



3M™ Novec™ 1230 Fire Protection Fluid

GA2XXXXNVC-BXXXX

Manual/Automatic, 175°F (79°C)

Sizes: 1200-4000 cu. ft.

34.0-113.3 cu. m

Owner's Manual
&
Installation Instructions



APPROVED

Project ID: 0003053255

U.S. Coast Guard Approved
No. 162.029/254/0

Read and comply with all instructions, warnings and limitations before installing, servicing or removing this device.

Additional copies this of manual are available at no charge by contacting the manufacturer, distributor or dealer. Fireboy-Xintex reserves the right to change features without notice.

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General Information

Fireboy GA2XXXXNVC-B series Fire Extinguishing Systems are Manual/Automatic with remote sensor blocks. They are manufactured for a broad range of applications, including marine, industrial, and commercial uses. This booklet is intended to outline the proper installation of the system for marine applications; most applications are similar. If further technical advice is required, information is available by contacting Fireboy-Xintex.

Fireboy FM Component Approved 3M Novec 1230 Systems are approved for use in normally occupied spaces and are approved for use within the European Union.

The National Fire Protection Agency defines normally occupied enclosure or space as “an enclosure or space where one or more persons are present under normal conditions.” (NFPA-2001).

SDS Sheets are available at no charge from the manufacturer and online at www.fireboy-xintex.com.

Referenced Agencies:

Bureau Veritas
3663 N. Sam Houston Pkwy. E., Suite 200
Houston, TX 88034

National Fire Protection Agency
1 Batterymarch Park
Quincy, MA 02269-9101
NFPA 2001, Standard on Clean Agent Fire Extinguishant Systems

FM Approvals
1151 Boston Providence Turnpike
Norwood, MA 02062

United States Coast Guard
2100 Second Street SW
Washington, DC 20593-0001

RINA
10 Upper Belgrave Street
London, SW1X 8BQ

WARNING:

1. NEVER INSTALL A FIREBOY SYSTEM ON THE UNDERSIDE OF A HATCH COVER OR ON AN ACCESS DOOR THAT MAY OPEN OR SEPARATE IN AN EXPLOSION
2. NEVER INSTALL THE ACTUATOR OR SENSOR BLOCK OF A FIREBOY SYSTEM IN CLOSE PROXIMITY TO EXHAUST MANIFOLDS OR TURBOCHARGERS. RADIATED HEAT MAY CAUSE PREMATURE ACTUATION
3. NEVER INSTALL A FIREBOY GA CYLINDER HORIZONTALLY OR UPSIDE DOWN
4. NEVER INSTALL A FIREBOY SYSTEM WHERE IT WILL TRAP OR BE IN DIRECT CONTACT WITH WATER
5. NEVER INSTALL A FIREBOY UNIT IN A COMPARTMENT LARGER THAN ITS VOLUME RATING
6. NEVER COMBINE THE VOLUME RATING OF TWO OR MORE FIREBOY UNITS TO PROTECT A GIVEN COMPARTMENT
7. THIS DEVICE SHALL NOT BE INSTALLED OR USED IN AIRCRAFT AND/OR RACING VEHICLES
8. DIESEL POWERED CRAFT MUST ALSO INSTALL THE AUTOMATIC ENGINE SHUTDOWN SYSTEM OR THIS SYSTEM MAY NOT EXTINGUISH THE FIRE (SEE ADDITIONAL EQUIPMENT)
9. FIREBOY SYSTEMS ARE NOT, NOR ARE THEY INTENDED TO BE, EXPLOSION SUPPRESSION DEVICES. THEY DO NOT LESSEN THE NEED TO INSPECT FOR FIRE HAZARDS AND TO VENTILATE ANY AREA WHERE FLAMMABLE FUMES MAY ACCUMULATE.
10. IN CASE OF ACCIDENTAL DISCHARGE, EVACUATE PROTECTED SPACE AND VENTILATE. DO NOT RETURN TO AREA UNTIL SPACE IS CLEAR OF AGENT. REFER TO HEALTH AND SAFETY SECTION (PAGE 29).

NOTE:

TO DETERMINE SYSTEM SPECIFICATIONS, REFER TO FACTORY PROVIDED WORKSHEETS.

Specifications

GA2XXXXNVC-B series extinguishers discharge automatically at a temperature of 175°F (79°C) or may be discharged manually at any temperature. All models introduce an atmospheric concentration of 5.85% into the protected space. This concentration includes a 30% safety factor to the 4.5% Minimum Extinguishing Concentration (MEC). Operational temperature range of extinguishers is 32°F (0°C) to 130°F (54°C).

Model Number	Volume Protected		Diameter		Total Height		Agent Weight Per Cylinder		Shipping Weight Per Cylinder		System Pressure (@70° F)
	ft ³	m ³	in	mm	in	mm	lbs	kgs	lbs	kgs	psi
GA21200NVC-BXXXX	1200	34.0	10	254	27.1	689	32.2	14.6	70	31.8	360
GA21300NVC-BXXXX	1300	36.8	10	254	27.1	689	34.9	15.8	73	33.1	360
GA21400NVC-BXXXX	1400	39.6	10	254	27.1	689	37.6	17.1	76	34.5	360
GA21500NVC -BXXXX	1500	42.5	10	254	27.1	689	40.3	18.3	78	35.4	360
GA21600NVC-BXXXX	1600	45.3	10	254	27.1	689	43.0	19.5	81	36.7	360
GA21700NVC-BXXXX	1700	48.1	10	254	27.1	689	45.7	20.7	84	38.1	360
GA21800NVC-BXXXX	1800	51.0	10	254	33.3	846	48.4	22.0	91	41.3	360
GA21900NVC-BXXXX	1900	53.8	10	254	33.3	846	51.0	23.1	94	42.6	360
GA22000NVC-BXXXX	2000	56.6	10	254	33.3	846	53.7	24.4	97	44.0	360
GA22100NVC-BXXXX	2100	59.5	10	254	33.3	846	56.4	25.6	99	44.9	360
GA22200NVC-BXXXX	2200	62.3	10	254	33.3	846	59.1	26.8	102	46.3	360
GA22300NVC-BXXXX	2300	65.1	10	254	33.3	846	61.8	28.0	105	47.6	360
GA22400NVC-BXXXX	2400	68.0	10	254	33.3	846	64.5	29.3	108	49.0	360
GA22500NVC-BXXXX	2500	70.8	10	254	38.1	968	67.2	30.5	117	53.1	360
GA22600NVC-BXXXX	2600	73.6	10	254	38.1	968	69.8	31.7	120	54.4	360
GA22700NVC-BXXXX	2700	76.5	10	254	38.1	968	72.5	32.9	123	55.8	360
GA22800NVC-BXXXX	2800	79.3	10	254	38.1	968	75.2	34.1	125	56.7	360
GA22900NVC-BXXXX	2900	82.0	10	254	38.1	968	77.9	35.3	128	58.1	360
GA23000NVC-BXXXX	3000	85.0	10	254	38.1	968	80.6	36.6	131	59.4	360
GA23100NVC-BXXXX	3100	87.8	10	254	47.3	1202	83.3	37.8	141	64.0	360
GA23200NVC-BXXXX	3200	90.6	10	254	47.3	1202	86.0	39.0	144	65.3	360
GA23300NVC-BXXXX	3300	93.4	10	254	47.3	1202	88.7	40.2	147	66.7	360
GA23400NVC-BXXXX	3400	96.3	10	254	47.3	1202	91.3	41.4	149	67.6	360
GA23500NVC-BXXXX	3500	99.1	10	254	47.3	1202	94.0	42.6	152	69.0	360
GA23600NVC-BXXXX	3600	101.9	10	254	47.3	1202	96.7	43.9	155	70.3	360
GA23700NVC-BXXXX	3700	104.8	10	254	47.3	1202	99.4	45.1	157	71.2	360
GA23800NVC-BXXXX	3800	107.6	10	254	47.3	1202	102.1	46.3	160	72.6	360
GA23900NVC-BXXXX	3900	110.4	10	254	47.3	1202	104.8	48.5	163	73.9	360
GA24000NVC-BXXXX	4000	113.2	10	254	47.3	1202	107.5	48.8	166	75.3	360

All above models are approved under U.S.C.G. # 162.029/254/0.

When specifications listed on the label differ from this manual, the information listed on the label is correct.

360psi = 2482kPa = 24.8Bar

Manual operation of GA2XXXXNVC-B Systems

1. In case of fire, do not wait for automatic actuation.
2. Close all hatches leading to the protected compartment.
3. Shutdown all forced ventilation devices, engines, generators and electrical systems.
4. Remove the safety pin from the "FIRE" T-handle, and pull firmly.

Automatic operation of GA2XXXXNVC-B systems

- Automatic Actuation of a Fireboy fire extinguisher occurs at 175°F (79°C) and is entirely dependent on the intensity of the fire.

Signs of actuation

1. A loud sound similar to small arms fire.
2. A loud sound of rushing air.
3. The green indicator lamp is not illuminated.
4. A stalled engine.

When actuation occurs

1. Immediately shutdown all engines, powered ventilation, and electrical systems.
2. Extinguish all smoking materials.
3. Do not open the engine compartment.
4. The protected space may see an increase in pressure during discharge. Appropriate relief vents may be needed where structural integrity of protected space is in question.

