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DESCRIPCIÓN TÉCNICA DE LA SOLUCIÓN DE FUEGO

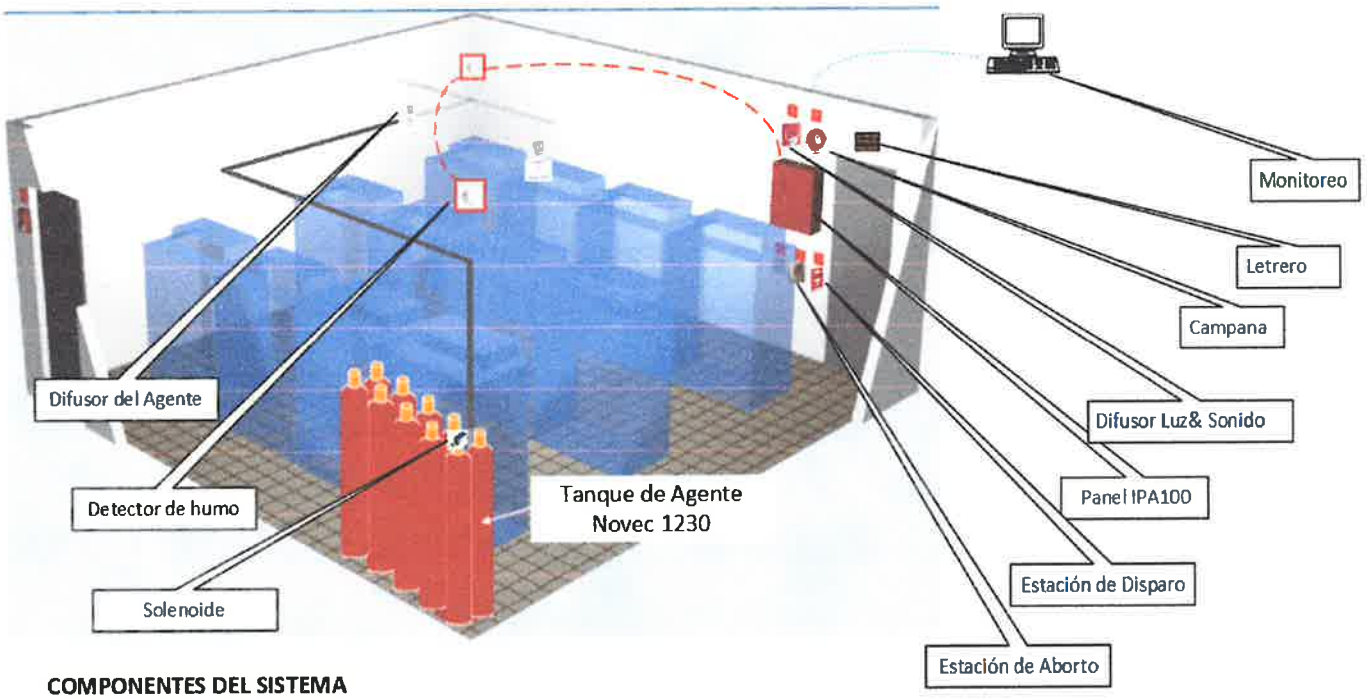
Por medio de la presente se ofrece una descripción técnica de la solución a implementar para el combate de fuego con agente limpio NOVEC 1230, para las tres salas solicitadas. El Data Center y cuarto de inversor en Santo domingo y el Data Center de La Romana.

En el siguiente diagrama podrán observar los diferentes componentes del sistema, para el combate de fuego los cuales serán explicados en detalle.

La solución es similar en cada una de las salas, variando solo la cantidad de agente necesario para lograr la extinción del fuego

De igual forma se presentará un gráfico para el sistema de detección temprana por aspiración, los cuales será explicados en detalle.

DIAGRAMA DEL SISTEMA DE COMBATE DE FUEGO CON AGENTE LIMPIO NOVEC 1230



COMPONENTES DEL SISTEMA

- Tanque con Agente
- Solenoide
- Difusor del Agente
- Detectores de humo
- Estación Manual de Disparo
- Difusor de luz & sonido
- Panel de descarga IPA100
- Campana
- Botón de Aborto
- Letrero

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Calle E # 5, Altos de Arroyo Hondo II, Santo Domingo, Rep. Dominicana, Tel: (809) 381-0660, email: info@idcorpsa.com, Web: www.idcorpsa.com

El sistema de combate ilustrado proviene del desarrollo de un cálculo hidráulico donde se determina la concentración del agente extintor Novec 1230 para el volumen específico de cada sala. En el siguiente cuadro se puede ver el resultado para una sala:

SEVO SYSTEMS

DATE: 10/26/2022

NOVEC 1230 SYSTEM - CALC CHART

NOTE: This calculation is only an estimate and must be reviewed by the installer.
NOTA: Estos cálculos son un estimado y deben ser revisados por el integrador.

QUOTATION: 1796
CUSTOMER: La Romana
REF: Junta Central Electoral

VOLUME 1: sala de data

LENGTH (M)	WIDTH (M)	HEIGTH (M)	NOZZLES 180°	NOZZLES 360°
9.89	4.12	3.55	1	

VOLUME IN M 3 130.02514
VOLUME IN FT 3 4592.466756

DESIGN CONCENTRATION	AT SEA LEVEL	ELEVATION CORRECTION FACTOR	WEIGHT PER UNIT OF VOL FOR INDICATED TEMP	NOVEC (LB) TO BE USED
NOVEC lb for 4.5%vol	186.4869536	1.00	0.0406	190.22
NOVEC lb for 4.5%vol	186.4869536	1.00	0.0406	190.22
NOVEC lb for 5.85%vol	246.6154648	1.00	0.0537	251.55
NOVEC lb for 6.0%vol	253.5041649	1.00	0.0552	258.57

METERS OVER THE SEA LEVEL	FEET OVER THE SEA LEVEL	TEMPERATURE (°C)
1	3.3	20

Height above sea level (ft)	Use correction factor
-3000	1.11
-2000	1.07
-1000	1.04
0	1
1000	0.96
2000	0.93
3000	0.89
4000	0.86
5000	0.82
6000	0.79
7000	0.75
8000	0.72
9000	0.69
10000	0.65

Reference
1 ft.
0.3048 m

NOZZLE COVERAGE
360° Nozzle coverage: 9.76m x 9.76m
180° Nozzle coverage: 9.76m x 9.76m
Maximum nozzle height: 4.30m

GENERAL INFORMATION NOVEC1230	
TOTAL NOZZLES 180°	1
TOTAL NOZZLES 360°	0

Total NOVEC (lbs) 4.5% Conc. (NFPA2001 ed 2018 Class A)	190.22
Total NOVEC (lbs) 4.5% Conc. (NFPA2001 ed 2018 Class C)	190.22
Total NOVEC (lbs) 5.85% Conc. (NFPA2001 ed 2018 Class B)	251.55
Total NOVEC (lbs) 6.00% Conc. For Voltages above 480V	258.57

Part. Number	Cylinder Sizes	Allowable Fill (lb)
CV 140069	40lbs - Ø 244.4mm Weight: 38lbs	16 - 40
CV 140079	76lbs - Ø 244.4mm Weight: 52lbs	31 - 76
CV 14817	104lbs - Ø 327.0mm Weight: 95lbs	66 - 164
CV 140057	322lbs - Ø 508.0mm Weight: 220lbs	129 - 322
CV 14813	601lbs - Ø 508.0mm Weight: 320lbs	241 - 601
CV 140107	910lbs - Ø 622.3mm Weight: 442lbs	390 - 910

VOLUME 2:

LENGTH (M)	WIDTH (M)	HEIGTH (M)	NOZZLES 180°	NOZZLES 360°

VOLUME IN M 3 0
VOLUME IN FT 3 0

DESIGN CONCENTRATION	AT SEA LEVEL	ELEVATION CORRECTION FACTOR	WEIGHT PER UNIT OF VOL FOR INDICATED TEMP	NOVEC (LB) TO BE USED
NOVEC lb for 4.5%vol	0	1.00	0.0406	0.00
NOVEC lb for 4.5%vol	0	1.00	0.0406	0.00
NOVEC lb for 5.85%vol	0	1.00	0.0537	0.00
NOVEC lb for 6.0%vol	0	1.00	0.0552	0.00

Descripción del funcionamiento:

La sala del Data Center de Santo Domingo tiene dos detectores de humo en la sala y otros dos detectores de humo bajo el piso técnico y en ambos ambientes trabajan como zonas cruzadas, es decir hay un detector A y un detector B (PAD-200PD), en la sala que operan en forma independiente. Si uno de los dos se activa, envía una señal al Panel IPA100 el cual entra en Pre-Alarma activando un difusor de luz y sonido (HS-24WR), instalado en la parte exterior de la sala y quedará a la espera de que el detector B se active, con lo cual, se descarta que sea una falsa alarma (lo mismo ocurre bajo el piso técnico). Al activarse el detector B, el panel pasa a un estado de Alarma, y se activa la campana (MBA-624), que también está instalada en el lado exterior. En este momento se inicia un conteo regresivo (normalmente configurado en 60 segundos, pero que puede variarse acorde a la dificultad de que un funcionario pueda acudir a atender la emergencia), y de no tomarse

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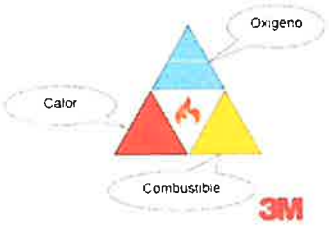
ninguna acción, el sistema enviará la señal al solenoide (MA3033T), que se encuentra en el cilindro y el agente extintor se liberará inundando la sala con la concentración establecida en el cuadro anterior.

El agente extintor, Novec 1230 producido por 3M se encuentra en estado líquido dentro del tanque bajo una presión de 500psi y al liberarse viaja por la tubería hasta la boquilla de descarga, donde ese difusor (N180-2.0"), lo convierte en forma de gas, el cual elimina el calor, factor indispensable para que se haga el fuego, como se ve en el gráfico adjunto que ilustra los componentes necesarios para que se produzca fuego.



Un letrero luminoso en el exterior de la sala se iluminará indicando que hay una descarga del agente y deberá ser atendido por un personal entrenado. El agente no es tóxico para el ser humano en la concentración establecida y no contamina la atmósfera, por ello se denomina, agente limpio. Adicionalmente no afecta los equipos electrónicos que pueden seguir operando en su presencia.

Es importante indicar que el sistema de combate explicado no soluciona la causa que está generando el fuego, solo está impidiendo que progrese, por lo que es necesario que, al entrar personal a la sala, verifique y contenga la causa que lo está generando.

Es necesario verificar la integridad de la sala para que el agente no salga de ella hasta que la situación sea atendida y por ello, el aire acondicionado debe ser de circuito cerrado y las aberturas que generan las tuberías de entrada y salida sean selladas.

En la sala también se instala un botón de disparo (PAD100-PSDA) y uno de aborto (MAS-R / Abort), que permiten al personal detener la salida del agente durante el proceso de alarma, (también hay una activación manual (MA3033T) en el mismo cilindro, el cual le da 180 segundos de espera y de no tomarse acción vuelve a iniciar el conteo regresivo. Con el botón de disparo se da instrucción al panel para realizar la salida del gas en forma inmediata sin esperar que los procesos de pre alarma y alarma se desarrollen, dado que la emergencia es visible y el personal entiende que el uso de un extinguidor manual que hay en la sala no será suficiente para contener el fuego.

El cilindro posee un switch de mantenimiento que elimina la acción del solenoide, que se usa durante los procesos de mantenimiento o de una actividad de pintura o fumigación de la sala que pudiera engañar a los detectores.

El Panel IPA100 tiene una característica especial y es la de que posee un puerto nativo de red TCP/IP aprobado por UL/FM de forma que puede comunicarse con una plataforma de monitoreo llamada Intelliview, que en una PC monitorea el estado del panel y de sus componentes. Esta plataforma tiene la posibilidad de monitorear múltiples paneles en forma simultánea, por lo que se podrá manejar en un solo punto las otras salas como el de Inversore y el data center de La Romana. La Romana podrá ser monitoreada también de forma local. El cliente debe suministrar la computadora conectada en su red TCP/IP. También hay la posibilidad vía el internet de comunicarse con el servidor en la nube del fabricante Potter para realizar este monitoreo.

El Panel IPA-100 posee un respaldo de baterías en su gabinete, pero debe ofrecerse un suministro de energía regulada y protegida con UPS. Así mismo tiene un protector de sobre tensión para protegerlo de la entrada de un pico de energía.

Los equipos y procedimientos indicados son los mismos para las demás salas, solo difiere que las otras no poseen piso técnico por lo que no hay una protección bajo el piso y que las cantidades de agente extintor han sido calculadas por el tamaño de cada sala.

Presentamos las características del agente, emitidas directamente por el fabricante:

Características en la Seguridad y la Salud de las personas.

- No se presenta sensibilidad cardiaca a niveles menores o igual a: NOAEL = 10%
- No se presenta Toxicidad aguda al inhalar el agente durante 4 horas dentro de los Niveles NOAEL = 10%
- Estos Datos Fueron estudiados y revisados por diversas organizaciones independiente.

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Margen de Seguridad al Implementar Novec 1230

Consideraciones de Seguridad:

Agente	Concentración de trabajo	NOAEL*	Margen de seguridad
Novec 1230	[1]4.2% - [2]5.85%	10%	[2]71% - [1]138%
Halon 1301	5%	5%	NIL
HFC-227ea	[1]6.25% - [2]8.7%	9.0%	[2]3% - [1]44%
HFC-125	[1]8.0% - [2]11.3%	7.5%	Negative

* No Observed Adverse Effect Level

[1] Class A Fuels
[2] Class B Fuels

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También podemos ver como el agente cumple un papel ecológico en la naturaleza y el tiempo que permanece en la atmósfera, como se ilustra en el siguiente cuadro:

Novec 1230 Una solución sustentable a largo plazo

Properties	Novec™ 1230	halon 1301*	HFC-125*	HFC-236fa*
Ozone Depletion Potential	0.0	10.0	0.0	0.0
Global Warming Potential	<1	7030	3500	9500
Atmospheric Lifetime (years)	0.014	65	29	240
SNAP Approval	Yes	No	Yes	Yes

* IPCC 2001

3M

www.3M.com/Novec1230Fluid

3M™ Novec 1230 Fluid

- Supresor de incendios que apaga fuegos de clase A, B & C
- Es una Fluorocetona, no un HFC
- Dielectrico – no conduce electricidad- no dañará equipos electronicos, mecanicos, ni documentos
- Extincion rapida
- No deja residuo
- Nivel mas alto de seguridad
- No hay desgaste de la capa de ozono
- Tiempo en la atmosfera de 5 dias
- Bajo potencial de Calentamiento Global - valor menos que 1 (CO_2 =1)

3M

DETECCIÓN TEMPRANA POR ASPIRACIÓN

El otro sistema que estará presente en la solución de protección de fuego es la detección temprana por aspiración, que consiste, como pueden ver en el siguiente gráfico, de un sistema complementario en el cual, una tubería de CPVC recorre las áreas sensitivas de la sala y está conectada a un dispositivo que succiona aire de esa tubería 24/7 a través de pequeños orificios.

Este aire ingresa a una cámara donde es analizada su composición, detectando los componentes que se encuentran en el fuego, aun en forma incipiente, sin haber presencia de llama, y por ello se denomina detección temprana, pues da una alerta con anticipación al inicio del fuego, lo que ofrece un tiempo precioso para acudir a atender cualquier emergencia que esté en proceso de crearse!

El sistema seleccionado para la Junta Central Electoral es el VESDA 250, uno de los más reconocidos a nivel mundial en esta categoría, el cual pasaremos a dar sus características principales.

