FIRETRACE® LTD

AUTOMATIC FIRE SUPPRESSION SYSTEMS

Issue 5 Nov 2017

Firetrace® "**Indirect**" Co^2 Automatic Fixed Fire Suppression Systems For CNC / EDM Applications

Please read instructions carefully prior to starting installation

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Stops fires where they start

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System Overview.

The Fixed Firetrace® system is a simple self-actuating device that is designed to suppress fires within an identified risk area. **The cylinder is not intended for portable use.**

The system works by using pressurised Firetrace® linear detection tubing that is installed throughout the risk area. This tubing is heat sensitive and when subjected to a temperature above 120 Degrees centigrade, or when touched by flame, the Firetrace® tubing will burst.

Tube burst

The extinguishant is then deployed via discharge pipe work and diffusers onto the fire.

The Firetrace® system requires no external power source or separate detectors and owing to its simple design ensures that all of the extinguishant is always deployed in the risk area.

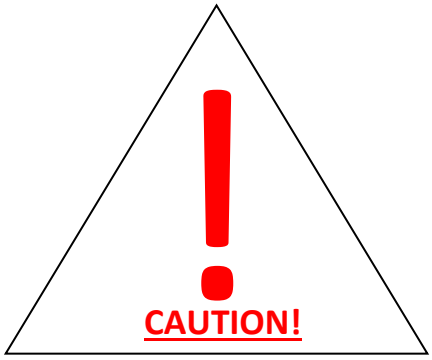
The Firetrace® system can be fitted with a volt free single pressure switch (FT0124) or volt free twin pressure switch (FT0124/T75) which, when connected to the cylinder, not only provides constant monitoring of the system but can also send a signal to indicate a discharge via a Self-contained Alarm Sounder (FT0178) or building alarm.

It is important that the cylinder, Firetrace® detection tubing and discharge pipe work are correctly installed and that the system is subjected to a regular maintenance regime in line with BS5306-3 by a competent engineer.

FT0178 – Self-Contained Alarm Sounder

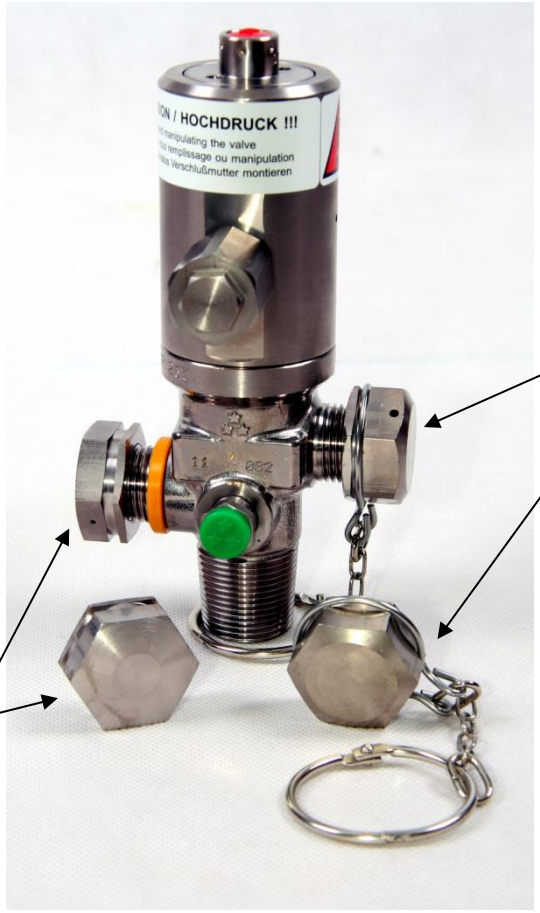
FT0178/SS – Self Contained Alarm Strobe Sounder

High Pressure Valve Safety



CAUTION!

HIGH PRESSURE



High Pressure Discharge port with safety cap

Filling Port with Blanking Cap - Do Not Remove

!!! HIGH PRESSURE !!!

Ensure High Pressure Discharge port safety cap is fitted when fitting, moving or transporting the cylinder.

