPUT. CIRCUITS SHALL NOT EXCEED 3 FLOORS OF COVERAGE.

14.) ALL WIRE COLORS SHALL BE MAINTAINED FROM DEVICE TO DEVICE AND SHALL NOT BE TRANSPOSED NOR CHANGED AT ANY DEVICE OR TERMINAL BLOCK. PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL CONNECTIONS AT THE FACP, OTHER CONTROL EQUIPMENT, POWER SUPPLIES, AND TERMINAL CABINETS.

15.) NOTIFICATION CIRCUIT BOOSTER POWER SUPPLIES OR 24 VDC POWER CIRCUITS SERVING ADDRESSABLE CONTROL RELAYS SHALL BE INDIVIDUALLY MONITORED FOR INTEGRITY.

16.) SPOT TYPE DETECTOR MUST HAVE THE DETECTOR ADDRESS LOOP AND DEVICE NUMBERS PERMANENTLY MOUNTED TO THEIR BASES, SO IT IS READABLE FROM THE FLOOR. THE ADDRESS MUST BE SHOWN ON THE AS-BUILT PLANS.

17.) SMOKE DETECTORS SHALL BE A MINIMUM OF THREE FEET FROM ANY AIR SUPPLY DIFFUSER OR AIR RETURN OPENING.

18.) DUCT DETECTOR SAMPLING TUBES SHALL EXTEND THE FULL WIDTH OF THE DUCT. ANY TUBES EXCEEDING 36 INCHES SHALL PROTRUDE THROUGH THE FAR END AND ANY TUBES EXCEEDING FIVE FEET SHALL BE SUPPORTED IN THE MIDDLE. INSTALL DETECTOR HOUSING AND SAMPLING TUBES PER MANUFACTURER'S RECOMMENDATIONS.

19.) SURGE SUPPRESSORS SHALL BE USED ON A CIRCUIT ANYTIME IT EXITS (OR ENTERS) A BUILDING TO/ FROM THE OUTSIDE.

20.) ALL PENETRATIONS THROUGH RATED WALLS SHALL BE SEALED USING THE APPROPRIATE U.L. SYSTEM.

21.) PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL TERMINATIONS AND SPLICES FOR EVERY CIRCUIT.

22.) DO NOT INSTALL CONDUIT INTO THE BOTTOM OF THE FIRE ALARM CONTROL PANEL(S).

23.) ALL WIRE SHALL BE INSTALLED PER THE WIRE SCHEDULE IN THESE PLANS.

AEGIS PANEL INSTALLATION NOTES

1.) ALL INITIATING/ INPUT CIRCUITS HAVE A MAXIMUM LINE RESISTANCE OF 100 OHMS.

2.) ALL PROGRAMMABLE RELAYS HAVE A RATING OF 3 AMPS AT 30 VDC OR 120 VAC.

3.) TOTAL POWER SUPPLY CURRENT IS 5.4 AMPS.

4.) POWER SUPPLY CAN CHARGE UP TO 68 AMPHOURS AND THE CABINET CAN HOLD UP TO 12 AMPHOURS.

5.) AUXILIARY CONTACTS ARE A MAXIMUM OF 1.0 AMPS AND THE NAC'S ARE A MAXIMUM OF 1.5 AMPS AND A 2 VOLT DROP.

REVISIONS:

MARK	REVISION	BY	DATE

Seal

Seal

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028412 BRIAN S. DONNELLY

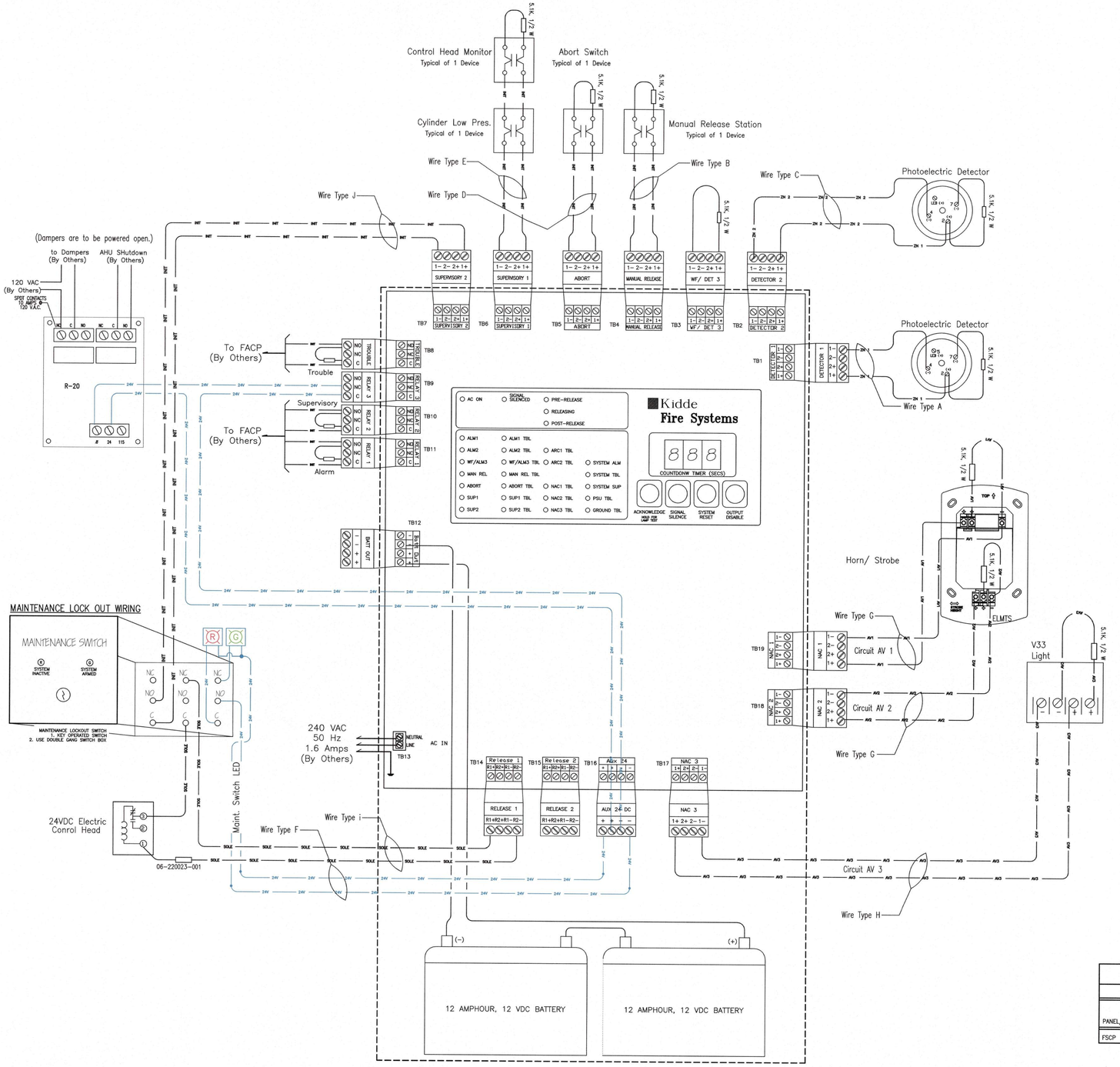
Clean Agent Fire Suppression System
Armtec Defense Technologies
608 East McNeil Street
Lillington, North Carolina 27546

BFPE INTERNATIONAL
FIRE SAFETY SECURITY
115 BESTWOOD DRIVE
CARY, NC 27513
Ph: 919-550-2699 • Web: www.bfpe.com
BFPE International NC Fire License No. D-0205

DRAWN BY: BSD
CHECKED BY:
SCALE: N.T.S.
SHEET NO. 2 OF 4 SHEETS
DATE: 1-23-24
PROJECT NO: RA-A7132-A-23

Sheet Contents:
Clean Agent Suppression System
Electrical Installation Notes
w/ SEQ

DRAWING NO.:
FP201



AEGIS 2.0 FIRE ALARM PANEL
SCALE: NONE

AEGIS CONFIGURATION		
CONFIG No. – 1&2	ITEM	CONFIG. No. – 3
03	AGENT REL CKT 1	05
04	AGENT REL CKT 2	01
05	ABORT BOTH?	02
06	ABORT	01
07	INPUT CKT 3	01
08	REL1	02
09	REL2	04
10	REL3	09
11	TROUBLE RELAY	04
12	MANUAL DELAY ARC1	02
13	MANUAL DELAY ARC2	~~01~~ n/a
14	ARC1 TIME DELAY	04
15	ARC2 TIME DELAY	~~01~~ n/a
16	ARC1 TIME	01
17	ARC1 LIMITED	03
18	ARC2 TIME	~~01~~ n/a
19	ARC2 LIMITED	~~03~~ n/a
20	TROUBLE LATCHING	01
21	SUPV 1 LATCHING	01
22	SUPV 2 LATCHING	01
23	OUTPUTS DISABLED	04
24	NAC1 TO ARC'S	01
25	NAC2 TO ARC'S	01
26	NAC3 TO ARC'S	01
27	NAC1 FIRST ALARM	01
28	NAC1 PRE-RELEASE	03
29	NAC1 RELEASING	07
30	NAC2 FIRST ALARM	07
31	NAC2 PRE-RELEASE	07
32	NAC2 RELEASING	05
33	NAC3 FIRST ALARM	C
34	NAC3 PRE-RELEASE	C
35	NAC3 RELEASING	04
36	NAC USED GENERAL ALARM	08
37	NAC1 GENERAL ALARM	09
38	NAC2 GENERAL ALARM	09
39	NAC3 GENERAL ALARM	09
40	SERIAL CABLE TROUBLE	~~02~~ n/a

SYSTEM BATTERY CALCULATIONS								
	Calculation Basis	Standby time	48 hours	Alarm time	0.084 hours			
PANEL/ P.S.	Standby Load (Amps)	Standby subtotal (AmpHours)	Alarm Load (Amps)	Alarm subtotal (AmpHours)	Secondary Load (AmpHours)	Safety derating factor	Required Battery (AmpHours)	Battery Size Supplied (AmpHours)
FSCP	0.15	7.21	0.86	0.07	7.28	x1.2	8.74	12

WIRE SCHEDULE

Conductor	Description	Wire Size	Wire Type	Wire Color	
				Positive(+)	Negative(–)
A	INITIATING, ZONE 1	14 AWG	THHN STRANDED	RED	BLACK
B	MANUAL RELEASE CIRCUIT	14 AWG	THHN STRANDED	WHITE	RED
C	INITIATING, ZONE 2	14 AWG	THHN STRANDED	WHITE	BLUE
D	ABORT SWITCH CIRCUIT	14 AWG	THHN STRANDED	BLUE	BLACK
E	SUPERVISORY – LOW PRESSURE SWITCH	14 AWG	THHN STRANDED	ORANGE	ORANGE
F	24 VOLT POWER	14 AWG	THHN STRANDED	YELLOW	BROWN
G	NOTIFICATION CIRCUIT – PREDISCHARGE	14 AWG	THHN STRANDED	ORANGE	BROWN
H	NOTIFICATION CIRCUIT – DISCHARGE	14 AWG	THHN STRANDED	YELLOW	GREY
i	AGENT RELEASE CIRCUIT (SOLENOID)	14 AWG	THHN STRANDED	PINK	PURPLE
J	SUPERVISORY – MAINTENANCE SWITCH	14 AWG	THHN STRANDED	YELLOW	YELLOW

ALL CONDUCTORS ARE TAGGED BY LETTER.

REVISIONS:	REVISION	BY	DATE
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NORTH CAROLINA PROFESSIONAL SEAL 028412 ENGINEER BRIAN S. DONNELLY 1-23-24

Clean Agent Fire Suppression System

Armtec Defense Technologies

608 East McNeil Street

Lillington, North Carolina 27546

BFPE INTERNATIONAL
FIRE SAFETY · SECURITY
115 BESTWOOD DRIVE
CARY, NC 27513
Ph: 919-550-2699 • Web: www.bfpe.com
BFPE International NC Firm License No. P-0105

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SCALE: N.T.S.

SHEET NO. 3 OF 4 SHEETS

DATE: 1–23–24

PROJECT NO: RA-A7132-A-23

Sheet Contents:

Clean Agent Suppression System

Detailed Riser

DRAWING NO.:

FP202

Kidde Fire Systems

KFS Hydraulic Flow Calculation Program v4.00
KFS - ECS-500 with Fluoro-K™ Fire Suppression Clean Agent
UL: EX4674 / Component of FM Approved System

BFPE International
115 Bestwood Drive
Clayton, NC 27520
File Name: 7132.FC4

Consolidated Report

Customer Information

Company Name: Armtec Defense Technologies
Address: 608 East McNeil St
Lillington, NC 27546

Phone:
Contact:
Title:

Project Data

Project Name: Server Room
Designer: Brian S. Donnelly, PE
Number: RA-A7132-CA-23
Account:
Location:
Description: Area = 14'-11" x 12'-4" = 183.96 sq. ft.
Vol = 183.96 sq. ft. x 9'-1/2" = 1,663.0 cu. ft.

Enclosure Report

Elevation: 0 ft (relative to sea level)
Atmospheric Correction Factor: 1 (NFPA 2001)

Enclosure 1 Server Room

Enclosure Temperature: Number of Nozzles: 1

Consolidated Report

Minimum: 67 F
Maximum: 73 F
Max. Concentration: 4.92% (At 73 F)

Design Concentration:
Adjusted: 4.86 %
Minimum: 4.52 %
Min. Agent Required: 68.6 lb
Adjusted Agent Required: 74.0 lb
Concentration Profile: UL/FM Class C, (4.52 %)

Width: 0.0 ft
Length: 0.0 ft
Height: 0.0 ft
Volume: 1663.0 ft³
Non-permeable: 0.0 ft³
Total Volume: 1663.0 ft³

Agent Source Report

Agent: Fluoro-K™ Fire Suppression Clean Agent
Cylinder Name: 125 lb Cylinder w/LLI
Cylinder Part Number: 45-550121-901
Agent Per Cylinder: 74.0 lb
Fill Density: 41.4 lb / cubic ft
Number of Main Cylinders: 1
Number of Reserve Cylinders: 0

Cylinder Empty Weight: 98.0 lb
Weight, All Cylinders + Agent: 172.0 lb
Floor Area Per Cylinder: 0.89 ft²
Floor Loading Per Cylinder: 193 lb / ft²

Consolidated Report

Parts Report

Total Agent Required: 74.0 lb

Cylinder Name: 125 lb Cylinder w/LLI (Part: 45-550121-901)

Number of Cylinders: 1

Nozzle	Type	Nozzle Diameter	Nozzle Area	Part Number
E1-N1	180-BR	3/4 in	0.3008 in²	45-194714-161

Pipe & Fittings	Type	Diameter	Length	Elbows (90)	Elbows (45)	Tees	Unions
	40T	3/4 in	13.42 ft	2	0	0	0
	40T	1-1/2 in	0.50 ft	1	0	0	0

Other Objects	Name	Quantity	Part Number
	1-1/2 in. Valve Outlet Adapter	1	WK-283904-000

System Acceptance Report

System Discharge Time: 6.6 seconds
Percent Agent In Pipe: 11.8%
Percent Agent Before First Tee: 0.0%
Dead Volume: 0.0% (0.0 lb)

Enclosure Number: 1
Enclosure Name: Server Room
Minimum Design Concentration: 4.52%
Adjusted Design Concentration: 4.86%
Predicted Concentration: 4.87%

Consolidated Report

Maximum Expected Agent Concentration: 4.92% (At 73 F)
Concentration Profile: UL/FM Class C, (4.52 %)
Maximum Allowed Enclosure Pressure: 8.00 lb / ft²
Estimated Free Vent Area Required (Negative): 0.4 ft²
Estimated Free Vent Area Required (Positive): 0.1 ft²
Installed Vent Area: 0.0 ft²
Predicted Enclosure Pressure (Negative): N/A
Predicted Enclosure Pressure (Positive): N/A
Maximum Enclosure Flow Rate: 14.78 lb/s

Nozzle	Minimum Agent Required	Adjusted Agent Required	Predicted Agent Delivered	Average Nozzle Pressure
E1-N1	68.6 lb	74.0 lb	74.0 lb	187 psig
Total	68.6 lb	74.0 lb	74.0 lb	

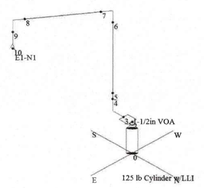
Consolidated Report

Pipe Network Report

Description	Pipe Section	Start Node	End Node	Pipe Type	Pipe Diameter	Pipe Length	Union	Total Elevation Change	Total Equivalent Length	Nozzle Name	Nozzle Size	Nozzle Type	Nozzle Area
Cylinder - On	Man./End	0	2		1-1/2 in	2.67 ft	0	2.67 ft	50.00 ft				
Adapter	System	2	3		1-1/2 in	0.22 ft	0	------	11.80 ft				
Elbow (90)	System	3	4	40T	1-1/2 in	------	0	------	4.30 ft				
Pipe	System	4	5	40T	1-1/2 in	0.50 ft	0	0.50 ft	0.50 ft				
Pipe	System	5	6	40T	3/4 in	6.00 ft	0	6.00 ft	6.00 ft				
Elbow (90)	System	6	7	40T	3/4 in	------	0	------	2.20 ft				
Pipe	System	7	8	40T	3/4 in	6.42 ft	0	------	6.40 ft				
Elbow (90)	System	8	9	40T	3/4 in	------	0	------	2.20 ft				
Pipe&Nozzle	System	9	10	40T	3/4 in	1.00 ft	0	-1.00 ft	1.00 ft	E1-N1	3/4 in	180-BR	0.3008 in²

Consolidated Report

View #: 1 - Isometric View-Node



REVISIONS:	REVISION	BY	DATE
MARK			

Seal

Seal

NORTH CAROLINA PROFESSIONAL SEAL 028412 ENGINEER BRIAN S. DONNELLY 1-23-24

Clean Agent Fire Suppression System

Armtec Defense Technologies
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CHECKED BY:
SCALE: N.T.S.
SHEET NO. 4 OF 4 SHEETS
DATE: 1-23-24
PROJECT NO: RA-A7132-A-23

Sheet Contents:
Clean Agent Suppression System
Calculations

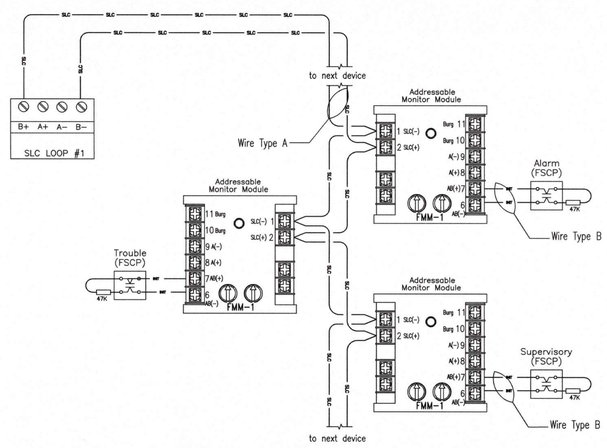
DRAWING NO.:
FP301

All initiating devices are exisitng

Armtec
608 East McNeil St
Lillington, North Carolina

Fire Alarm System Sequence of Operation Matrix

	MANUAL PULL STATION	SMOKE DETECTOR	WATERFLOW SWITCH	TROUBLE CONDITION ON FACP	AC POWER LOSS	GROUND FAULT	OPEN CIRCUIT
ACTIVATE HORN/ STROBES GENERAL ALARM	X	X	X				
DISPLAY DEVICE ACTUATED ON FACP LCD.	X	X	X	X	X	X	X
ACTIVATE SYSTEM ALARM LED ON FACP.	X	X	X				
SEND ALARM SIGNAL TO DIGITAL COMMUNICATOR.	X	X	X				
ACTIVATE SYSTEM TROUBLE ON FACP.				X	X	X	X
SEND TROUBLE SIGNAL TO DIGITAL COMMUNICATOR.				X	X	X	X
ACTIVATE SYSTEM SUPERVISORY ON FACP.			X				
SEND SUPERVISORY SIGNAL TO DIGITAL COMMUNICATOR.			X				
SHUTDOWN AHU			X				



TYPICAL DEVICE WIRING

SCALE: N.T.S.