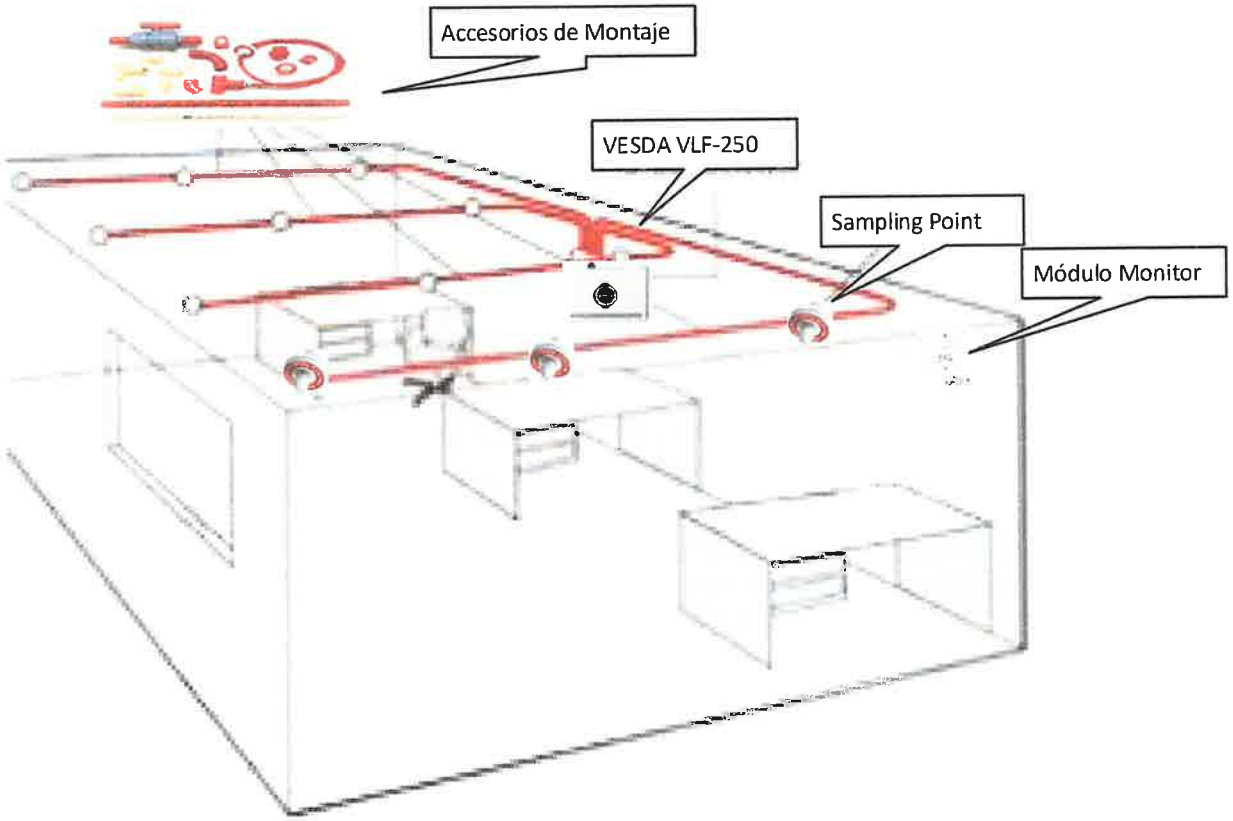
Este equipo se interconectará con el Panel IPA100 a través de un módulo monitor que recibe ya sea una señal de alarma, como una señal de avería, pudiendo así controlar su operación en tiempo real.

El módulo permite una tubería de hasta 25 metros con hasta 12 puntos de muestreo, aunque solo se necesitarán colocar 5 puntos en unos 12 metros lineales de tubería.

El módulo monitor de alarma y falla recibe la información del Vesda 250 y la redirecciona al Panel IPS-100, el cual notifica al centro de monitoreo, y a su vez activa las alarmas correspondientes con el difusor de luz y sonido programada para ello.

El Vesda también posee hasta 3 salidas de las cuales pueden tener una alarma visual y sonora de su activación.

DIAGRAMA DEL MÓDULO DE DETECCIÓN TEMPRANA POR ASPIRACIÓN:



La unidad de aspiración permite tener un cubrimiento hasta de 250 metros cuadrados, lo cual cubre ampliamente el tamaño de cada una de las salas. Esta unidad está absorbiendo el aire de la sala constantemente a través de los "puntos de muestreos", el cual es filtrado y pasado a una cámara de inspección que puede detectar las pequeñas partículas de carbón que conforman el humo independiente de la temperatura o humedad que contengan generando una alarma cuando se sobrepasan los valores prestablecidos como normales. Guarda un récord de hasta 18,000 eventos con fecha y hora discriminando el nivel de humo, el flujo de aire, estatus del detector y fallas.

Dando respuesta a los puntos solicitados como requerimiento para la solución de combate, las adjuntando en forma secuencial:

·Método: sistema automatizado de supresión por inundaci6n total con agente limpio fabricado con un proceso conocido como fluoración electroquímica.

En el sitio oficial de 3M indica el cumplimiento de este punto. https://www.3m.com/3M/en_US/novec-us/resources/hot-topics/full-story/?storyid=efb61e5c-e2e3-4d02-b09f-c37cdc77be87

La tecnología fluoroquímica ha sido una tecnología central de 3M durante más de 60 años y 3M ha comercializado más de 30 productos de la marca Novec. Todos estos productos son soluciones inteligentes, seguras y sostenibles, fabricadas consistentemente con especificaciones y estándares de alta calidad. La tecnología de secreto comercial de 3M no ha sido replicada por los fabricantes genéricos y la replicación de los procesos de 3M no parece estar en el horizonte.

·Debe tener capacidad de detección temprana, alertas (visuales y sonoras) y monitoreo remoto y capacidad de integrarse con otros sistemas de monitoreo.

La propuesta incluye un sistema de detección temprana por aspiración fabricado por Xtralis y los paneles Potter incluyen un puerto nativo TCP/IP por el cual pueden ser monitoreados por la plataforma Intelliview de Potter.

·El agente utilizado de ser seguro para uso en espacios ocupados, ambientalmente sustentable, no sea conductor eléctrico, capaz de extinguir un incendio en su etapa incipiente y reconocido por estándares internacionales, tales como NFPA 2001 e ISO14520

Se adjunta el boletín informativo del Novec 1230 que contiene todos los detalles técnicos del producto para extinguir el fuego y su relación ambiental; así como, se adjuntan las certificaciones de Registro ISO 14001 y la ISO 9001:2008

·El agente debe ser fabricado bajo las normas ISO 9001 e ISO 14001. Si cumple, certificados adjuntos.

·El equipo deberá estar listado por UL y aprobado por FM y el agente extintor deberá ser un componente reconocido por UL o FM para uso en el sistema. Si cumple, certificados adjuntos y hoja técnica de 3M

·Los cilindros del sistema estarán etiquetados indicando el fabricante del sistema y la marca de! agente. Si cumple

·El fluido de agente limpio debe tener un potencial de agotamiento de ozono (PA 0) igual a cero. El PAO debe estar en conformidad con la Agencia de Protección ambiental (EPA) de los Estados Unidos. Si cumple, ver hoja técnica en el boletín informativo Novec 1230 adjunto.

·El fluido agente limpio deberá tener potencial de calentamiento global (GWP) de> 1 (100 años ITH). Si cumple, ver hoja técnica en el boletín informativo Novec 1230 adjunto.

·El fluido de agente limpio no debe emitir gases de efecto invernadero ni ser agotador de ozono. Tampoco debe contener perfluorocarbonos (PFC), hidrofluorocarbonos (HFC) ni hidroclorofluorocarbonos (HCFC). Si cumple, ver hoja técnica en el boletín informativo Novec 1230 adjunto

IDCorp, s.r.l.

·El agente limpio debe tener un factor de seguridad mínimo del 60% entre el porcentaje de concentraci6n de diseño y el nivel sin efecto adverso observado (N0AEL) para los peligros de clase A y C. Si cumple, ver hoja técnica en el boletín informativo Novec 1230 adjunto

·La concentración mínima de extinción (MEC) determinada por la prueba según las normas reconocidas de los laboratorios de prueba (es decir, UL 2166, FM 5600) no deberá ser superior al 3,3%." Si cumple, Ver lo especificado en la siguiente tabla de NFPA 2001 Edo 2018, en la cual se basa el cálculo hidráulico de nuestros sistemas

Table A.5.4.2.2(b) Class A Flame Extinguishing and Minimum Design Concentrations Tested to UL 2166 and UL 2127

Agent	Class A MEC	Class A Minimum Design Concentration	Class C Minimum Design Concentration
FK-5-1-12	[illegible]	4.5	4.5
HFC-125	6.7	8.7	9.0
HFC-227ea	5.2	6.7	7.0

·El sistema debe estar certificado por el fabricante del sistema de supresión de incendios para que tenga un nivel de ruido durante la descarga del agente que no exceda los 110 dB, de 0,5 a 5,0 kHz, por un periodo mayor a 20 segundos, a una distancia de tres pies de la tobera de descarga de gas. Pendiente de recibir certificación del fabricante sobre este punto.

·El fabricante deberá proporcionar pruebas certificadas que documenten los niveles de ruido medidos y registrados por LZFmax según la frecuencia central de banda de 1 /3 de octava u otro medio aprobado. Pendiente de recibir certificación del fabricante sobre este punto.

·Adicionar extintores manuales en la propuesta. La propuesta incluye extinguidor con agente limpio para cada sala.

NOTA:

POR INSTRUCCIONES DADAS POR LA JCE EN LAS RESPUESTAS A LOS OFERENTES, DONDE SOLICITA QUE SE DE LA OPCIÓN DE PROTECCIÓN DE COMBATE AL CUARTO DE INVERSORES BAJANDO LA ALTURA DEL TECHO A 2.60 METROS, ENCONTRARÁN 2 OFERTAS ECONÓMICAS

IDCorp, s.r.l.

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2004

This is to certify that:

3M Company
Cordova Plant
22614 Route 84 North
Cordova
Illinois
61242
USA

Holds Certificate No: **EMS 544342**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2004 for the following scope:

The environmental management system of 3M Company, Cordova Plant, for control of environmental risk associated with manufacture of specialty chemicals, coating solutions, and performance fluids at Cordova, Illinois, USA.

This certificate is traceable to this company's original registration certificate No.A9223 dated January 26, 2001, and issued by Underwriters Laboratory registrar.

For and on behalf of BSI:

VP Regulatory Affairs, BSI Group America Inc.

Originally Registered: **12/17/2008** Latest Issue: **05/09/2011** Expiry Date: **06/07/2013**

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

3M Company
Cordova Plant
22614 Route 84 North
Cordova
Illinois
61242
USA

Holds Certificate No: **FM 544341**
and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The design and manufacture of acrylate monomers, polymers, fluorochemical inert fluids, fluorochemical and aromatic surfactants, epoxy resins, urethane, prepolymers and resins, carbon absorbents, alkyd resins, curatives, amide dyes, polyester resins, butadiene-styrene polymers, acrylate-styrene copolymers, filled polyol solutions, blocked adiprene polymers, hydrated silicates, silicone polymers, phenolic resins, UV absorbers, fluorosulfonamides and urea-formaldehyde resins and specialty chemical compounds, to specifications agreed with internal 3M business units.

The off-site facility at St. Paul, MN performs design.

For and on behalf of BSI:

VP Regulatory Affairs, BSI Group America Inc.

Originally Registered: **11/24/2008** Latest Issue: **05/01/2012** Expiry Date: **05/15/2015**

SEVO™ SYSTEMS
LATIN AMERICA

Octubre 25 de 2022

Dirigida a
Junta Central Electoral

Referencia: **Certificación para ID Corp, SRL**

Respetado cliente:

Por medio de la presente **SEVO Systems**, fabricante de sistemas automáticos de extinción de incendio que utilizan el fluido de protección contra incendios **Novec™ 1230 de 3M™**, y con planta de producción principal ubicada en Lenexa, Kansas, Estados Unidos de América, certifica que la empresa **ID Corp, SRL** es Integrador autorizado para Republica Dominicana y cuenta con el personal técnico certificado para diseñar, suministrar, instalar, implementar y realizar mantenimiento de nuestros sistemas.

La presente certificación se expide a solicitud de **ID Corp, SRL** y tiene una validez de un (1) año a partir de la fecha.

Me suscribo a su disposición para atender cualquier inquietud en referencia a nuestra compañía o a lo indicado en la presente.

Cordialmente,

Ing. Jesús Banegas
Regional Business Manager
Central America & Caribbean

SEVO® Systems Latin America, LLC
14335 W. 97TH Ter, Lenexa, Kansas, 66215 USA
Tel +1.305.574.1577 Ext 4
jbanegas@sevosystems.com

CERTIFICATE

This is to certify that

SEVO Systems - Fire Fluid Technologies - SEVO System Hub Pvt. Ltd. - Fire Fluid Technologies MHX - SEVO Industrial Fire Protection

14335 West 97th Terrace
Lenexa, KS 66215
United States of America

has implemented and maintains a **Quality Management System**.

Scope:
The design, manufacture, assembly, distribution, and service of fire protection and fire extinguishing systems.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

Certificate registration no.	10011653 QM15
Date of original certification	2012-09-27
Date of revision	2021-06-16
Date of certification	2021-07-03
Valid until	2024-07-02

DQS Inc.

Brad McGuire
Managing Director

Accredited Body: DQS Inc., 1500 McConnor Parkway, Suite 400, Schaumburg, IL 60173 USA

ID Corp, s. r. l.

Santo Domingo, D. N.
04 de noviembre del 2022

Señores
Junta Central Electoral
Ciudad. -

Distinguidos Señores:

Por medio de la presente les informamos que con la intención de ser adjudicados en el proceso de compra **Ref. JCE-CCC-CP-2022-0028,** certificamos lo siguiente:

- **Condiciones de Pago: 20% con la Orden – 80% restante crédito 45 días fecha factura**
- **Tiempo de Entrega: 24 a 26 semanas para el cilindro, accesorios 8 a 12 semanas, fecha Orden de compra**
- **Garantía: 2 años contra defectos de fabricación**

En la espera de que nuestra propuesta tenga la acogida deseada,

Cordialmente

ID Corp, s.r.l.

Raul Flamini
Presidente

POTTER
The Symbol of Protection

APS-SA/DA

Addressable Pull Station
Single/Dual Action

Features

- Single or Dual Action versions
- Durable die-cast construction
- Reset key matches the fire alarm control panels
- Compatible with all PFC-6000, PFC-8000, and P Series panels
- Product includes a 5 year warranty

Stock Numbers

- APS-SA Addressable Pull Station, Single Action – 1430810
- APS-DA Addressable Pull Station, Dual Action – 1430811

7150-0328:0201

c UL us LISTED S25236

Application

The APS-SA/DA is compatible with Potter's PFC-6000 series and PFC-8500 addressable fire alarm control panels. It is a non-coded addressable pull station available in either a single or dual action model and installs on a single box or surface mounts using the P32-BB or P32-DBB (deep) back box.

Description

The APS-SA (Single Action) is activated by simply pulling the white "T" bar handle down. The APS-DA (Dual Action) is activated by lifting the front cover and then pulling the white "T" bar handle down. Once activated, the "T" bar cannot be reset without opening the front cover. Opening the front cover will also activate the pull station. To reset the APS Series, use the Potter WS-93 key to unlock and open the front cover. Once the cover is open, push the "T" bar back into the normal position and re-secure the front cover.

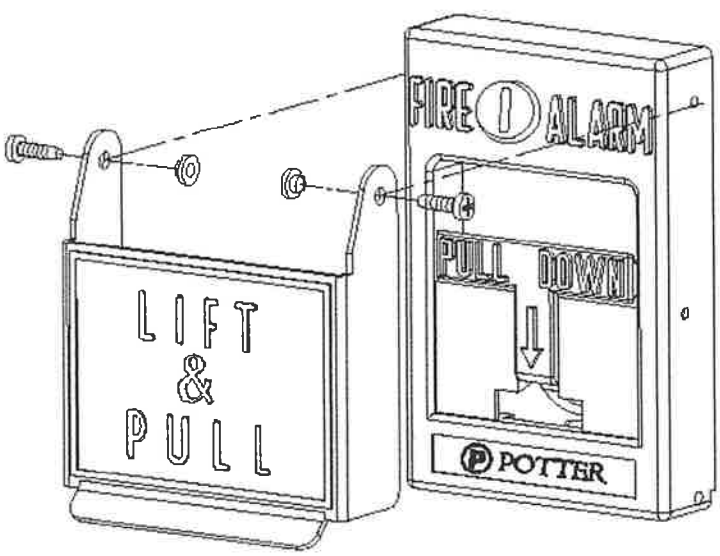
Technical Specifications

Operating Voltage	22.0 – 24.0 VDC
Max SLC Standby Current	0.325mA
Max SLC Alarm Current	0.325mA
Environmental Limitations	32°F - 120°F (0° - 49°C) Indoor Only
Dimensions	4.75" H x 3.25" W x 1.75" D
Relative Humidity Range	0 - 93% (non-condensing)
Mounting Options	Single gang box or Potter P32-BB/DBB
Shipping Weight	APS-SA - 1.22 lbs. APS-DA - 1.46 lbs.