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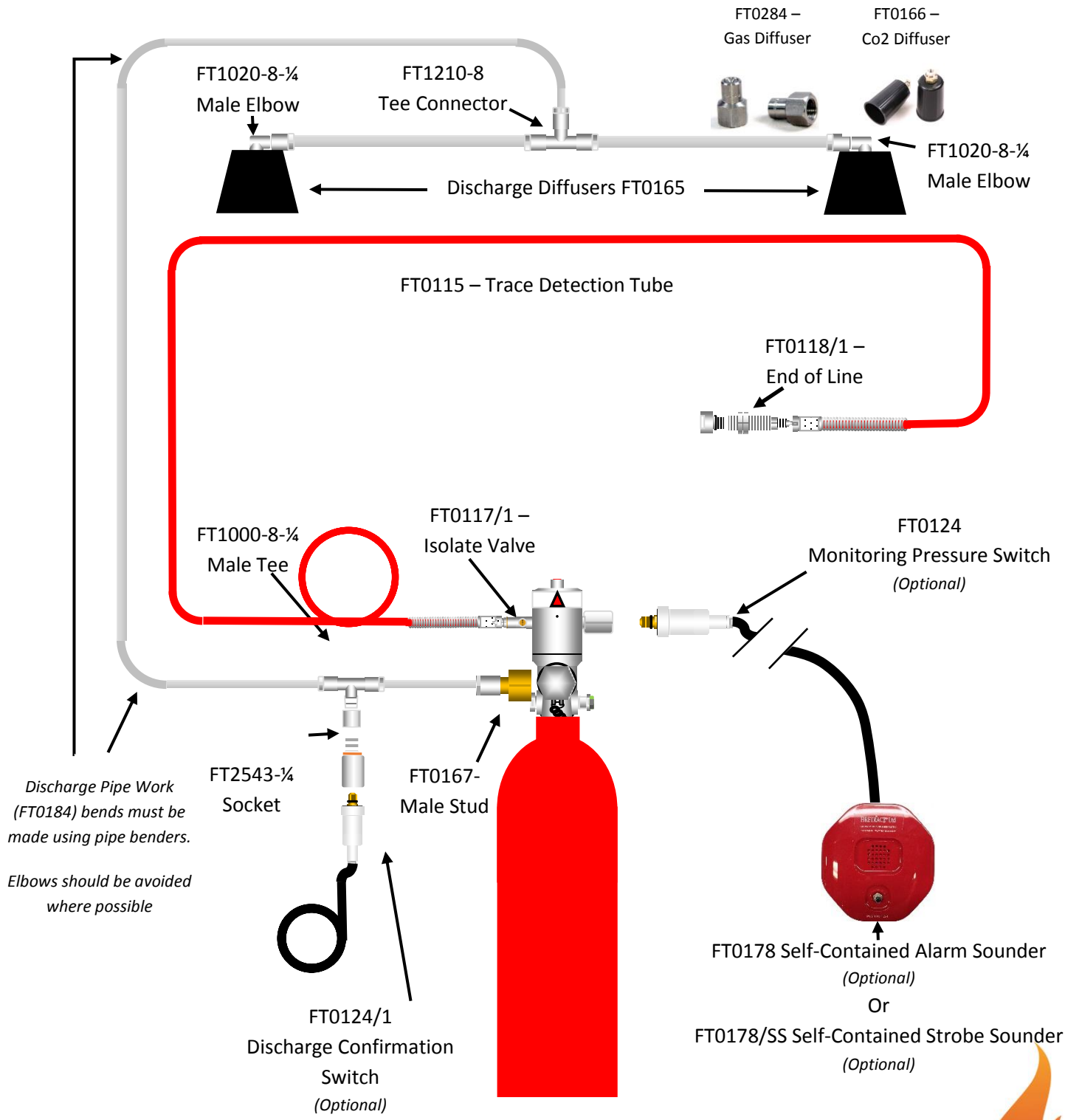
High Pressure System with Isolate Valve System Layout IHPC