WIRE SCHEDULE

Conductor	Description	Wire Size	Wire Type	Wire Color	
				Positive(+)	Negative(–)
A	ADDRESSABLE LOOP	16 AWG	TWISTED, UNSHIELDED	RED	BLACK

MINIMUM NOTIFIER WIRE NOTES

THIS CHART IS TO PROVIDE GUIDANCE IN SIZING WIRE BASED ON THE ALLOWABLE LENGTH TO BE USED IF OTHERWISE NOT SPECIFIED.

CIRCUIT TYPE	WIRE TYPE & LIMITATIONS	DISTANCE FT.	TYPICAL WIRE GAUGE
1. SLC LOOP (POWER LIMITED)	TWISTED (UNSHIELDED) PAIR 40 OHMS MAX PER LENGTH OF STYLE 6 AND 7 LOOPS. 40 OHMS PER BRANCH MAX FOR STYLE 4 LOOPS.	8,000 6,000 3,500	12 AWG BELDEN 5020UL, 6020UL 14 AWG BELDEN 5120UL, 6120UL 16 AWG BELDEN 5220UL, 6220UL
	UNTWISTED, UNSHIELDED PAIR	2,000	12–18 AWG
2. EIA–485, ACS TERM (POWER LIMITED)	TWISTED SHIELDED PAIR WITH A CHARACTERISTIC IMPEDANCE OF 120 OHMS.	5,000	18 AWG
2. EIA–232 (PWR LIMITED)	TWISTED SHIELDED PAIR	50	18 AWG
3. MONITOR MODULES	MAXIMUM LOOP WIRE RESISTANCE IS 40 OHMS FOR MONITOR & 20 OHMS FOR MINI MONITOR.	2,500	12–18 AWG – SOLID THHN
3. MONITOR MODULES FOR 2 WIRE SMOKES	MAXIMUM 2.4 VOLT DROP ALLOWED AT END OF CKT. MAX. RESISTANCE IS 25 OHMS	2,500	12–18 AWG – SOLID THHN
4. CONTROL MODULE (POWER LIMITED)	IN ALARM, MAXIMUM OF 1.2 VOLT DROP AT END OF CKT.	TO MEET 1.2V MAX DROP. PERFORM CALCULATIONS	12–18 AWG – SOLID THHN
5. 24VDC POWER RUN (POWER LIMITED)	IN ALARM, MAXIMUM OF 1.2 VOLT DROP FROM SOURCE TO END OF ANY BRANCH.	TO MEET 1.2V MAX DROP. PERFORM CALCULATIONS	12–18 AWG – SOLID THHN
6. CHG–120 OR CHG–75	12 AWG IN CONDUIT	20	12–18 AWG – SOLID THHN

CLASS 'B' (SLC) WIRING NOTES

1.) ALL WIRING SHALL BE IN ACCORDANCE WITH LOCAL AND NATIONAL CODES, INCLUDING NFPA 72 (2013 EDITION), NEC, AND ADA.

2.) ALL WIRING FROM CONTROL PANEL TO ANY DEVICE SHALL BE RUN IN MINIMUM 3/4" CONDUIT. SURFACE METAL RACEWAY IS ACCEPTABLE. FPLP CABLE IS ACCEPTABLE IN AREAS OTHER THAN WHERE WATERPROOF DEVICES ARE REQUIRED. CONDUIT SHALL BE USED TO DROP TO WALL MOUNTED DEVICES AND PENETRATIONS IN RATED WALLS SHALL BE MADE IN CONDUIT PER APPROPRIATE U.L. SYSTEM.

3.) DETECTORS ARE TO BE MOUNTED ON A STANDARD 4" OCTAGON BOX, SEE TYPICAL SUBFLOOR MOUNTING DETAILS IF APPLICABLE.

4.) NO PARALLEL BRANCHING OF WIRES ON SUPERVISED CIRCUITS IS PERMISSIBLE, AND POLARITY MUST BE OBSERVED. NO SPLICES SHALL BE MADE OTHER THAN AT TERMINAL BLOCKS. WIRE NUTS AND CRIMP SPLICES SHALL NOT BE PERMITTED.

5.) ALL FIELD WIRING SHALL BE CHECKED FOR SHORTS, OPENS, AND GROUNDS BEFORE CONNECTING TO THE CONTROL PANEL.

6.) A.C. WIRES SHALL BE RUN IN SEPARATE CONDUIT FROM D.C. WIRING, SUCH THAT A SYSTEM ALARM DOES NOT DE–ENERGIZE THE CONTROL PANEL. MINIMUM SIZE WIRE TO BE AWG 12 THHN. PROTECTION AGAINST VOLTAGE TRANSIENTS AND SURGES SHALL BE INSTALLED AT THE ELECTRICAL PANELBOARD AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL AC POWER TO FIRE ALARM EQUIPMENT (i.e. CONTROL PANEL, REMOTE POWER SUPPLY, ETC.) SHALL BE A DEDICATED CIRCUIT.
CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED BY THE SYSTEM TYPE:
i.e. 'FIRE ALARM', 'EMERGENCY COMMUNICATIONS', 'FIRE ALARM/ECS'.

7.) NO POWER, INCLUDING EMERGENCY BATTERY SUPPLY, SHALL BE CONNECTED TO THE CONTROL PANEL UNTIL BFPE INTERNATIONAL'S TECHNICIAN IS ON THE JOB SITE.

8.) SEE MANUFACTURER'S DATA SHEETS FOR MOUNTING DETAILS.

9.) ALL JUNCTION BOX COVERS SHALL BE RED IN COLOR. THOSE IN FINISHED AREAS ARE PERMITTED TO MATCH THE FINISH COLOR.

10.) ALL ADDRESSABLE LOOP WIRE SHALL BE AWG 16 MINIMUM, LOW CAPACITANCE, TWISTED UNSHIELDED COPPER PAIR. TYPE TO BE FPL, FPLR, OR FPLP SOLID OR STRANDED COPPER. CABLE JACKET COLOR SHALL BE RED (+) AND BLACK (–) CONDUCTOR INSULATION. REFER TO THE MINIMUM WIRE NOTES REQUIREMENTS NOTE TO DETERMINE MINIMUM REQUIREMENTS OF SIZE AND LENGTH.

11.) ALL NON–ADDRESSABLE WIRE SHALL BE AWG 14 MINIMUM SOLID OR STRANDED COPPER, TYPE THHN/THWN.

12.) ALL ADDRESSABLE SIGNALING LINE CIRCUITS SHALL BE A CLASS 'B' PATHWAY AS DEFINED IN TABLE A.12.3 (b) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. THESE CONDITIONS AS WELL AS A SINGLE OPEN, AN OPEN AND GROUND, A SHORT, A SHORT AND OPEN, OR A SHORT AND GROUND SHALL SIGNAL A TROUBLE CONDITION AT THE FACP. NO "T" TAPS SHALL BE MADE.

13.) THE AUDIBLE EVACUATION SIGNAL SHALL BE THE ANSI S3.41 THREE–PULSE TEMPORAL PATTERN AS DESCRIBED IN NFPA 72.

14.) ALARM NOTIFICATION CIRCUITS SHALL BE A CLASS 'B' PATHWAY AS DEFINED IN TABLE A.12.3 (c) OF NFPA 72; WHERE A SINGLE GROUND SHALL NOT PREVENT THE RECEIPT OF AN ALARM AT THE FACP. A SINGLE OPEN, SINGLE GROUND, OR A WIRE TO WIRE SHORT SHALL SIGNAL A TROUBLE CONDITION AT THE FACP. EACH CIRCUIT SHALL NOT EXCEED ITS RATED OUTPUT. CIRCUITS SHALL NOT EXCEED 3 FLOORS OF COVERAGE.

15.) ALL WIRE COLORS SHALL BE MAINTAINED FROM DEVICE TO DEVICE AND SHALL NOT BE TRANSPOSED NOR CHANGED AT ANY DEVICE OR TERMINAL BLOCK. PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL CONNECTIONS AT THE FACP, OTHER CONTROL EQUIPMENT, POWER SUPPLIES, AND TERMINAL CABINETS.

16.) ALL RIGID OR IMC CONDUIT TERMINATING AT SHEET METAL BOXES OR CABINETS SHALL UTILIZE INSULATING BUSHINGS AND DOUBLE LOCK NUTS. EMT CONNECTORS MUST BE STEEL COMPRESSING TYPE WITH INSULATING THROATS.

17.) NOTIFICATION CIRCUIT BOOSTER POWER SUPPLIES OR 24 VDC POWER CIRCUITS SERVING ADDRESSABLE CONTROL RELAYS SHALL BE INDIVIDUALLY MONITORED FOR INTEGRITY.

18.) SPOT TYPE DETECTOR MUST HAVE THE DETECTOR ADDRESS LOOP AND DEVICE NUMBERS PERMANENTLY MOUNTED TO THEIR BASES, SO IT IS READABLE FROM THE FLOOR. THE ADDRESS MUST BE SHOWN ON THE AS–BUILT PLANS.

19.) DUCT DETECTOR SAMPLING TUBES SHALL EXTEND THE FULL WIDTH OF THE DUCT. ANY TUBES EXCEEDING 36 INCHES SHALL PROTRUDE THROUGH THE FAR END AND ANY TUBES EXCEEDING FIVE FEET SHALL BE SUPPORTED IN THE MIDDLE. INSTALL DETECTOR HOUSING AND SAMPLING TUBES PER MANUFACTURER'S RECOMMENDATIONS.

20.) SPOT TYPE SMOKE DETECTORS SHALL HAVE THEIR SENSITIVITIES SET TO NORMAL/MEDIUM UNLESS OTHERWISE DIRECTED BY THE AHJ OR ENGINEER'S SPECIFICATION.

21.) SMOKE DETECTORS SHALL BE A MINIMUM OF THREE FEET FROM ANY AIR SUPPLY DIFFUSER OR AIR RETURN OPENINGS.

22.) SURGE SUPPRESSORS SHALL BE USED ON A CIRCUIT ANYTIME IT EXITS (OR ENTERS) A BUILDING TO/ FROM THE OUTSIDE.

23.) ALL PENETRATIONS THROUGH RATED WALLS SHALL BE SEALED USING THE APPROPRIATE U.L. SYSTEM.

24.) PERMANENT WIRE MARKERS SHALL BE USED TO IDENTIFY ALL TERMINATIONS AND SPLICES FOR EVERY CIRCUIT.

25.) ALL ADDRESSABLE DEVICES SHALL BE LOCATED INSIDE THE BUILDING, NOT OUTSIDE WHERE THEY WOULD BE EXPOSED TO EXTREME TEMPERATURE AND HUMIDITY. (i.e. THOSE WHICH ARE TO MONITOR DEVICES OR PERFORM SHUTDOWNS.)

26.) DO NOT INSTALL CONDUIT INTO THE BOTTOM OF THE FIRE ALARM CONTROL PANEL(S).

27.) ALL WIRE SHALL BE INSTALLED PER THE WIRE SCHEDULE IN THESE PLANS.

28.) PER 23.6 IN NFPA 72, SIGNALING LINE CIRCUITS SHALL BE CONFIGURED SO THAT A SINGLE FAULT ON THE PATHWAY SHALL NOT CAUSE THE LOSS OF MORE THAN 50 ADDRESSABLE DEVICES. REFER TO THE WIRING DIAGRAMS/RISER, PROJECT SPECIFIC NOTES, AND NOTES ON THE LAYOUT SHEETS IN THIS PLAN SET AS DESIGNED TO MAKE SLC INSTALLATION COMPLY WITH THIS NFPA 72 REQUIREMENT.

MARK	REVISION	BY	DATE

REVISIONS

Seal

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NORTH CAROLINA PROFESSIONAL SEAL 028412 ENGINEER BRIAN S. DONNELL

Clean Agent Fire Suppression System
Armtec Defense Technologies
608 East McNeil Street
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SHEET NO. 1 OF SHEETS
DATE: 1-23-24
PROJECT NO: RA-A7132-A-23

Sheet Contents:
Fire Alarm System
Electrical Installation Notes

DRAWING NO.:
FA101

A WOMAN OWNED BUSINESS

7512 CONNELLEY DRIVE ⁂ HANOVER, MD 21076
410-768-2200 ⁂ 800-966-2212 ⁂ FAX 410-768-5649

CHESAPEAKE, VA
757-436-1301 ⁂ 800-394-2373
FAX 757-436-3176

CLAYTON, NC
919-550-2699 ⁂ 800-849-8886
FAX 919-550-0719

MYRTLE BEACH, SC
843-448-9075
FAX 843-448-9020

STERLING, VA
703-834-5399 ⁂ 888-834-5008
FAX 703-834-5396

LAURINBURG, NC
910-276-1112
FAX 910-276-5811

LANCASTER, PA
717-464-7440
FAX 717-464-1011

DOVER, DE
302-527-2373 ⁂ 888-553-2373
FAX 302-346-4806

WILMINGTON, NC
910-762-5418 ⁂ 800-948-5489
FAX 910-762-9279

YORK, PA
717-741-9980 ⁂ 866-922-2373
FAX 717-741-9981

FLUORO-K™ FIRE SUPPRESSION SYSTEM
ARMTEC DEFENSE TECHNOLOGIES
608 EAST MCNEIL STREET
LILLINGTON, NORTH CAROLINA

MEMBER NATIONAL ASSOCIATION OF FIRE EQUIPMENT DISTRIBUTORS
MEMBER NATIONAL FIRE PROTECTION ASSOCIATION
MEMBER FIRE SUPPRESSION SYSTEMS ASSOCIATION
MEMBER AMERICAN FIRE SPRINKLER ASSOCIATION
MEMBER AUTOMATIC FIRE ALARM ASSOCIATION
MEMBER BUILDING OWNERS AND MANAGERS ASSOCIATION

FLUORO-K™ FIRE SUPPRESSION SYSTEM

ARMTEC DEFENSE TECHNOLOGIES

608 EAST McNEIL STREET

LILLINGTON, NORTH CAROLINA

Fire Prot. Contractor:	BFPE International 115 Bestwood Drive Clayton, NC 27520
Project No.:	RA-A7132-CA-23
Date:	January 25, 2024

Kidde Fire Systems
Agent Component Datasheet

Fluoro-K™ Fire Suppression Clean Agent

Effective: April 2023
K-45-0900 Rev AA

FEATURES

- **Fluoro-K™ Fire Suppression Clean Agent is UL Listed and FM Approved**
- **Colorless, with Low Odor and No Particulate or Oily Residue Allowing for Minimal Business Disruption After a Discharge**
- **Zero Ozone Depletion Potential**
- **Atmospheric Lifetime of Five Days**
- **Electrically Non-Conductive**
- **Space Saving; Quantity of Agent Needed to Extinguish Fires Typically Required Minimal Cylinders, thus Minimal Space Required**
- **People Safe at Concentration Levels Required to Extinguish Fire**

EXTINGUISHING AGENT

Fluoro-K™ Fire Suppression Clean Agent (herein referred to as "agent") is a fluorinated ketone (Dodecafluoro-2-methylpentan-3-one) compound of carbon, fluorine and oxygen ($CF_3CF_2C(O)CF(CF_3)_2$). It is colorless, electrically non-conductive and has a low odor. It suppresses fire primarily by physical mechanisms due to its relatively high heat capacity with minimal effect on the available oxygen. This allows people to see and breathe, permitting them to leave the fire area safely.
The agent fluid is acceptable for use in occupied spaces when used in accordance with the United States Environmental Protection Agency (EPA) Significant New Alternatives Policy (SNAP) program rules.
Although the agent is considered non-toxic to humans in concentrations necessary to extinguish most fires, certain safety considerations should be observed when applying and handling the agent. The discharge of the agent may create a hazard to people from the decomposition products which result when the agent is exposed to fire or other hot surfaces. Exposure to the agent is generally of less concern than is exposure to the decomposition products. Unnecessary exposure to the agent or the decomposition products should be avoided.

TOXICITY

Unnecessary exposure to clean agents is to be avoided in accordance with the requirements of NFPA-2001. As such, upon operation of a system pre-discharge alarm, all personnel should immediately exit the protected space. In no case shall personnel remain in a room in which there is a fire. In the very unlikely instance where a clean agent system should discharge unexpectedly into an occupied room, all personnel should proceed in a calm and orderly manner to an exit and leave the room.
The agent fluid has been evaluated for cardiac sensitization in accordance with test protocols approved by the United States Environmental Protection Agency (U.S. EPA). The EPA's SNAP Program classifies the agent fluid as acceptable for use as a total flooding agent in occupied spaces with specific limitations. Refer to the SNAP program rules or NFPA 2001 for more information. The agent fluid has been judged acceptable by the U.S. EPA for use in occupied spaces when used in accordance with the guidance of NFPA 2001. In accordance with NFPA 2001, the agent fluid designed for use with agent vapor concentrations up to ten volume percent in air are permitted. See NFPA 2001, Sect. 1-5, *Safety*.
Although the agent fluid has negligible toxicity in concentrations needed to suppress most fires, certain safety considerations must be observed when applying and handling the agent. For example, the agent fluid is a liquid at room temperature and has been superpressurized with dry nitrogen. Upon release to atmospheric pressure (e.g., from nozzles) the liquid flash evaporates at a low temperature. Thus, nozzles must be located to avoid direct impingement on personnel.

DECOMPOSITION

When the agent fluid is exposed to high temperatures, such as what may be expected in a flame front, hazardous products of thermal decomposition (halogen acids) are produced. If the agent fluid is discharged in 10 seconds or less, flames will be extinguished rapidly and the amount of by-products produced will be minimal.

CLEANLINESS

The agent fluid is clean and leaves no residue, thereby eliminating costly after-fire clean-up and keeping expensive downtime to a minimum. Most materials such as steel, stainless steel, aluminum, brass and other metals as well as plastics, rubber and electronic components are unaffected by exposure to the agent fluid.

APPROVALS

The agent fluid complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems, EPA SNAP Program, (Significant New Alternate Policy), Underwriters Laboratories, Inc. (UL) FM Approvals (FM).

USE

Kidde Fire Systems Fire Suppression Systems designed for use with the agent are designed to extinguish fires in specific hazards or equipment located where an electrically non-conductive agent is required, where agent cleanup creates a problem, where extinguishing capability with low weight is a factor and where the hazard is normally occupied by personnel. The agent fluid is an acceptable alternative to Halon and is approved by the EPA and NFPA for use in fire suppression systems.

Table 1: Agent Fluid Physical Properties

Chemical Formula	$CF_3CF_2C(O)CF(CF_3)_2$
NFPA Reference	Dodecafluoro-2-methylpentan-3-one
Molecular Weight	316.04
Freezing Point	-162.4°F (-108°C)
Boiling Point at 1 Atm.	120.6°F (49.2°C)
Critical Temperature	335.6°F (168.7°C)
Critical Density	39.91 lb./ft.^{3} (639.1 kg/m^3)
Critical Pressure	270.44 PSIA (1865 kPa)
Critical Volume	0.0251 ft.^{3}/lbm (494.5 cc/mole)
Ozone Depletion Potential	0
Global Warming Potential	1

Table 2: Agent Fluid Toxicity Properties

NOAEL (No Observable Adverse Effect Level)	10.0%
LOAEL (Lowest Observable Adverse Effect Level)	>10.0%

COMPATIBILITY

System	Industrial Approval	Marine Approval
ECS-500™ System	UL, ULC, FM	UL
ADS™ with Fluoro-K™ Fire Suppression Clean Agent	UL, ULC, FM	UL
ECS™ 360 with Fluoro-K™ Fire Suppression Clean Agent*	UL, ULC, FM	UL

*This system is no longer offered for sale. Agent is for refill purposes only.