After actuation

1. Before inspecting for damage, allow the agent to "soak" the compartment for at least 15 minutes and wait for hot metals or fuels to cool.
2. Have approved portable extinguishers in hand and ready for use.
3. Do not breathe fumes or vapors caused by the fire and/or suppression agent. They are hazardous and toxic. Refer to Health and Safety section (Page 29).
4. Forced ventilation will often be necessary. Care should be taken to readily dissipate hazardous atmospheres and not merely move them to another location. Consideration should be given to exhaust paths when opening or venting the enclosure after discharge. Ventilation should not be directed near any area that might be used as a gathering spot for personnel.

Before Installation

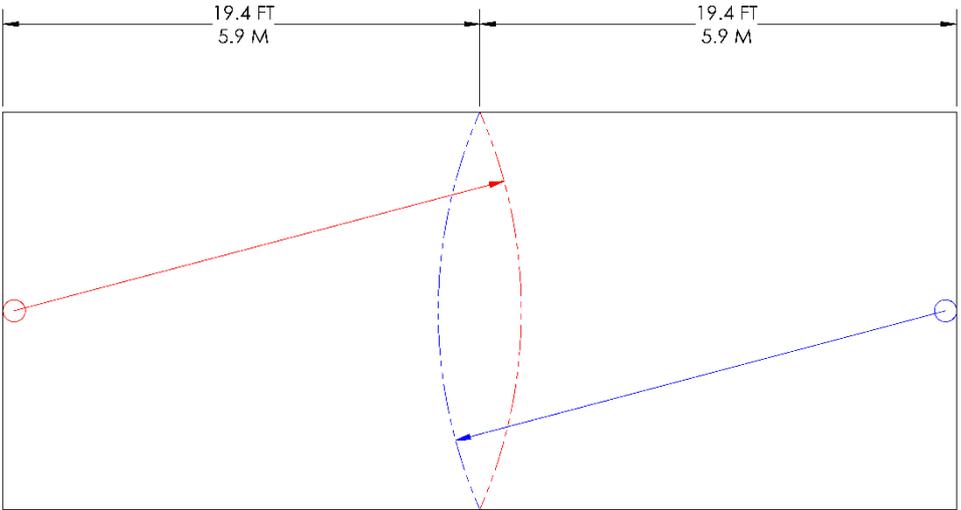
1. Check the system for damage during shipment.
2. Check the pressure gauge to be sure the gauge pointer lies within the green zone at 70°F (21°C).
3. The correct weight is shown on the label for the appropriate model.
4. Select an interior location not directly subject to weather or seawater.
5. Confirm the volume of the compartment to be protected in cubic feet or cubic meters by multiplying the width, by the length, by the depth at the keel; make no deductions for installed equipment.
6. Verify calculated volume with volume shown on label and model specifications section.

Selecting a Location

1. Do not install a Fireboy system rated for less cubic volume than the gross volume of the compartment to be protected.
2. The maximum approved distance from the nozzle to ceiling is 24in (610mm).
3. Orientation:
 - Mount system in vertical orientation only.
 - Install Cylinders on the forward or aft vertical bulkhead of the engine compartment as near to the centerline of the vessel (keel) as possible.
 - Separate individual cylinders as much as possible
4. To prevent accelerated corrosion, do not mount directly to an aluminum/metal surface. Maintain galvanic isolation between the extinguisher and metal mounting surface.
5. Maintain a minimum distance of 2.0in (50.8mm) between floor and bottom of Extinguisher.

Selecting a Location Continued

- 6. The approved ceiling height of the protected space is 4ft (1.2m) to 12.6ft (3.8m)
- 7. The maximum approved radial reach and area of coverage is 19.4ft (5.9m), 303ft² (28.1m²) per Cylinder, see illustration below for example.



- 8. Temperature Sensors should be located on the ceiling of the protected space, near potential fire hazards.

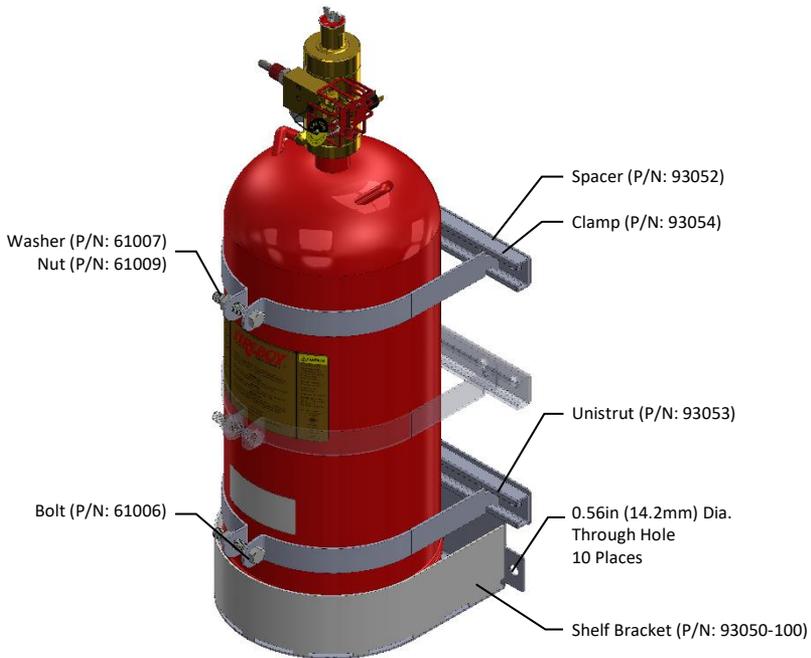
Mounting Fireboy system

DANGER:

ACCIDENTAL DISCHARGE DURING HANDLING OR INSTALLATION MAY CAUSE SERIOUS INJURY. DO NOT LIFT, CARRY, OR HANDLE BY ACTUATOR, PRESSURE SWITCH, OR CABLE. WEAR EYE PROTECTION WHEN INSTALLING OR SERVICING CYLINDER. DO NOT REMOVE SAFETY NUTS UNTIL SYSTEM IS FULLY INSTALLED. REFER TO HEALTH AND SAFETY SECTION (PAGE 29).

Mounting Extinguisher

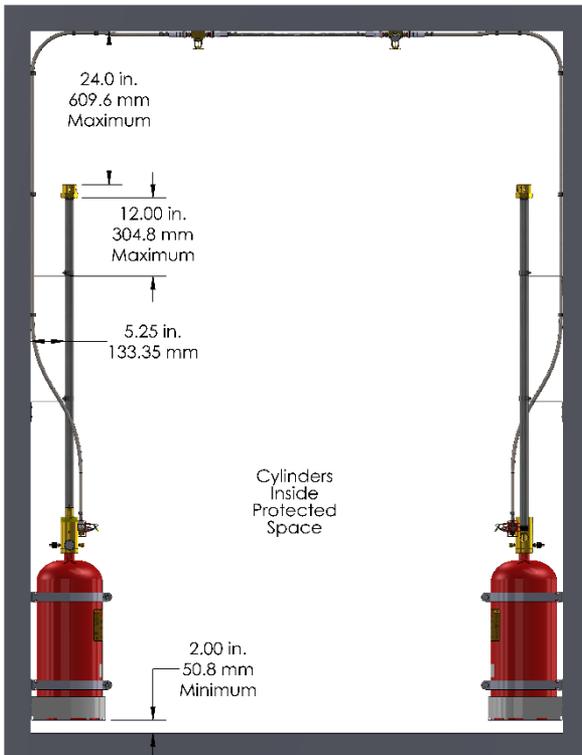
1. Use appropriate size and length bolts and lock washers and fasten to bulk head.
2. Mount the Shelf Brackets using the 6 mounting holes. Be sure to include unistrut while mounting bracket.
3. Locate upper bracket 1in (25.4mm) below the top weld seam of cylinder. Be sure to include spacer while mounting unistrut.
4. Install Clamps in Unistrut and tighten with provided fasteners.
5. Models 2500-4000 will include a third clamp, to be located at the midpoint between the other two clamps.