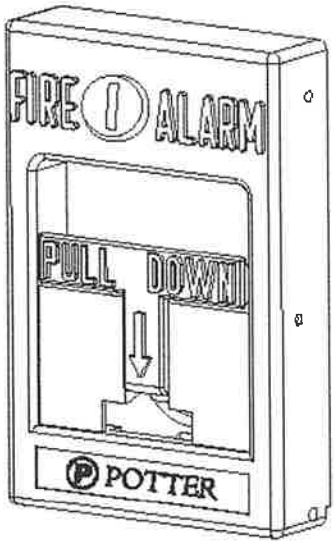
Setting the Address

The APS Series uses one SLC address which must be assigned prior to installation of the device. The address is set using either the handheld device programmer or the device addressing feature built into each Potter fire alarm control panel.

Pull Station Front View

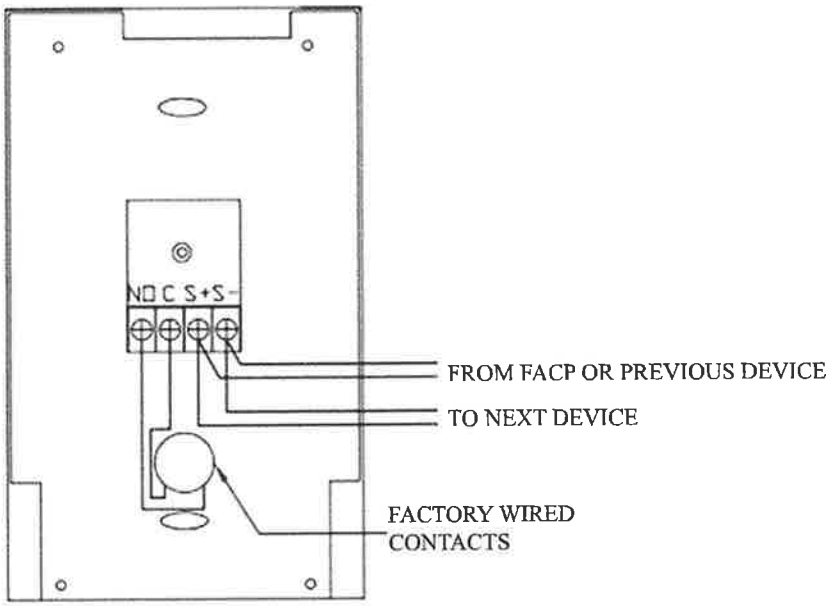


APS-DA



APS-SA

Pull Station Back View and Wiring



POTTER
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PAD300-PD

Photoelectric Smoke Detector

Features

- Low profile, less than 2 inches with the base
- Wide selectable sensitivity range of 1.1 to 3.5%/foot
- Detector communicates sensitivity to control panel
- UL listed smoke calibration and sensitivity
- Optional locking tab to prevent unwanted removal
- Simple DIP switch address setting, no programming tool required
- Magnetic test switch
- LED alarm indicator
- Product includes 5-year warranty
- UUKL Listed for Smoke Control
- UL268 7th edition compliant

Description

The Photoelectric Smoke Detector is a listed Analog Addressable smoke detector compatible with fire alarm control panels that utilize the Potter Addressable Device (PAD) protocol. The PAD300-PD is a low profile smoke detector with a wide sensitivity range. The detector and base are made of a durable plastic in an off-white color to blend in with the ceiling.

The PAD300-PD has a sensitivity range of 1.1 to 3.5 % per foot and is UL listed. The PAD300-PD features drift compensation and has built in dirty detector warning as well. The PAD300-PD and the control panel communicate over a proven and robust digital communication path and the system analyzes the information at the particular device. The total polling speed is less than five (5) seconds, well under the UL requirements.

The detector is compatible with any of the PAD300 series detector bases and simply twists on. The PAD300-PD is addressed using DIP switches in the rear of the detector and can be easily programmed in the field without special tools.

Setting the Address

Each addressable device on the SLC loop must have a unique address from 1 to 127 to function properly. The address is set using DIP switches.

Before connecting a device to the SLC loop, take the following precautions to prevent potential damage to SLC or device. Verify the following:

1. Power to the device is removed.
2. Field wiring is correctly installed.
3. Field wiring has no open or short circuits.

Technical Specifications

Operating Voltage	24 VDC
Detector Current Draw	300 µA
Alarm Indicator	1 LED
Alarm Set-point Range	1.1 to 3.5%/ft (3.6 to 11%/m)
Installation Temperature Range	32 to 120 ° F (0 to 49 ° C)
Operating Relative Humidity range	0% to 93% (Non-condensing)
Start-up Time	Max. 1 sec.
Maximum Number of Addresses Per Loop	127
Maximum Number of Lighted Indicators in Alarm Per Loop	30
Color	Eggshell White
Weight (without base)	91g (3.2oz)
Dimensions (without base)	Height: 1.42 in (36mm) Diameter: 3.93 in (100 mm)

Air Velocity Ratings

The PAD300-PD has an Open Area of Protection air velocity rating of 0 to 300 feet per minute.

The system has a maximum of 30 LEDs that can be turned on simultaneously. If the system already has 30 LEDs on, the PAD300-PD will operate even though the LED may not illuminate.

Operation

The PAD300-PD is an analog addressable detector that uses one address on the Signaling Line Circuit (SLC) of a compatible fire alarm control panel. The unit communicates with the control panel as it is polled. The LEDs flash every time the unit is polled and they will flash at a fast rate if the unit is in an active status. The polling LED can be turned off if desired for less conspicuous operation.

The PAD300-PD with the PAD300-4DB or PAD300-6DB has a low profile of less than two (2) inches to blend into the surrounding environment. The detector includes an insect screen to prevent foreign objects from reaching the chamber and can be cleaned to restore operation of a dirty detector.

Detector Sensitivity

The PAD300-PD and the compatible control panel work in tandem to keep the sensitivity consistent. As the detector is installed over time, the detector compensates for the dirt in the unit until it is out of range. At that time, the panel will indicate a dirty detector. The detector will then have to be cleaned or replaced.

The PAD300-PD can be programmed to provide a maintenance alert prior to reaching the dirty detector level which will allow for intervention prior to the detector going into trouble. This allows for detector replacement or cleaning prior to a nuisance trouble occurs.

NOTE: As required by NFPA, do not install the detectors until all construction is complete and the work area has been thoroughly cleaned. If the detectors have been installed in a construction environment, they should be cleaned or replaced before the system is placed into service.

Spacing

The PAD300-PD is UL listed with a recommended maximum spacing of 30 feet. Refer to NFPA 72 for specific information regarding detector spacing, placement and special applications.

Compatible Bases

All bases will mount on a single gang, 3-1/2" octagon, 3-1/2" square, double gang, 4" octagon, 4" square, 50mm c/c, 60mm c/c and 70mm c/c boxes.

Device	Description	Stock No.
PAD300-4DB	4" Detector Base	3992781
PAD300-6DB	6" Detector Base	3992782
PAD300-IB	6" base with an isolator module included	3992783
PAD300-RB	6" base with one Form-C relay contact. 2A @ 30VDC, 0.5A @ 125VAC	3992784
PAD300-SB	6" base with sounder module included. Sound pattern is provided from external source	3992785
PAD300-LFSB	6" base with 520Hz sounder module included. Sound pattern is provided from external source	3992786

Ordering Information

Model	Description	Stock No.
PAD300-PD	Photoelectric Smoke Detector	3992775

POTTER
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ABORT SWITCH

UL and cUL Listed, FM Approved

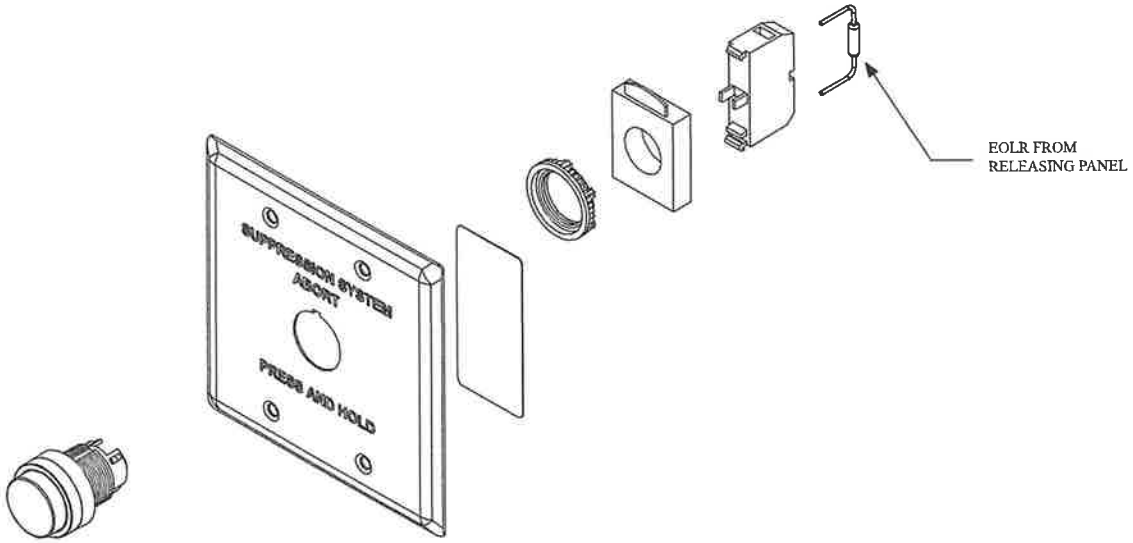
Dimensions:
4-1/2" W x 4-1/2" H x 2" D (Approximate)

Contact Rating:
One N.O. momentary contact rated.
2.5 Amps @ 24 VDC (5 mA minimum)

Environmental Specifications:
Indoor use only

Stock number: 3001000 - RED BUTTON
3001004 - BLUE BUTTON

Description
The Potter Abort Switch is designed to be wired to the abort terminals of the Potter PFC-4410-RC, PFC-4410A-RC and PFC-4410RC (9th Edition) releasing panels. The device consists of a stainless steel faceplate and a modular switch assembly. It is designed to mount on a standard double gang electrical enclosure.



POTTER
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PAD100-DIM

Dual Input Module

Features

- Single module with dual contact monitoring inputs
- Two (2) Class B or one (1) Class A monitoring inputs
- SLC Class A, Class X & Class B
- Mounts in a standard 4" or double gang box
- Wiring terminals accessible when mounted in box
- All wiring terminals accept 22 to 12 AWG
- Product includes a 5 year warranty
- UUKL Listed for Smoke Control

NOTE: This addressable module does not support 2-wire smoke detectors.

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Description

The PAD100-DIM uses one (1) SLC loop address when monitoring two (2) Class B circuits or one (1) Class A circuit. The module mounts on either a 4" square or double gang box. The module is capable of monitoring two (2) separate class B circuits making it ideal for monitoring sprinkler waterflow and valve tamper switches when they are located in the same proximity. The PAD100-DIM includes one red LED to indicate the module's status. In normal condition, the LED flashes when the device is being polled by the control panel. When an input is activated, the LED will flash at a fast rate.

Application

The PAD100-DIM is compatible with Potter's IPA and AFC/ARC series addressable fire alarm control panels. The PAD100-DIM is an interface module used to monitor dry contact devices such as sprinkler waterflow, valve tamper switches, or conventional pull stations. The module is capable of monitoring two separate Class B or one Class A circuits.

Setting the Address

Each addressable SLC device must be assigned an address. The address is set using the DIP switch located on the PAD100-DIM. When the PAD100- DIM is used to monitor two individual Class B circuits a single device address is assigned, each input is then identified as a sub-point of the module address. For example, if the address number is assigned as "8", the first input will be "8.1" and the second input will be "8.2".

Before connecting a device to the SLC loop, take the following precautions to prevent potential damage to the panel or device:

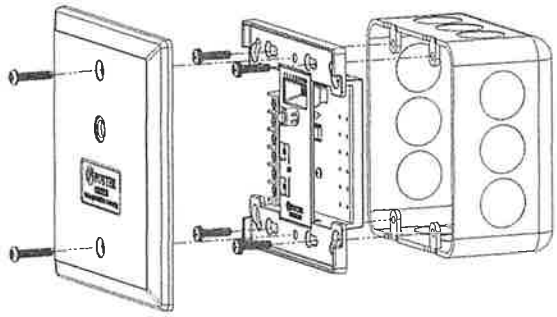
1. Power to the device is removed.
2. Field wiring is correctly installed.
3. Field wiring has no open or short circuits.

Technical Specifications

Operating Voltage	24.0V
Max SLC Standby Current	240µA
Max SLC Alarm Current	240µA
Max Wiring Resistance of IDC	100 Ω
Max Wiring Capacitance of IDC	1µF
EOL Resistor	5.1K Ω
Operating Temperature Range	32 to 120°F (0 to 49°C)
Operating Humidity Range	0 to 93% (non-condensing)
Max no. of Module Per Loop	127 units
Dimensions	4.17" (106mm)L × 4.17" (106mm)W × 1.14" (29mm)D
Mounting Options	Standard 4" Square or Double Gang Box
Shipping Weight	0.6 lbs

Installation Using Compatible Electrical Box

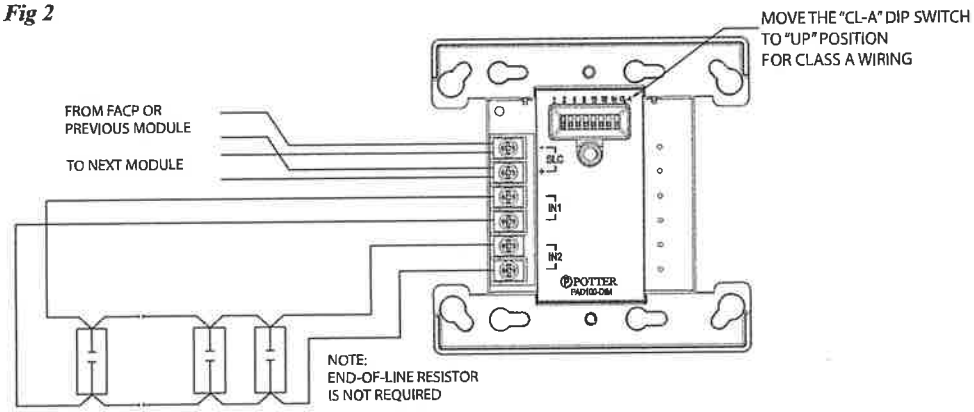
Fig 1



Wiring Diagrams

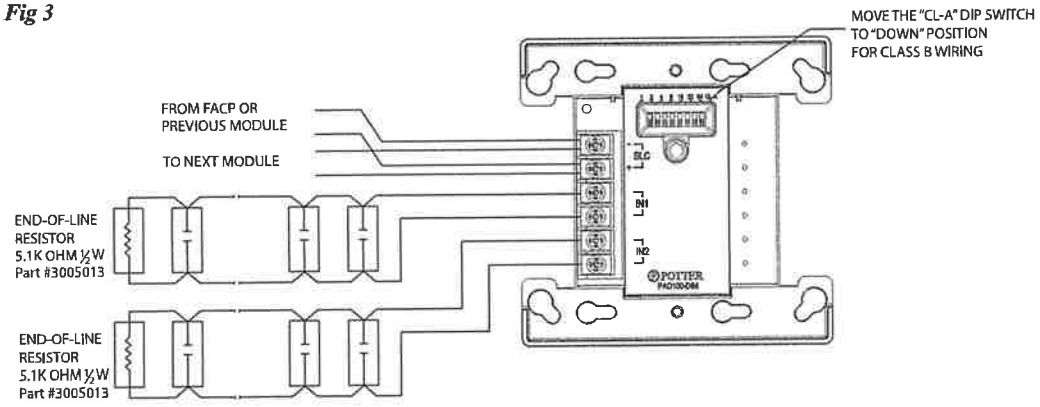
PAD100-DIM With One Class A Circuit

Fig 2



PAD100-DIM With Two Class B Circuits

Fig 3



Ordering Information

Model	Description	Stock No.
PAD100-DIM	Dual Input Module	3992703

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

SEVO 1230 Clean Agent Fire Suppression Systems
Pre-Engineered, Balanced and Engineered, Unbalanced
500 psi (34.5 bar)

Prepared for:

SEVO Systems, Inc.
14335 W 97th Terrace
Lenexa KS 66215
USA

Manufactured at:

SEVO Systems, Inc
14335 97th Terrace
Lenexa KS 66215
USA.