AGENT APPROVALS

Agent	Industrial Approval	Marine Approval
Kidde Fire Systems Fluoro-K™ Fire Suppression Clean Agent	UL, ULC, FM	UL

DESIGN CONCENTRATION NOTES

Table 3: NFPA Minimum Design Concentrations for Fluoro-K™ Fire Suppression Clean Agent

Class of Fire	Minimum Design Concentration
Class A	4.50
Class B (n-Heptane)	5.85*
Class B (Ethyl alcohol)	7.02*
Class C with Voltage < 480 V	4.52
Class C with Voltage ≥ 480 V	For voltages ≥480 volts that remain powered during and after discharge, the MDC shall be determined by testing, as necessary, and a hazard analysis.
*For additional Class B values, contact Kidde Fire Systems Technical Support.	

FM GLOBAL CLASS C CONCENTRATION VALUES

Per the FM Global Property Loss Prevention Data Sheet 4-9, Interim Revision July 2021, the Class C Fires Minimum Design Concentrations for Fluoro-K Fire Suppression Clean Agent are as follows:

Table 4: FM Global Class C Fires Minimum Design Concentrations for Fluoro-K Fire Suppression Clean Agent

Class of Fire	Minimum Design Concentration
Class C with Voltage ≤ 480 V	4.52
Class C with Voltage > 480 V	10

Note: The Minimum Design Concentration for Class C fires with voltages greater than 480 volts meets or exceeds the EPA Accepted LOAEL and NOAEL for the agent. Using this high of an MDC requires use of the following:

- Pneumatic Time Delays
- Pneumatic Sirens
- Signs
- Lockout Valves

EXPORT INFORMATION (USA)
Jurisdiction: EAR
Classification: EAR99
This document contains technical data subject to the EAR.

K-45-0900 Rev AA

Kidde Fire Systems
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
kiddefiresystems.com

Kidde Fire Systems
ECS-500™ Cylinder Component Datasheet

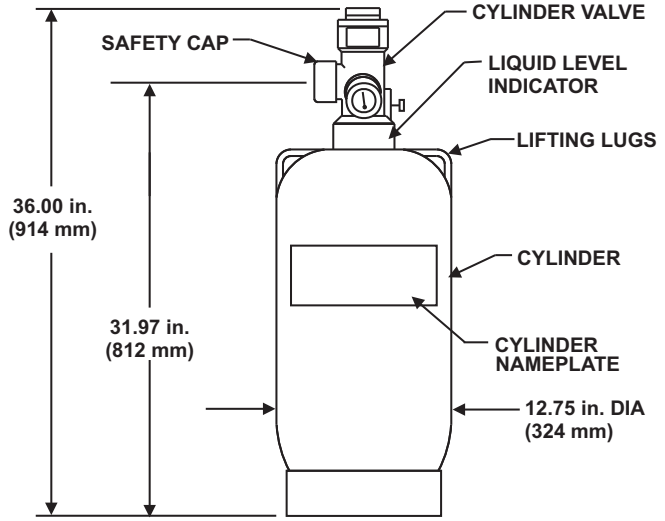
Cylinder and Valve Assemblies, 125 lb. Capacity, with Fluoro-K™ Fire Suppression Clean Agent

Effective: April 2023
K-45-0902 Rev AA

FEATURES

- **UL Listed, ULC Listed, and FM Approved for use with Kidde Fire Systems ECS-500™ Systems (DIOM P/N 06-237585-001)**
- **UL Listed and ULC Listed for use with Kidde Fire Systems ECS-500™ Marine System (DIOM P/N 06237589-001)**

P/N: 45-550121-901



Note:

1. The safety cap must be installed on the valve outlet at all times, except when the cylinders are connected to the system piping, or being filled. The safety cap must not be removed from its chain.
2. See K-85-2070 for additional information.

ORDER INFORMATION

Part Number	Description
45-550121-901	125 lb. Capacity Cylinder with Liquid Level Indicator

MATERIALS

Valve Body: Brass
Cylinder: Steel, Painted Red

MANUALS

Manual	P/N
Kidde Fire Systems ECS-500™ System	06-237585-001
Kidde Fire Systems ECS-500™ Marine System	06-237589-001

EXPORT INFORMATION (USA)
Jurisdiction: EAR
Classification: EAR99
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Kidde Fire Systems
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Kidde Fire Systems
Component Description

Liquid Level Indicator

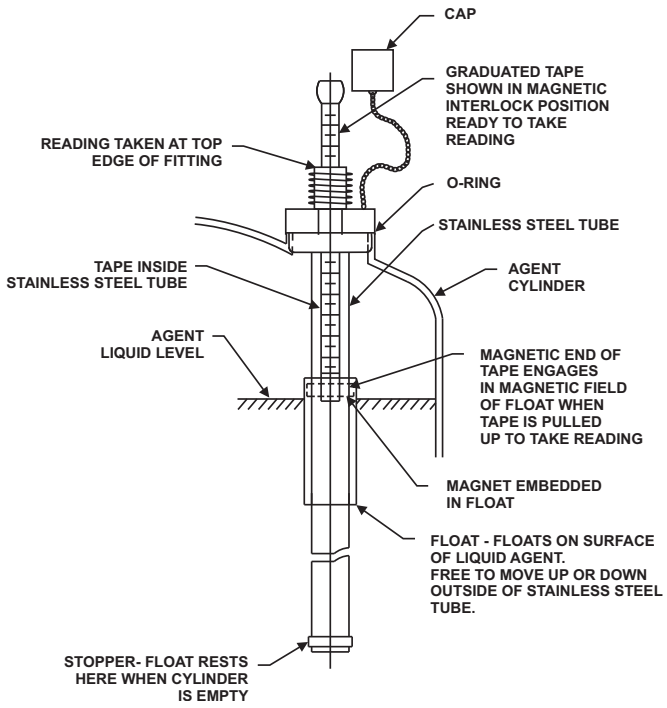
Effective: November 2021
K-85-2110 Rev AC

FEATURES

- **For Approvals, see the Table, "COMPATIBILITY" table.**
- ***RoHS Compliant***

DESCRIPTION

Kidde Fire Systems ECS™, ECS-500™, and ADS™ cylinders of capacity 125 lbs. and larger include a liquid level indicator (LLI). The LLI is housed in stainless steel tubing with a black colored cap.



COMPATIBILITY

Series	DIOM P/N	Approvals
ECS-500™ System	06-237585-001	UL, ULC, FM
ECS-500™ Marine System	06-237589-001	UL, ULC, USCG
ECS™ 360 with 3M™ Novec™ 1230 Fire Protection Fluid	06-236553-001	UL, ULC, FM
ADS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-237256-001	UL, ULC, FM
ECS™ 360 Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-236559-001	UL, ULC, USCG
ADS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-237257-001	UL, ULC, USCG
ECS™ 360 with HFC-227ea Agent	06-236115-001	UL, ULC, FM
ECS™ 360 Marine with HFC-227ea Agent	06-236225-001	UL, USCG
ADS™ Marine with HFC-227ea Agent	06-236595-001	UL, ULC, USCG
ADS™ with HFC-227ea Agent	06-236068-001	UL, ULC, FM

SPARE PARTS

Use the part numbers listed in Table 1 to replace an LLI, if necessary, for the following systems:

- ADS with 3M™ Novec™ 1230 Fire Protection Fluid
- ECS-500 with 3M Novec 1230 Fire Protection Fluid
- ECS with 3M Novec 1230 Fire Protection Fluid
- ECS with HFC-227ea Agent

Table 1.

Cylinder	New LLI P/N
125 lb (57 kg)[1]	85-235000-025
200 lb (91 kg)	85-235000-037
350 lb (159 kg)	85-235000-037
450 lb (205 kg)[2]	85-235000-042
600 lb (272 kg)	85-235000-037
900 lb (408 kg)	85-235000-042
1100 lb (499 kg)[3]	85-235000-037

[1]Cylinder size not available for ADS Systems

[2]Cylinder size only available for ECS-500 and ADS Systems with 3M Novec 1230 Fire Protection Fluid

[3]Cylinder Size Only available for ECS-500 Systems

Use the part numbers listed in Table 2 to replace an LLI, if necessary, for an ADS system with HFC-227ea Agent:

Table 2.

Cylinder	New LLI P/N
225 lb (102 kg)	85-235000-037
395 lb (179 kg)	85-235000-037
675 lb (306 kg)	85-235000-037
1010 lb (458 kg)	85-235000-042

Use the parts listed in Table 3 to order a replacement tape for an LLI:

Note: These spare tapes are not compatible with the legacy LLIs with the white cap.

Table 3.

Part Number	Description
06-237764-025	Spare Tape for Liquid Level Indicator P/N: 85-235000-025
06-237764-037	Spare Tape for Liquid Level Indicator P/N: 85-235000-037
06-237764-042	Spare Tape for Liquid Level Indicator P/N: 85-235000-042

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K-85-2110 Rev AC

Kidde Fire Systems
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Fax: 508.881.8920
kiddefiresystems.com

Kidde Fire Systems
ECS-500™ psi System Component Datasheet

Supervisory Pressure Switch

Effective: January 2019
K-45-0514 Rev AB

FEATURES

- **Both Normally Open and Normally Closed Configuration with One Unit**
- **Suitable for 10 lb. through 1100 lb. Kidde Fire Systems ECS-500™ psi Systems cylinders**
- **UL Listed, ULC Listed, and FM Approved for use with ECS-500™ Systems**

P/N: 45-118500-001 and 45-500537-001

DESCRIPTION

The cylinder supervisory pressure switch is intended to detect a fall in pressure in the Kidde Fire Systems ECS-500™ psi Systems cylinder. The cylinder supervisory pressure switch can be wired for either normally open or normally closed operation, depending on installation requirements. This cylinder supervisory pressure switch can be installed on ECS-500™ System cylinders, 10 lb. through 1100 lb. size.

OPERATION

When the pressure in the ECS-500 System container drops from the standard charge pressure of 500 PSI (35 bar) to below 435 PSI (30 bar) the switch operates. If wired in the NC (open-under-pressure) configuration the resulting pressure drop will cause the contacts to close. When connected to a monitored circuit of a suppression control panel the switching will result in an alarm or trouble condition.

INSTALLATION

The supervisory pressure switch can be installed on a fully charged cylinder, without loss of pressure, provided the unit is handled with care and only by trained service personnel. Remove the protective cap from the pressure connection. Do not apply thread compound to the threads. Install the switch with an 1-1/16 inch open-ended wrench while holding the pressure connection with a 7/16 inch open-end wrench. Tighten hand-tight, plus one-quarter turn. Leak check using a leak detector or bubbling solution. Secure switch body with wrench when connecting electrical conduit.

Isolate the assembly from shock, vibration and areas subject to wide-ranging or rapid temperature fluctuations. Disconnect all supply circuits before wiring the supervisory switch.

ORDER INFORMATION

The cylinder supervisory pressure switch offers combined normally opened and normally closed functionally. The part number for ordering the cylinder supervisory pressure switch is 45-118500-001 or 45-500537-001 (ATEX Approved).

Note: The supervisory pressure switch differentiator is an orange color band on both the box and switch.

SPECIFICATIONS

Setting:	435 PSI (30 bar) on falling pressure
Electrical rating:	5 Amps, 250 Vac
Wire color coding:	Blue = Normally Open Black = Normally Closed Violet = Common
Operating temperature range:	32 to 130°F (0 to 54°C)
Pressure connection:	0.25 in. SAE 45° flare female with valve core deflector
Wetted materials:	EPR, Brass Copper
Lead length:	36 in. ± 2 in. (914 mm ± 50 mm)

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Classification: EAR99
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Kidde Fire Systems
System Component Datasheet

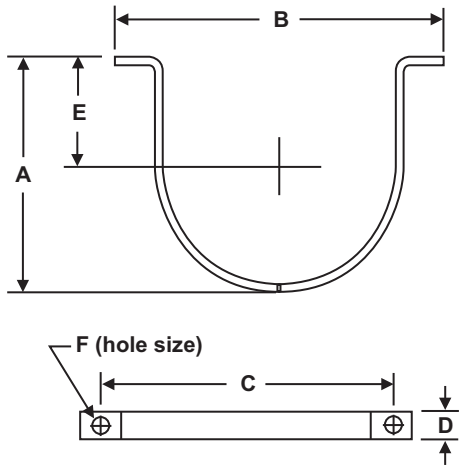
Effective: December 2018
K-85-0502 Rev AB

Cylinder Mounting Straps

FEATURES

- **For Approvals, see the "COMPATIBILITY" table on page 2.**

Steel straps and brackets are used to mount the cylinders in a vertical position. Cylinder straps (P/N WK-283945-000, WK-283934-000, 06-235317-001, WK-281866-000, WK-294651-000, 06-236125-001 and 30710193) are available for all size cylinders.



Part Number	Cylinder Size	Cylinder O.D.	Dimension A	Dimension B	Dimension C	Dimension D	Dimension E	Dimension F
WK-283945-000	10 lb., 20 lb.	7.07 in. (180 mm)	6.48 in. (165 mm)	9.62 in. (224 mm)	8.62 in. (219 mm)	1 in. (25 mm)	2.78 in. (71 mm)	0.437 in. (11 mm)
WK-283934-000	40 lb., 70 lb.	9 in. (229 mm)	8.16 in. (207 mm)	11.69 in. (297 mm)	10.69 in. (272 mm)	1 in. (25 mm)	3.50 in. (89 mm)	0.437 in. (11 mm)
06-235317-001	125 lb., 200 lb., 225 lb.*	12.75 in. (324 mm)	12.93 in. (329 mm)	16.18 in. (411 mm)	14.56 in. (370 mm)	1.75 in. (44 mm)	5.59 in. (142 mm)	0.625 in. (16 mm)
WK-281866-000	350 lb., 395 lb.*	16 in. (406 mm)	15.50 in. (394 mm)	19.50 in. (495 mm)	17.88 in. (454 mm)	1.75 in. (44 mm)	6.06 in. (154 mm)	0.625 in. (16 mm)
WK-294651-000	600 lb., 675 lb.*	22 in. (559 mm)	21.56 in. (548 mm)	25.75 in. (654 mm)	24.12 in. (613 mm)	1.75 in. (44 mm)	10.25 in. (260 mm)	0.625 in. (16 mm)
06-236125-001	900 lb., 1010 lb.*	24 in. (610 mm)	23.75 in. (603 mm)	27.75 in. (705 mm)	26 in. (660 mm)	1.75 in. (44 mm)	12.13 in. (308 mm)	0.625 in. (16 mm)
30710193	1100 lb**	30 in (762 mm)	30-1/8 in (765 mm)	34-1/4 in (870 mm)	32-1/4 in (819 mm)	1-1/2 in (38 mm)	15 in (381 mm)	7/16 in (11 mm)

* 225, 395, 675, and 1010 lb cylinders are only applicable to Kidde® ADS™ with HFC-227ea systems.

** 1100 lb. Cylinder is only available for Kidde® ECS-500™ System land-based systems.

MATERIALS

- Steel, Painted Black SAE 1020

COMPATIBILITY

Series	DIOM P/N	Approvals
Kidde® ECS-500™ System	06-237585-001	UL, ULC, FM
Kidde® ECS-500™ Marine System	06-237589-001	UL, ULC, USCG
Kidde® ECS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-236553-001	UL, ULC, FM
Kidde® ADS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-237256-001	UL, ULC, FM
Kidde® ECS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-236559-001	UL, ULC, USCG
Kidde® ADS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-237257-001	UL, ULC, USCG
Kidde® ECS™ with HFC-227ea Agent	06-236115-001	UL, ULC, FM
Kidde® Modular ECS™ with HFC-227ea Agent	06-236116-001	UL, ULC, FM
Kidde® ECS™ Marine with HFC-227ea Agent	06-236225-001	UL, USCG
Kidde® ADS™ Marine with HFC-227ea Agent	06-236595-001	UL, ULC, USCG
Kidde® ADS™ with HFC-227ea Agent	06-236068-001	UL, ULC, FM

Agent	Series	Cylinder Size							
		10, 20 lb	40, 70 lb	125 lb	200/ 225* lb	350/ 395* lb	600/ 675* lb	900/ 1010* lb	1100 lb**
3M Novec 1230 Fire Protection Fluid	ECS-500 System	X	X	X	X	X	X	X	X
	ECS 360	X	X	X	X	X	X	X	
	ADS				X	X	X	X	
HFC-227ea Agent	ECS 360	X	X	X	X	X	X	X	
	ECS 360 Modular	X	X	X	X	X	X		
	ADS				X	X	X	X	

* 225, 395, 675, and 1010 lb cylinders are only applicable to Kidde ADS™ with HFC-227ea systems.
** 1100 lb. Cylinder is only available for Kidde ECS-500™ System land-based systems.

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Jurisdiction: EAR
Classification: EAR99
This document contains technical data subject to the EAR.

K-85-0502 Rev AB

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Kidde Fire Systems
System Component Datasheet

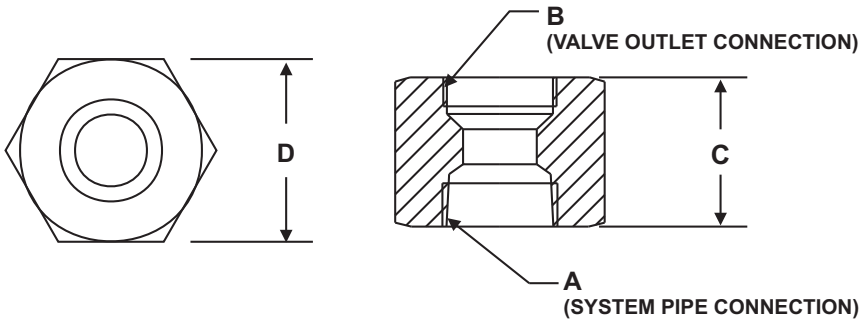
Effective: December 2018
K-45-0518 Rev AB

Valve Outlet Adapters

FEATURES

- **For Approvals, see the "COMPATIBILITY" table on page 2.**

P/N: WK-28390X-000



Note: For direct connection of cylinder valve to distribution piping.