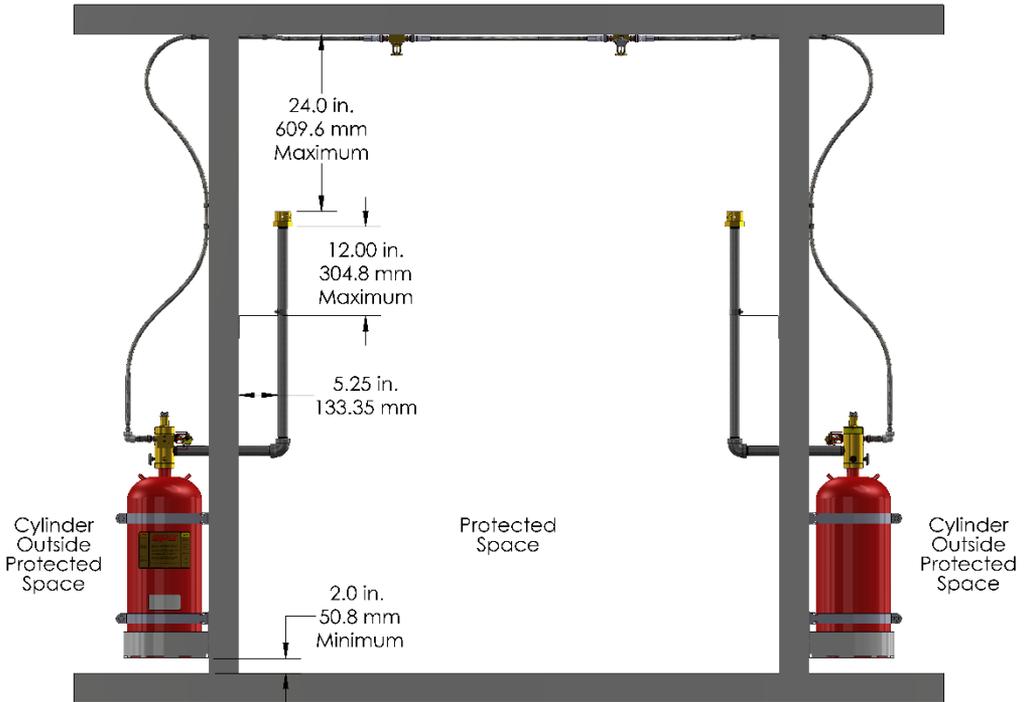
Installing Discharge Piping

1. Pipe must be 1in NPT, schedule 40. Galvanized, Stainless, and Black Steel Pipe are acceptable.
2. Total pipe length cannot exceed 76in (193.1cm). Minimum individual pipe length is 4in (10.2cm). Maximum individual pipe length is 72in (182.9cm).
3. Piping must include one 90° elbow.
4. Teflon Tape Mil-Spec T-27730A should be used for all threaded connections.
5. Install Nozzle with indicator arrow pointed away and perpendicular to cylinder mounting wall.

Installation Example 1

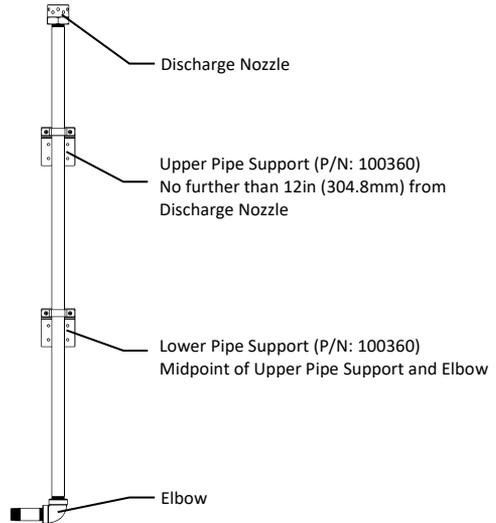


Installation Example 2



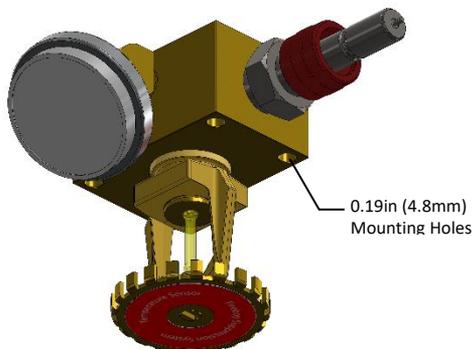
Installing Discharge Piping Supports

1. At least one Pipe Support must be used on vertical pipe run, no more than 12in (304.8mm) from discharge nozzle. Two Pipe Supports must be used on vertical pipe runs greater than 40in (1016mm).
2. Use appropriate size and length bolts and lock washers and fasten to bulk head.
3. Mount the Pipe Support using the 4 mounting holes.
4. Lower Pipe Support, if required, should be placed at the midpoint between the top Pipe Support and the Elbow of the Discharge Piping.



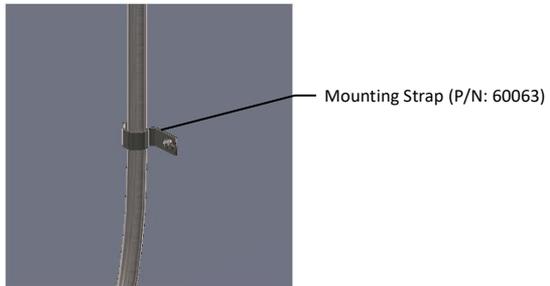
Installing Temperature Sensors

1. Locate Temperature Sensors in previously determined location.
2. Use appropriate size and length hardware to mount to ceiling.
3. Mount the Temperature Sensor using the 4 mounting holes.



Installing GA Link Hose

1. Route and secure Hoses to ceiling using provided mounting straps.



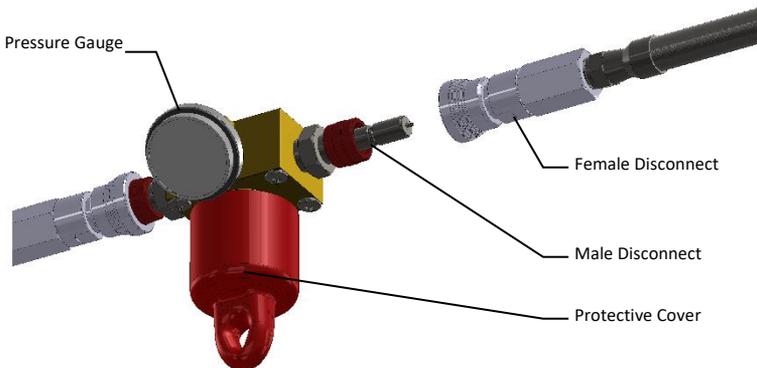
NOTE:

CONNECTIONS OF GA LINKS SHOULD ALWAYS BE MADE TO TEMPERATURE SENSORS FIRST. CONNECTIONS WILL BE DRAMATICALLY MORE DIFFICULT IF THE LINE HAS BEEN PRESSURIZED BY CONNECTING HOSES TO EXTINGUISHERS.

CAUTION:

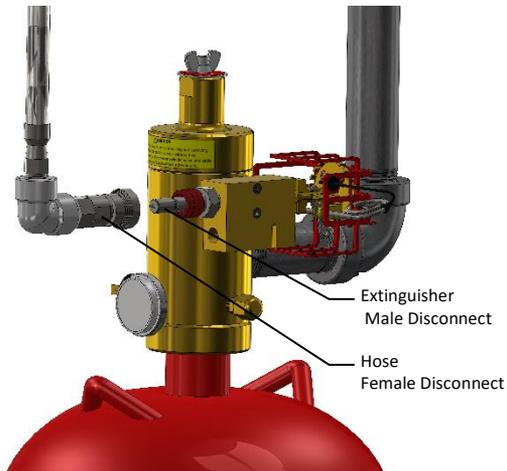
BE SURE SAFETY NUTS & WASHERS ARE IN PLACE AND FINGER TIGHT ON BOTH CYLINDERS BEFORE CONNECTING GA LINK HOSE TO EXTINGUISHERS.

2. Connect Hoses to Temperature Sensors. There should be an audible click.

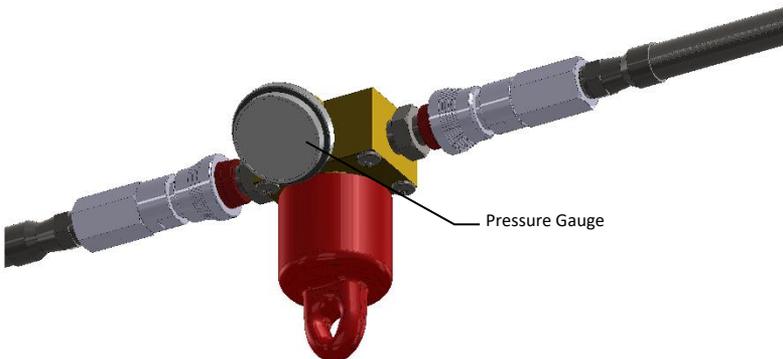


Installing GA Link Hose Continued

3. Connect Hose to Extinguishers. There should be an audible click. The male connector will be under pressure, which will require more force to make the connection.



4. Once all connections have been made, wait approximately 15 minutes and verify that the reading on the pressure gauge on Temperature Sensors is in the Green zone.



WARNING:

1. ALL FIREBOY GA2XXXXNVC-B SYSTEM INSTALLATIONS MUST USE ONLY GENUINE FIREBOY CABLES AND ASSOCIATED COMPONENTS THAT ARE ENGINEERED SPECIFICALLY FOR THIS APPLICATION. NOTHING ELSE WILL PROVIDE THE INTENDED DEGREE OF SAFETY AND RELIABILITY INHERENT IN THESE SYSTEMS.
2. ANY SUBSTITUTION WILL VOID ALL LABORATORY AND COAST GUARD APPROVALS AND FIREBOY-XINTEX WARRANTIES, AND MAY RESULT IN AN INOPERATIVE SYSTEM, AND UNSAFE AND HAZARDOUS CONDITIONS.
3. NEVER INSTALL A MANUAL RELEASE HANDLE IN THE SPACE TO BE PROTECTED.

NOTE:

1. IF A DUAL RELEASE ADAPTER (DRA-1001) IS TO BE USED WITH THIS INSTALLATION, FOLLOW THE INSTRUCTIONS ENCLOSED WITH THAT UNIT AT THIS TIME.
2. AT LEAST ONE MANUAL RELEASE CABLE IS REQUIRED FOR A GA SYSTEM.