FM Approvals Class: 5612

Approval Identification: 0003037217 Approval Granted: 06 June 2011

Said Approval is subject to satisfactory field performance, continuing follow-up Facilities and Procedures Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

For more than 160 years FM Approvals has partnered with business and industry to reduce property losses.

Richard B. Dunne
Group Manager –Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062

FM Approvals®

Member of the FM Global Group

Altronix®

Rev. 10182021

M Series

Multi-Output Power Supply/Chargers

AL600ULM

Altronix M series access control power supply/chargers are specifically designed for use with access control systems and accessories. These units convert a 115VAC, 60Hz input into five (5) individually protected 12VDC or 24VDC outputs (see specifications). Each output will route power to a variety of access control hardware devices including Mag Locks, Electric Strikes, Magnetic Door Holders, etc. These outputs will operate in both Fail-Safe and Fail-Secure modes. Controlled trigger input is achieved through normally open [NO] or normally closed [NC] supervised input or the polarity reversal from an FACP (Fire Alarm Control Panel). A form "C" dry output relay enables HVAC Shutdown, Elevator Recall or may be used to trigger auxiliary devices.

Key Features

- Fire Alarm Panel or Access Control System trigger inputs. [NO] or [NC] supervised trigger input and polarity reversal trigger input (4mA draw from FACP)
- Five (5) individual power-limited Class 2 outputs (auto-resettable)
- Filtered and electronically regulated outputs
- Thermal and short circuit protection with auto reset.
- Overload protection
- Output relay energizes when unit is triggered (form "C" contact rated 1A @ 28VDC)
- Supervision:
  - AC Fail
  - Battery Fail and Battery Presence
- Built-in charger for sealed lead acid or gel type batteries
- Instantaneous transfer to stand-by batteries
- Power and input trigger LEDs
- DC output LED indicator
- LEDs indicate condition of power outputs
- UL Listed in the U.S. and Canada
- CSFM Approved
- Lifetime Warranty
- All units are available in grey or red enclosure

M Series Power Supply Configuration Reference Chart

Altronix Model Number	12VDC Total Output Current (A)	24VDC Total Output Current (A)	Class 2 Rated Power-Limited Outputs (auto-resettable)	115VAC, 60Hz Input Current Draw (A)	Power Supply Board Input Fuse Rating	Power Supply Board Battery Fuse Rating	Accommodates Batteries
AL300ULM	2.5	2.5	5	3.5A	5A/250V	15A/32V	Two (2) 7AH
AL300ULMX							Two (2) 12AH
AL400ULM	4	3					Two (2) 7AH
AL400ULMX							Two (2) 12AH
AL600ULM	6	6				–	Two (2) 7AH
AL600ULMX							Two (2) 12AH
AL1012ULM	10	–		2.6A		15A/32V	One (1) 12AH
AL1024ULM	–	10		4.2A			Two (2) 12AH

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phone: +1 718.567.8181 | fax: +1 718.567.9056 | email: info@altronix.com | www.altronix.com

Altronix®

M Series

Multi-Output Power Supply/Chargers

Specifications

Input

Voltage	115VAC, 60Hz.
Fusing	Varies, see Reference Chart

Outputs

Voltage	12VDC or 24VDC, see Reference Chart
Current	Varies, see Reference Chart
Protection	PTC 2.5A
Other	Overvoltage protection Filtered and regulated outputs

Back-up Battery *(not included)*

Capacity	7AH / 12VDC (AL300ULM, AL400ULM, AL600ULM) 12AH / 12VDC (AL300ULMX, AL400ULMX, AL600ULMX, AL1012ULM, AL1024ULM)
Type	Sealed lead acid or gel type
Fuse Rating	15A @ 32VDC AL600ULM(X) does not have a battery fuse.
Failover	Upon AC loss, instantaneous

Supervision

AC Failure	Form "C" contacts
Battery	Form "C" contacts

Indicators (LED)

Input	115VAC is present
DC Output	Powered
Battery	Discharged or not connected
Power and Input	Individual LEDs indicate outputs are triggered (relays energized)

Agency Listings

All Models:

UL:

UL294	Access Control System Units

cUL:

CSA C22.2 No.205	Signal Equipment

Agency Listings (cont'd)

All Models in Series, Except AL1012ULM:

UL1481	Fire Protective Signaling Systems
CSFM	California State Fire Marshall Approved.

AL300ULM, AL400ULM, AL600ULM Only:

UL603	Burglar Alarms Systems
UL1069	Hospital Signaling and Nurse Call Equipment

Physical and Environmental

Dimensions (H x W x D)

AL300ULM, AL400ULM, AL600ULM:
13.5" x 13" x 3.25" (342.9mm x 330.2mm x 82.55mm).

AL300ULMX, AL400ULMX, AL600ULMX, AL1012ULM, AL1024ULM
15.5" x 12" x 4.5" (393.7mm x 304.8mm x 114.3mm).

Product Weight / Shipping (approx.)

Model	Product Weight	Shipping Weight
AL300ULM	7.6 lbs. (3.45 kg)	8.6 lbs. (3.9 kg)
AL300ULMX	9.4 lbs. (4.26 kg)	10.4 lbs. (4.72 kg)
AL400ULM	7.6 lbs. (3.45 kg)	8.6 lbs. (3.9 kg)
AL400ULMX	9.4 lbs. (4.26 kg)	10.4 lbs. (4.72 kg)
AL600ULM	7.9 lbs. (3.58 kg)	8.9 lbs. (4.04 kg)
AL600ULMX	9.7 lbs. (4.4 kg)	11.2 lbs. (5.1 kg)
AL1012ULM	8.95 lbs. (4.06 kg)	10.25 lbs. (4.65 kg)
AL1024ULM	10.8 lbs. (4.90 kg)	11.8 lbs. (5.35 kg)

Temperature

Operating	0°C to 49°C (32°F to 120°F).
Storage	-20°C to 70°C (-4°F to 158° F).
Relative Humidity	85% +/-5%.

BTU/Hr. (approx.):

Model	12VDC	24VDC
AL300ULM(X)	15	31
AL400ULM(X)	25	37
AL600ULM(X)	37	74
AL1012ULM	61	N/A
AL1024ULM	N/A	123

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IntelliView

Mobile App & Web Access

Features

- Able to be installed and running on a panel in five minutes
- Identify the location of panel signals instantly at any time
- Filter signals list by any of the statuses
- Push notifications to mobile app allow for immediate signal notification
- Suppress push notifications to some users for up to 24 hours
- Acknowledge, Silence, Reset, Enable/Disable, Drill – while panel is in walk test
- Monitor up to 1000 locations or panels
- No additional fire panel hardware is required to enable IntelliView
- Android or iOS compatible mobile devices (tablets & phones)
- Google Chrome supported on desktop applications
- Supports all IPA, all AFC, and PFC-4064 panels
- Monitor nitrogen generator status and purge valves remotely via mobile app or desktop
- Monitor system leak rates, run time, and nitrogen purity through easy to undersatnd graphs and diagnostics
- Manage multiple buildings or a campus from one location, obtain status information without disturbing occupants
- Developed, manufactured and supported by Potter in the U.S.A.

Download on the App Store | WebApp | Google play

Description

With Potter's IntelliView, users can connect and monitor their Potter fire system or IntelliGen Nitrogen Generators from anywhere in the world through a mobile app or web site. Users connect the unit to a building's existing network and register at www.PotterIntelliView.com. Within minutes users will have real time access to their fire system and Nitrogen Generators. Fire systems will send mobile device push notifications for any off normal signal, give access to all signals on all fire panels, display historical data, and even control the panel.

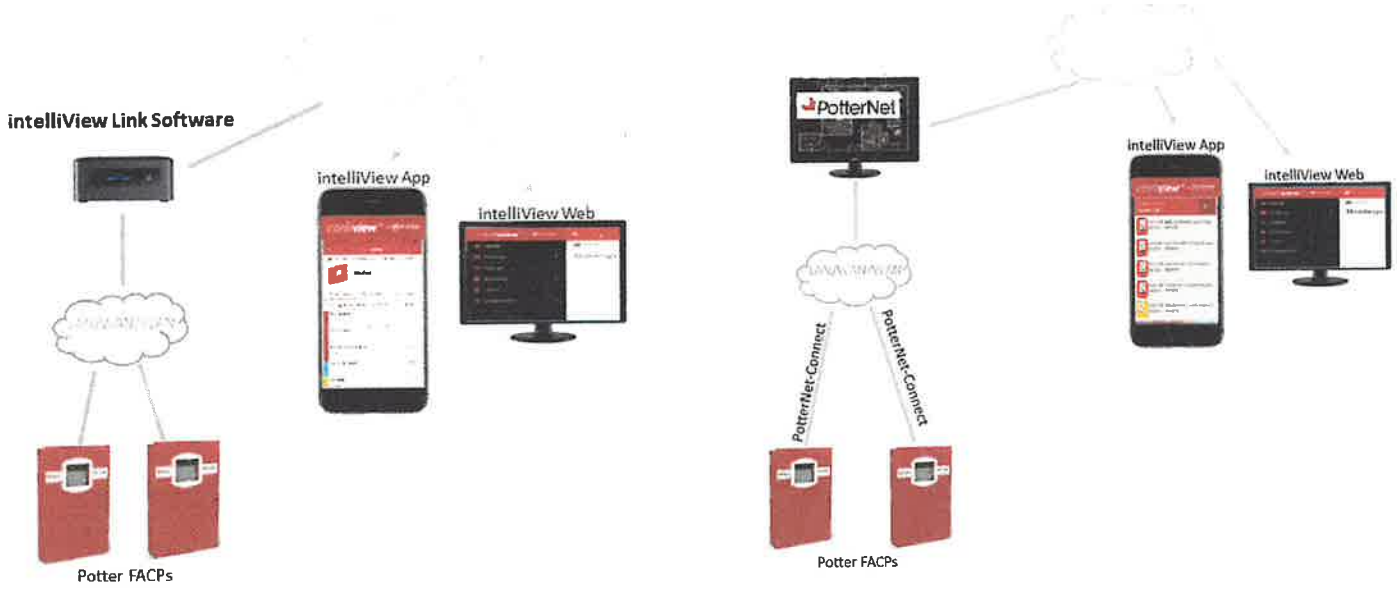
Multiple buildings or a campus can now be managed from one location using the IntelliView dashboard. There is no longer a need to disturb occupants with a physical visit to the equipment in order to obtain status information.

Nitrogen Generators will allow IntelliView users access to system status, panel activity purge valve and nitrogen purity information, maintenance, historical data, leak rates and much more, all while providing easy to follow graphs and other diagnostic information. Great for system commissioning, maintenance and supplementary life safety signal notification.

Labor and time can also be reduced with unique fire system walk test features. Panels will deliver push notifications of every point status change and all activity will be saved to history. The fire panel's walk test mode will allow users to control the panel through the app.

Features	Standard	Premium
Pay per Connected Panel	Free	✓
System Overview	✓	✓
Signals Display	×	✓
Point Information	×	✓
Panel History	×	✓
Push Notifications	×	✓
Control (When Testing)	×	✓

Achitecture Options



Ordering Information

IntelliView is a standard feature in PotterNet. There is nothing additional to order if PotterNet is currently owned. See the PotterNet datasheet (8830148) for ordering and licensing details. Systems without PotterNet can order IntelliView as outlined below. Customer provides a compatible Windows® 10 Professional, 64-bit, English (USA) platform for the IntelliView Link software.

Model	Description	Stock No.
INTELLIVIEW-LINK-STANDARD	IntelliView Link Standard is a free license that enables a user to connect up to 1000 panels to the cloud server and have access to the panel through a mobile app and web interface. This license is free and will enable basic functions in the IntelliView App.	3993027
INTELLIVIEW-LINK-PREMIUM	IntelliView Link Premium enables a user to connect up to 1000 panels to the cloud server and have access to the panel through a mobile app and web interface. The license enables the advanced features of IntelliView. Features include: System Overview, Signals Display, Point Information/Read Status, Panel History, Push Notifications/One Man Walk Test, Panel Control When Testing. Unlimited number of App users. **This is a yearly subscription. One license is needed for each panel on the IntelliView Link.**	3993028
INTELLIVIEW-LINK-PREMIUM-SUB	1-Year subscription renewal for INTELLIVIEW-LINK-PREMIUM. **If INTELLIVIEW-LINK-PREMIUM is not renewed, the application will revert to and operate as INTELLIVIEW-LINK-STANDARD.**	3993030

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IPA-100
Fire Alarm Control Panel

Features

- 127 addresses available on this analog addressable system
- Additional system capacity achieved via multi-point SLC modules
- 99 software zones
- NFPA 72 Compliant Smoke Sensitivity Test Built-In
- System Operates as Class A or Class B for SLC, P-Link and NACs
- 5 Amp Power Supply, Expandable to 310 amps
- 2 NACS, Regulated, Rated at 3 Amps each, expandable to 188
- 2 Input/Output (I/O) Circuits for system flexibility rated at 1 Amp each, ideal for manual release and abort
- Strobe Synchronization and System Wide Sync for Potter/AMSECO®, Gentex®, Cooper Wheelock® and System Sensor® strobes
- Dedicated Alarm, Supervisory and Trouble Relays
- 4,000 Event History Buffer
- Cabinet will house up to 18 AH batteries
- Optional two line DACT with UD-2000 that can report General, Zone or Point Information
- Built in IP Communicator
- Ethernet Port for Programming and Network Connectivity
- E-Mail System Status, Reports and Event Information
- Product includes 5 year warranty
- UUKL Listed for Smoke Control

FM APPROVED

UL LISTED

Description

The IPA-100 is an analog/addressable releasing fire alarm system with a total system capacity of 127 addresses. Additional capacity on the system is achieved using multi-point SLC modules. The control panel utilizes the exclusive Potter protocol that includes a complete line of sensors and modules. Each SLC may be comprised of any combination of smoke sensor, heat detectors or modules and allows for a total of 50 ohms of impedance and may use any wire compliant with the National Electrical Code (NEC).

The IPA-100 has a 5 Amp power supply with two Notification Appliance Circuits (NACs) and two Input/Output (I/O) circuits. The NACs are rated at 3 Amps each and the I/Os are rated at 1 Amp each. Each output is regulated and power limited. In addition, each output is uniquely programmable and may be configured for steady signal, strobe synchronization, constant power, door holder power, or releasing. The strobe synchronization includes Potter/AMSECO, Gentex, System Sensor and Cooper/Wheelock and with the exclusive Quadrasync each output may have a unique brand and all strobes will flash together. The I/Os are designed for inputs such as manual release stations and abort switches that will not require polling and react nearly instantaneously.

The IPA-100 is listed for releasing of fire suppression systems. The software allows cross zones, counting zones, and timers for suppression. The system is capable of multiple release outputs across multiple hazards. In addition, the PSN-1000 may be used to extend releasing capability. The NACs may be expanded using the PSN-1000 series intelligent power supplies. Each PSN-1000 adds another 10 Amps of power, 2 additional input circuits and the IPA-100 will support up to 31 power supplies. The system will synchronize the strobes system wide. In addition, the PSN-1000E has space to allow the installation of up to six loop expansion cards. The cards mount on a stacker bracket that allows access to all SLC circuit connections.

Technical Specifications

Dimensions	16"W x 17"H x 3 7/8"D
AC Mains	3.0 Amps @ 120 VAC 50/60 HZ 2.0 Amps @ 240 VAC 50/60 HZ
Enclosure	16 gauge cold rolled steel with removable locked door with Lexan viewing window
Battery	Standby Current-130 mA Alarm Current-200 mA • 5 Amps power for NACs, I/O, and P-Link • 3 Amps per NAC, regulated • 1 Amp per I/O circuit, regulated • Battery Charger range 8-55 Ah • Battery Charger voltage 27.3 VDC • P-Link maximum current of 1 Amp
Temperature and Humidity Range	32° to 120° (0°C to 49°C) with a maximum humidity of 93% non-condensing.
Standards	• NFPA 12, 12A, 13, 15, 16, 17, 17A, 70, 72, 750, and 2001 • ANSI/UL 864 - Local (L), Remote Station (RS), Central Station (CS), Propriety (PPU), Auxiliary (AUX).Type of Service: Automatic (A), Manual (M), Water flow (WF) Sprinkler Supervisory (SS) Type of Signaling: Digital Alarm Communicator (DAC), March Time (March), Non Coded (NC), Reverse Polarity (Rev Pol), Other Technologies (OT) • IBC 2000, 2003, 2006, 2009, 2012

SLC Loop Accessories

The control panel may be connected with up to 127 addressable devices or modules in any combination. The SLC is not restricted by any special wire requirements and may be wired with any wire that complies with the NEC.