Part Number	Size	A	B	C	D
WK-283904-000	1-1/2 in. (38 mm)	1-1/2 in. (38 mm) 11-1/2 NPT	1-7/8 in. 12 UNJ	2-11/16 in. (68 mm)	2-1/2 in. (64 mm) Hex
WK-238905-000	2 in. (51 mm)	2 in. (51 mm) 11-1/2 NPT	2-1/2 in. (64 mm) 12 UNJ	3-1/8 in. (79 mm)	3 in. (76 mm) Hex

MATERIALS

- Brass

COMPATIBILITY

Series	DIOM P/N	Approvals
Kidde® ECS-500™ System	06-237585-001	UL, ULC, FM
Kidde® ECS-500™ Marine System	06-237589-001	UL, ULC, USCG
Kidde® ECS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-236553-001	UL, ULC, FM
Kidde® ADS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-237256-001	UL, ULC, FM
Kidde® ECS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-236559-001	UL, ULC, USCG
Kidde® ADS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-237257-001	UL, ULC, USCG
Kidde® ECS™ with HFC-227ea Agent	06-236115-001	UL, ULC, FM
Kidde® Modular ECS™ with HFC-227ea Agent	06-236116-001	UL, ULC, FM
Kidde® ECS™ Marine with HFC-227ea Agent	06-236225-001	UL, USCG
Kidde® ADS™ Marine with HFC-227ea Agent	06-236595-001	UL, ULC, USCG
Kidde® ADS™ with HFC-227ea Agent	06-236068-001	UL, ULC, FM
Kidde® FE-13™ Engineered Suppression System	06-236169-002	UL

EXPORT INFORMATION (USA)
Jurisdiction: EAR
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K-45-0518 Rev AB

Kidde Fire Systems
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Ph: 508.881.2000
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www.kiddefiresystems.com

Component Description

Stackable Electric Control Head Kit with Control Head Monitor and Lever Operated Control Head, P/N 85-486500-010

Effective: November 2015
K-85-3002 Rev AA

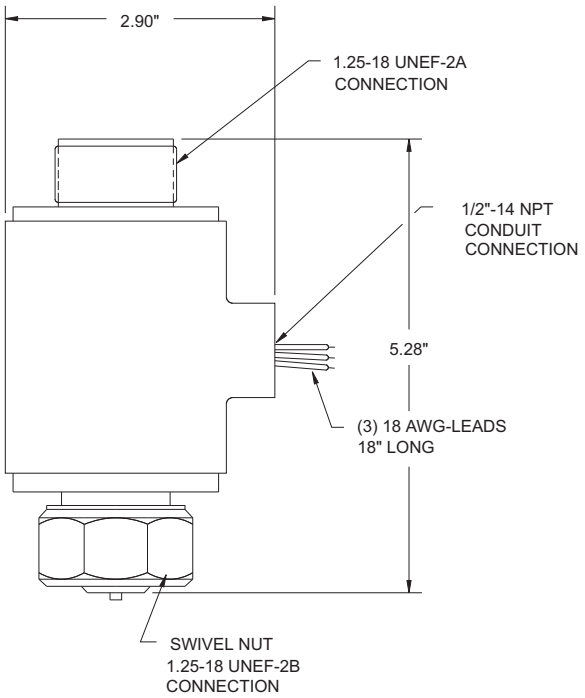
FEATURES

- ***UL Listed, ULC Listed, and FM Approved for use with systems listed below in the Compatibility table.***

ORDER INFORMATION

Part Number	Description
85-486500-010	Kit, Includes: • Electrical Control Head, 24 VDC, Stackable, (Ex. Proof), P/N: 82-486500-010 • Control Head Monitor, P/N 85-100000-100 (for more information, see datasheet K-85-3000) • Lever Operated Control Head, P/N WK-870652-000 (for more information, see datasheet K-85-6005)

ELECTRIC CONTROL HEAD, PART NO. 486500-01 IS RATED FOR USE IN HAZARDOUS (CLASSIFIED) LOCATIONS CLASS 1, DIV. I, GROUPS C, D AND CLASS II, DIV. II, GROUPS E, F, G BETWEEN -40F AND 140F. USE CONDUIT SEAL WITHIN 18 IN. (45cm) OF THIS DEVICE.



Note: This control head is polarized. Improper wiring will result in failure of this device to operate.

WARNING

Electric control head, P/N: 82-486500-010, is designed for installation directly on 487 Series Halon and Kidde ECS agent valves only to a maximum size of 350 lbs. This control head must not be installed on any other type of halon or agent cylinder valve, nitrogen valve, carbon dioxide cylinder valve, FE-13 cylinder valve or Stop (Directional) valve. Installation of this control head to any other device (e.g., pressure operated control head) will result in failure of device to operate.

MATERIAL

Body: Brass

SECIFICATIONS

Voltage: 24 VDC
Current: 0.2A Continuous Draw

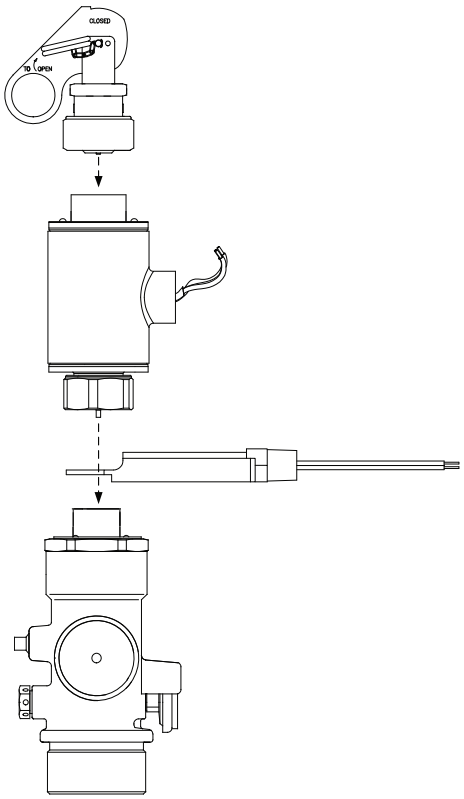


Figure 1. Electric Control Head (Stackable Type) with Lever Operated Control Head and Control Head Monitor

COMPATIBILITY

Series	For Use With	DIOM P/N	Supplement P/N
Kidde ECS with HFC-227ea Agent*	X	06-236115-001	06-236115-003
Kidde Modular ECS with HFC-227ea Agent*	X	06-236116-001	06-236116-002
Kidde ECS with 3M™ Novec™ 1230 Fire Protection Fluid*	X	06-236553-001	06-236553-004
*For Cylinders up to 350 lbs. maximum			

K-85-3002 Rev AA

Kidde Fire Systems
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
www.kiddefiresystems.com

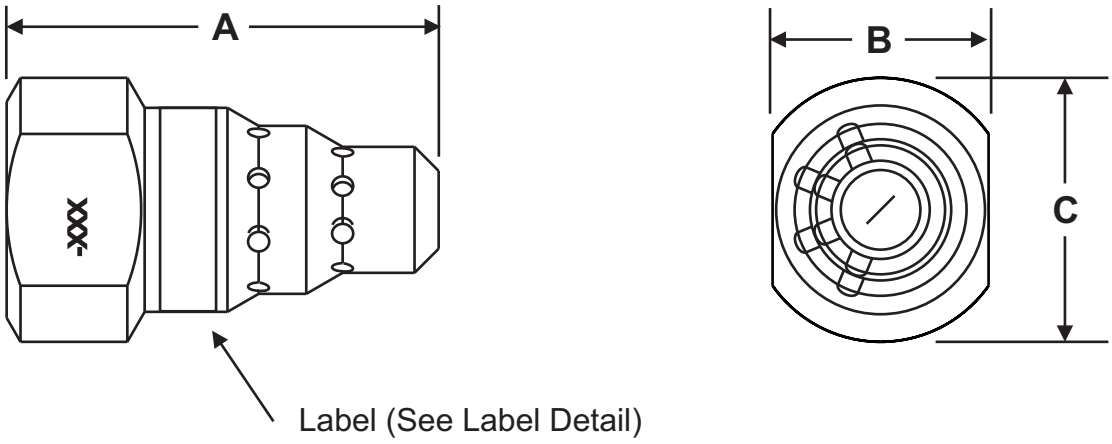
Kidde Fire Systems
System Component Datasheet
180 Degree Pendant Nozzle Data Sheet for use with Kidde ECS-500™ System and Kidde ECS™ with 3M™ Novec™ 1230 Fire Protection Fluid

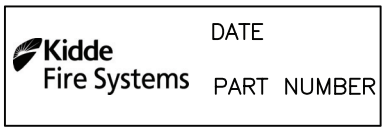
Effective: December 2018
K-45-2150 Rev AK

FEATURES

- **UL Listed, ULC Listed, and FM Approved for use with the systems listed in the Table , "COMPATIBILITY," on page 2.**
- **Nozzles can be mounted upright or pendent.**

P/N: 45-1946XX-XXX (Stainless Steel)
P/N: 45-1947XX-XXX (Brass)





LABEL DETAIL

Note: A selection of orifices are available for each nozzle size and make. Consult the appropriate DIOM featured in the Table , "COMPATIBILITY," on page 2 for details.

Nozzle Size	Dimension		
	A	B	C
1/4 in. (6 mm)	1.91 in. (49 mm)	1.03 in. (26 mm)	0.88 in. (22 mm)
3/8 in. (10 mm)	2.03 in. (52 mm)	1 in. (25 mm)	1.19 in. (30 mm)
1/2 in. (13 mm)	2.25 in. (57 mm)	1.13 in. (29 mm)	1.38 in. (35 mm)
3/4 in. (19 mm)	2.69 in. (68 mm)	1.38 in. (35 mm)	1.63 in. (41 mm)
1 in. (25 mm)	2.88 in. (73 mm)	1.63 in. (41 mm)	1.94 in. (49 mm)
1-1/4 in. (32 mm)	3.29 in. (83 mm)	2 in. (51 mm)	2.38 in. (60 mm)
1-1/2 in. (38 mm)	3.63 in. (92 mm)	2.25 in. (57 mm)	2.69 in. (68 mm)
2 in. (51 mm)	4.50 in. (114 mm)	3 in. (76 mm)	3.50 in. (89 mm)

Note: Nozzles are offered in either Stainless Steel or Brass.

COMPATIBILITY

Series	DIOM P/N	Approvals
Kidde® ECS-500™ System	06-237585-001	UL, ULC, FM
Kidde® ECS-500™ Marine System	06-237589-001	UL,, ULC, USCG
Kidde® ECS™ with 3M™ Novec™ 1230 Fire Protection Fluid	06-236553-001	UL, ULC, FM
Kidde® ECS™ Marine with 3M™ Novec™ 1230 Fire Protection Fluid	06-236559-001	UL, USCG

EXPORT INFORMATION (USA)
Jurisdiction: EAR
Classification: EAR99
This document contains technical data subject to the EAR.

K-45-2150 Rev AK

Kidde Fire Systems
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
www.kiddefiresystems.com

AEGIS™ 2.0

Conventional Fire Alarm-Suppression Control Unit

Kidde Fire Systems

Effective: April 2016
K-84-200

FEATURES

- *Suppression Focused Control Unit*
- *Triple R Redundancy Provides Maximum Protection Against Inadvertent Release*
- *Agency Approvals*
  - *FM Approved to ANSI 864, 9th edition, NFPA 72 (2002) and ULC S527-99*
  - *UL Listed to ANSI 864, 9th edition and ULC S527-99*
- *Listed for a Wide Range of Suppression Systems:*
  - *Kidde ECS HFC-227ea and FK-5-1-12*
  - *Kidde ADS HFC-227ea and FK-5-1-12*
  - *Kidde HP CO2*
  - *Kidde IG Argonite & Nitrogen*
  - *Kidde FE-13*
  - *Fenwal Spheres*
  - *Fenwal BDCs*
  - *Kidde IND™ Dry Chemical & WHDR™ Wet Chemical Systems*
  - *Sprinkler Supervisory Service*
  - *Deluge, Pre-Action, Foam, Foam-Water Systems*
- *Combination Clean Agent plus Pre-Action System*
- *Compact Cabinet Design Supports Large Number of Input and Output Circuits*
- *Option with Door Mounted Abort and Manual Release Switches Available*
- *Built-in Class-A and Class-B Circuitry*
- *Listed for use with Kidde, Fenwal and Chemetron agent release devices including Control Heads and Initiators*
- *Sophisticated Programmable NACs*
- *Independently Programmable Agent Releasing Circuits*
- *Input and Output*
  - *3 Detection Circuits*
  - *2 Supervisory Circuits*
  - *Option to Use SUP 1 as 4th Detection Circuit*
  - *1 Manual Release Circuit*
  - *1 Abort Input Circuit (with 6 Abort Modes)*
  - *3 Notification Appliance Circuits*
  - *2 Release Circuits*
  - *3 Programmable and 1 Trouble Form-C Relays*
  - *1 Auxiliary Power Output, 1 Amp*
- *5.4 Amp Power Supply Unit*
- *120/240 V, 50/60 Hz AC Input*
- *Easy-to-Use User Interface and Display*
- *Flexible Configuration Options*
- *Password Protected*
- *Digital Release Countdown*
- *Battery Voltage and Charging Current Display*
- *Charging Capacity of 68 AH*
- *Extensive Diagnostics*
- *Backwards Compatible*

DESCRIPTION

The Kidde AEGIS™ 2.0 is a Conventional Single Hazard Agent Releasing Unit which provides configuration flexibility in a compact footprint to protect life and assets in commercial, high-tech and industrial applications. The AEGIS 2.0 control unit has a NEMA1 enclosure and an option for door mounted Manual Release and Abort switches to avoid the additional expense of wall mounting these items.

The AEGIS 2.0 is well equipped to handle all special hazard extinguishing systems due to the high degree of programming flexibility provided and the following full complement of input and output circuits:

- *Three (3) Class A or Class B Detection Circuits*
- *Two (2) Class A or Class B Supervisory Circuits*
- *Option to Use SUP 1 as Fourth Detection Circuit*
- *One (1) Class A or Class B Manual Release Circuit*
- *One (1) Class A or Class B Abort Input Circuit*
- *Three (3) Class A or Class B Notification Appliance Circuits*
- *Two (2) Class B Agent Release Circuits*
- *Three (3) Programmable and 1 Trouble Form-C Relays*

DETECTION CIRCUITS

The Detection Circuits support Conventional 700 Series, CPD-705x Ionization Smoke, PSD-715x Photoelectric Smoke and THD-705x Heat Detectors as well as Normally Open contact closure type devices. Two circuits are dedicated to the main suppression function and can be programmed to activate the release circuits by either single-shot or cross-zone input. The user configuration allows automatic release via detection to be delayed from 0 to 60 seconds in 10-second intervals and also allows a choice of which of the two Agent Release Circuits to activate.

The third Detection Circuit is programmable for either Waterflow or as an independent Detection circuit. When programmed for Waterflow, Notification Appliance Circuits can be programmed as Non-Silenceable as required by certain jurisdictions. Additionally, the Supervisory 1 circuit can be configured to be the fourth detection circuit.

SUPERVISORY CIRCUITS

The Supervisory Circuits accept Normally Open contact closure type devices such as pressure switches on the agent cylinders or on the water or air pipe network. The system configuration enables the supervisory input to be a participant in the suppression function. For example, low air supervisory can be included with detection for release of pre-action systems as required by certain jurisdictions.

MANUAL RELEASE AND ABORT CIRCUITS

Both the Manual Release and Abort Circuits accept Normally Open contact closure type devices. Activation of the Agent Release Circuits can either be instantaneous or delayed up to 30 seconds (maximum) upon receipt of Manual Release input. Agent release can be temporarily delayed by activating the Abort Circuit. The Abort input can be programmed for 6 modes of operation. These include the UL 10-second mode, the full-delay mode, the IRI mode, two NYC modes, or the abort can be disabled. Aborts can also be programmed to be applicable for either one (ARC 1) or both Agent Release Circuits thereby allowing use with Deluge/Pre-Action systems.

NOTIFICATION APPLIANCE CIRCUITS (NAC)

The three Notification Appliance Circuits are rated 1.5 Amps each and accept polarized 24 VDC Notification Appliances. Each circuit is driven independently and is user configurable for First Alarm, Pre-Release, and Releasing as well as for 60 BPM, 120 BPM, Temporal, or Continuous pattern.

The control unit supports appliances that provide the option to use silenceable horns and non-silenceable strobes on the same NAC. Multiple NAC circuits (connected to audible devices only) programmed with the same master code pattern are synchronized, regardless of any differing starting times that preceded their concurrent operation. The NACs configuration includes a user-selectable intelligent synchronization feature which allows a silenceable horn to be shut off while the strobe continues to flash in synchronized fashion.

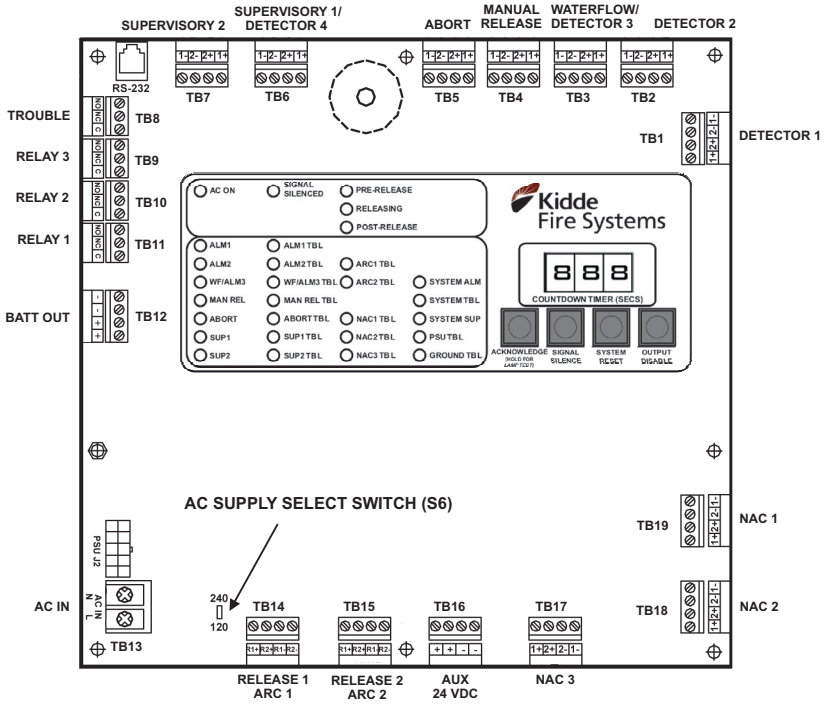


Figure 1. Printed Circuit Board (PCB)

BUILT-IN CLASS A AND B CIRCUITRY

For the input and NAC circuits, the choice of Class A or Class B supervision is made at site on the board itself by selecting the terminals used for wiring. Neither conversion boards nor additional hardware nor jumper selection is required for this purpose.

AGENT RELEASING CIRCUITS (ARC)

The two circuits can be programmed for activation by different inputs, with independent time delays and abort modes to fire combinations of two of the following releasing devices:

- 1 or 2 Kidde Continuous and Momentary Solenoid Control Heads
- 1 Kidde Actuator or Fenwal Initiator
- 1 Factory Mutual Group A, B, D, E, F, G, I, J, or K Solenoid

In other words, operating in tandem, the two circuits can release:

- 1 or 2 Control Heads on ARC 1 and 1 or 2 Control Heads on ARC 2
- 1 or 2 Control Heads on ARC 1 and 1 Actuator/ Initiator on ARC 2 or vice-versa
- 1 or 2 Control Heads on ARC 1 and 1 FM Sprinkler Solenoid on ARC 2 or vice-versa
- 1 Actuator/Initiator on ARC 1 and 1 Actuator/Initiator on ARC 2
- 1 FM Solenoid on ARC 1 and 1 FM Solenoid on ARC 2

This configurability is useful for those jurisdictions where the gaseous suppression agent is required to be supplemented with a pre-action system.

TRIPLE-R PROTECTION FOR ARCS

The two ARCs feature a triple failure redundancy safeguard system to protect them from inadvertent activation by the main microprocessor. The Triple-R system requires that in order to activate an ARC, the main microprocessor issues two release commands of opposing polarity via separate channels and that these commands be combined with a third signal from the panel watchdog timer to confirm the microprocessor operation. The Triple-R system ensures that electrical transients or disturbances such as power surges that could interfere with the operation of the main microprocessor will not inadvertently activate the connected suppression system. The result is a more robust and reliable suppression-focused panel.

PROGRAMMABLE RELAYS

Of the 4 relays, three are user-programmable for a variety of alarm related conditions and the fourth is a dedicated trouble relay. All relay contacts are rated 3.0 Amps at 30 VDC/120 VAC (resistive).

POWER-LIMITED CIRCUITRY

All circuits are inherently power-limited. ARCs can be configured for power-limited or non-power-limited operation. One in-line releasing device is required for each solenoid on a power limited ARC. In-line releasing devices are not included with the panel; the appropriate number of in-line releasing devices should be ordered using part number 06-220023-001.