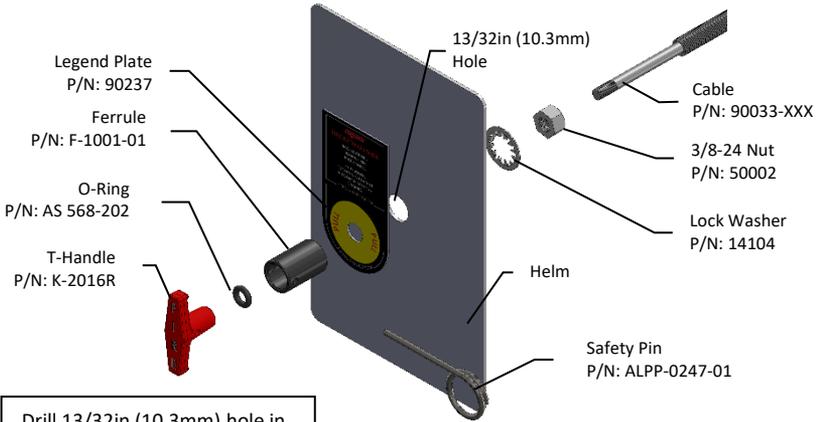
CAUTION:

DO NOT CONNECT CABLE TO CYLINDER AT THIS TIME!

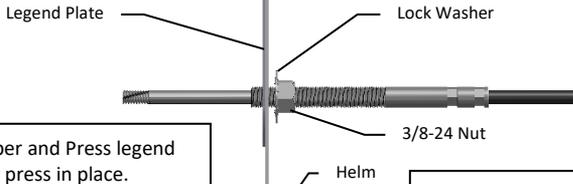
Routing the Cable

1. Locate the legend plate (1.9in (48mm) x 3.6in (92mm) with 7/16in (11.1mm) hole) for the manual release handle.
 - On a solid and secure surface (Minimum of 1/2in (6.4mm) thick)
 - In full view of the operator
 - With enough clearance for the cable ferrule to extend approximately 12in (304.8mm) behind the panel
 - Angle Adaptor CAA-0285-01 available where clearance is limited
2. Using the legend plate as a template, locate and drill a 13/32in (10.3mm) hole.
3. Route the cable in the most direct manner, with as few bends as possible, to the cylinder location.
 - Do not bend in a radius of less than 6in (152.4mm) (a 12in (304.8mm) circle)
 - Follow the same route as manufacturer installed cables, if possible (Example: Steering, throttle, and transmission cables)
 - Do not subject cable to pinching or crushing, rubbing, extreme vibration, sharp bending or kinking, or extremes of heat or cold
 - Do not exceed 1440° of total bends (Example: 16 bends x 90° = 1440°)
 - Use the shortest allowable cable whenever possible
 - Maximum manual cable length is 100ft (30.5m)
4. Secure loose sections of the cable with the included nylon clamps.
 - Do not clamp cable in a bend
 - Do not crush cable with clamps

Legend Plate and T-Handle



Drill 13/32in (10.3mm) hole in desired location for Pull Station.



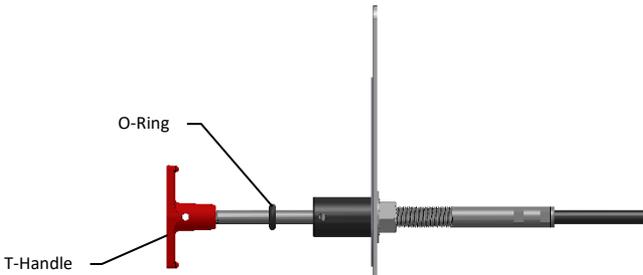
Peel off paper and Press legend plate firmly press in place. Install 3/8-24 Nut and Lock Washer on Cable and position through hole. Leave enough space to tighten later.

NOTE: Temperature must be above +50°F (10°C) for proper adhesion.



Note: Do NOT thread further than Ferrule's internal threads.

Thread Ferrule onto Cable using 3 full revolutions. Adjust Ferrule so that holes are parallel to the floor and tighten Nut.

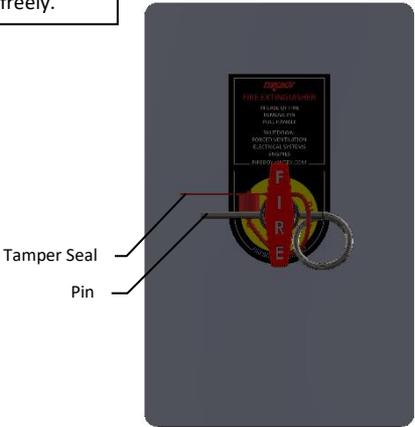


Slide O-Ring onto Cable.
Thread T-Handle onto Cable 7 Full turns. Make sure not to obstruct through hole.



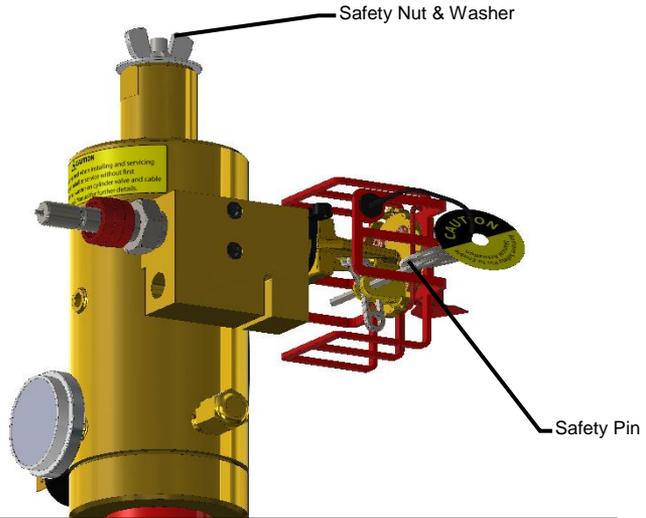
With Cable **DISCONNECTED** from extinguisher, take this time to test Cable operation. Cable should slide freely.

Push T-Handle into Ferrule to align through holes. There will be resistance from O-Ring.



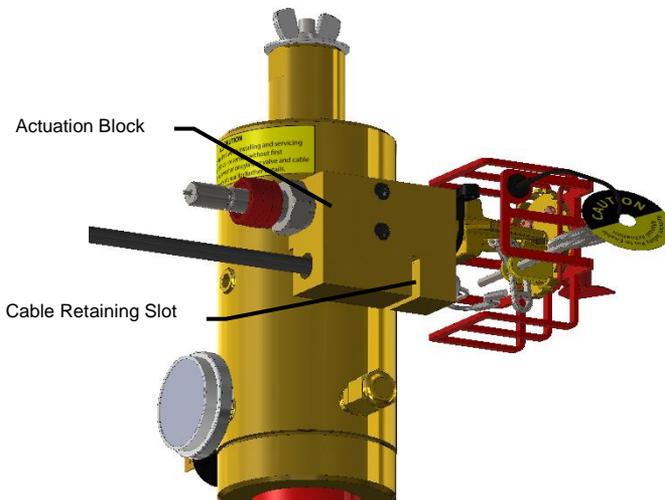
Insert Pin into Ferrule and T-Handle through holes. Wrap Tamper Seal through loop of Safety Pin and around Ferrule. Insert end of seal into side marked "ENTER" and pull tight.

Connecting Cable to Cylinder

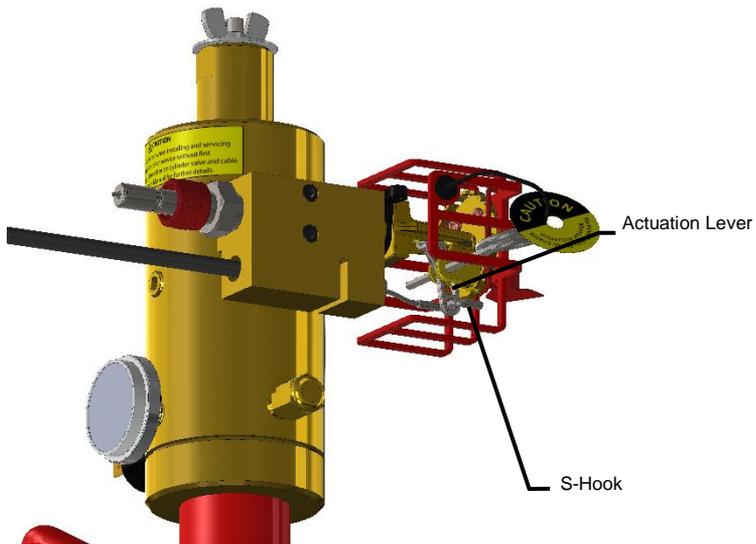


CAUTION:

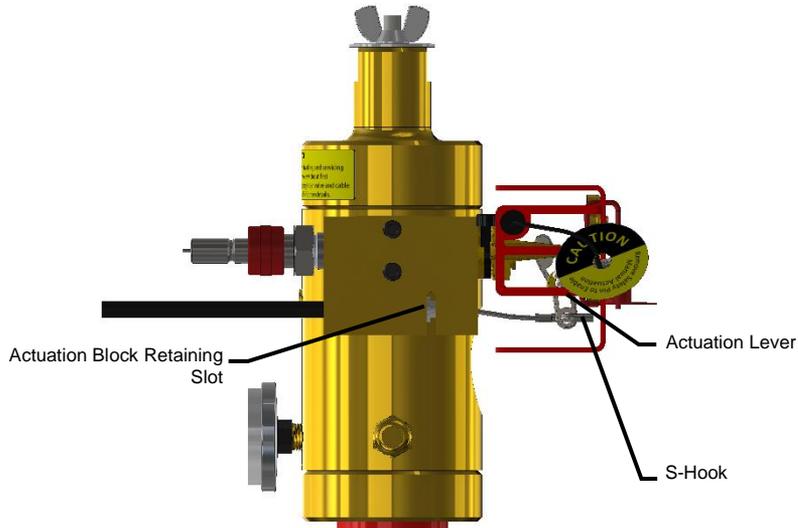
1. EXTINGUISHER SHOULD BE SECURELY MOUNTED.
2. CABLE SHOULD BE ROUTED AND SECURED.
3. BE SURE THE SAFETY PIN IS IN PLACE.
4. BE SURE SAFETY NUT & WASHER ARE IN PLACE AND FINGER



Insert extinguisher end of Cable through hole in Actuator Block past retaining slot on Cable.