SLC Loop Devices

Device	Description
PAD100-PD	Analog Photo Electric Smoke Detector is a smoke detector with a listed obscuration of 1.02 to 3.83 percent per foot.
PAD100-PHD	Combination Analog Photo Electric Smoke/Heat Detector – a smoke detector with a listed obscuration of 1.02 to 3.83 percent obscuration and a fixed temperature 135° Fahrenheit heat detector.
PAD100-HD	Analog Fixed Temperature Heat Detector that is selectable from 135° F to 185°F.
PAD100-DUCTR	Addressable Duct Smoke Detector with Form C Relay.
PAD100-DUCT	Addressable Duct Smoke Detector.
PAD100-6B	6" round base that is mounted to an electrical box and wired for connection of one of the above sensors.
PAD100-4B	4" round base that may be mounted to an electrical box and wired for connection to the above sensors.
PAD100-IB	Isolator base that interrupts a short in a SLC and prevents the short from affecting protected devices on the loop.
PAD100-RB	Addressable Relay Base that contains one relay controlled by the SLC. Relay is rated at rated at 2 amps at 30 VDC or 0.5A at 125VAC.
PAD100-SB	Addressable Sounder Base that contains an addressable sounder module that may be configured for local, group and all call.
PAD100-CD	Addressable CO gas detector.
PAD100-DD	Addressable photo electric smoke detector for use in DUCT/DUCTR enclosure.
PAD100-LFSB	Addressable Low Frequency Sounder Base that contains an addressable sounder module that may be configured for local, group and all call. The LFSB complies with the Low Frequency Signal Requirements (520 Hz)
PAD100-SPKB	Speaker base is a wall or ceiling mount speaker capable of 25 or 70.7 VRMS and is field selectable from 1/8W to 4W.

Modules

Device	Description
PAD100-MIM	Micro Input Module provides a small foot print contact module for mounting inside an enclosure.
PAD100-PSSA	Single Action Addressable Pull Station.
PAD100-PSDA	Dual Action Addressable Pull Station.
PAD100-SIM	Single Input Module is a standard contact module with an LED that mounts into a 4" square electrical box.
PAD100-DIM	Dual Input Module is a device that can monitor two distinct inputs with a single device or in a Class A mode.
PAD100-TRTI	Two Relay Two Input module provides two form C relays that are individually controlled by the control panel. Each relay is rated for 2 amps at 30VDC or 0.5 amps at 125VAC. Also provides two contact inputs.
PAD100-NAC	Notification Appliance Circuit module is an addressable remote appliance circuit controlled by the panel.
PAD100-ZM	Zone Module is used to connect conventional 2-wire smoke detectors to the system.
PAD100-IM	Isolater Module interrupts a short on the SLC and prevents the short from affecting protected devices on the loop.
PAD100-RM	Relay Module that provides one form C relay controlled by the control panel. Relay is rated for 2 amps at 30VDC or 0.5 amps at 125VAC.
PAD100-LED	Module provides a single addressable LED that is controlled by the control panel.
PAD100-SM	Speaker Module provides switching for two audio channels.
PAD100-LEDK	Addressable LED and key switch that mounts in a single gang box.
PAD100-DRTS	DUCTR Remote Test Switch that mounts in a single gang box and optionally supervised.
PAD100-OROI	One Relay One Input Module provides one form C relay and one input. The relay is rated at 2 amps at 30VDC or 0.5 amps at 125VAC.

SLC Features

The Potter protocol is a digital protocol with a proven design for reliability and noise immunity. The system does not require special cable or conductors for connection of the Signaling Line Circuit as long as the cable is compliant with NFPA 70 and NFPA 72. The system allows for Class A or Class B installations as well as "T-Taps", with a max wiring distance of 10,000 Ft.

Sensor Features

The sensors through the fire alarm control panel provide a real time status as to the condition of the system. The smoke detector sensitivity, heat detector temperature level and drift compensation are all programmable options. The system also allows for a day/night mode where the panel automatically adjusts the sensitivity depending on the time of day. To assist in the reduction of false alarms, the smoke detectors also have a maintenance warning that sends a trouble signal when a detector is dirty to the point that it can no longer maintain the programmed sensitivity.

User Interface

The fire alarm control panel has a 2 x 16 LCD display to provide information to the system status. The keypad has navigation keys to allow manipulation of the Menu on board the panel. The panel is shipped standard with the following LEDs:

- AC Power - Green
- Alarm - Red
- Earth Fault - Amber
- Supervisory - Amber
- Silenced - Amber
- Trouble - Amber
- Pre-Release - Amber
- Release - Red

The common buttons include a Silence, Reset, Acknowledge, and Drill. All of the buttons are accessible once the locked door is opened.

P-Link

The IPA-100 has a proprietary communication protocol that communicates through a RS-485 connection to field devices. Up to 64 devices may be connected to a single P-Link connection. The P-Link includes the communication terminals and regulated 24 VDC connection for the field devices. The field devices may be any of the following:

RA-6075R – 2 x 16 LCD annunciator with a key pad in a locked metal enclosure.

RA-6500R(F) – 4 x 40 LCD annunciator with a key pad in a locked metal enclosure. Flush mount version available.

LED-16(F) – 16 LED annunciator with common indicators in a locked metal enclosure. Flush mount version available.

PSN-1000(E) – 10 amp, remote intelligent power supply with 6 NACs, 2 Inputs and a P-Link repeater. This panel is listed in conjunction with the IPA-100 as releasing circuits.

CA-6075 – Class A convertor that converts the SLC, NACs and P-Link connection

UD-2000 – UL listed, Dual line telephone alarm communicator

DRV-50 – LED driver expander, used to connect up to 50 LEDs in a graphic display

FCB-1000 – Fire communication bridge, provides remote mounting of the Ethernet connection

FIB-1000 – Fiber interface module, used to extend P-Link to multi-mode fiber (2 required)

RLY-5 – Relay module, provides 5 form C relay contacts rated at 3.0 amps 24VDC/125AC

SPG-1000 – Serial parallel gateway, allows for the connection to a serial or parallel printer

The **FIB-1000, FCB-1000** and the **SPG-1000** may be installed in the stacker bracket or ordered with the optional rack mount enclosure.

MC-1000 Multi-Connect allows up to sixty-three IPA series panels to share a single reporting technology.

IDC-6 – Initiating device circuit provides 6 programmable inputs

AE-2 – Two card expansion cabinet

AE-8 – Eight card expansion cabinet

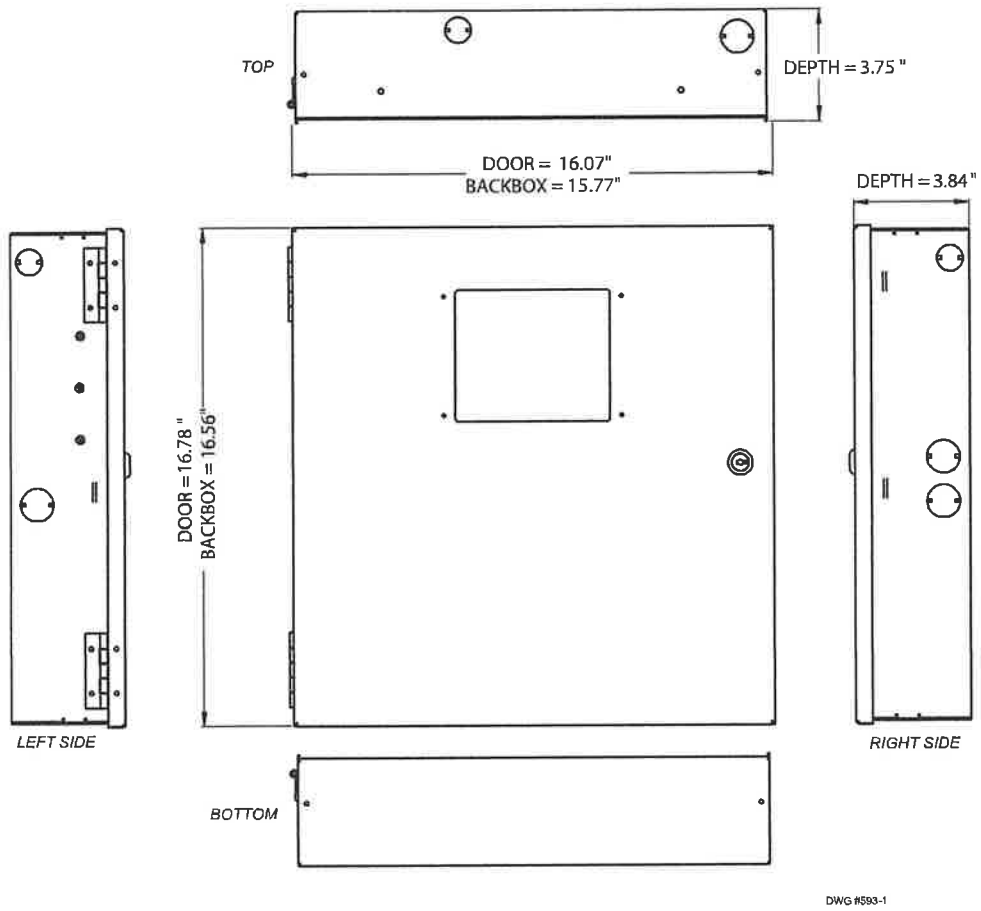
AE-14 – Fourteen card expansion cabinet

Ethernet/I.P. Connection

The IPA-100 is shipped standard with an Ethernet connection. This connection is the programming port and may be connected to a building Wide Area Network (WAN) or Local Area Network (LAN). Once connected to the Internet, the panel may be selectively programmed to e-mail alarm conditions, trouble conditions, supervisory conditions, test, Event History and detector status. An e-mail may be sent to the panel and the panel will e-mail the event history, detector status, configuration file or server status to an authorized E-mail account. In addition, reminders may be set to send an e-mail for service, testing or other conditions.

In addition, the Ethernet connection is UL listed as an IP communicator. The IP communicator is listed to report to the UL listed Sur-Gard III IP receiver. The IP communicator replaces the traditional less reliable alarm communicator transmitter that utilized telephone lines. The IP communicator is an active method of connection and communication to the monitoring station.

Dimensions



Compatible Releasing Devices

Note: For releasing applications please order the Potter EOLD (3005012) for circuits connected to a releasing solenoid or actuator.

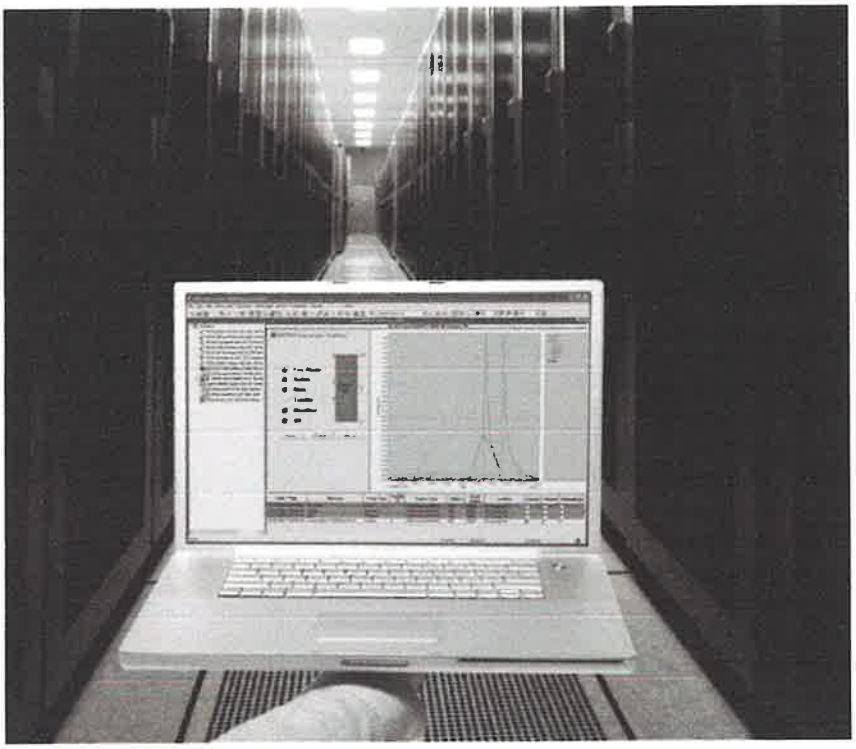
Brand	Description
Skinner	73218BN4UNLVN0C112CZ 73212BN4TNLVN0C322C2
Victaulic	753-E Series
Mini Max	MX123 & MX200 w/ 8876677 & 889323
Viking	11591, 11601, 11602, 13843, & 13844
TLX	PA0036

Ordering Information

Model	Description	Stock No.
IPA-100	Fire Alarm Releasing Control Panel	3992715
	Replacement Board IPA-100	3992739

Xtralis VSC

VSW-100



Xtralis VSC Software

Xtralis VSC configures, commissions and maintains a range of Xtralis fire and gas detection systems including VESDA and ICAM smoke and gas detectors and anciliary devices. Xtralis VSC can configure a single Xtralis device or your entire Xtralis system.

Off-line Configuration and File Management

Xtralis VSC allows you to create a system configuration without being present on-site or connected to the system. You can create an off-line configuration at your convenience and later connect and configure the system when on-site. Xtralis VSC's file management enables designers to specify standardized device configuration settings according to facility management policies and email them to on-site engineers.

The comparison/merge tool enables users to immediately identify changes made between visits, create audit reports, or revert to previously agreed configurations.

Remote Management

Xtralis VSC allows you to access your Xtralis system remotely via a range of networking options. This means you could be in your own office at a different site, and remotely manage or troubleshoot your Xtralis system.

Features

- Comprehensive configuration and commissioning of all Xtralis devices
- Merging and comparison of data between online & offline configurations
- Automatic detection of networked devices
- Trend charts
- Real-time active event list
- Sorting and filtering of detector events
- Remote management support
- Multi-language support
- Customizable software views

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Xtralis VSC

VSW-100

Automatic discovery of network devices

All VESDA and ICAM devices connected to Xtralis VSC are automatically detected. Unconfigured devices are easily and uniquely identified, enabling easy incorporation into the configuration and providing savings in time and effort when setting up your network.

Multiple device commands

You can use Xtralis VSC to select several devices and perform an action (for example, Reset) on multiple devices. This saves you time when commissioning and managing your networks.

Trend charts

Xtralis VSC enables straightforward comparisons of smoke and gas trends between multiple detectors by the ability to plot these trends from different detectors on one chart. Comparing trend charts makes it easier to analyze and report on smoke or gas events.

Event log filtering

Xtralis VSC includes an event log filtering feature. This feature sorts detector events according to your preferred criteria such as the time the event occurred or the type of a particular event. This allows you to quickly investigate incidents and identify the source and frequency of your network events.

Real-time active event list

Xtralis VSC's powerful real-time active event list helps simplify commissioning, maintenance and troubleshooting of your Xtralis system.

View management

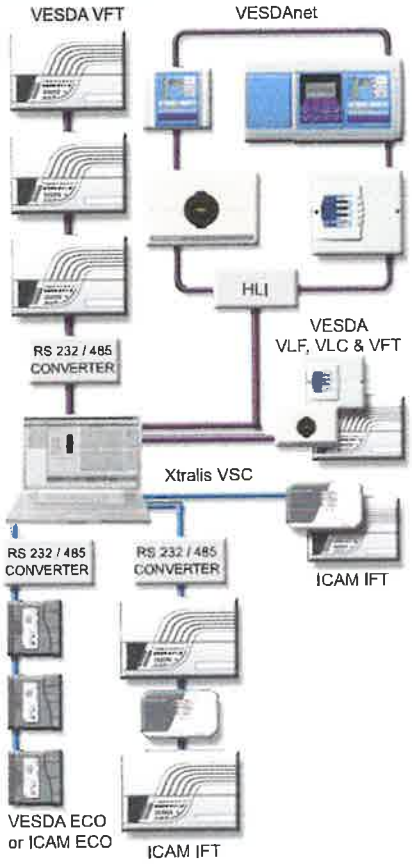
Multiple Views for entire network management allows simultaneous display of an overview of the network and several other windows displaying information about elements of the network. For example, an active event list and a mimic display of one of the detectors.