ROBUST POWER SUPPLY UNIT (PSU)

The AEGIS 2.0 features a universal 120/240 V, 50/60 Hz AC Power Supply Unit with a robust 5.4 Amps of 24 VDC power. Input voltage selection is via a slider switch with no jumper cutting required. The on-board battery charger is able to charge 24 VDC (2 x 12) batteries of capacity up to 68 AH thereby allowing from 24 hours of supervision plus 5 minutes of alarm to 90 hours of supervision plus 10 minutes of alarm required by some jurisdictions.

AUXILIARY POWER SUPPLY

Up to 1 Amp of auxiliary power at 24 VDC is available to power external 4-wire devices such as Flame Detectors, AlarmLine modules, Duct Detectors, etc. The auxiliary power output is resettable.

ELEGANT USER INTERFACE

The user interface consists of an array of LED Indicators, Control Switches, a Digital Display, and Buzzer. Over and above the System, Power Supply status, Input circuit Fire and Trouble and Output circuit Trouble LEDs, the AEGIS 2.0 annunciates its suppression state-of-alarm via three additional Pre-Release, Releasing and Post Release LEDs. Four switches are provided, one each for Acknowledge, Signal Silence, System Reset and Output Disable. The 3-digit display provides a countdown of impending agent release. On command from the user interface switches, it also indicates the battery open circuit voltage and charging current.

SIMPLE SITE-SPECIFIC CONFIGURATION

Setting the site-specific configuration is easily done using the digital display and user interface buttons. To prevent unauthorized use, the configuration menu is protected by a user-changeable password. Factory technical support can provide assistance with lost or forgotten passwords.

Apart from the input voltage selection performed on both the PSU and main board via a slider switch, no other on-board settings or jumper cuttings are required.

EXTENSIVE DIAGNOSTICS

Also initiated via the digital display and user interface switches, the troubleshooting function displays diagnostic codes that assist in determining causes of trouble. A complete list of diagnostic codes and their meaning ships factory installed on the inside of the enclosure door for easy reference.

BACKWARDS COMPATIBILITY

The AEGIS 2.0 is backwards compatible and listed for use with a full range of conventional detectors and alarm devices as well as suppression accessories from Kidde, Fenwal and Chemetron. Going forward, this will allow legacy panels to be replaced with relative ease.

EASY TO INSTALL CABINET

The cabinet design allows for easy installation by fitting between the studs of a standard 16 inch studded wall. It is large enough to house two 12 VDC, 12 AH Batteries and provides up to 2 inches (51 mm) of wiring and finger space between the circuit board and the cabinet wall.

An optional door design features a Manual Release and Abort switch for applications with space constraints. Both switches incorporate guards that prevent their inadvertent activation.

TECHNICAL SPECIFICATIONS

- **Hazards Protected**
  - One
- **Power Supply**
  - 120/240 V, 50/60 Hz (90 to 264 Vrms, 47 to 63 Hz) AC Main Input
  - 5.4 Amps at 27 VDC Output
  - Battery capacity up to 68 AH @ 24 VDC
  - Auxiliary power output rated at 1 Amp at 18.8 - 27.6 VDC (resettable)
- **Three (3) or Four (4) Detection Circuits**
  - Compatible with 700 Series, CPD-705x, PSD-715x, and THD-705x detectors as well as Normally Open contact closure type devices. Refer to documents K-70-100 and F-70-63 for details on compatibility and the maximum number of devices supported.
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power limited
  - DET 1 and DET 2 used for suppression
  - DET3/WF configurable for detection or waterflow
  - Option to use SUP 1 circuit as DET 4 circuit
- **One (1) Manual Release Circuit**
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Power limited

TECHNICAL SPECIFICATIONS *(cont'd)*

- **One (1) Abort Circuit**
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Supervised for ground faults and open circuits
  - Six (6) Abort Modes available
  - Power-limited
- **Two (2) Supervisory Circuits**
  - Compatible with normally open contact-closure type devices
  - Configurable as Class A/Style D or Class B/Style B
  - Option to use SUP 1 as 4th detection circuit
  - Supervised for ground faults and open circuits
  - Power-limited
- **Three (3) Notification Appliance Circuits (NACs)**
  - Compatible with polarized 24 VDC Audio-Visual devices
  - Rated at 1.5 Amps each
  - Up to 35 synchronized appliances
  - Configurable as Class A/Style Z or Class B/Style Y
  - Supervised for ground faults, shorts, and open circuits
  - Power-limited
  - Common NAC/ARC output disconnect switch
- **Two (2) Agent Release Circuits**
  - Each compatible with 1 or 2 control heads, or 1 actuator/initiator, or 1 FM sprinkler solenoid
  - Circuits electrically capable of simultaneously releasing any combination of two of the above devices
  - Factory configured as Class B/Style Y
  - Supervised for ground faults and open circuits
  - Default setting: Power-Limited. Each solenoid on a power-limited ARC requires the use of an in-line releasing device, P/N 06-220023-001 (order separately, not included with panel).
  - Common NAC/ARC output disconnect switch
- **Four (4) Relays**
  - 3 independently programmable, normally de-energized Form-C Relays
  - 1 dedicated normally energized Form-C Trouble Relay
  - Relay contacts rated 3 Amps at 30 VDC/120 VAC (resistive)

TECHNICAL SPECIFICATIONS *(cont'd)*

- **Enclosure**
  - NEMA 1 rated 18 gauge sheet steel with door
  - Red color
  - Suitable for wall and surface mounting
  - Optional Trim Ring
  - Optional door with Manual Release and Abort switches
  - Optional Dead Front Plate
  - Dimensions:
    - *with Standard Door:*
      14-1/4 in. W x 5 in. D x 19 in. H
      (362 mm x 127 mm x 483 mm)
    - *with Switch Door:*
      14-1/4 in. W x 6 in. D x 19 in. H
      (362 mm x 152 mm x 483 mm)
- **Environmental Criteria**
  - Indoor/Dry use only
  - Operating temperature range: 32°F to 120°F (0°C to 49°C)
  - Humidity: 93 ± 2% RH at 90 ± 3°F (32 ± 2°C)
- **Packaging/Shipping**
  - Enclosure, PCB, and PSU packaged in individual cartons. Field assembly is required.
  - Accessories shipped include mounting hardware, battery leads, IOM manual on CD-ROM, operating instruction sheet, and EOL resistor kit.
  - Order in-line releasing device (required for power-limited ARCs) and batteries separately.

ORDERING INFORMATION

Description	Part Number
Kidde AEGIS 2.0 Control Unit	84-732001-901
Kidde AEGIS 2.0 Control Unit with Switches	84-732001-902
In-Line Releasing Device	06-220023-001
Dead Front Plate for NEMA1 Enclosure	06-220175-001
EOL Resistors (10 pk)	06-220184-001
EOL Backbox (Canadian applications only)	06-129963-002
Trim Ring	76-600000-007
Large Capacity Battery Enclosure	76-100010-001
Installation/Configuration Kit	06-220148-902
Replacement Hardware Installation Kit	06-220149-001
Replacement Enclosure Assembly	06-220172-902
Replacement Enclosure Assembly (with Switches)	06-220174-902
Replacement Door Switches Kit	06-220176-001
Replacement PCB Assembly	06-220150-901
Replacement Power Supply	06-118394-002
Replacement Bezel Assembly	06-220151-001
Spare Key	06-118013-001
Spare Keylock with Keys	06-129924-001

EXPORT INFORMATION (USA): Jurisdiction: EAR, US ECCN: EAR99
This document does not contain any export-controlled technical data.

For detailed installation, operation, and configuration information, refer to the Kidde AEGIS 2.0 Conventional Fire Alarm-Suppression Control Unit Installation, Operation, and Maintenance Manual P/N 06-237463-001.

Kidde Fire Systems
400 Main Street
Ashland, MA 01721 USA
Tel: 508.881.2000
www.kiddefiresystems.com

K-84-200 Rev AA

KC2-OS-CD Two-Wire Conventional Optical Smoke Detector

Effective: October 2022
K-70-350

STANDARD FEATURES

- ***Two-Wire Conventional Optical (Photoelectric) Smoke Detector***
- ***Multi-criteria optical smoke sensing technology***
- ***Compatible with Kidde Fire Systems AEGIS™ 2.0 and AEGIS™-XLT Conventional Control Units***
- ***Advanced alarm verification feature reduces chance of nuisance alarms***
- ***Self-diagnostic capability continually monitors operation***
- ***Remote LED indicator available***
- ***Low-profile design blends into the ceiling***
- ***FM Approved***
- ***cULus Listed***
- ***California State Fire Marshal Listed***

DESCRIPTION

The KC2 Optical Smoke Detector is a conventional low-profile, self-diagnostic, two-wire detector which monitors its own sensitivity and operational status and is designed for the demands of commercial and industrial environments. The Optical Smoke Detector uses an advanced photoelectric sensing chamber to discriminate between smoke from a fire and nuisance smoke from non-fire sources before signaling an Alarm condition.

COMPATIBLE BASES

The KC2-OS-CD detector head attaches easily to either a KC2-SB Standard or KC2-RB Relay Base. Detector bases have wiring terminals that are accessible from the “room-side” after mounting the base to the electrical box.

- **Model KC2-SB/-SB4 Standard Base**: Connects the detector to circuit.
- **Model KC2-RB/-RB4 Relay Base**: Connects the detector to circuit and provides optional Relay functionality to the KC2 series detector. (The base’s relay contacts automatically change state when detector goes into Alarm.)

TRIM SKIRT

A trim skirt is supplied with the KC2-SB4 and KC2-RB4 bases to help hide mounting tabs. The GSA-TS trim skirt may optionally be ordered for KC2-RB or KC2-SB bases if desired.

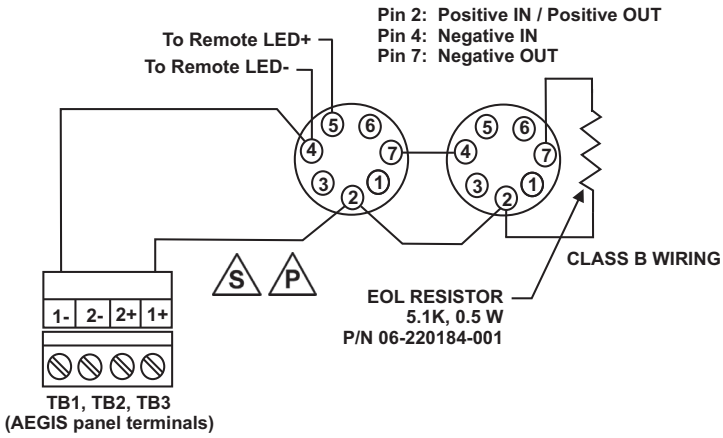
STATUS LED

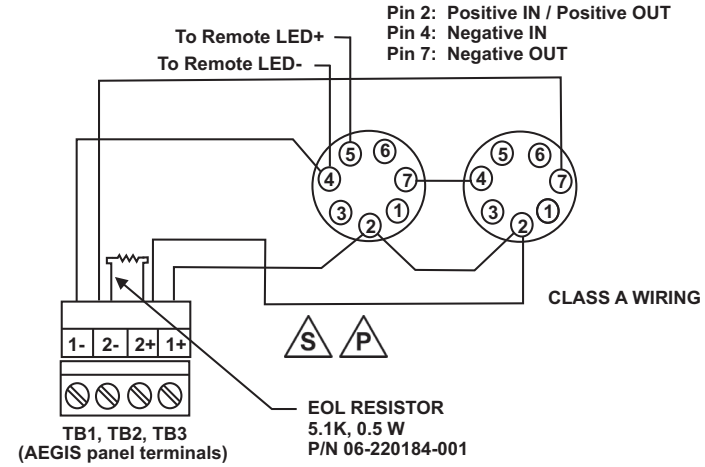
KC2-OS-CD detectors use an LED to indicate the detector’s condition. A flashing green LED every 30 seconds indicates Normal condition. A Trouble condition is indicated by a flashing green LED every 5 seconds. A steady red LED indicates an Alarm condition. An optional Remote LED Indicator is available for convenient viewing.

INSTALLATION

KC2 Standard and Relay bases mount to:

- North American single-gang box
- Octagon box 3-1/2 in. (89 mm) by 1-1/2 in. (38 mm) deep
- Octagon box 4 in. (102 mm) by 1-1/2 in. (38 mm) deep
- European single-gang box 75 mm with 60.3 mm fixing centers
- BESA box with 60.3 mm fixing centers
- Square box 4 in. (102 mm) by 1-1/2 in. (38 mm) deep (KC2-SB4 or KC2-RB4 base required)





TECHNICAL SPECIFICATIONS

Electrical/Environmental	
Operating Voltage	6.5 to 33 VDC
Standby Current	88 µA at 18 VDC 145 µA at 33 VDC
Alarm Current	up to 60 mA maximum, if not limited by control unit
Remote LED Output Current	0.225 mA average (50 msec ON, 1 sec OFF)
Reset Voltage	2.5 V, maximum
Reset Time	1 second, minimum
Vibration Level	10 to 35 Hz, with an amplitude of 0.01 in.
Photoelectric Sensitivity	0.5 to 4.36 %/ft. obscuration (1.63 to 13.62 %/m)
Air velocity	0 to 4000 ft/min (0 to 20.32 m/s)
Environmental Compensation	Automatic
Response Time Index (evaluated by FM Approvals)	Quick
Operating Temperature Range	32°F to 100°F (0°C to 38°C)
Relative Humidity Range	0 to 93% noncondensing
Storage Temperature	-4 to 140 °F (-20 to 60 °C)
LED Indicator	Normal = Green every 30 seconds Alarm = Steady Red Trouble = Green every 5 seconds
UL Two-Wire Detector Compatibility Identifier	S10AR2
Compatible Bases	KC2-SB, KC2-SB4, KC2-RB, KC2-RB4
Wall Mounting: Distance from Ceiling	12 in. (305 mm) maximum

Physical	
Color	White head and base
Detector Head Dimensions	4.375 in. D x 2.25 in. H (11.10 cm x 5.70 cm)
Base Dimensions	4.4 in. D x 0.75 in. H (11.18 cm x 1.90 cm)
Total Height (head and base)	2.625 in. (6.67 cm) H

ORDERING INFORMATION

KC2-OS-CD	Optical Smoke Detector, head only, two-wire
KC2-SB	Standard Base for KC2 Series Detectors with output for Remote LED, 4 in. diameter
KC2-SB4	Standard Base for KC2 Series Detectors with output for Remote LED, 4 in. diameter (with tabs for 4-in. square box; includes trim skirt)
KC2-RB	Relay Base for KC2 Series Detectors, 4 in. diameter
KC2-RB4	Relay Base for KC2 Series Detectors, 4 in. diameter (with tabs for 4-in. square box; includes trim skirt)
GSA-TS	Optional Trim Skirt for KC2 Series Bases
GSA-LED	Optional Remote LED Alarm Indicator (for use with KC2-SB and KC2-SB4 Standard Bases Only)
SIGA-RTA	Optional Removal Tool (attaches to standard telescoping pole)
SM200-12PKG	Canned smoke for functional testing of smoke detectors

NOTE: Refer to Kidde Fire Systems Datasheet Number K-70-300 for smoke detector compatibility.

Kidde Fire Systems

K-70-350 Rev AB

Kidde Fire Systems
400 Main Street
Ashland, MA 01721 USA
Ph: 508.881.2000
www.kiddefiresystems.com

Manual Pull Stations
Series 3300

Kidde Fire Systems
A UTC Fire & Security Company

Effective: April 2007
K-84-08

FEATURES

- ***Exclusive KIDDE® Design***
- ***Unique Field Labeling for either Fire Alarm or Suppression Applications***
- ***Dual Action Operation***
- ***Single Pole or Double Pole***
- ***Keylock for Reset***
- ***FM Approved***
- ***cULus Listed for US and Canada***
- ***Other domestic approvals in process***
- ***Surface and Weatherproof Backboxes***
- ***Backwards compatible mounting with the B-10 and B-11***

DESCRIPTION

The Kidde® Conventional SPST and DPST Series 3300 Manual Pull Stations are high quality, non-coded alarm initiating devices. The Manual Pull Stations are constructed of heavy die-cast aluminum for long life and use an internal toggle switch for reliable operation.

The SPST Manual Pull Station provides an Single Pole, Single Throw switch with screw terminal connections for wiring to the Fire Alarm/Suppression Control Unit.

The DPST Manual Pull Station provides a Dual Pole, Single Throw switch with screw terminal connections. One set of contacts must be wired to the Fire Alarm/Suppresion Control Unit and the other may be used for local or remote annunciation.

These Manual Pull Stations are designed for quick, efficient response by personnel in an emergency, while the double action PUSH/PULL levers prevent accidental operation. This unit should use a break rod as an indicator of operation.

The Manual Pull Stations can be mounted in an indoor or outdoor weatherproof backbox (Model SBG-32S or Model SGB-32C) or a North American 2-1/2 in. (64 mm) deep 1-gang box. The Manual Pull Station terminal block accepts 14, 16 and 18 AWG wire.

FIRE ALARM OR SUPPRESSION RELEASE LABELING

The Kidde Series 3300 Manual Pull Stations have a unique labeling method which provides the installer the greatest amount of flexibility. Seven labels are shipped with each station:

- **FIRE ALARM**
- **CO_2 RELEASE**
- **FIRE SYSTEMS RELEASE**
- **NOVEC 1230 RELEASE**
- **FM-200 RELEASE**
- **FE-13 RELEASE**
- **HALON-1301 RELEASE**

These permanent, heavy-duty Lexan® self-adhesive labels are die-cut with raised lettering. During installation, the installer simply chooses the appropriate label, removes the protective backing, and places the label into the space on the top of the station. This flexibility allows installations to be customized for each customer, without the expense of having to carry extra inventory.

OPERATION

The dual action Series 3300 manual stations are operated by simply pushing the PUSH bar inwards, allowing the PULL handle to be grasped in a one-handed motion. The handle is then pulled down as far as it will go. If the optional breakrod is installed, it would break at this point. The handle is now locked in place, and is easily visible from up to 50 feet away. The handle is reset by opening the station with the key and placing the handle in the normal upright position. Place the switch actuator in the

down position, insert breakrod into cavity beneath handle (if applicable), and re-lock the station.

SPECIFICATIONS

Station Type:	Double Action, Non-coded
Switch Type:	P/N 84-330001-001: SPST P/N 84-330001-002: DPST
Switch rating:	2 Amp @ 240 Vac or 125 Vdc
Operating Temperature Range:	-40ºF to 150ºF (-40ºC to 66ºC)
Operating Humidity Range:	0-95% RH
Construction:	Die-cast metal housing
Compatible Electrical Boxes:	Indoor: Sheet metal Model SGB-32S Outdoor: Weatherproof Die-cast Model SGB-32C
Shipping Weight:	1.12 lbs. (510 g)

SGB-32S INTERIOR SURFACE BACKBOX

Dimensions:	4.75 in. H x 3.25 in. W x 2.25 in. D
Construction:	Steel sheet metal.
Conduit:	Two knockouts for 1/2 in. conduit connectors, one on top and bottom.
Mounting:	Mounts to the box with (4) 8/32 screws, which ship with each box.