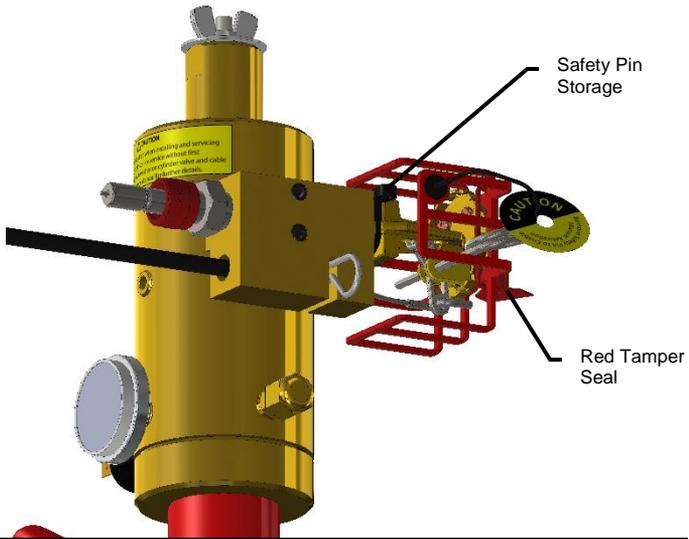


Insert S-Hook into hole at the Bottom of Actuation Lever.

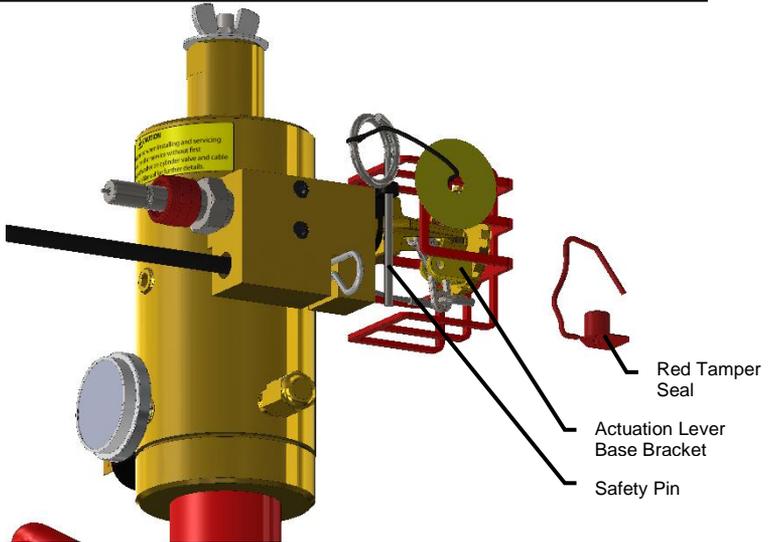


Align retaining slot of Cable with retaining slot of Actuation Block.

Connecting Cable to Cylinder Continued

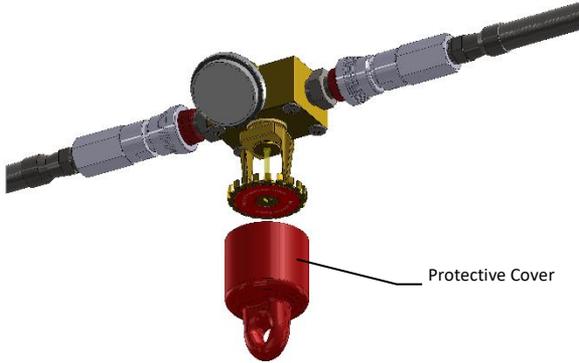


Secure Cable to Actuation Block with Retaining Clip.

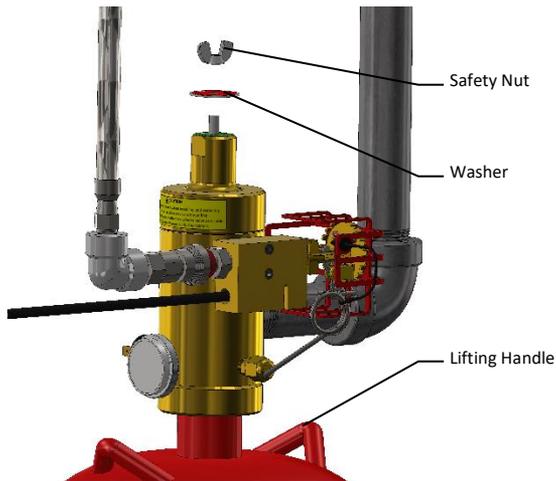


With T-Handle previously secured, remove Red Tamper Seal from Extinguisher to remove Safety Pin and store in provided location.
Cable system is now operational.

1. Remove Protected Cover from Temperature Sensors.



2. Remove Safety Nut and Washer from both Extinguishers. Reusable Zip-Ties are provided to anchor Washers and Nuts to Lifting Handle of Extinguishers for future use.



3. System is now fully armed and operational. Refer to "Maintaining Fireboy Fire Extinguisher" section for disarming instructions.

WARNING:

FAILURE TO INSTALL AN ENGINE SHUTDOWN BOX WITH A FIREBOY SYSTEM IN ANY DIESEL ENGINE APPLICATION IMPEDES THE FIRE EXTINGUISHER AND MAY PREVENT FIRE EXTINGUISHMENT.

CAUTION:

FAILURE TO CONNECT A POWERED VENTILATION SYSTEM IN THE MANNER DESCRIBED BELOW IMPEDES FIRE EXTINGUISHER AND MAY PREVENT FIRE FROM BEING EXTINGUISHED.

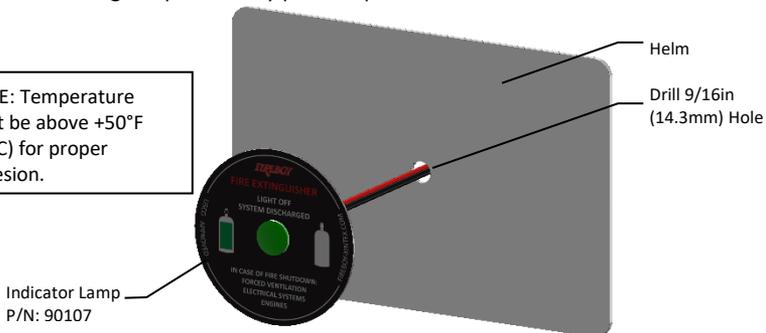
1. Automatic Engine Shutdown units are available through your Fireboy-Xintex distributor, dealer or retailer in three, five, eight, and ten circuit models.
2. Follow the installation instructions included with the Automatic Engine Shutdown for proper installation.
3. Technical Support for Automatic Engine Shutdowns is available by calling Fireboy-Xintex or visiting our website at www.fireboy-xintex.com.

Installing Indicator Lamp (P/N: 90107)

Mounting Indicator Lamp

1. U.S. Coast Guard Rule 162.029 requires an indicator lamp and legend plate at each helm position from which the craft may be operated.
2. Your Fireboy System is supplied with one (1) indicator lamp and legend plate. Additional indicator lamps and legend plates are available factory direct, or through an authorized dealer.
3. Select an appropriate location for the indicator lamp and legend plate on or near the instrument panel at the helm and in full view of the operator.
4. Drill a 9/16in (14.3mm) hole.
5. Remove the backing paper on the legend plate.
6. Feed both wires through 9/16in (14.3mm) hole.
7. Press legend plate firmly press in place.

NOTE: Temperature must be above +50°F (10°C) for proper adhesion.