Multi-language support and translation

Xtralis VSC allows you to configure and maintain your Xtralis system in your local language, and then send your data files to someone to view in a different language. Xtralis VSC will automatically translate your file into the language of your choice.

Comprehensive Help topics

Xtralis VSC's context-sensitive Help provides explanatory information to aid with configuring and troubleshooting your Xtralis system.



Xtralis VSC provides local or remote connection to:

- *VESDA VLF, VLC, VFT and ICAM IFT detectors via RS232*
- *Multiple VESDA devices on a VESDAnet via a High Level Interface (HLI)*
- *Multiple ICAM IFT or VESDA VFT detectors on a Modbus RS485 connection via a RS232 / RS485 converter*
- *ICAM IFT or VESDA VFT detectors via Modbus TCP/IP*
- *Multiple VESDA ECO and ICAM ECO detectors on Modbus RS485 networks*
- *Multiple standalone VESDA ECO and ICAM ECO detectors via Modbus over USB*

Computer requirements

OS	Microsoft Windows 7, Windows Vista®, Windows XP or Windows 2000
Processor	Minimum: 1 GHz 32-bit (x86) or 64-bit (x64)
Memory	Preferred: 1 GB Minimum: 512 MB
Hard Disk	Minimum: 200 MB Free
Display	Single Monitor, Graphics Card with 128 MB memory

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Document: 12331_08 Part: 21155

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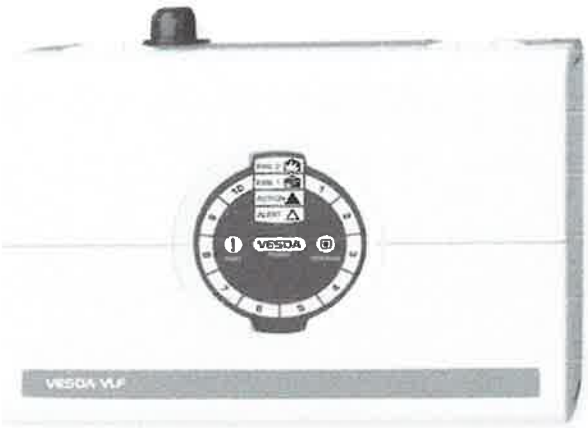
VESDA VLF

VLF-250



The VESDA VLF-250 detector is a very early warning smoke detector designed to protect small, business-critical environments of less than 250 m² (2,690 sq. ft.).

The detector works by continually drawing air into sampling holes in a pipe network. The air is filtered and passed into a detection chamber where light scattering technology detects the presence of very small amounts of smoke. Detector status information is communicated on the detector display and via relays or optional interface cards.

Out-of-the-box operation

The VLF can be installed and commissioned out-of-the-box without the need for a special interface or software programming tools.

In operation, the unique Smoke Dial™ display provides the user with an instant understanding of a smoke event, even from a distance. Should a fault occur, the user simply opens the field service door and activates the Instant Fault Finder feature to determine the specific fault condition. This information can then be passed onto their fire service company, ensuring that service technicians arrive onsite fully prepared.

Ultrasonic Flow Sensing

The patent-pending Ultrasonic Flow Sensing used in the VLF provides a direct reading of the sampling pipe flow rate. The system is immune to air temperature and pressure changes and is unaffected by contamination. The VLF is the first air sampling smoke detector to use ultrasonic flow sensing.

Features

- Out-of-the-Box Installation and Commissioning
- Ultrasonic Airflow Sensing
- Laser-Based Absolute Smoke Detection
- Pre-engineered pipe network designs
- Programmable Alarm Thresholds
- Clean air barrier optics protection
- Instant Recognition Display
- Instant Fault Finder™
- AutoLearn™ Smoke
- AutoLearn™ Flow
- Field Service Access Door
- Multiple Event Logging in separate logs
- Event log – up to 18000 events
- Offline/online configuration capability
- Up to 250 m² (2,690 sq. ft.) coverage*

Listings/Approvals

- UL
- ULC
- CCC
- FM
- ActivFire
- CE
- LPCB
- VdS
- VNIIPO
- NF
- EN 54-20
  - Class A (12 holes / 0.12% obs/m)
  - Class B (12 holes / 0.35% obs/m)
  - Class C (12 holes / 0.80% obs/m)

  Classification of any configuration is determined using ASPIRE.

Regional approvals listings and regulatory compliance vary between VESDA product models. Refer to www.xtralis.com for the latest product approvals matrix.

VESDA by Xtralis

VESDA VLF

VLF-250

Specifications

Input Power

Voltage:	24V DC Nominal (18-30 V DC)
Current @ 24 VDC:	220 mA nominal, 295 mA in alarm
Dimensions (W x H x D)	256 mm x 183 mm x 92 mm ($10^{1}/_{16}$ in x $7^{1}/_{5}$ in x $3^{2}/_{3}$ in)
Weight	Approx. 2 kg (4.4 lbs)
IP Rating	IP30
Mounting	Upright, inverted or horizontal

Operating Conditions*

Ambient:	0°C to 39°C (32°F to 103°F)*
Tested to (EN54-20):	-10°C to 55°C (14°F to 131°F)
Sampled Air**:	-20°C to 60°C (-4°F to 140°F)
Humidity:	5% to 95% RH, non-condensing

Sampling Network

Maximum pipe lengths:	1 x 25 m (80 ft) (Max. 12 holes) 2 x 15 m (50 ft) per branch (Max. 6 holes per branch)
Sampling Hole Options:	Pre-Engineered Option or Maximum Pipe length in accordance with Pipe Modelling Design Tool (ASPIRE™)

Air Inlet Pipe
Accepts both metric and American standard pipe sizes
Metric: 25 mm (1.05 in.) American Pipe: IPS 21 mm (¾ in.)

Area Coverage
Up to 250 m² (2,690 sq. ft.) depending on local codes and standards

Relay Outputs
3 changeover relays (Fire 1, Action, Fault), Contacts rated 2A @ 30 VDC (max). NO/NC Contacts

Cable Access
3 x 25 mm (1.05 in.) cable entries (1 rear entry, 2 top entry)

Cable Termination
Screw Terminals 0.2-2.5 mm² (30-12 AWG)

Interfaces
Shown in Terminal Block Connections diagram, to right, plus an RS232 Programming Port. General Purpose Input (GPI) interface offers: Reset, Disable, Standby, Alarm set 1, Alarm set 2 and External Input functions.

Alarm Threshold Setting Range

Alert, Action	0.025 - 2.00% obs/m (0.008 - 0.625% obs/ft)
Fire 1, Fire 2	0.025 - 20.00% obs/m (0.008 - 6.25% obs/ft)
Individual Alarm Delays	0 – 60 seconds
Two Alarm Threshold Settings	Either time or GPI based

Display

- 4 Alarm State Indicators
- Smoke Level Indicator
- Reset, Disable and Test Controls
- Fault and Disabled Indicators
- Instant Fault Finder
- Smoke and Flow AutoLearn Controls

Event Log
Up to 18000 events, time and date stamped in separate, non-volatile, logs for: Smoke Level, Flow Level, Detector Status and Faults

AutoLearn Smoke & Flow

- Automatically set acceptable alarm thresholds for both smoke and flow levels
- Minimum 15 minutes, maximum 15 days (default 14 days)
- During AutoLearn thresholds are NOT changed from pre-set values

Warranty Period
2 years

Ordering Information:

VLF-250-00	VESDA VLF. European language set. English display labels
VLF-250-01	VESDA VLF. European language set. International display labels
VLF-250-02	VESDA VLF. English + Asian language set. International display labels
VLF-250-04	VESDA VLF. English + Russian language set. International display labels
VLF-250-05	VESDA VLF. English + Eastern Euro language set. International display labels
VIC-010	VESDAnet Interface Card, VIC-020 Multifunction Control Card (MCC)
VIC-030	Multifunction Control Card (MCC) with Monitored Powered Output (MPO)
VSP-005	Filter Cartridge
VSP-722	Aspirator for VESDA VLF-250

Display:

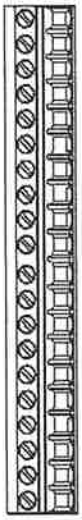
The display provided to the user includes a Smoke Dial™ and alarm and status indicators.

When the field service access door is open, the user has access to the RESET ↺, DISABLE ▣, Fire Test 🖃, AutoLearn ◇» and Instant Fault Finder functions.
When the Instant Fault Finder function is activated, the Smoke Dial™ converts to a fault indicator, with the dial segment numbers corresponding to the faults listed below.

Legend of fault indicators:

1 Filter	6 External Device/PSU
2 Aspirator	7 Interface card
3 High flow	8 Field wiring
4 Low flow	9 AutoLearn Fail
5 n/a	10 Detector failure

Terminal Block Connections:



1	GPI	
2	GPI	
3	Display TX	
4	Display RX	
5	Display Common Ground	
6	Display Power -	
7	Display Power +	
8	Power Return 0 VDC	From power supply unit
9	Power In 24 VDC	
10	Power Return 0 VDC	To next detector (if more than 1 detector per Power Supply Unit)
11	Power Out 24 VDC	
12	NC	
13	Common	Fault relay
14	NO	
15	NC	
16	Common	Action relay
17	NO	
18	NC	
19	Common	Fire 1 relay
20	NO	

Approvals Compliance

Please refer to the Product Guide for details regarding compliant design, installation and commissioning.

* Product UL listed for use from 0°C to 38°C (32°F to 100°F).

** Sampled Air temperature shall reach Ambient Detector temperature upon entry into Detector. Refer to Xtralis Design Guides & Application Notes for sampled air pre-conditioning.

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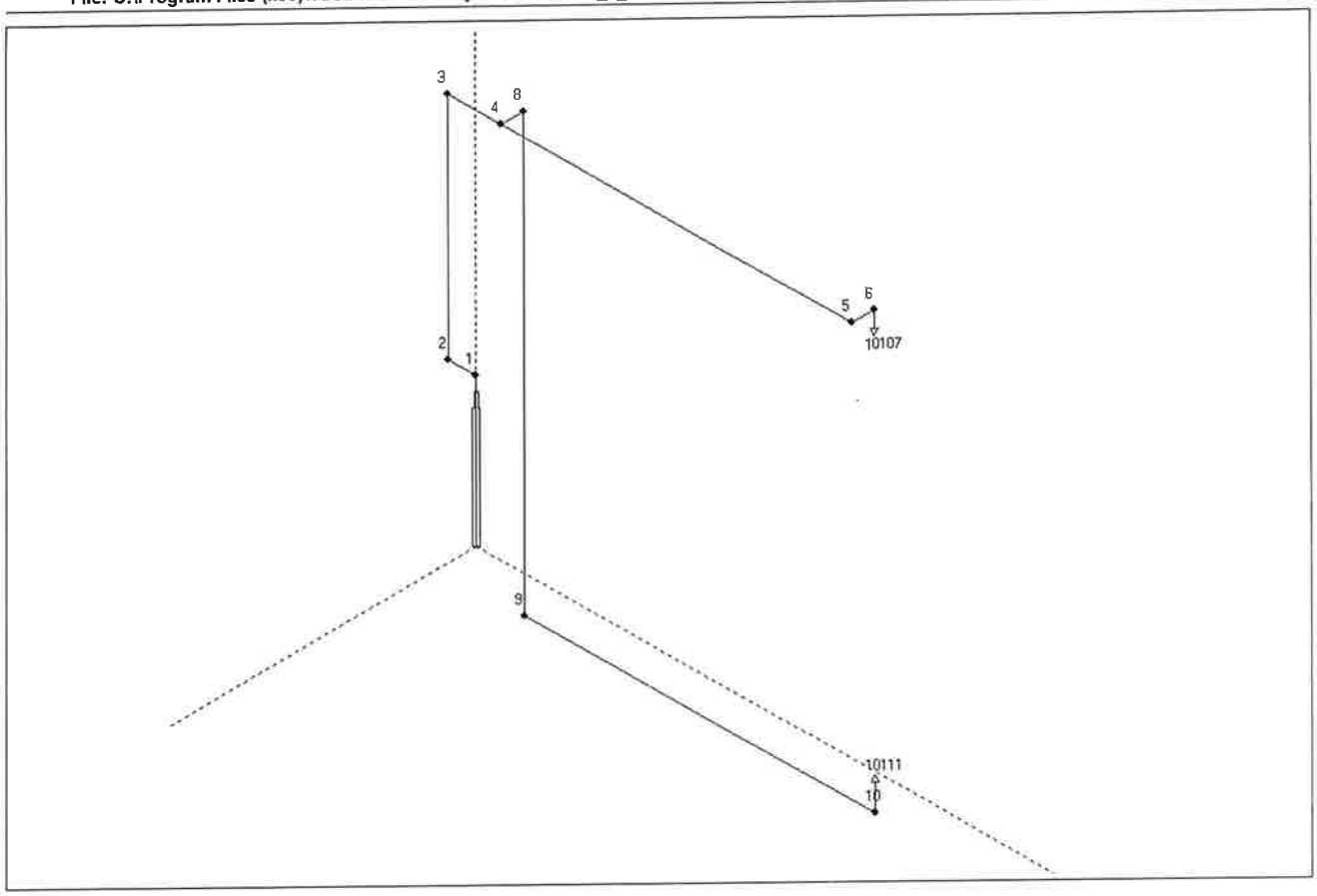
Doc. no. 07854_17
Part: 20293

VESDA by xtralis

Project:	Junta Central Electoral
Project-No:	1796_1_2
Building:	
Object:	Data Center
Contractor:	ID Corp
Owner:	
Project engineer:	jeb
Date:	31/10/2022
Regulation rule for calculation of FK-5-1-12 quantities:	NFPA 2001, Edition 2018
Altitude above sealevel:	1 m
Atmospheric correction factor:	1.000

Project description:
1 x 2.0" 180° Sidewall Nozzle 10107
1 x 1.0" 180° Sidewall Nozzle 10111

Pipe catalogue:	schedule40.rkl
Component catalogue:	SEVOcomp_1_2.arm
Nozzle catalogue:	SEVO.noz


3
4
8
5
6
10107
2
1
9
10111
10

Pipesystem data:

Section-No:	Starting-node	Endnode	Length [m]	Height [m]	Pipetype	Diameter [inch] **	Fitting *	Component code	Component coefficient	Nb of containers FK-5-1-12 quantity
1	0	1	1.378	1.378	10	2 1/2	C	601	7.000	1.0
2	1	2	0.254	0.000	13	2 1/2	E	-	-	0.0
3	2	3	2.140	2.140	13	2	E	-	-	0.0
4	3	4	0.500	0.000	13	2	E	-	-	0.0
5	4	5	3.250	0.000	13	2	T-0°	-	-	0.0
6	5	6	0.200	0.000	13	2	E	-	-	0.0
7	6	10107	0.150	-0.150	13	2	E	-	-	0.0
8	4	8	0.200	0.000	13	1	T-90°	-	-	0.0
9	8	9	3.900	-3.900	13	1	E	-	-	0.0
10	9	10	3.250	0.000	13	1	E	-	-	0.0
11	10	10111	0.250	0.250	13	1	E	-	-	0.0

* C=Component, B=Bend, T=T-Piece, E=Elbow
** If a pipe diameter is equal zero see the extra table of the calculated diameters

Legend of pipetypes

Type	Pipeclass	Pipe roughness
10	schedule 40	smooth
13	schedule 40	black pipe

Legend of components

Code	Type	Resistance coefficient
601	SEVO 601 LB/2 1/2" (CV14813)	7.000

Nozzle data:

No.	Calculation zone	Diameter [mm]
10107	Ambiente	34.8
10111	Piso Técnico	13.3

Legend of nozzles:

Type	Number of orifices	C1	C2	C3	C4	C5	C6
1 Nozzle 1	1	0.10652	0.26900	0.23203	-0.20251	0.00000	0.00000

Calculation zone data:

Calculation of design quantity:

Zone	Total volume [m3]	Volume of building parts [m3]	Calculated volume [m3]	Total surface	Max. Over-pressure [mbar]	Design temp. [°C]	Extinguish-conc. [% Vol]	Design factor	Design conc. [% Vol]	Design quantity [kg]
1 Ambiente	214.5	0.0	214.5	558.0	1.000	20.0	3.3	1.35	4.5	140.62
2 Piso Técnico	24.4	0.0	24.4	171.5	1.000	20.0	3.3	1.35	4.5	15.96

Regulation rule for calculation of FK-5-1-12 quantities:	NFPA 2001, Edition 2018
Calczone no. 1:	Class C Fire, NFPA 2001 (Edition 2018)
Calczone no. 2:	Class C Fire, NFPA 2001 (Edition 2018)
Altitude above sealevel:	1.0 m
Atmospheric correction factor:	1.000

FK-5-1-12 storage input data:

Container volume:	227.0 l
Maximum filling ratio of a container:	1.200 kg/l
Filling pressure:	34.5 bar abs
Storage temperature:	20.0 °C
Supplement factor:	1.01
Minimum storage quantity:	156.75 kg
Number of containers:	1

Discharge time (input value): 10.0 s

Further information:
Design with included gas discharge time
Design with predeterminated orifice diameters

Calculation results:

FK-5-1-12 storage data:

Design quantity:	156.4 kg
Supplement factor:	1.01
Minimum storage quantitiy:	158.0 kg
Container volume:	227.0 l
Filling ratio:	0.70 kg/l
Filling pressure:	34.5 bar abs
FK-5-1-12 -mass per container:	158.0 kg
Number of containers:	1
Actual storage quantity:	158.0 kg
Storage temperature:	20.0 °C
Starting container pressure:	34.5 bar abs

Discharge time:

Discharge time air:	0.1 s
Total gas discharge time:	0.7 s
Two-phase discharge time:	6.3 s
Total discharge time:	7.0 s

System information:

Container working pressure:	22.4 bar abs
Container working temperature:	20.0 °C
Total network volume:	22.9 l
Medium pipe content:	29.3 kg FK-5-1-12
Filling portion in pipe system:	0.19 kg FK-5-1-12 /kg FK-5-1-12 -storage

Pipe system:

Section-No:	Starting-node	Endnode	Pressure [bar abs]	Flowrate [kg/s]	Pipedimension Di [mm]	DN
1	0	1	20.82	23.41	62.7	2 1/2
2	1	2	20.45	23.50	62.7	2 1/2
3	2	3	19.07	23.50	52.5	2
4	3	4	18.21	23.50	52.5	2
5	4	5	17.63	21.09	52.5	2
6	5	6	17.00	21.09	52.5	2
7	6	10107	16.39	21.09	52.5	2
8	4	8	17.49	2.41	26.6	1
9	8	9	17.18	2.41	26.6	1
10	9	10	16.67	2.41	26.6	1
11	10	10111	16.29	2.41	26.6	1

Tee split table

T-Type	Flow in		1th Flow out			2nd Flow out			Regulation conform
	Section No.	Flow kg/s	Section No.	Flow kg/s	Split %	Section No.	Flow kg/s	Split %	
Side Tee	4	23.50	5	21.09	89.745	8	2.41	10.255	Yes

Nozzle data:

Calculation-zone no:	Nozzle no.	Nozzle type	Number of orifices	Pipeconnection Di [mm]	DN	Orifice [mm]	FK-5-1-12 output [kg]
1	10107	1	1	52.5	2	34.8	141.0
2	10111	1	1	26.6	1	13.3	16.1

Two-phase discharge time: 6.3 s

MAXIMUM TRANSPORT TIME DIFF. BETWEEN NOZZLES: 10111./ 10107. IS 0.58 S

Calculation-zone no:	Nozzle no.	Outlet velocity [m/s]	Transport time [s]	Jetdistance [m]	Evaporation distance [m]
1	10107	16.5	1.18	13.4	4.9
2	10111	30.8	1.76	8.1	2.7

Concentrations:

Calculation-zone no:	Gascomposition after discharge [%] O2	FK-5-1-12	N2
1	20.0	4.5	74.6
2	20.0	4.5	74.6

Pressure relief opening:

Calculation-zone no:	Recommended area against overpressure Area [m²]	Overpressure [mbar]	Max. flow [kg/s]
1	0.200	1.0	21.1
2	0.023	1.0	2.4

Component list:

Component	Number	Code	Coefficient
SEVO 601 LB/2 1/2" (	1	601	7.000

Nozzle-type	Number	C1	C2	C3	C4	C5	C6
1	2	0.10650	0.26900	0.23200	-0.20250	0.00000	0.00000

Pipe-type	Di [mm]	DN	Length [m]
10	62.70	2 1/2	1.400
13	62.70	2 1/2	0.300
13	52.50	2	6.200
13	26.60	1	7.700

Number of bends (+) and elbows (-)

Bend-type	Di [mm]	DN	Number
-90	62.70	2 1/2	1
-90	52.50	2	4
-90	26.60	1	3

Number of T-distributors (in- and outdiameter)

Number	Input	90-out	90-out	0-out
1	2	1	0.0	2

3M™ Novec™ 1230 Fire Protection Fluid

Introduction

3M™ Novec™ 1230 Fire Protection Fluid is a next-generation halon alternative offering outstanding performance, large margin of safety, and an excellent environmental profile.

- Zero ozone depletion potential
- 5-day atmospheric lifetime
- A global warming potential of 1
- A large margin of safety for occupied spaces

Novec 1230 Fire Protection Fluid is based on a proprietary chemical from 3M called a fluoroketone. The full chemical name for this compound is dodecafluoro-2-methylpentan-3-one. Its ASHRAE nomenclature – the way it is designated in the NFPA 2001 and ISO 14520 clean agent standards – is FK-5-1-12.

Novec 1230 fluid offers a unique combination of safety, low environmental impact and extinguishing performance, making it the first chemical halon replacement to offer a viable, long-term, sustainable technology for special hazards fire protection.

Physical Properties

Novec 1230 fluid is applied as a gas, but is liquid at room temperature. It is electrically non-conducting in both the liquid and gaseous state. The breakdown voltage of Novec 1230 fluid vapor under saturated conditions at 1 atm, 21°C over a 2.7 mm electrode gap is 15.6 kV, nearly 2.3 times that of dry nitrogen. The breakdown voltage of liquid Novec 1230 fluid under the same conditions is 48 kV.

The properties of Novec 1230 fluid are similar to many of the first generation halon alternatives with one primary exception – this compound is a liquid at ambient conditions. The boiling point of Novec 1230 fluid is 49.2°C, meaning this product has a much lower vapor pressure than other clean agents, which are gases at ambient conditions.

Novec 1230 fluid has a very low heat of vaporization, approximately 25 times less than that of water. This, along with a higher vapor pressure, causes Novec 1230 fluid to evaporate more than 50 times faster than water. This allows the agent to transition from a liquid to a gaseous state very rapidly when discharged through a nozzle. In a properly designed system, Novec 1230 fluid will rapidly vaporize and evenly distribute throughout the protected space.

Properties Description

Not for specification purposes. All values @ 25°C (77°F) unless otherwise specified.

Not for specification purposes. All values @ 25°C (77°F) unless otherwise specified.

Properties	Novec™ 1230 Fluid
Chemical Formula	$CF_3CF_2C(O)CF(CF_3)_2$
Molecular Weight	316.04
Boiling Point @ 1 atm	49.2°C (120.6°F)
Freezing Point	-108.0°C (-162.4°F)
Critical Temperature	168.7°C (335.6°F)
Critical Pressure	18.65 bar (270.44 psi)
Critical Volume	494.5 cc/mole (0.0251 ft^3/lbm)
Critical Density	639.1 kg/m^3 (39.91 lbm/ft^3)
Density, Sat. Liquid	1.60 g/ml (99.9 lbm/ft^3)
Density, Gas @ 1 atm	0.0136 g/ml (0.851 lbm/ft^3)
Specific Volume, Gas @ 1 atm	0.0733 m^3/kg (1.175 ft^3/lb)
Specific Heat, Liquid	1.103 kJ/kg°C (0.2634 BTU/lb°F)
Specific Heat, Vapor @ 1 atm	0.891 kJ/kg°C (0.2127 BTU/lb°F)
Heat of Vaporization @ boiling point	88.0 kJ/kg (37.9 BTU/lb)
Liquid Viscosity @ 0°C/25°C	0.56/0.39 centistokes
Vapor Pressure	0.404 bar (5.85 psig)
Relative Dielectric Strength, 1 atm (N_2=1.0)	2.3

3M

Physical Properties (continued)

Although 3M™ Novec™ 1230 Fire Protection Fluid is a liquid at room temperature, its vapor pressure is sufficient for the agent to readily achieve vapor extinguishing concentrations in air. At 25°C, one could form vapor concentrations with Novec 1230 fluid up to 39 volume percent prior to reaching saturation. Typical fire suppression design concentrations for most applications are in the range of 4 to 6 percent by volume of the protected space. That large differential between design and saturation concentrations dictates that condensation of vapor will not occur.

Design Concentrations

Minimum design concentration based upon cup burner results × 1.3

Flammable Liquid	Design Concentration (vol%)
Acetone	5.6
Ethyl alcohol	7.2
n-heptane	5.9
Technical heptane	5.6
Diesel fuel	4.5
Methanol	8.5
Methyl ethyl ketone	5.9

Like other halocarbon halon alternatives, Novec 1230 fluid extinguishes principally by removing heat from the fire. Upon discharge, Novec 1230 fluid creates a gaseous mixture with air. This agent/air mixture has a heat capacity much larger than that of air alone. A higher heat capacity means that this gas mixture will absorb more energy (heat) for each degree of temperature change it experiences. At the system design concentration, the agent/air mixture absorbs sufficient heat to upset the conditions required for combustion to occur. The amount of heat the fire loses to the surroundings is increased by the presence of the agent. This causes the combustion zone to cool to the point that the fire extinguishes. Novec 1230 fluid has the highest heat capacity of the commercially available halon alternatives resulting in the lowest extinguishing concentrations for a given fuel. The design concentration for Class A fuels is a minimum of 4.2 vol% for designs based on UL 2166 in the USA. Different design concentrations may be required in other countries based on local approvals.

Typical Applications

Novec 1230 fluid can effectively be applied in total and localized flooding, inerting and explosion suppression applications in the following areas:

- Data Processing Centers
  - Computer Rooms
  - Data Storage Facilities
- Telecommunications
  - Cellular Sites
  - Switching Centers
- Commercial and Military Aviation
  - Engine protection
- Commercial Marine
  - Control and Paint Rooms
  - Engine Rooms
  - Storage Rooms
- Military Systems
  - Combat Vehicles
  - Marine Engine Rooms
- Oil & Gas Petrochemical Facilities
  - Pumping Facilities
  - Gas Compressor Rooms
  - Offshore Oil Exploration Rigs
- Transportation
  - Merchant Marine Vessels
  - Mass Transit Vehicles
- Recreation
  - Pleasure Craft
  - Race Cars
- Cultural Facilities
  - Museums
  - Libraries
  - Archives
- Medical Facilities
- Manufacturing Facilities
- Storage Areas

Environmental Properties

Once emitted to the environment, there are a number ways for organic compounds to be removed from the atmosphere. Studies conducted on 3M™ Novec™ 1230 Fire Protection Fluid have determined the atmospheric loss rates via these removal mechanisms and the effect on the atmospheric lifetime of this compound. The very low water solubility of Novec 1230 fluid and the low degree to which it partitions into liquid water was found to preclude atmospheric hydrolysis from being a meaningful removal mechanism. The principal atmospheric sink for Novec 1230 agent is photolysis. It exhibits strong absorption of energy at near UV wavelengths, resulting in a very short atmospheric lifetime. The rate of photolysis under atmospheric conditions and the mechanism of decomposition of this compound have been investigated by two different research groups[1,2]. The photolysis rate of the fluoroketone leads to an atmospheric lifetime of approximately 1 week, which is consistent with the 3M study that found the atmospheric lifetime of Novec 1230 fluid to be on the order of 5 days.

Ozone Depletion Potential

Novec 1230 fluid, which contains no chlorine or bromine, has an ozone depletion potential of zero.

Global Warming Potential

The Global Warming Potential (GWP) is an index that provides a relative measure of the possible climate impact due to a compound that acts as a greenhouse gas in the atmosphere. The GWP of a compound, as defined by the Intergovernmental Panel on Climate Change (IPCC), is calculated as the integrated radiative forcing due to the release of 1 kilogram of that compound relative to the warming due to 1 kilogram of CO_2.

The potential for Novec 1230 fluid to have a climate impact is limited by its very short atmospheric lifetime and low global warming potential. The GWP of Novec 1230 fluid is calculated to be 1 or less using the IPCC 2007 method and a 100-year integration time horizon[3], including both the direct effect from the agent as well as the indirect effect from decomposition products. Taniguchi et al.[1] and D'Anna et al.[2] have concluded that "the global warming potential of the compound is negligible."

Potential for Reducing GHG Emissions

The fire protection industry has made considerable progress in reducing emissions from the relatively high levels experienced during the use of halon. However, the high GWP of the HFCs used in these applications combined with their growing installed base results in continually increasing greenhouse gas emissions. A single discharge of an average sized fire protection system containing HFCs is meaningful in itself. Based upon an average sized halon 1301 system containing 200 kg, an equivalent sized system using, for example, HFC-227ea, contains approximately 347 kg of agent. A GWP of 3220 results in CO_2 equivalent emissions of 1,110,000 kg when this HFC agent is discharged. This is equivalent to the emissions from more than 240 typical automobiles in the USA driven for an entire year!

Discharge of a fire protection system using Novec 1230 fluid in place of an HFC extinguishing agent results in significantly reduced greenhouse gas emissions. Due to the dramatically lower GWP, greenhouse gas emissions from discharge of Novec 1230 fluid are reduced by more than 99.9% compared to any of the HFCs used in fire protection. As a result, Novec 1230 fluid is a low GWP alternative that can reduce emissions of greenhouse gases in fire protection applications and help to further the environmental goals of the industry.

Environmental Properties Comparison

Not for specification purposes.

All data other than those for Novec 1230 fluid were compiled from published sources.

Properties	Novec 1230	Halon 1211	Halon 1301	HFC-125	HFC-227ea
Ozone Depletion Potential (ODP)[1]	0.0	4.0	12.0	0.0	0.0
Global Warming Potential–IPCC[2]	1	1890	7140	3500	3220
Atmospheric Lifetime (years)	0.014	16	65	29	34.2
SNAP (Yes/No)	Yes	N/A	N/A	Yes	Yes

[1] World Meteorological Organization (WMO) 1998, Model-Derived Method.
[2] Intergovernmental Panel on Climate Change (IPCC) 2007 Method, 100 Year ITH.

Safety Considerations

The safety of 3M™ Novec™ 1230 Fire Protection Fluid has been thoroughly evaluated through both acute and repeat dose toxicity testing. A full series of toxicological tests has been completed using this compound. In each case, Novec 1230 fluid has been demonstrated to be very low in toxicity and to have a large margin of safety in use as a clean extinguishing agent. Key testing of Novec 1230 fluid was conducted at independent laboratories as shown in the following table.

Toxicity testing results

Properties	Novec 1230
4-hour Acute Inhalation	Practically Non-Toxic (LC_{50} >100,000 ppm)
Cardiac Sensitization	Not a Sensitizer (NOAEL = 100,000 ppm)
Acute Dermal Toxicity	Low Toxicity (LD_{50} >2000 mg/kg)
Ames Assay	Negative
Primary Skin Irritation	Non-Irritating
Primary Eye Irritation	Minimally Irritating
Acute Oral Toxicity	Low Toxicity (LD_{50} >2000 mg/kg)
Skin Sensitization	Not a Skin Sensitizer
28-Day Inhalation Study	NOAEL of this study: 4,000 ppm
Chromosomal Aberration	Negative

The no observable adverse effect level (NOAEL) for any end point of acute toxicity has been determined to be 10 volume percent (100,000 ppmv) in air. With a NOAEL of 10%, there is consensus that Novec 1230 fluid is not only safe for its intended end use but that it provides a large margin of safety relative to the typical design concentrations of fire protection systems. Typical design concentrations in the range of 4.2 to 5.9 volume percent result in safety margins of 69 to 138%.