SGB-32C WEATHERPROOF SURFACE BACKBOX

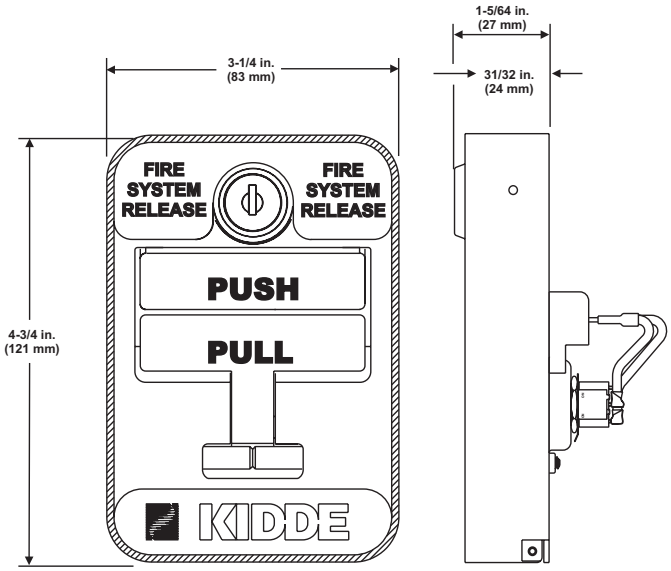
Dimensions:	4.75 in. H x 3.25 in. W x 2.25 in. D
Construction:	Cast aluminum.
Conduit:	One threaded opening for 1/2 in. conduit connector.
Mounting:	Mounts to the box with (4) 8/32 screws and a foam gasket, which ship with each box.

ORDERING INFORMATION

Part Number	Description
84-330001-001	Double Action Manual Pull Station with SPST Switch — ships with mounting hardware, 2 keys, 1 break rod, and label set.
84-330001-002	Double Action Manual Pull Station with DPST Switch — ships with mounting hardware, 2 keys, 1 break rod, and label set.
84-100009-001	SGB-32S Indoor Backbox
84-100009-002	SGB-32C Outdoor Waterproof Backbox
84-100008-002	Pkg. of (12) Breakrods
06-118013-001	Spare Key
06-231866-930	Label Set

DIMENSIONS

(shown with Fire System Release Label installed)



S

K-84-08 Rev AA Printed in USA

Kidde Fire Systems
A UTC Fire & Security Company
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
www.kiddefiresystems.com

Model 878752 Suppression System Abort Station

Kidde Fire Systems
A UTC Fire & Security Company

Effective: May 2007
K-84-10

FEATURES

- **UL Listed, File # S3743**
- **Flush or Surface Mount**
- **One Normally Open Contact**
- **Sized for Double Gang Box**
- **Large Yellow Push Button Switch**

DESCRIPTION

The Kidde Model 878752 Abort Station features a large, easy-to-operate abort push button. The momentary type switch is very easy to see due to its highly visible yellow color. The abort station stainless steel faceplate is clearly labelled with operation procedures—eliminating indecision and hesitation.

The Backbox is painted with red enamel and is provided with four 1/2-inch knockouts. The pre-drilled and tapped mounting tabs allow for easy attachment of the abort station.

TECHNICAL SPECIFICATIONS

Electrical Ratings:
One normally open momentary contact rated 2.5 Amps @ 120 Vdc

Ambient Temperature:
-13°F to 158°F (-25°C to 70°C)

Terminals:
Captive screws and saddle clamps accept 14 AWG to 24 AWG wire

Mounting:
Four 6-32 x 1/2-inch mounting screws included

ORDERING INFORMATION

Part Number	Description	Shipping Weight
84-878752-010	Abort Station	2 lb. (.9 kg)
84-878752-020	Abort Station with Backbox	3 lb. (1.4 kg)
84-296105-000	Backbox	1 lb. (.45 kg)

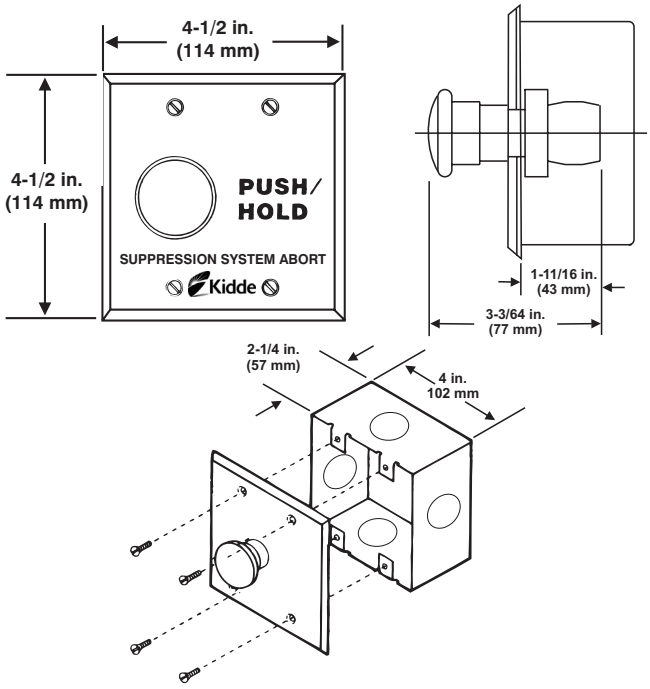


Figure 1. Dimension Details

  Printed in USA

Kidde Fire Systems
A UTC Fire & Security Company
400 Main Street
Ashland, MA 01721
Ph: 508.881.2000
Fax: 508.881.8920
www.kiddefiresystems.com

Eluxa multitone horns & horn strobes

Description

Providing eight (8) alerting sounds in a single device, the Wheelock Eluxa multitone horns and horn strobes will meet most of your signaling needs. The nationally and internationally recognized alerting sounds include Horn, Bell, March Time Horn, Code-3 Tone, Code-3 Horn, Slow Whoop, Siren or Hi/Lo Tone. The Code-3 horn and tone patterns are engineered to comply with NFPA/ANSI Temporal Pattern specifications without requiring additional equipment. The multitone horn strobe models include an advanced power saving LED technology with a full range of candela settings for indoor wall and ceiling-mount applications.

High efficiency, LED technology

Eaton's high energy efficient technology leads the industry in lowest current draw across the full candela range, which reduces overall power consumption and costs in fire alarm systems. As the first notification appliances in the industry to utilize LED as the light source, this breakthrough design, resulting in best-in-class efficiency, enables material and system cost savings, allowing for a greater number of appliances on the notification appliance circuit and fewer power supplies. All strobe models feature six candela settings: 15, 30, 75, 110, 135, 185 cd on wall models and 15, 30, 75, 110, 150, 177 cd on ceiling models. Amber, blue, green, and red lens strobes are also available. See seperate data sheet for colored lens specifications.

Low profile design and rich feature set

Eluxa is feature rich with 6 candela settings in 1 device, two sound output levels: Standard dBA and High dBA, and pre-wire/pre-test via mounting plate with hinged feature for ease-of-installation. These products are suitable for indoor wall and ceiling mount applications. The ELMT is for both 24V and 12V system operation and the ELMTS is for 24V operation. All models may be used with filtered or unfiltered (full-wave-rectified) input voltages. Separate input terminals and shunt wires are provided to enable both audible and strobe to operate simultaneously from a single input or from two inputs using 4-wires.

Approvals and synchronization

The Eluxa notification appliances are listed under UL Standards 1638 and 464 and under CAN/ULC-S525 and CAN/ULC-S526. Listings also include California State Fire Marshall (CSFM), and Factory Mutual (FM). The appliances are Restriction of Hazardous Substances (RoHS) compliant and contain no mercury or other hazardous substances.

In addition, the Eluxa product line has been UL/ULC listed as compatible with all Fire Alarm Control Panels (FACP) and accessories that have been determined to be compatible with Exceder LED3 and Wheelock RSS strobe-based products, including the RSS, CH, E, EH, ET, ST, HS, MT, S8, SA, STH and Z Series. The listing also includes the ability to install the Eluxa strobes in the same notification zone and field of view with any Wheelock RSS strobe models making them backward compatible with our installed based of existing notifications.

Powering Business Worldwide

Features

- 8 signals in 1 device to provide superior sound penetration for various ambient conditions
  - Horn, Bell, March Time Horn, Code-3 Tone, Code-3 Horn, Slow Whoop, Siren or Hi/Lo Tone
- 2 field selectable sound output levels: Standard and High
- Code-3 horn and tone meet ANSI/NFPA temporal pattern for standard emergency evacuation signaling
- Audible and strobe can operate from a single NAC circuit or from separate NAC circuits with any of the (8) eight audible sounds
- Energy Efficient
  - LED technology provides industry's lowest current draw
  - Fewer power supplies required, smaller wire gage, reduced wire runs
- Low-Profile Design
  - Small footprint with sleek, modern aesthetics
- 6 Field Selectable Settings in 1 Device
  - Wall: 15, 30, 75, 110, 135, 185 cd
  - Ceiling: 15, 30, 75, 110, 150,177 cd
- Easy-to-Install
  - Mounting plate included with all models: Convenient capture hinge allows installers to easily hold the device while fastening the single-mount screw in place.
  - Pre-wire/pre-test capability to check for wiring and ground faults prior to appliance installation
  - Candela slide swith, Multitone DIP switch
  - Built-in level adjustment feature and snap-on grille cover
  - IN/OUT screw terminals provided for #12 to #18 AWG wires
  - Mounting options include ELSPKBB backboxes and 4" square, 2 1/8" deep backboxes for wall models and LSPKBB-C backboxes and 4" square, 2 1/8" deep backboxes for ceiling models
- Strobe Synchronization Components
  - Meet synchronizing standards with Wheelock's DSM Sync Modules, PS or INC Power Supplies or SAFEPATH products
  - Ability to mix xenon and LED strobes in the same field of view
- Compliance
  - UL 1638, UL 464, ULC-S525, ULC-S526
  - Factory Mutual (FM)
  - California State Fire Marshal (CSFM)
  - ADA/NFPA/ANSI/OSHA

Note: Please read these specifications and associated installation instructions, before using, specifying, or installing this product. Visit Eaton.com/Lifesafetynotification for current installation instructions.

General Notes

- Strobes are designed to flash at 1 flash per second minimum over their "Regulated Voltage Range." Note that NFPA-72 specifies a flash rate of 1 to 2 flashes per second and ADA Guidelines specify a flash rate of 1 to 3 flashes per second.
- All candela ratings represent minimum effective strobe intensity based on UL 1638.

Drawings

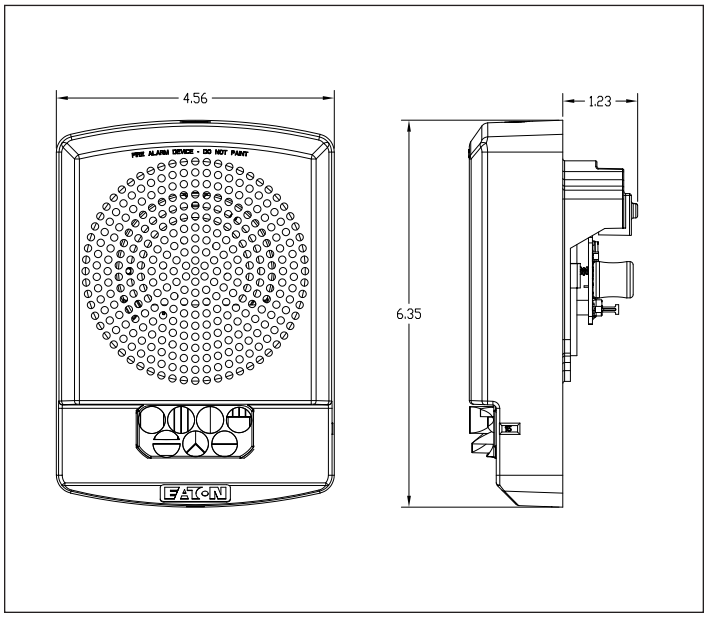


Figure 1. Wall multitone strobe

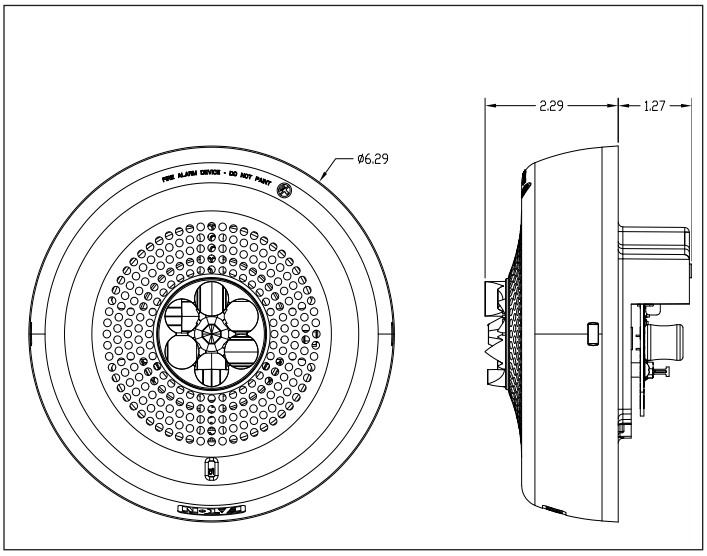
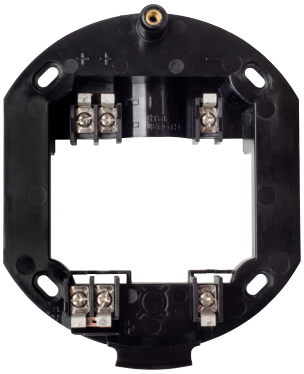


Figure 2. Ceiling multitone strobe

Mounting plate images



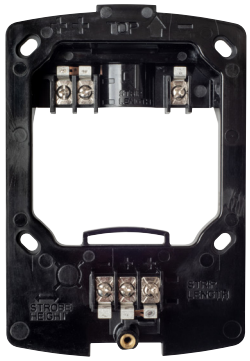


Table 1. Strobe ratings (Must add Alarm Tone current for combination.)

		UL/ULC Max Current ①							
		24VDC							
Model	Regulated Voltage Range VDC	15	30	75	110	135	150	177	185
ELMTS	16.0-33.0	0.022	0.030	0.060	0.086	0.125	0.125	0.185	0.185
ELMTSC	16.0-33.0	0.022	0.030	0.060	0.086				

Table 2. Maximum RMS current for audibles (VDC)

Alarm Tones	24 VDC		12 VDC	
	HI Output	STD Output	HI Output	STD Output
Horn	0.108	0.044	0.177	0.034
Bell	0.053	0.024	0.095	0.020
March Time Horn	0.104	0.087	0.142	0.034
Code-3 Horn	0.122	0.035	0.200	0.034
Code-3 Tone	0.135	0.035	0.152	0.021
Slow Whoop	0.098	0.037	0.142	0.035
Siren	0.104	0.036	0.152	0.030
HI/LO	0.057	0.025	0.114	0.026

Maximum RMS current for audibles (FWR)

Alarm Tones	24 FWR		12 FWR	
	HI Output	STD Output	HI Output	STD Output
Horn	0.087	0.045	0.177	0.039
Bell	0.067	0.028	0.095	0.023
March Time Horn	0.087	0.045	0.142	0.039
Code-3 Horn	0.087	0.045	0.200	0.039
Code-3 Tone	0.110	0.029	0.152	0.023
Slow Whoop	0.092	0.042	0.142	0.038
Siren	0.092	0.040	0.152	0.034
HI/LO	0.063	0.032	0.114	0.029

Table 3. dBA for Multitone Audible Portion

	Wall UL Reverberrant dBA at 10 Feet				Ceiling	
Alarm Tones	24 VDC		12 VDC (ELMT)		24 VDC	
	HI Output	STD Output	HI Output	STD Output	HI Output	STD Output
Horn	91	86	91	76	86	80
Bell	83	76	82	67	80	72
March Time Horn	88	83	88	73	82	77
Code-3 Horn	87	82	87	72	81	76
Code-3 Tone	85	80	85	70	79	74
Slow Whoop	90	84	89	73	85	79
Siren	89	84	89	74	85	79
HI/LO	88	84	88	72	85	81

	Wall ULC Anechoic dBA at 10 Feet				Ceiling	
Alarm Tones	24 VDC		12 VDC (ELMT)		24 VDC	
	HI Output	STD Output	HI Output	STD Output	HI Output	STD Output
Horn	99	93	99	86	97	91
Bell	89	81	87	73	90	82
March Time Horn	99	93	99	85	93	88
Code-3 Horn	99	93	99	86	97	91
Code-3 Tone	95	90	91	78	88	83
Slow Whoop	99	94	99	88	95	89
Siren	98	93	98	84	95	89
HI/LO	93	88	92	72	91	86

Table 4. Specification & Ordering Information

Model	Strobe Candela	Red	White	Lettering	Wall/Ceiling	Sync w/ DSM or Wheelock Power Supplies
Multitone strobes						
ELMTSR	15/30/75/110/135/185	X		FIRE	Wall	X
ELMTSW	15/30/75/110/135/185		X	FIRE	Wall	X
ELMTSR-N	15/30/75/110/135/185	X		No lettering	Wall	X
ELMTSW-N	15/30/75/110/135/185		X	No lettering	Wall	X
ELMTSRC	15/30/75/110/150/177	X		FIRE	Ceiling	X
ELMTSWC	15/30/75/110/150/177		X	FIRE	Ceiling	X
ELMTSR-A	15/30/75/110/135/185	X		AGENT	Wall	X
ELMTSW-A	15/30/75/110/135/185		X	AGENT	Wall	X
Multitone horns						X
						X
ELMTR		X		FIRE or N (No lettering)	Wall	X
ELMTW			X	FIRE or N (No lettering)	Wall	
Backboxes						
ELSPKBB-R		X			Wall	
ELSPKBB-W			X		Wall	
LSPKBB-CR		X			Ceiling	
LSPKBB-CW			X		Ceiling	

① RMS current ratings are per UL maximum RMS method. UL max current rating is the maximum RMS current within the listed voltage range (16-33v for 24v units). For strobes the UL max current is usually at the minimum listed voltage (16v for 24v units). For audibles the max current is usually at the maximum listed voltage (33v for 24v units). For unfiltered FWR ratings, see installation instructions.

Table 5. Specifications

Physical

Material	Red or white textured UV stabilized, colored impregnated engineered plastic. Exceeds 94V-0 UL flammability rating
Weight	Wall multitone strobe: 0.82 lbs (370g); Ceiling multitone strobe: 0.94 lbs (426g); Speaker Backbox: 0.44 lb (267g)
Lens	Light Emitting Diode (LED) in a rugged Lexan lens
Dimensions	ELMT: 6.35"H x 4.56" W x 1.54" D; ELMTS: 6.35"H x 4.56" W x 1.54" D; ELMTSC: 6.27" Diameter x 2.29" Depth
Operating Temperature	Indoor: 32°F to 122°F (0°C to 50°C) and maximum humidity of 93%
Mounting & Wire Connections	
Mounting (indoor only)	Mounting plate included with all models. ELMTS multitone strobes are for wall-mount applications only. ELMT multione horns can be used for wall or ceiling-mount applications. ELMTSC are for ceiling-mount applications. Mounting options include ELSPKBB backboxes and 4" square, 2 1/8" deep backboxes for wall models and LSPKBB-C backboxes and 4" square, 2 1/8" deep backboxes for ceiling models.
Wire Connections	#12 through #18 AWG
Power & General	
Operating voltage	24VDC/24VFWR; 12VDC/12VFWR (ELMT only)
Strobe Output Rating	UL 1638, ULC S526: Wall: Selectable 15, 30, 75, 110, 135, 185 candela output; Ceiling: Selectable 15, 30, 75, 110, 150, 177 candela output
Synchronization Models	Strobes can be synchronized with Wheelock's DSM Sync Modules, PS Power Supplies or SAFEPATH products, using Wheelock patented sync protocol

Architects and Engineers Specifications

The multitone appliances shall be Wheelock® ELMT multitone horns and ELMTS multitone strobes for wall-mount applications and ELMT multitone horns and ELMTSC multitone strobes for ceiling-mount applications with a low-profile design or approved equals. Notification appliance shall be electronic and use solid state components. Electromechanical alternatives are not approved. Each electronic appliance shall provide eight (8) field selectable alarm tones. The tones shall consist of: HORN, BELL, MARCH TIME HORN, CODE-3 HORN, CODE-3 TONE, SLOW WHOOP, SIREN and HI/LO. Tone selection shall be by dip switch. The multitones shall be UL Listed under Standard 464 for Audible Signal Appliances and multitones equipped with strobes shall be listed under UL Standard 1638.