NOTE:

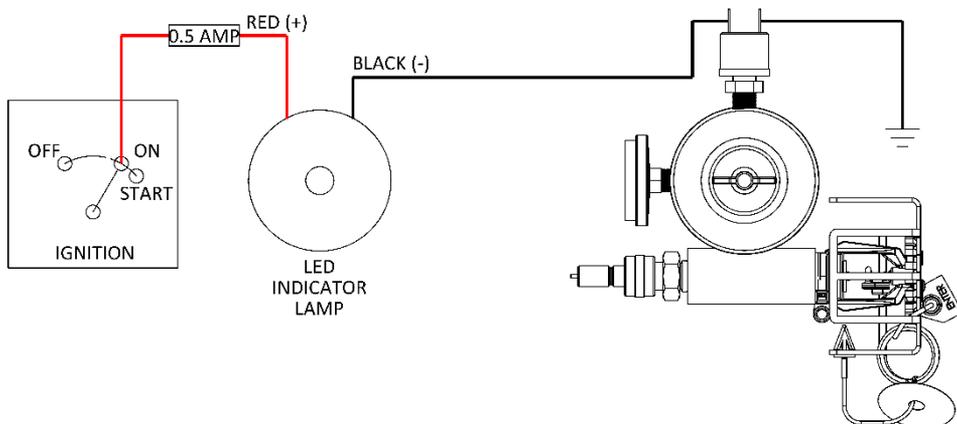
THE INDICATOR LAMP SUPPLIED IS FOR 12/24 VDC USE

WARNING:

1. AN ELECTRICAL SHORT MAY RESULT IN ELECTRICAL BURN, INJURY OR FIRE
2. BEFORE ATTEMPTING TO WIRE THE INDICATOR LAMP, TURN OFF ALL ELECTRICAL CURRENT TO THE IGNITION SWITCH
3. ALL FIREBOY WIRING MUST COMPLY WITH THE AMERICAN BOAT AND YACHT COUNCIL STANDARD E-11, TITLED AC AND DC ELECTRICAL SYSTEMS ON BOATS, AVAILABLE FROM ABYC, WWW.ABYCINC.ORG

Wiring Indicator Lamp

1. Review all wiring instructions below.
2. Consult a qualified marine electrician if you have any doubts about your ability to safely and properly complete the wiring. Ignition systems and electrical systems vary from boat to boat, and the directions which follow, may not apply to your boat.
3. Assemble the supplies you will need that are not included with your Fireboy System.
 - The necessary length of insulated 16 gauge (minimum) stranded wire
 - A one-half (0.5) ampere in-line fuse and fuse holder or circuit breaker
 - Properly sized insulated crimp-on wire connectors
4. Connect one lead of the fuse to the "ON" position of the starter switch.
5. Connect the other lead of the fuse to the red (+) wire of the LED indicator lamp.
6. Connect the black (-) wire of the indicator lamp to one of the pigtail wires on the Fireboy System (as shown below).
7. Do not reverse red and black wire, indicator lamp will not function.
8. Connect the remaining wire from the Fireboy system to ground.



Connecting to Powered Ventilation

Engine compartments not equipped with a powered ventilation system require no further wiring.

If the engine compartment is equipped with a powered ventilation system, U.S. Coast Guard Rule 162.029 requires that the ground connection of the ventilation system be connected to the Fireboy system.

CAUTION:

FAILURE TO CONNECT A POWERED VENTILATION SYSTEM IN THE MANNER DESCRIBED BELOW IMPEDES FIRE EXTINGUISHER AND MAY PREVENT FIRE FROM BEING EXTINGUISHED.

Powered Ventilation Systems (Blowers)

1. Determine the maximum current draw of the powered ventilation system.
2. For current draw not exceeding 5 amps connect the negative (-) wire from the ventilation blower to the pressure switch at the same point as the indicator lamp.
3. For current draw exceeding 5 amps, use a Fireboy Automatic Engine Shutdown system.

NOTE:

THE LEGEND PLATE LED IS CONNECTED TO THE PRESSURE SWITCH AT THE SAME POINT THAT AUXILIARY DEVICES CAN BE CONNECTED. CARE MUST BE TAKEN WHEN WIRING OTHER DEVICES TO THE PRESSURE SWITCH TO ENSURE THE PRESENCE OF THE LED DOES NOT AFFECT THE OPERATION OF THE DEVICE. CONTACT FIREBOY-XINTEX TECHNICAL SUPPORT REGARDING ANY INSTALLATION QUESTIONS.

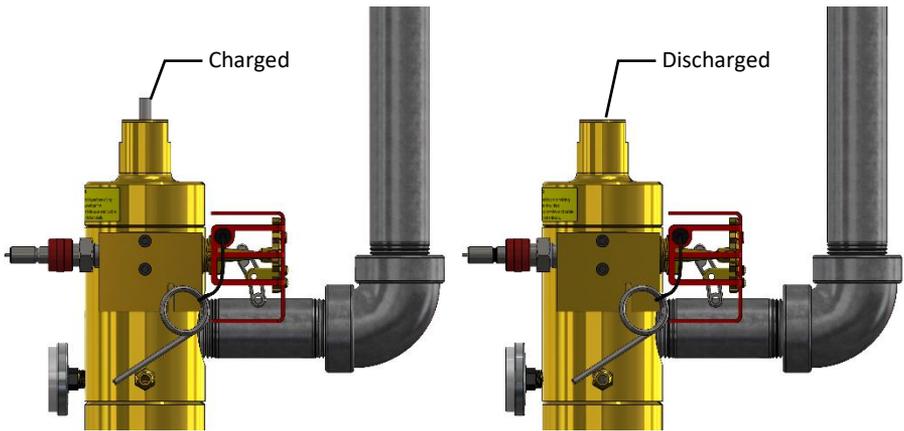
Use of indicator lamp

- The Fireboy System indicator lamp is designed to announce to the helmsman the state of the fire extinguisher when the ignition key is in the ON position.
- A GLOWING green light indicates the Fireboy system is CHARGED.
- A NON GLOWING light indicates the Fireboy system is DISCHARGED or is in need of service due to a loss in pressure.

INSTALLATION CHECKLIST	
Verified Volume of Protected Space	
Verified Extinguisher Model is for Volume of Protected Space	
Mounted Extinguisher according to installation instructions	
Located extinguisher according to installation instructions	
Located Temperature Sensors according to installation instructions	
Orientated extinguisher according to installation instructions	
Nozzle is installed no greater than 24in (609.6mm) from ceiling	
Secured Extinguisher Bracket according to installation instructions	
Installed Discharge Piping according to installation instructions	
Installed Discharge Piping Supports according to installation instructions	
Installed Temperature Sensor according to installation instructions	
Installed GA Link Hose according to installation instructions	
Verified reading of Pressure Gauge on Temperature Sensor	
Installed Cable According to installation instructions	
Located Manual Release Handle according to installation instructions	
Routed Cable according to installation instructions	
No more than Sixteen 90° Bends (16 x 90° = 1440°)	
Secured Cable according to installation instructions	
Installed Manual Release Handle according to installation instructions	
Connected Cable to extinguisher according to installation instructions	
Removed Safety Pin from Extinguisher (Cable System is operational)	
Armed GA System according to installation instructions	
Removed Protected Cover from Temperature Sensor	
Removed Safety Nut & Washer from Extinguishers and stored for future use	
Installed Indicator Lamp According to installation instructions	
Located Indicator Lamp according to installation instructions	
Mounted Indicator Lamp according to installation instructions	
Wired Indicator Lamp according to installation instructions	
Review Maintenance of system	
Review Health and Safety Section of Manual	
Installed Fireboy Automatic Engine Shutdown if required	

Maintaining Fireboy Extinguishing System

1. Inspect the pressure gauges and the system daily. Pointer must indicate in green zone at 70°F (21°C).
2. Compare actuator to illustration below to determine if the extinguisher is charged or discharged.



3. Remove and weigh the complete unit (without brackets and discharge piping) on a certified scale every six (6) months and record on tag provided.

DANGER:

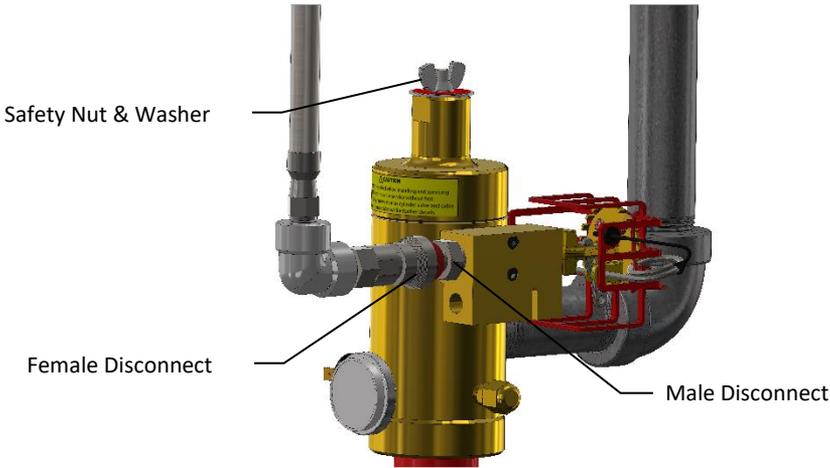
ACCIDENTAL DISCHARGE DURING HANDLING, INSTALLATION OR INSPECTION MAY CAUSE SERIOUS INJURY. WEAR EYE PROTECTION WHEN INSTALLING OR SERVICING FIRE EXTINGUISHER OR DISCHARGE CABLE.

Disarm each Extinguisher by reinstalling Washer and Safety Nut (finger tight) before any maintenance or inspection is performed. (Reference the illustration on page 21)

CAUTION:

BE SURE SAFETY NUT & WASHER ARE IN PLACE ON BOTH EXTINGUISHERS AND FINGER TIGHT BEFORE DISCONNECTING GA LINK HOSE FROM EITHER EXTINGUISHER.

Disconnect GA Link Hose by pushing the raised portion of the female disconnect toward the male disconnect.