Thermal Decomposition

Well over 90% of applications involving the use of halocarbons, like 3M™ Novec™ 1230 Fire Protection Fluid, protect Class A assets, including those related to computer and telecommunication facilities. Continuity of operation is paramount, and those types of assets, typically involving electronic switches and circuit boards, cannot tolerate even a relatively modest fire. System design, therefore, must be such that fire size be kept to a minimum.

Levels of HF produced from fires extinguished by Novec 1230 fluid are similar to those involving other physically acting halocarbon agents. Industry practice over the last decade has demonstrated that fire extinguishing systems using halogenated halon alternatives can be designed to minimize thermal decomposition product formation and avoid adding to the potential toxic threat of a fire event (the hazards created by the combustion products of the fire).

Materials Compatibility

Compatibility of "O" Rings with Novec 1230 Fluid

Exposure Time: 1 Week@ 25°C, 100°C

Elastomer Type	Exposure Temperature	Change in Shore A Hardness	% Change in Weight	% Change in Volume
Neoprene	25°C	-1.8	-.06	-1.2
	100°C	-2.2	+2.3	+0.8
Butyl rubber	25°C	-2.7	+0.2	+0.1
	100°C	-4.0	+4.3	+4.2
Fluoroelastomer	25°C	-6.2	+0.7	+0.6
	100°C	-12.6	+9.5	+10.6
EPDM	25°C	-4.7	+0.6	+0.3
	100°C	-5.7	+3.3	+2.4
Silicone	25°C	N/A	+3.1	+2.8
	100°C	-5.4	+6.0	+5.1
Nitrile	25°C	-0.7	-0.3	-0.5
	100°C	+2.5	+4.6	+0.7

Effect of Novec 1230 Fluid on Various Metals

Metals	Effect
Aluminum Alloy 6262 T6511	A
Brass Alloy UNS C36000	A
AISI Type 304L stainless steel	A
AISI Type 316L stainless steel	A
Copper UNS C12200	A
ASTM A 516, Grade 70 carbon steel	A

A. No discoloration or destruction of fluid or metal at temperature indicated, 10 days minimum exposure, 48°C.

3M has extensive data on compatibility with various materials. For more information, contact your local 3M technical service representative.

Regulatory Registries

When commercializing 3M™ Novec™ 1230 Fire Protection Fluid, inclusion of the chemistry on a region's or country's chemical registry was required. For example, in Japan, a chemical must attain METI approval and, in the EU, the ELINCS approval must be in place before a chemical may be imported. Local regulatory approvals and listings on chemical registries of key countries are complete. The following table lists eight of the major chemical registry approvals.

Chemical Registry Approvals

Chemical: dodecafluoro-2-methylpentan-3-one CAS#: 756-13-8

Country/Region	Status
USA (TSCA)	Listed
Canada (CDSL)	Listed
EU (ELINCS):	EC# 436-710-6
Australia (AICS)	Listed
Japan (METI)	METI# (2)-4024
Korea (KECI)	KECI# 2002-3-2022
China (IECSC)	Listed
Philippines (PICCS)	Listed

Additionally, both the German Hygiene Institute and Swiss BUWAL approval have been attained. In the USA, Novec 1230 fluid has been approved by the EPA Significant New Alternatives Policy (SNAP) Program for use as a halon replacement in both total flooding and streaming applications.

Industry Approvals

Fire suppression systems containing Novec 1230 fluid are commercially available globally. Major system listings and approvals, with Novec 1230 fluid as a component, are included in the following table. Component recognitions have been attained from US-based Underwriters Laboratories, Inc. and FM Global, as well as EU-based LPCB, VdS and CNPP. Also, the German Amtliche Prüfstelle has approved systems using Novec 1230 fluid. While approval from the SSL in Australia is complete, other AsiaPac approvals are in progress.

Industry Listings and Approvals

Underwriters Laboratories Inc (ULI)	USA
Underwriters Laboratories CA (ULC)	Canada
FM Global (FM)	USA
Loss Prevention Certification Board (LPCB)	United Kingdom
Scientific Services Laboratories (SSL) Also called Certifire Pty Ltd	Australia
VdS Schadenverhütung (VdS)	Germany
Centre National de Prévention et de Protection (CNPP)	France
Korea Fire Institute (KFI)	Korea

Novec 1230 fluid is included in the 2008 edition of NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems and the 2006 edition of ISO 14520, Gaseous Media Fire Extinguishing Systems. In each standard, it is referenced by the generic ASHRAE nomenclature FK-5-1-12.

For one specific industry, commercial marine, numerous approvals for systems using 3M™ Novec™ 1230 Fire Protection Fluid have been attained globally, and are listed below.

Global marine approvals for Novec 1230 fluid

American Bureau of Shipping (ABS)	International
Australian Maritime Safety Agency	Australia
Bureau Veritas (BV)	France
Canadian Coast Guard	Canada
Danish Maritime Authority (DMA)	Denmark
Det Norske Veritas (DNV)	Norway
Germanischer Lloyd (GL)	Denmark
Icelandic Maritime Administration	Iceland
Inland/Sea going acceptance (BZI)	Belgium
Lloyd's Register of Shipping (LR)	International
Maritime and Coastguard Agency (MCA)	UK
Marine Marchant Approval	France
Nippon Kaiji Kyokai (NK)	Japan
Polish Register of Shipping	Poland
Registro Italiano Navale (RINA)	Italy
Shipping Authority Acceptance – Inland/Sea going	Holland
United States Coast Guard (USCG)	USA
Marine Equipment Directive (MED) Module B	EU

Commercial Availability

Six independent original equipment manufacturers (OEMs) have substantially invested to gain the necessary approvals and to commercialize their total flooding systems with Novec 1230 fluid. They are:

- Firetrace International (USA)
- Minimax (DE)
- Sevo Systems (USA)
- Siemens Systems (CH)
- Tyco Fire & Security (USA)
- UTC Fire & Security (USA)

Total flooding system development has been the near term effort of these companies. All have invested heavily to test their systems against recognized test protocols and commercialize their products. Future development is expected to expand into specialty, military, and aerospace clean agent applications as well as handheld portable extinguishers.

Packaging and Availability

Novec 1230 fluid is currently available in 2425 lb. (1100 kg) intermediate bulk containers (IBCs), 661 lb. (300 kg) drums and 11 lb. (5 kg) glass sample jugs.

A cylinder containing Novec 1230 fluid superpressurized with nitrogen varies less than 150 psi (10 bar) over a temperature range of 250°F (120°C). Also, because it is packaged in IBCs and drums, it can be air freighted without the restrictions of gaseous alternatives.

Resources and Distribution

Novec 1230 fluid is supported by global sales, technical and customer service resources, with technical service laboratories in the U.S., Europe, Japan, Latin America and Southeast Asia. Users benefit from 3M's broad technology base and continuing attention to product development, performance, safety and environmental issues.

Extensive OEM policies and equipment design guidelines have been prepared for system retrofit, installers and equipment manufacturers in support of Novec 1230 fluid.

For additional technical information on Novec 1230 fluid in the United States, or for the name of a local authorized distributor, call 3M Electronics Markets Materials Division, **800 810 8513**.

For other 3M global offices, and information on additional 3M products, visit our web site at **www.3M.com/novec1230fluid.**

References

1. Taniguchi, N., Wallington, T.J., Hurley, M.D., Guschin, A.G., Molina, L.T., Molina, M.J., *Journal of Physical Chemistry A*, 107(15), 2674-2679, 2003.
2. D'Anna, B., Sellevag, S., Wirtz, K., and Nielsen, C.J., *Environmental Science and Technology*, 39, 8708-8711, 2005.
3. IPCC 2007: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp, 2007.

The 3M™ Novec™ Brand Family

The Novec brand is the hallmark for a variety of patented 3M products. Although each has its own unique formula and performance properties, all Novec products are designed in common to address the need for safe, effective, sustainable solutions in industry-specific applications. These include precision and electronics cleaning, heat transfer, fire protection, lubricant deposition and several specialty chemical applications.

3M™ Novec™ Engineered Fluids • 3M™ Novec™ Aerosol Cleaners • 3M™ Novec™ 1230 Fire Protection Fluid • 3M™ Novec™ Electronic Coatings • 3M™ Novec™ Electronic Surfactants

United States
3M Electronics Markets Materials Division
800 810 8513

China
3M China Ltd.
86 21 6275 3535

Europe
3M Belgium N.V.
32 3 250 7521

Japan
Sumitomo 3M Limited
813 3709 8250

Korea
3M Korea Limited
82 2 3771 4114

Singapore
3M Singapore Pte. Ltd.
65 64508888

Taiwan
3M Taiwan Limited
886 2 2704 9011

3M

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Issued: 4/09 © 3M 2009.

98-0212-3709-8

UL Product iQ™

GAQF.EX6174 - Clean-agent Extinguishing System Units

Clean-agent Extinguishing System Units

See General Information for Clean-agent Extinguishing System Units

EX6174

SEVO SYSTEMS INC
14335 W 97TH TER
LENEXA, KS 66215-1150 USA

PRE-ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, having nominal charging capacities of 40, 76, 164, 322 and 601 lb (18.1, 34.5, 74.4, 146.1 and 272.6 kg) Novec™ 1230 Fluid, respectively. The units are super-pressurized to 25 bar (363 psig) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

A description of these extinguishing system units, and the design and installation limitations are contained in the Listee's installation manual dated October 17, 2002 (p/n SE 1230), Revised December 29, 2015. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
16-40	CV 140069
30-76	CV 140079
66-164	CV 14817
129-322	CV 140057
241-601	CV 14813

ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, with **welded cylinders** having nominal charging capacities of 38, 40, 65, 76, 130, 164, 277, 322, 395, 601, 850 and 910 lb (17.8, 18.1, 29.5, 34.5, 59.0, 74.4, 125.6, 146.1, 179.2, 272.6, 385.6 and 412.8 kg) Novec™ 1230 Fluid, respectively. The units are super-pressurized to 25 bar (360 psig) with operating temperatures of 0° F to 130° F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

These system units are intended to be designed and installed in accordance with the Listee's Engineered System Design, Installation, Operation and Maintenance Manual P/N SE 1230 360 Eng Issued April 2009 and Revised May 30, 2019 and Sevo software Novec - Calculation program Versions 7.2 or 7.6. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
16-40	CV 140077-360
16-40	CV 140069-360

26-65	CV 140078-360
30-76	CV 140079-360
52-130	CV 140068-360
66-164	CV 14817-360
111-277	CV 140021-360
129-322	CV 140057-360
157-395	CV 140067-360
241-601	CV 14813-360
366-854	CV 140106-360
390-910	CV 140107-360

ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, with seamless cylinders, having nominal storage capacities of 106, 160, 211, 320, and 393.75 lb (48.1, 72.6, 95.7, 145.1, and 178.6 kg) of Novec™ 1230 Fluid (dodecafluoro-2-methylpentan-3-one). The units are pressurized with dry nitrogen to 25 bar (360 psig) at 70°F (21°C) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

* These system units are intended to be designed and installed in accordance with the Listee's Engineered System Design, Installation, Operation and Maintenance Manual, for system units with seamless cylinders, P/N SE 1230 360 Eng Seamless, Issued April 2014, Revised January 5, 2016, and Sevo VDS software Novec - Calculation program Versions 7.2 or 7.6. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
44-106	CV 140040-360
66-160	CV 140060-360
88-211	CV 140080-360
132-320	CV 140120-360
157.5-393.75	CV 140150-360

ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, **welded cylinders** having nominal storage capacities of 40, 76, 164, 322, 601 and 910 lb (18.1, 34.5, 74.4, 146.1, 272.6, and 412.8 kg) Novec™ 1230 Fluid, respectively. The units are super-pressurized to 34.5 bar (500 psig) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

These system units are intended to be designed and installed in accordance with the Listee's Engineered System Design, Installation, Operation and Maintenance Manual P/N SE 1230 500 Eng Issued April 2009 and Revised January 5, 2016, and Sevo VDS software Novec - Calculation program Versions 7.2 or 7.6. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
16-40	CV 140069-500

30-76	CV 140079-500
66-164	CV 14817-500
129-322	CV 140057-500
241-601	CV 14813-500
390-910	CV 140107-500

ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, **welded cylinders**, having nominal storage capacities of 38, 65, 130, 277, 395 and 850 lb (17.2, 29.5, 59.0, 125.6, 179.6 and 385.6 kg) Novec™ 1230 Fluid, respectively. The units are super-pressurized to 34.5 bar (500 psig) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

These system units are intended to be designed and installed in accordance with the Listee's Engineered System Design, Installation, Operation and Maintenance Manual P/N SE 1230 500 Eng Issued April 2009 and Revised January 6, 2016, with FFT cylinder sizes supplement pages 64-69, and Sevo VDS software Novec - Calculation program Versions 7.2 or 7.6. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
15-38	CV 140077-500
26-65	CV 140078-500
52-130	CV 140068-500
111-277	CV 140021-500
157-395	CV 140067-500
366-854	CV 140106-500

ENGINEERED UNITS, 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one) Extinguishing System Units, stored pressure type, with **seamless cylinders**, having nominal storage capacities of 106, 160, 211, 320, and 393.75 lb (48.1, 72.6, 95.7, 145.1, and 178.6 kg) of Novec™ 1230 Fluid (dodecafluoro-2-methylpentan-3-one). The units are pressurized with dry nitrogen to 34.5 bar (500 psig) at 70°F (21°C) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

* These system units are intended to be designed and installed in accordance with the Listee's Engineered System Design, Installation, Operation and Maintenance Manual, for system units with seamless cylinders, P/N SE 1230 500 Eng Seamless, Issued April 2014, Revised January 5, 2016 (and Sevo VDS software Novec - Calculation program Versions 7.2 or 7.6. Copies are available from the above Listee.

Weight of Agent (lbs)	Part No.
44-106	CV 140040-500
66-160	CV 140060-500
88-211	CV 140080-500
132-320	CV 140120-500
157.5-393.75	CV 140150-500

PRE-ENGINEERED UNIT, Model Flex, Clean Agent Extinguishing System Units containing Novec 1230, stored pressure type, having nominal

storage capacities of 3, 7 and 14 lbs. The units are super-pressurized with dry nitrogen to 240 psig at 70°F (21°C) with operating temperatures of -32°F to -130°F (0°C to 54°C). The units are designed for total-flooding protection against Class A surface burning, Class B flammable liquid, and Class C fires occurring within an enclosure.

A description of these extinguishing system units and the design and installation limitations are contained in the Listee's installation manual Part No. FE 1230 240 PRE, dated 11/14. Copies are available from the above Listee.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
3	FLEX-L0300
7	FLEX-L0700
14	FLEX-L1400

ENGINEERED UNITS, Titan Series Engineered Clean Agent Extinguishing System Units containing 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one), stored pressure type, with welded cylinders having nominal storage capacities of 40, 76, 164, 322, 601 and 910 lb (18.1, 34.5, 74.4, 146.1, 272.6 and 412.8 kg) of Novec™ 1230 Fluid (dodecafluoro-2-methylpentan-3-one). The units are pressurized with dry nitrogen to 240 psig (16.5 bar) at 70°F (21°C) with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

ENGINEERED UNITS, Titan Series Engineered Clean Agent Extinguishing System Units containing 3M™ Novec™ 1230 Fire Protection Fluid (dodecafluoro-2-methylpentan-3-one), non-pressurized type, with welded cylinders having nominal storage capacities of 40, 76, 164, 322, 601, 910, 1250 and 2500 lb (18.1, 34.5, 74.4, 146.1, 272.6, 412.8, 567.0 and 1134.0 kg) of Novec™ 1230 Fluid (dodecafluoro-2-methylpentan-3-one). The units are unpressurized with operating temperatures of 0°F to 130°F (-18°C to 54°C). The units are designed for total flooding protection against Class A surface burning, Class B flammable liquid and Class C fires occurring within an enclosure.

A description of these extinguishing system units and the design and installation limitations are contained in the Listee's Engineered System Design, Installation, Operation and Maintenance Manual P/N TE 1230 500 ENG issued April 2009 and revised March 31, 2016 Version D and Sevo VDS software Novec -Calculation Program Versions 7.2 or 7.6.

AGENT STORAGE CONTAINER ASSEMBLY

Weight of Agent (lbs)	Part No.
16-40	CT 140069
30-76	CT 140079
66-164	CT 14817
129-322	CT 140057
241-601	CT 14813
390-974	CT 140107
507.8-1271	CT 140480
1000.8-2505	CT 140946

Last Updated on 2019-07-26

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