The audible and the strobe shall be able to operate from a single NAC circuit or two independent circuits. The appliance shall provide two output sound levels: STANDARD and HIGH dBA. The HIGH dBA setting shall provide a typical 5 dBA increase in sound output at nominal voltage. The HIGH anechoic dBA at 10 feet on the alarm HORN SETTING shall be 99 dBA. Operating voltages shall be either 12 VDC or 24 VDC for ELMT models and 24VDC for ELMTS models, using filtered power or unfiltered power supply (full-wave-rectified). All models shall have provisions for standard reverse polarity type supervision and IN/OUT field wiring using terminals that accept #12 to #18 AWG wiring.

The series ELMTS/ELMTSC multitone strobe appliances shall produce a flash rate of one (1) flash per second over the Regulated Voltage Range and shall incorporate a Light Emitting Diode (LED) as the light source with a rugged Lexan® lens. The series shall be of low current design. The LED strobe flash duration shall be 20 ms. Where Multi-Candela appliances are specified, the strobe intensity shall have 6 field selectable settings at 15, 30, 75, 110, 135 and 185 candela for wall mount applications and 15, 30, 75, 110, 150 and 177 for ceiling applications. The selector switch for selecting the candela shall be tamper resistant. Appliances with candela settings shall show the candela selection in a visible location at all times when installed.

The multi-tones shall be designed for indoor surface or flush mounting and include a mounting plate. Mounting options shall include ELSPKBB back-boxes and 4" square, 2 1/8" deep back-boxes for wall models and LSPKBB-C back-boxes and 4" square, 2 1/8" deep back-boxes for ceiling models. The multi-tone and multi-tone strobe shall incorporate a mounting plate with a snap-on grille cover and shall mount to standard electrical hardware requiring no additional trim-plate or adapter. Removal of an appliance shall result in a supervision fault condition by the Fire Alarm Control Panel (FACP). All notification appliances shall be backwards compatible.

The ELMT wall model shall have a low profile measuring 6.35" H x 4.56" W x 1.54" D. The ELMTS wall model shall have a low profile measuring 6.35" H x 4.56" W x 1.54" D. The ELMTSC ceiling models shall have a low profile measuring 6.27" diameter and 2.29" D. Finish shall be red or white. Special lettering and amber, red, blue and green lens models shall be available.

When synchronization is required, the appliance shall be compatible with Wheelock®'s DSM Sync Modules, PS or INC Power Supplies, SAFEPATH products or other manufacturer's panels with built-in Wheelock® Patented Sync Protocol. The strobes shall not drift out of synchronization at any time during operation. If the sync protocol fails to operate, the strobe shall revert to a non-synchronized flash-rate and still maintain (1) flash per second over its Regulated Voltage Range. Multi-tone may be synchronized using Code 3 Horn setting and Wheelock Sync (DSM or PS).

UL 1638, UL 464, ULC-S525, ULC-S526, CSFM, FM, FCC, ICES

Note: Due to continuous development of our products, specifications and offerings are subject to change without notice in accordance with Cooper Wheelock Inc., dba Eaton standard terms and conditions.

NEMA Member

WE ENCOURAGE AND SUPPORT NICET CERTIFICATION
3 YEAR WARRANTY

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Life safety & mass notification solutions
273 Branchport Ave.
Long Branch, NJ 07740
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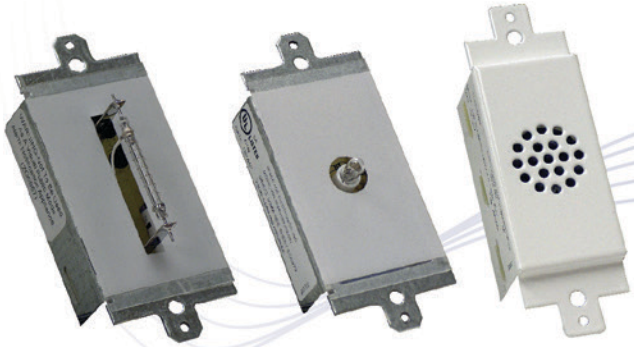
Publication No. TD450181EN
December 2022

Powering Business Worldwide

Infinity Series
Modular Components

IAV
Strobes, Lamps, and Horns



Offering a broad range of solutions to your general signaling needs, these modules are available in a variety of voltages, functions, and colors.

Features

- Durable steel frame mounts into an Infinity Gang Box or standard electrical back box and securely holds the Infinity Gang Plate
- Standard mounting hardware included

Specifications

Compatible with all IAM and ICM units. Lamps and strobes available in 12, 14, and 120 volts with red, blue, clear, amber, white, and green lenses. Lamps available flashing or non-flashing. Strobes flash 60 times per minute and Lamps flash approximately 30 times per minute. Horn is piezo driven white mini-horn with an operating voltage range of 12/24 VDC each with a HI and LO setting making its range 78-53 dBA @24 VDC and 73-48 dBA @12 VDC. Standard clinch type terminal strip used for field wiring. Operating temperature range -31°F to 150°F (-35°C to 66°C).

Current Draw

- **Strobe:**
  115mA @24VDC | 155mA @12VDC | 30mA @120VAC
- **Lamp:**
  96mA @24VDC | 125mA @12VDC | 50mA @120VAC
- **Horn:**
  25mA @24VDC HI | 2.5mA @24VDC LO
  73mA @12VDC HI | 2.7mA @12VDC LO

Agency Approvals

- UEES.E56737 UL Listed Visual-signal Appliance
  (Visual signaling appliance; Model V33, followed by -TJ12D, -TJ24D, -TJX1A, -TP12D, -TP24D, -TPX1A, -TE12D, -TE24D or -TEX1A intended for indoor use. Also suitable for outdoor use when used with the appropriate backbox and weatherproof kit SSU03030)
- 7300.0553-002 California State Fire Marshal (CSFM) Strobes Only
- 160-94-E B NYC Department of Buildings (MEA)

SPACE AGE ELECTRONICS

www.1sae.com | toll free **1.800.486.1723** | fax **508.485.4740**

ORDERING INFORMATION

Part #	Description
IAVSTR12 (V33-TJ12D)	12V Xenon Strobe
IAVSTR24 (V33-TJ24D)	24V Xenon Strobe
IAVST120 (V33-TJX1A)	120V Xenon Strobe
IAVSLM12 (V33-TP12D)	12V Steady Incandescent
IAVSLM24 (V33-TP24D)	24V Steady Incandescent
IAVSL120 (V33-TPX1A)	120V Steady Incandescent
IAVFLM12 (V33-TE12D)	12V Flashing Incandescent
IAVFLM24 (V33-TE24D)	24V Flashing Incandescent
IAVFL120 (V33-TEX1A)	120V Flashing Incandescent
IAVHORN	White Mini Horn
SSU03030	Weatherproof Kit

To select a colored lens, add the corresponding letter to your part number:
(ex. IAVSTR12R: 12V Xenon Strobe w/ Red Lens)

R: Red

B: Blue

C: Clear

A: Amber

W: White

G: Green

SPACE AGE ELECTRONICS

www.1sae.com | toll free **1.800.486.1723** | fax **508.485.4740**

MAINTENANCE SWITCH

Effective September 2014
PART# **GEM MAINT** Specify **3 POLE OR 4 POLE**
Optional Surface Mount Back Box
PART# **GEM 2GRB**

MAINTENANCE SWITCH

This MAINTENANCE panel is a key switch, which disconnects actuation circuits in the system to prevent accidental discharge during maintenance operations.

Two "LEDS" indicate "SYSTEM ARMED" and "SYSTEM INACTIVE". When the key is inserted and turned towards "SYSTEM INACTIVE", the red LED illuminates and the green LED indicating "SYSTEM ARMED" turns off. The key can only be removed in the "SYSTEM ARMED" position.

This panel is also available with the key removable in both the "ARMED" and the "INACTIVE" positions.

The information is silk-screened on a two-gang stainless steel plate.

INSTALLATION

The 2-Gang plate mounts to GEMCOM's Part# GEM 2GRB Surface Back Box and operates on 24VDC. This plate can also be flush mounted with a two-gang plaster ring on a deep 4" square 1900 box. Refer to Figures 1 & 2 for dimensions.

FIGURE 1

2 GANG PLATE
FRONT VIEW

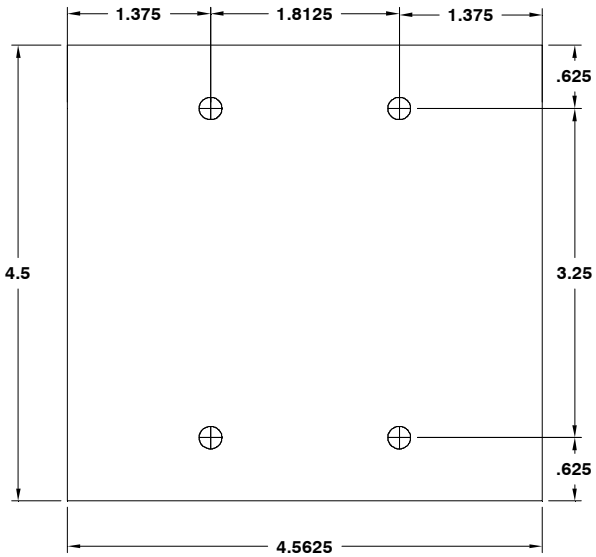
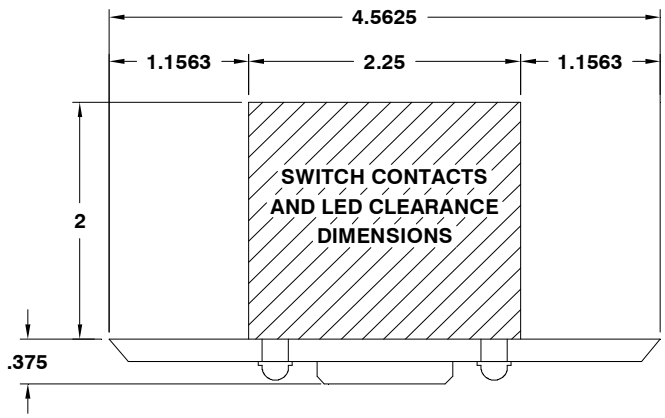


FIGURE 2

2 GANG PLATE
TOP VIEW



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MAINTENANCE SWITCH

Effective September 2014
PART# **GEM MAINT** Specify **3 POLE OR 4 POLE**
Optional Surface Mount Back Box
PART# **GEM 2GRB**

Switch rated at

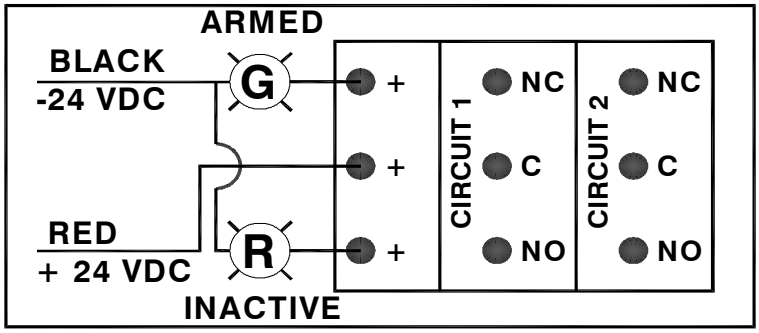
10A 250VAC, 15A 125-250VAC, the DC rating is 15A up to 30VDC.
Operating Temperature 32 to 120°F(0 to 49°C)
For dry indoor use only.
Listed UL 864, 9th edition.

LEDS rated at

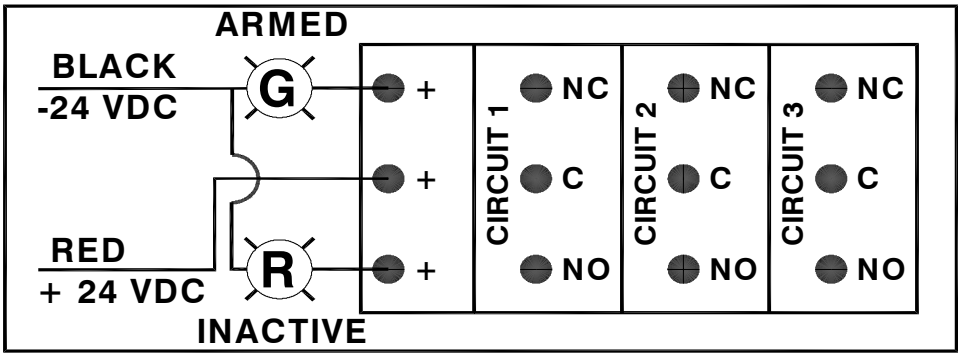
10mA each for a total current draw of 20mA.

Mounting screws supplied: (4) 6-32 x ½" and (4) 6-32 x 1"

3-POLE WIRING DIAGRAM



4-POLE WIRING DIAGRAM



REV A
SS104

FMM-1(A), FMM-101(A), FZM-1(A) & FDM-1(A)

Monitor Modules with FlashScan®

NOTIFIER® by Honeywell

Intelligent/Addressable Devices

General

Four different monitor modules are available for Notifier's intelligent control panels for a variety of applications. Monitor modules supervise a circuit of dry-contact input devices, such as conventional heat detectors and pull stations, or monitor and power a circuit of two-wire smoke detectors (FZM-1(A)).

FMM-1(A) is a standard-sized module (typically mounts to a 4" [10.16 cm] square box) that supervises either a Style D (Class A) or Style B (Class B) circuit of dry-contact input devices.

FMM-101(A) is a miniature monitor module a mere 1.3" (3.302 cm) H x 2.75" (6.985 cm) W x 0.65" (1.651 cm) D that supervises a Style B (Class B) circuit of dry-contact input devices. Its compact design allows the FMM-101(A) to be mounted in a single-gang box behind the device it monitors.

FZM-1(A) is a standard-sized module that monitors and supervises compatible two-wire, 24 volt, smoke detectors on a Style D (Class A) or Style B (Class B) circuit.

FDM-1(A) is a standard-sized dual monitor module that monitors and supervises two independent two-wire Style B (Class B) dry-contact initiating device circuits (IDCs) at two separate, consecutive addresses in intelligent, two-wire systems.

FlashScan® (U.S. Patent 5,539,389) is a communication protocol developed by NOTIFIER that greatly increases the speed of communication between analog intelligent devices. Intelligent devices communicate in a grouped fashion. If one of the devices within the group has new information, the panel CPU stops the group poll and concentrates on single points. The net effect is response speed greater than five times that of other communication protocols.

FMM-1(A) Monitor Module

- Built-in type identification automatically identifies this device as a monitor module to the control panel.
- Powered directly by two-wire SLC loop. No additional power required.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry of address: 01 – 159 on FlashScan loops; 01 – 99 on CLIP loops.
- LED flashes green during normal operation (programmable option) and latches on steady red to indicate alarm.

The FMM-1(A) Monitor Module is intended for use in intelligent, two-wire systems, where the individual address of each module is selected using the built-in rotary switches. It provides either a two-wire or four-wire fault-tolerant Initiating Device Circuit (IDC) for normally-open-contact fire alarm and supervisory devices. The module has a panel-controlled LED indicator. The FMM-1(A) can be used to replace MMX-1(A) modules in existing systems.

FMM-1(A) Applications

Use to monitor a zone of four-wire smoke detectors, manual fire alarm pull stations, waterflow devices, or other normally-open dry-contact alarm activation devices. May also be used to monitor normally-open supervisory devices with special supervisory indication at the control panel. Monitored circuit may be wired as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuit. A 47K Ohm End-of-Line Resistor (provided) terminates the Style B circuit. No resistor is required for supervision of the Style D circuit.

FMM-1(A) (Type H)

FMM-1(A) Operation

Each FMM-1(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC). A flashing LED indicates that the module is in communication with the control panel. The LED latches steady on alarm (subject to current limitations on the loop).

FMM-1(A) Specifications

Nominal operating voltage: 15 to 32 VDC.

Maximum current draw: 5.0 mA (LED on).

Average operating current: 375 µA (LED flashing), 1 communication every 5 seconds, 47k EOL.

Maximum IDC wiring resistance: 1500 Ohms.

Maximum IDC Voltage: 11 Volts.

EOL resistance: 47K Ohms.

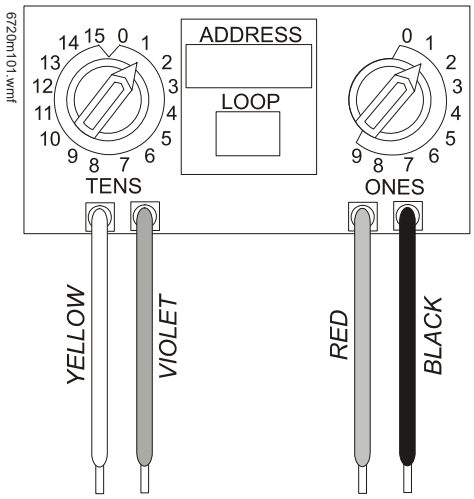
Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 1.25" (3.175 cm) deep. Mounts to a 4" (10.16 cm) square x 2.125" (5.398 cm) deep box.

FMM-101(A) Mini Monitor Module

- Built-in type identification automatically identifies this device as a monitor module to the panel.
- Powered directly by two-wire SLC loop. No additional power required.
- High noise (EMF/RFI) immunity.
- Tinned, stripped leads for ease of wiring.
- Direct-dial entry of address: 01 – 159 on FlashScan loops; 01 – 99 on CLIP loops.



The FMM-101(A) Mini Monitor Module can be installed in a single-gang junction directly behind the monitored unit. Its small size and light weight allow it to be installed without rigid mounting. The FMM-101(A) is intended for use in intelligent, two-wire systems where the individual address of each module is selected using rotary switches. It provides a two-wire initiating device circuit for normally-open-contact fire alarm and security devices. The FMM-101(A) can be used to replace MMX-101(A) modules in existing systems.

FMM-101(A) Applications

Use to monitor a single device or a zone of four-wire smoke detectors, manual fire alarm pull stations, waterflow devices, or other normally-open dry-contact devices. May also be used to monitor normally-open supervisory devices with special supervisory indication at the control panel. Monitored circuit/device is wired as an NFPA Style B (Class B) Initiating Device Circuit. A 47K Ohm End-of-Line Resistor (provided) terminates the circuit.

FMM-101(A) Operation

Each FMM-101(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC).

FMM-101(A) Specifications

Nominal operating voltage: 15 to 32 VDC.

Average operating current: 350 µA, 1 communication every 5 seconds, 47k EOL; 600 µA Max. (Communicating, IDC Shorted).

Maximum IDC wiring resistance: 1500 Ohms.

Maximum IDC Voltage: 11 Volts.

Maximum IDC Current: 450 µA.

EOL resistance: 47K Ohms.

Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 1.3" (3.302 cm) high x 2.75" (6.985 cm) wide x 0.65" (1.651 cm) deep.

Wire length: 6" (15.24 cm) minimum.

FZM-1(A) Interface Module

- Supports compatible two-wire smoke detectors.
- Supervises IDC wiring and connection of external power source.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry entry of address: 01 – 159 on FlashScan loops, 01 – 99 on CLIP loops.
- LED flashes during normal operation; this is a programmable option.
- LED latches steady to indicate alarm on command from control panel.