Remove Discharge Piping and Pipe Supports.

Remove and inspect manual discharge cable annually when inspecting the fire extinguisher.

- Do not remove the safety pin on the T-handle when disconnecting the manual discharge cable from the fire extinguisher manifold.
 - Carefully reinstall Safety Nut & Washer to threaded portion on top of extinguisher valve (hand tight). (Reference the illustration on page 21)
 - Carefully reinstall safety pin through actuation lever. Safety pin should secure actuation lever in actuation lever base. (See Page 20)
 - Remove the retaining clip securing the cable located at the slot in the actuation block of extinguisher valve. (See Page 20)
 - Carefully push the cable from the backside of the manifold towards the actuator far enough to allow the flexible center strand to bend.
 - Remove the "S" hook from the actuation lever.
 - Once the "S" hook is free of the actuation lever, pull the cable out and away from the manifold.
4. Remove fire extinguisher from service immediately for repair or replacement if measured gross weight is greater than 5% below what is stated on unit's label (Label Gross Weight x 0.95 = Minimum Allowable Weight).
 5. Inspect cylinder in accordance with CGA C-6, every 5 years OR have cylinder hydrostatic tested every 12 years.

Refer to "Marine Installation Instructions" and "Cable Installation" to reinstall and re-arm Extinguishers and Manual Cable after maintenance or service is complete.

Maintaining the Indicator Lamp Circuit

Should the indicator lamp fail to come ON when the ignition key is ON

1. Check the pressure gauge and actuator to see if the system has adequate pressure or has been discharged.
2. Check fuse.
3. Using a continuity tester, check the electrical pressure switch on the system bottle itself:
 - Pull the connectors off the spade terminals and place the probes of the continuity tester directly on the spade connectors
 - A closed circuit indicates a functioning pressure switch
4. Check the continuity of the remaining wiring circuit.
5. The indicator lamp is an LED (light emitting diode) and cannot be tested with a continuity tester. A simple method to test LED's is to remove the lamp and touch the Red wire to the + terminal and the black wire to the – terminal of an ordinary 9 volt battery.
6. Should the continuity of the pressure switch indicate an open circuit, the system will have to be returned to the factory for either replacement or repair, depending upon the model involved.

Additional Equipment

Coast Guard Regulation 162.029 requires an indicator lamp be installed at each helm station from which the vessel may be operated.

An Automatic Discharge Alarm provides both an audible and visual alarm when the system discharges. Includes a 2in round instrument with a simple three (3) wire hookup.

Automatic Engine Shutdown/Override System is required for use with Fireboy systems in diesel powered craft.

These additional equipment options are available factory direct or through your dealer. Outside the U.S.A. and Canada, see your dealer.

- A properly designed and installed suppression system should not present any significant health or safety problems; however, there are basic precautions to be taken to avoid accidents, and aspects of the system operation that should be fully understood.
- 3M Novec 1230 extinguishes fires by causing a cooling effect and by causing a chemical reaction with the combustion products and not by displacement of oxygen as is the extinguishment method of carbon dioxide. The agent therefore provides the ability to utilize the 3M Novec 1230 system in occupied areas.
- 3M Novec 1230 can decompose at high temperatures to form halogen acids. If so, their presence is readily detected as a sharp, pungent odor long before hazardous maximum exposure levels are reached.
- The noise created by the 3M Novec 1230 agent discharging can be loud enough to startle people in the vicinity, but is unlikely to cause any permanent injury. Turbulence caused by high velocity discharge can dislodge substantial objects directly in its path, and cause enough general turbulence within the protected area to move paper and light objects.
- Direct contact with the vaporizing liquid discharged from a 3M Novec 1230 nozzle has a cooling effect on objects and in extreme cases can cause frostbite to the skin. The liquid phase vaporizes rapidly when mixed with air and therefore limits the risk to the immediate vicinity of the nozzle. Reduction in visibility will occur due to the condensation of water vapor.

WARNING:

THE DISCHARGE OF CLEAN AGENT SYSTEMS TO EXTINGUISH A FIRE CAN RESULT IN A POTENTIAL HAZARD TO PERSONNEL FROM THE NATURAL FORM OF THE CLEAN AGENT OR FROM THE PRODUCTS OF COMBUSTION THAT RESULTS FROM EXPOSURE OF THE AGENT TO THE FIRE OR HOT SURFACES. TO AVOID SERIOUS PERSONAL INJURY, UNNECESSARY EXPOSURE OF PERSONNEL TO THESE POTENTIAL HAZARDS MUST BE AVOIDED.

HMIS: 0-0-1/DODECAFLUORO-2-METHYLPENTAN-3-ONE/CONTENTS UNDER PRESSURE.
0-0-0/NITROGEN EXPELLANT GAS/VERY COLD, CONTENTS UNDER PRESSURE. CONSULT 3M ELECTRONICS MARKETS MATERIALS DIVISION, 3M CENTER, ST. PAUL, MN 55144-1000; EMERGENCY PHONE: 1-800-364-3577.

First Aid

- Skin** Maintain at body temperature, thaw affected area with gentle heat. If frostbite occurs, seek medical assistance. Do not rub affected area.
- Eyes** Apply gentle heat. Do not allow patient to touch affected area, seek medical assistance.

For more information on 3M Novec 1230, please see the SDS on page 31.

DANGER:

1. DO NOT HANDLE BY ACTUATOR
2. DO NOT DROP
3. KEEP AWAY FROM CHILDREN
4. KEEP AWAY FROM EXTREME HEAT
5. DO NOT DISCHARGE ANY FIREBOY SYSTEM UNLESS SECURELY FASTENED IN ACCORDANCE WITH THE OWNER'S MANUAL
6. NEVER ATTEMPT TO DISASSEMBLE ANY COMPONENT OF THIS SYSTEM
7. ALWAYS WEAR EYE, FACE AND BODY PROTECTION WHEN INSTALLING, REMOVING OR WORKING IN THE IMMEDIATE VICINITY OF THIS SYSTEM

Principle health hazards

- Death without warning if high concentrations are inhaled
- Reduced oxygen available for breathing
- Frostbite from direct exposure
- Increased susceptibility to the toxicity of excess exposure for individuals with pre-existing diseases of the central nervous system, cardiovascular system, lungs or kidneys
- Toxic by-products are produced when this agent extinguishes fire

Medical instructions

- If high concentrations are inhaled, immediately move the exposed to fresh air and keep calm
- If not breathing, give artificial respiration. Seek medical assistance
- If breathing is difficult give oxygen. Seek medical assistance
- In case of skin contact immediately flush skin with water for 15 minutes
- Treat for frostbite if necessary by gently warming affected area. Seek medical assistance if irritation is present
- In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical assistance
- Wash contaminated clothing before reuse

Fireboy FM Component Approved 3M Novec 1230 Systems contain dodecafluoro-2-methylpentan-3-one. Dodecafluoro-2-methylpentan-3-one has been accepted by the EPA and EU as a suitable alternate to Halon. None of the components in these materials are listed by IARC, NPT, OSHA or ACGIH as a carcinogen.

Safety Data Sheet

SECTION 1. IDENTIFICATION

Product identifier: 3M™ Novec™ 1230 [FK-5-1-12] (Fire extinguishing agent)
Product identification numbers: 98-0212-3203-2, 98-0212-3217-2, 98-0212-3414-5
Intended Use: Streaming and flooding fire extinguishing agent

Manufacturer/Supplier: Fireboy-Xintex LLC Fireboy-Xintex UK Operations Limited
O-379 Lake Michigan Dr. Unit 10 Holton, Holton Ind. Estates
Grand Rapids, MI 49534 Poole Dorset BH16 6LT UK
1-616-735-9380 44 (0) 845 9462

SECTION 2. HAZARDS IDENTIFICATION

OSHA/HCS status: This material is considered hazardous by OSHA Hazard Communication Standard (29 CFR 1910.1200)

Classification of substance or mixture: Gases under Pressure

GHS label elements:

Hazard Pictograms:



Signal word: Warning

Hazard statements: H280: Contains gas under pressure; may explode if heated
P210: Keep away from heat/spark/open flame. – No smoking
P233: Keep container tightly closed in a cool/well-ventilated place
P260: Do not breathe dust/fumes/gas/vapors/spray
P273: Avoid release to the environment
P280: Wear protective gloves/protective clothing/eye protection/face protection
P403: Use and store only in a well-ventilated area
Other Hazards: May cause frostbite
May displace oxygen and cause rapid suffocation
Overheating and over pressurizing may cause gas release or violent cylinder bursting

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone	756-13-8	99.5%

SECTION 4: FIRST AID MEASURES

- Inhalation: Remove person to fresh air. If you are concerned, get medical advice.
Skin Contact: Wash with soap and water. If signs/symptoms develop, get medical attention.
Eye Contact: Flush with large amounts of water. Remove contact lenses if easy to do.
Continue rinsing. If signs/symptoms persist, get medical attention.
If Swallowed: Rinse mouth. If you feel unwell, get medical attention.

SECTION 5. FIRE FIGHTING MEASURES

Suitable extinguishing media: Product is a fire-extinguishing agent. Material will not burn. Use a fire fighting agent suitable for the surrounding fire.

Special hazards arising from the substance or mixture: Exposure to extreme heat can give rise to thermal decomposition.

Hazardous Decomposition or By-Products:

<u>Substance</u>	<u>Condition</u>
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Fluoride	During Combustion
Toxic Vapor, Gas, Particulate	During Combustion

Special protective actions for fire-fighters: When firefighting conditions are severe and total thermal decomposition of the product is possible, wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Evacuate area.

Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice.

Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and personal protective equipment.

Environmental precautions: Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.

Methods and material for containment and cleaning up: Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible.

SECTION 7. HANDLING AND STORAGE

Handling: For industrial or professional use only. Contents may be under pressure, open carefully. Do not breathe thermal decomposition products. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment.

Storage: Protect from sunlight. Do not store in temperature above 130°F (54°C). Store away from strong bases. Store away from amines.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: Provide appropriate local exhaust when product is heated. For those situations where the material might be exposed to extreme overheating due to misuse or equipment failure, use with appropriate local exhaust ventilation sufficient to maintain levels of thermal decomposition products below their exposure guidelines. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

Eye/face protection: Eye protection not required.

Skin/hand protection: No protective gloves required

Respiratory protection: Use a positive pressure supplied-air respirator if there is a potential for over exposure from an uncontrolled release, exposure levels are not known, or under any other circumstances where air-purifying respirators may not provide adequate protection. If thermal degradation products are expected, use a full face piece supplied-air respirator.

Exposure limits: Not established.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form:	Liquid
Odor, Color, Grade:	Clear, colorless, low odor.
General Physical Form:	Liquid
Auto ignition temperature:	<i>Not Applicable</i>
Flash Point:	No flash point
Flammable Limits (LEL):	None detected
Flammable Limits (UEL):	None detected
Boiling Point:	49°C [@ 760 mmHg]
Vapor Density:	11.6 [<i>Ref Std: AIR=1</i>]
Vapor Pressure:	40.4kPa [@ 25 °C]
Specific Gravity:	1.6 [<i>Ref Std: WATER=1</i>]
pH:	<i>Not Applicable</i>
Melting point:	-108°C
Solubility in Water:	Nil
Evaporation rate:	> 1 [<i>Ref Std: BUOAC=1</i>]
Volatile Organic Compounds:	1600g/l [<i>Test Method: calculated SCAQMD rule 443.1</i>]
Kow - Oct/Water partition coef:	<i>Not Applicable</i>
Percent volatile:	100%
VOC less H2O & Exempt Solvents:	1600g/l [<i>Test Method: calculated SCAQMD rule 443.1</i>]
Viscosity:	0.6 centipoise [@ 25°C]

Safety Data Sheet Continued

SECTION 10. STABILITY AND REACTIVITY

Chemical stability:	Stable
Conditions to avoid:	Light
Materials to avoid:	Strong bases, Amines, Alcohols
Hazardous Polymerization:	Hazardous polymerization will not occur.
Hazardous Decomposition or By-Products:	

<u>Substance</u>	<u>Condition</u>
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion
Hydrogen Fluoride	During Combustion
Toxic Vapor, Gas, Particulate	During Combustion

SECTION 11. TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the SDS for Toxicological Information on this material and/or its components.

SECTION 12. ECOLOGICAL INFORMATION

<u>Test Organism</u>	<u>Test Type</u>	<u>Result</u>
Green algae, Selenastrum capricornutum	72 hrs Effect Conc. 50%	7.7mg/l
Zebra Fish, Brachydanio rerio	96 hrs Lethal Conc. 50%	>1200mg/l
Water flea, Daphnia magna	48 hours Effect Concentration 50%	>1200mg/l
Green algae, Selenastrum capricornutum	72 hours No obs Effect Conc	1.2mg/l

Please contact the address listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information: Not determined

Photolytic half-life: 3-5 days

Photolytic degradation products may include Trifluoroacetic acid (TFA)

NOTE: Hydrolysis is not expected to be a significant degradation pathway. Product is highly insoluble in water and volatile, and use as a clean extinguishing agent would not typically result in releases to aquatic environments.

SECTION 13. DISPOSAL CONSIDERATIONS

Dispose of contents/container in accordance with the local/regional/national/international regulations.

Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Combustion products will include HF. Facility must be capable of handling halogenated materials. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14. TRANSPORT INFORMATION

ID Number(s): 98-0212-3031-7, 98-0212-3201-6, 98-0212-3203-2, 98-0212-3217-2, 98-0212-3371-7, 98-0212-3414-5, 98-0212-3588-6

3M Novec 1230 by itself is not regulated by DOT

Or – If packaged as a charged Fire Extinguisher...

DOT	UN number:	1044
	Proper shipping name:	Fire Extinguishers
	Class:	2.2 (Non-Flammable Gas)
	Labelling No. :	2.2
IATA_C	UN number:	1044
	Proper shipping name:	Fire Extinguishers
	Class:	2.2 (Non-Flammable Gas)
	Labelling No. :	2.2
IMDG	UN number:	1044
	Proper shipping name:	Fire Extinguishers
	Class:	2.2 (Non-Flammable Gas)
	Labelling No. :	2.2

SECTION 15. REGULATORY INFORMATION

US federal regulations: Contact Fireboy-Xintex LLC for more information.

311/312 Hazard Categories: Fire Hazard – No Pressure Hazard – No,
Reactivity Hazard – No Immediate Hazard – No
Delayed Hazard - No

State regulations: Contact Fireboy-Xintex LLC for more information.

Chemical inventories:

The components of this product are in compliance with the new substance notification requirements of CEPA.

The components of this material are in compliance with the China "Measures on Environmental Management of New Chemical Substance". Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of the Korean Toxic Chemical Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Philippines RA 6969 requirements. Certain restrictions may apply. Contact the selling division for additional information.

The components of this product are in compliance with the chemical notification requirements of TSCA.

Contact Fireboy-Xintex LLC for more information.

Safety Data Sheet Continued

International regulations: Contact Fireboy-Xintex LLC for more information.

Additional information: U.S. EPA. Significant New Alternatives Policy Program (SNAP) approved for uses is streaming and flooding fire protection application. This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16. OTHER INFORMATION

NFPA Hazard Classification:

Health: 3 Flammability: 0 Reactivity: 1 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification:

Health: 0 Flammability: 0 Reactivity: 1 Protection: X - See PPE section

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision: May 6, 2016

January 27, 2017

Returning Fireboy-Xintex Equipment

No product may be returned for credit or repair without a written "Returned Material Authorization" (RMA) form. Purchaser must call or email Fireboy-Xintex 616-735-9380 or fireboy@fireboy-xintex.com for a RMA. If due to extenuating circumstances a product is to be returned, after approval it must be received in 100% new/resalable condition. Products stored by the buyer for more than 26 weeks may not be returned for any reason. Maintaining fresh and current inventory is the responsibility of the buyer.

Recharging Fireboy Extinguishers

Fireboy-Xintex cylinders comply with DOT specification 4BW/360 which allows for recharging as long as the extinguisher was not discharged due to a fire and passes visual inspection in accordance with CGA C-6, or a hydrostatic test. Extinguisher cannot be recharged or refilled in the field. Contact manufacturer for details on the recharging process.

This Warranty is in lieu of all other expressed or implied Warranties

Seller warrants title, materials, and workmanship on equipment, except components manufactured by others for which the Seller assigns, as permitted, the original manufacturer's warranty. Seller's warranty shall be for a period of (3) three years from the date of sale to the ORIGINAL CONSUMER PURCHASER, during which non-conforming equipment returned to the Seller at Buyer's expense and risk, be repaired or replaced at the Seller's option. Fireboy-Xintex LLC will repair or replace products found to be defective in materials or workmanship within the period set forth above, provided that: (a) the product has not been subjected to abuse, contamination, neglect, accident, incorrect wiring not our own, improper installation or servicing, or used in violation of instructions furnished by Fireboy-Xintex LLC and (b) as to any prior defects in materials or workmanship covered by this warranty, the product has not been repaired or altered by anyone except Fireboy-Xintex LLC and (c) the serial number has not been removed, defaced or otherwise changed, and (d) examination discloses, in the judgment of Fireboy-Xintex LLC, does not assume the costs of removal and/or installation of the product or any other incidental costs of removal and/or installation of the product or any other incidental costs which may arise as a result of any defect in material or workmanship, and (e) upon discovery of defect, Buyer shall immediately cease use of and notify Fireboy-Xintex LLC.

Any warranty implied by law, including warranties of merchantability or fitness, is in effect only for the duration of the expressed warranties set forth above, no person is authorized to give any other warranty, or to assume for Fireboy-Xintex LLC any other liability in connection with the sale of its products; Fireboy-Xintex LLC shall not be liable for the loss of use, revenue, or profit or for any injury, or for any other consequential or incidental damages, buyer is not relying on seller's judgment regarding his or her particular requirements, and has had an opportunity to inspect the product to his or her satisfaction.

This warranty gives you specific legal rights, and you may also have other rights, which vary, from state to state.

www.fireboy-xintex.com

Fireboy-Xintex LLC
O-379 Lake Michigan Dr. NW
Grand Rapids, MI 49534
fireboy@fireboy-xintex.com
Phone (616) 735 9380

Fireboy-Xintex UK Operations Limited
10 Holton Road, Holton Heath Trading Park
Poole Dorset BH16 6LT UK
fireboyeu@fireboy-xintex.com
Phone 44 (0) 845 9462