The FZM-1(A) Interface Module is intended for use in intelligent, addressable systems, where the individual address of each module is selected using built-in rotary switches. This module allows intelligent panels to interface and monitor two-wire conventional smoke detectors. It transmits the status (normal, open, or alarm) of one full zone of conventional detectors back to the control panel. All two-wire detectors being monitored must be UL compatible with the module. The FZM-1(A) can be used to replace MMX-2(A) modules in existing systems.

FZM-1(A) Applications

Use the FZM-1(A) to monitor a zone of two-wire smoke detectors. The monitored circuit may be wired as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuit. A 3.9 K Ohm End-of-Line Resistor (provided) terminates the end of the Style B or D (class B or A) circuit (maximum IDC loop resistance is 25 Ohms). Install ELR across terminals 8 and 9 for Style D application.

FZM-1(A) Operation

Each FZM-1(A) uses one of the available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC). A flashing LED indicates that the module is in communication with the control panel. The LED latches steady on alarm (subject to current limitations on the loop).

FZM-1(A) Specifications

Nominal operating voltage: 15 to 32 VDC.

Maximum current draw: 5.1 mA (LED on).

Maximum IDC wiring resistance: 25 Ohms.

Average operating current: 270 µA, 1 communication and 1 LED flash every 5 seconds, 3.9k eol.

EOL resistance: 3.9K Ohms.

External supply voltage (between Terminals T10 and T11):

- DC voltage: 24 volts power limited.
- Ripple voltage: 0.1 Vrms maximum.
- Current: 90 mA per module maximum.

Temperature range: 32°F to 120°F (0°C to 49°C).

Humidity range: 10% to 93% noncondensing.

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 1.25" (3.175 cm) deep. Mounts to a 4" (10.16 cm) square x 2.125" (5.398 cm) deep box.

FDM-1(A) Dual Monitor Module

The FDM-1(A) Dual Monitor Module is intended for use in intelligent, two-wire systems. It provides two independent two-wire initiating device circuits (IDCs) at two separate, consecutive addresses. It is capable of monitoring normally open contact fire alarm and supervisory devices; or either normally open or normally closed security devices. The module has a single panel-controlled LED.

NOTE: *The FDM-1(A) provides two Style B (Class B) IDC circuits ONLY. Style D (Class A) IDC circuits are NOT supported in any application.*

FDM-1(A) Specifications

Normal operating voltage range: 15 to 32 VDC.

Maximum current draw: 6.4 mA (LED on).

Average operating current: 750 µA (LED flashing).

Maximum IDC wiring resistance: 1,500 Ohms.

Maximum IDC Voltage: 11 Volts.

Maximum IDC Current: 240 µA

EOL resistance: 47K Ohms.

Temperature range: 32° to 120°F (0° to 49°C).

Humidity range: 10% to 93% (non-condensing).

Dimensions: 4.5" (11.43 cm) high x 4" (10.16 cm) wide x 1.25" (3.175 cm) deep. Mounts to a 4" (10.16 cm) square x 2.125" (5.398 cm) deep box.

FDM-1(A) Automatic Addressing

The FDM-1(A) automatically assigns itself to two addressable points, starting with the original address. For example, if the FDM-1(A) is set to address “26”, then it will automatically assign itself to addresses “26” and “27”.

NOTE: *“Ones” addresses on the FDM-1(A) are 0, 2, 4, 6, or 8 only. Terminals 6 and 7 use the first address, and terminals 8 and 9 use the second address.*

CAUTION:
Avoid duplicating addresses on the system.

Installation

FMM-1(A), FZM-1(A), and FDM-1(A) modules mount directly to a standard 4" (10.16 cm) square, 2.125" (5.398 cm) deep, electrical box. They may also be mounted to the SMB500 surface-mount box. Mounting hardware and installation instructions are provided with each module. All wiring must conform to applicable local codes, ordinances, and regulations. These modules are intended for power-limited wiring only.

The FMM-101(A) module is intended to be wired and mounted without rigid connections inside a standard electrical box. All wiring must conform to applicable local codes, ordinances, and regulations.

Agency Listings and Approvals

In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- **UL:** S635.
- **ULC:** S635.
- **FM Approved.**
- **CSFM:** 7300-0028:0219, 7165-0028:0224, 7165-0028:0243.
- **MEA:** 457-99-E.
- **U.S. Coast Guard:** 161.002/50/0 (NFS2-640, NFS2-320, NFS2-3030).
- **Lloyd’s Register:** 11/600013 (NFS2-640, NFS2-320, NFS2-3030).
- **Fire Dept. of New York:** COA #6121 (NFS2-640, NFS-320), COA# 6114 (NFS2-3030).

Product Line Information

NOTE: *“A” suffix indicates ULC-listed model.*

FMM-1(A): Monitor module.

FMM-101(A): Monitor module, miniature.

FZM-1(A): Monitor module, two-wire detectors.

FDM-1(A): Monitor module, dual, two independent Class B circuits.

SMB500: Optional surface-mount backbox.

NOTE: *See installation instructions and refer to the SLC Wiring Manual, PN 51253.*

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This document is not intended to be used for installation purposes.
We try to keep our product information up-to-date and accurate.
We cannot cover all specific applications or anticipate all requirements.
All specifications are subject to change without notice.

For more information, contact Notifier. Phone: (203) 484-7161, FAX: (203) 484-7118.
www.notifier.com

SAFETY DATA SHEET
Fluoro-K™ Fire Suppression Clean Agent (Dodecafluoro-2-methylpentan-3-one) (Fire Extinguishing Agent, Pressurized and Non-pressurized)

1. IDENTIFICATION

Product Name	Fluoro-K™ Fire Suppression Clean Agent (Dodecafluoro-2-methylpentan-3-one) (Fire Extinguishing Agent, Pressurized and Non-pressurized)
Recommended use of the chemical and restrictions on use	
Identified uses	Fire Extinguishing Agent
Restrictions on use	Consult applicable fire protection codes
Company Identification	Kidde-Fenwal, Inc. 400 Main Street Ashland, MA 01721 USA
Customer Information Number	(508) 881-2000
Emergency Telephone Number	
CHEMTREC Number	(800) 424-9300 (703) 527-3887 (International)
Issue Date	September 11, 2022
Supersedes Date	New SDS

Safety Data Sheet prepared in accordance with OSHA's Hazard Communication Standard (29 CFR 1910.1200) and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

2. HAZARD IDENTIFICATION

This SDS covers the product listed above as sold in pressurized and non-pressurized containers. GHS classifications for both forms are listed below.

GHS Classification – Pressurized

Hazard Classification
Chronic hazard to the aquatic environment - Category 3 (This classification not adopted by OSHA)
Gas under pressure – Compressed gas

Label Elements
Hazard Symbols

Signal Word: Warning

Hazard Statements
Harmful to aquatic life with long lasting effects.
Contents under pressure; may explode if heated.

2. HAZARD IDENTIFICATION

Precautionary Statements
Prevention
Avoid release to the environment.
Response
None
Storage
Protect from sunlight.
Store in well-ventilated place.
Disposal
Dispose of contents/container in accordance with local regulation.

GHS Classification: Non - pressurized

Hazard Classification
Chronic hazard to the aquatic environment - Category 3 (This classification not adopted by OSHA)

Label Elements
Hazard Symbols
None

Signal Word: None

Hazard Statements
Harmful to aquatic life with long lasting effects.

Precautionary Statements
Prevention
Avoid release to the environment.
Response
None
Storage
None
Disposal
Dispose of contents/container in accordance with local regulation.

Other Hazards
None identified.

Specific Concentration Limits
The values listed below represent the percentages of ingredients of unknown toxicity.

Acute oral toxicity	0%
Acute dermal toxicity	0%
Acute inhalation toxicity	0%
Acute aquatic toxicity	0%

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a substance.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Concentration
1,1,1,2,2,4,5,5,5,-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	>99.9%

Note: Pressurized product uses nitrogen as the expellant.

4. FIRST- AID MEASURES

Description of necessary first-aid measures

Eyes
Immediately flood the eye with plenty of water for several minutes, holding the eye open. Obtain medical attention if soreness or redness persists.
Skin
Wash skin thoroughly with soap and water. Obtain medical attention if irritation persists.
Ingestion
Rinse mouth. Obtain medical attention if you feel unwell.
Inhalation
Move victim to fresh air. Obtain medical attention immediately for any breathing difficulty.

Most important symptoms/effects, acute and delayed
Aside from the information found under Description of necessary first aid measures (above) and Indication of immediate medical attention and special treatment needed, no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed
Notes to Physicians
Treat symptomatically.

5. FIRE - FIGHTING MEASURES

Suitable Extinguishing Media
This preparation is used as an extinguishing agent and therefore is not a problem when trying to control a blaze. Use extinguishing agent appropriate to other materials involved. Keep pressurized containers and surroundings cool with water spray as they may rupture or burst in the heat of a fire

Specific hazards arising from the chemical
Predominant decomposition product is hydrogen fluoride in fire situations. By-products are irritating and potentially toxic. Pressurized containers may explode in heat of fire.

Special Protective Actions for Fire-Fighters
Wear full protective clothing and self-contained breathing apparatus as appropriate for specific fire conditions.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Wear appropriate protective clothing. Prevent skin and eye contact. Remove leaking container to a safe place. Ventilate the area.

6. ACCIDENTAL RELEASE MEASURES

Environmental Precautions
Prevent large quantities of the material from entering drains or watercourses.

Methods and materials for containment and cleaning up
Contain and absorb using earth, sand or other inert material. Transfer into suitable containers for recovery or disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Wear appropriate protective clothing.

Conditions for safe storage
Store at temperatures not exceeding 38°C/100°F. Pressurized containers should be properly stored and secured to prevent falling or being knocked over. Do not drag, slide or roll pressurized containers. Do not drop pressurized containers or permit them to strike against each other. Never apply flame or localized heat directly to any part of the pressurized or plastic container. Store pressurized and plastic containers away from high heat sources. Storage area should be: - cool - dry - well ventilated - under cover - out of direct sunlight

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

Fluoro-K™ Fire Suppression Clean Agent
Manufacturer's recommended exposure limit: 150 ppm, 8 hr TWA

Appropriate engineering controls
Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions.

Individual protection measures
Respiratory Protection
Wear respiratory protection if there is a risk of exposure to high vapor concentrations, aerosols or if material is exposed to extreme overheating. The specific respirator selected must be based on the airborne concentration found in the workplace and must not exceed the working limits of the respirator.
Skin Protection
Gloves
Eye/Face Protection
Chemical goggles or safety glasses with side shields.
Body Protection
Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Non- Pressurized

Appearance	
Physical State	Liquid
Color	Colorless
Odor	Slight
Odor Threshold	No data available
pH	Not applicable
Specific Gravity	1.6
Boiling Range/Point (°C/F)	49.2 °C/120.6 °F
Melting Point (°C/F)	-108 °C/-162.4 °F
Flash Point (PMCC) (°C/F)	Not flammable
Vapor Pressure	0.3260 bar @ 20 °C
Evaporation Rate (BuAc=1)	>1
Solubility in Water	Nil
Relative Vapor Density (Air = 1)	11.6
VOC (g/l)	1600 g/l
VOC (%)	100%
Partition coefficient (n-octanol/water)	No data available
Kinematic Viscosity	No data available
Auto-ignition Temperature	Not applicable
Decomposition Temperature	No data available
Upper explosive limit	None detected
Lower explosive limit	None detected
Flammability (solid, gas)	No data available
Particle Characteristics	Not applicable

Expellant - Nitrogen

Appearance	
Physical State	Compressed gas
Color	Colorless
Odor	None
Odor Threshold	No data available
pH	Not applicable
Specific Gravity	No data available
Gas Density	0.075 lb/ft^3 @70°F as vapor
Boiling Range/Point (°C/F)	-196°C/-321 °F
Melting Point (°C/F)	-210°C/-346 °F
Flash Point (PMCC) (°C/F)	Not flammable
Vapor Pressure	No data available
Evaporation Rate (BuAc=1)	No data available
Solubility in Water	0.2 g/l
Relative Vapor Density (Air = 1)	0.97
VOC (g/l)	None
VOC (%)	None
Partition coefficient (n-octanol/water)	No data available
Kinematic Viscosity	Not applicable
Auto-ignition Temperature	No data available
Decomposition Temperature	No data available
Upper explosive limit	Not explosive

9. PHYSICAL AND CHEMICAL PROPERTIES

Lower explosive limit	Not explosive
Flammability (solid, gas)	Not flammable
Particle Characteristics	Not applicable

10. STABILITY AND REACTIVITY

Reactivity
Pressurized containers may rupture or explode if exposed to heat.

Chemical Stability
Stable under normal conditions.

Possibility of hazardous reactions
Hazardous polymerization will not occur.

Conditions to Avoid
Exposure to direct sunlight - ultraviolet light - contact with incompatible materials

Incompatible Materials
Strong bases - amines - alcohols - water

Hazardous Decomposition Products
Oxides of carbon - hydrogen fluoride - perfluoroisobutylene

11. TOXICOLOGICAL INFORMATION

Acute Toxicity
Fluoro-K™ Fire Suppression Clean Agent
Oral LD50 (rat) >5000 mg/kg (estimated)
Dermal LD50 (rat) >5000mg/kg (estimated)
Inhalation LC50 (rat) >5 mg/l 4hr
Nitrogen
Simple asphyxiant

Specific Target Organ Toxicity (STOT) – single exposure
Fluoro-K™ Fire Suppression Clean Agent: All data were negative in a 2 hour rat inhalation study (nervous system). The NOAEL was determined to be 10,000ppm. All data were negative in a 17 minute dog inhalation study (cardiac sensitization).
Nitrogen: Exposure to nitrogen gas at high concentrations can cause suffocation by reducing oxygen available for breathing. Breathing very high concentrations can cause dizziness, shortness of breath, unconsciousness or asphyxiation.

Specific Target Organ Toxicity (STOT) – repeat exposure
Fluoro-K™ Fire Suppression Clean Agent: NOAEL from 28-day inhalation study in rats was determined to be 300000 mg/m3 (6h/d, 5d/w). Results indicate Fluoro-K™ Fire Suppression Clean Agent is not expected to cause target organ effects after repeat exposure.

Serious Eye damage/Irritation
Fluoro-K™ Fire Suppression Clean Agent: No significant irritation to eyes in rabbit study.

11. TOXICOLOGICAL INFORMATION

Skin Corrosion/Irritation
Fluoro-K™ Fire Suppression Clean Agent: No significant irritation to skin in rabbit study.

Respiratory or Skin Sensitization
Fluoro-K™ Fire Suppression Clean Agent: Did not cause skin sensitization in guinea pig study.

Carcinogenicity
Not considered carcinogenic by NTP, IARC, and OSHA.

Germ Cell Mutagenicity
Fluoro-K™ Fire Suppression Clean Agent: Not mutagenic in both in vitro mammalian chromosome aberration test and mammalian cell gene mutation test.

Reproductive Toxicity
Fluoro-K™ Fire Suppression Clean Agent: Not toxic to male reproduction, female reproduction or development in rat inhalation study. The NOAEL was determined to be 3000ppm.

Aspiration Hazard
Not an aspiration hazard.

Quality
The NFPA 2001 purity specifications and cardiac sensitization NOAEL help to address the safety of agents included in the standard. Historically, the unstated safety assumptions have been as follows:

1. The NOAEL for cardiac sensitization will be protective for all other end points of acute toxicity.

2. 99 percent purity precludes the presence of impurities that could impact the NOAEL for agent acute toxicity. However, there are some impurities that, when present at less than 1 percent by weight in the liquid agent, could result in acute toxicity at agent concentrations below the NOAEL for cardiac sensitization. Hexafluoropropylene (HFP) thermodynamic and kinetic dimers are examples of such impurities. For these dimers, a 5-minute exposure to a concentration in air greater than 10 ppm by volume for the HFP thermodynamic dimer or greater than 300 ppm by volume for the HFP kinetic dimer could cause toxicological effects. [Maranion, 2020] For FK-5-1-12 at a use concentration of 10 percent by volume in air, these levels would translate to 95 ppm (0.0095 percent) by weight in the liquid agent for the thermodynamic dimer and 2850 ppm (0.2850 percent) by weight in the liquid agent for the kinetic dimer.

Note: Each batch of FK-5-1-12 is tested to ensure the PPM for these Dimers is lower than these upper threshold limits.

12. ECOLOGICAL INFORMATION

Ecotoxicity
Fluoro-K™ Fire Suppression Clean Agent
LC50 Zebra fish >1070 mg/l 96h
EC50 Daphnia magna >1080 mg/l 48h
EC50 Pseudokirchneriella subcapitata 10.6mg/l 72h
Classified by ECHA as Aquatic Chronic 3: Harmful to aquatic life with long lasting effects.

Mobility in soil
Fluoro-K™ Fire Suppression Clean Agent: Product is highly insoluble in water and volatile.

Persistence/Degradability
Fluoro-K™ Fire Suppression Clean Agent: Not readily biodegradable

Bioaccumulative Potential
BCF = 1.2 – 4.8

Other adverse effects
No relevant studies identified.

13. DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose of container in accordance with all applicable local and national regulations.

14. TRANSPORT INFORMATION

Safety Data Sheet information is intended to address a specific material and not various forms or states of containment.

Pressurized Containers

DOT CFR 172.101 Data	Fire extinguishers, 2.2, UN1044
UN Proper Shipping Name	Fire extinguishers
UN Class	(2.2)
UN Number	UN1044
UN Packaging Group	Not applicable
Classification for AIR Transportation (IATA)	Consult current IATA Regulations prior to shipping by air.
Classification for Water Transport IMDG	Consult current IMDG Regulations prior to shipping by water. Fire extinguishers, 2.2, UN1044

Non-pressurized Containers

DOT CFR 172.101 Data	Not Regulated
UN Proper Shipping Name	Not Regulated
UN Class	None.
UN Number	None.
UN Packaging Group	None.
Classification for AIR Transportation (IATA)	Consult current IATA Regulations prior to shipping by air.
Classification for Water Transport IMDG	Consult current IMDG Regulations prior to shipping by water.

This section is believed to be accurate at the time of preparation. It is not intended to be a complete statement or summary of the applicable laws, rules, or hazardous material regulations, and is subject to change. Users have the responsibility to confirm compliance with all laws, rules, and hazardous material regulations in effect at the time of shipping.

15. REGULATORY INFORMATION

United States TSCA Inventory
This product contains ingredients that are listed on or exempt from listing on the EPA Toxic Substance Control Act Chemical Substance Inventory.

Canada DSL Inventory
All ingredients in this product are listed on the Domestic Substance List (DSL) or the Non-Domestic Substance List (NDSL) or are exempt from listing.

SARA Title III Sect. 311/312 Categorization: Pressurized
Gas under pressure
SARA Title III Sect. 311/312 Categorization: Non-pressurized
None

SARA Title III Sect. 313
This product does not contain any chemicals that are listed in Section 313 at or above de minimis concentrations.

16. OTHER INFORMATION

NFPA Ratings
NFPA Code for Health - 1
NFPA Code for Flammability - 0
NFPA Code for Reactivity - 1
NFPA Code for Special Hazards - None

Legend
ACGIH: American Conference of Governmental Industrial Hygienists
CAS#: Chemical Abstracts Service Number
ECHA: European Chemicals Agency
EC50: Effect Concentration 50%
IARC: International Agency for Research on Cancer
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
N/A: Denotes no applicable information found or available
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
TLV: Threshold Limit Value
TSCA: Toxic Substance Control Act

P/N: SDS_KFS_45_0003_EN

Revision Date: September 11, 2022
Replaces: March 11, 2020
Changes made: Update to sections 11 and 16.

Information Source and References
This SDS is prepared by Hazard Communication Specialists based on information provided by internal company references.

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