Stops fires where they start

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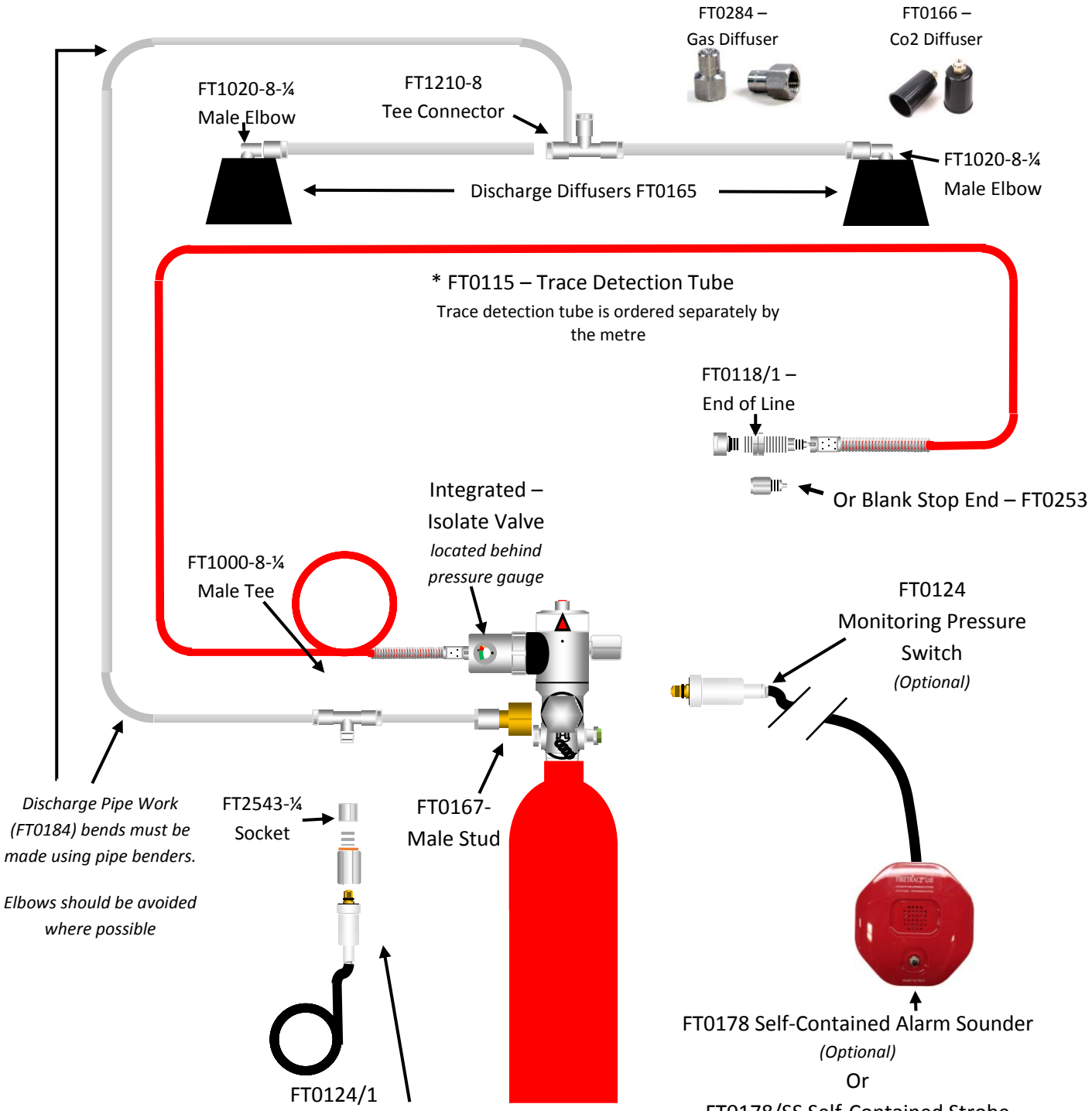
Indirect High Pressure Firetrace® System with integrated isolate valve *(IHPCINT)*



Stops fires where they start

Firetrace® Installation Instructions.

Cylinder

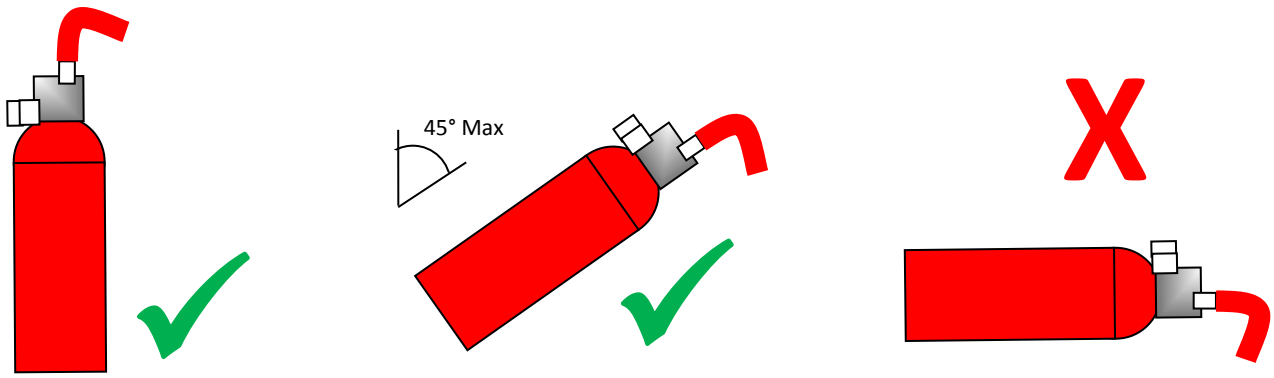
When installing the Firetrace® system it is important that a suitable cylinder location is selected and that the cylinder is orientated correctly.

The cylinder location shall ideally be in a clean area away from direct heat. The cylinder must not be placed in a location where the ambient temperature is above 80 Degrees centigrade.

The cylinder shall be readily accessible to allow future servicing / inspections and as close as practicable to the risk area.

The cylinder shall be adequately fixed to a suitable load bearing surface.

Wherever possible the cylinder shall be **mounted vertically** and in no circumstances must the cylinder be positioned at an angle of more than 45 Degrees from vertical.

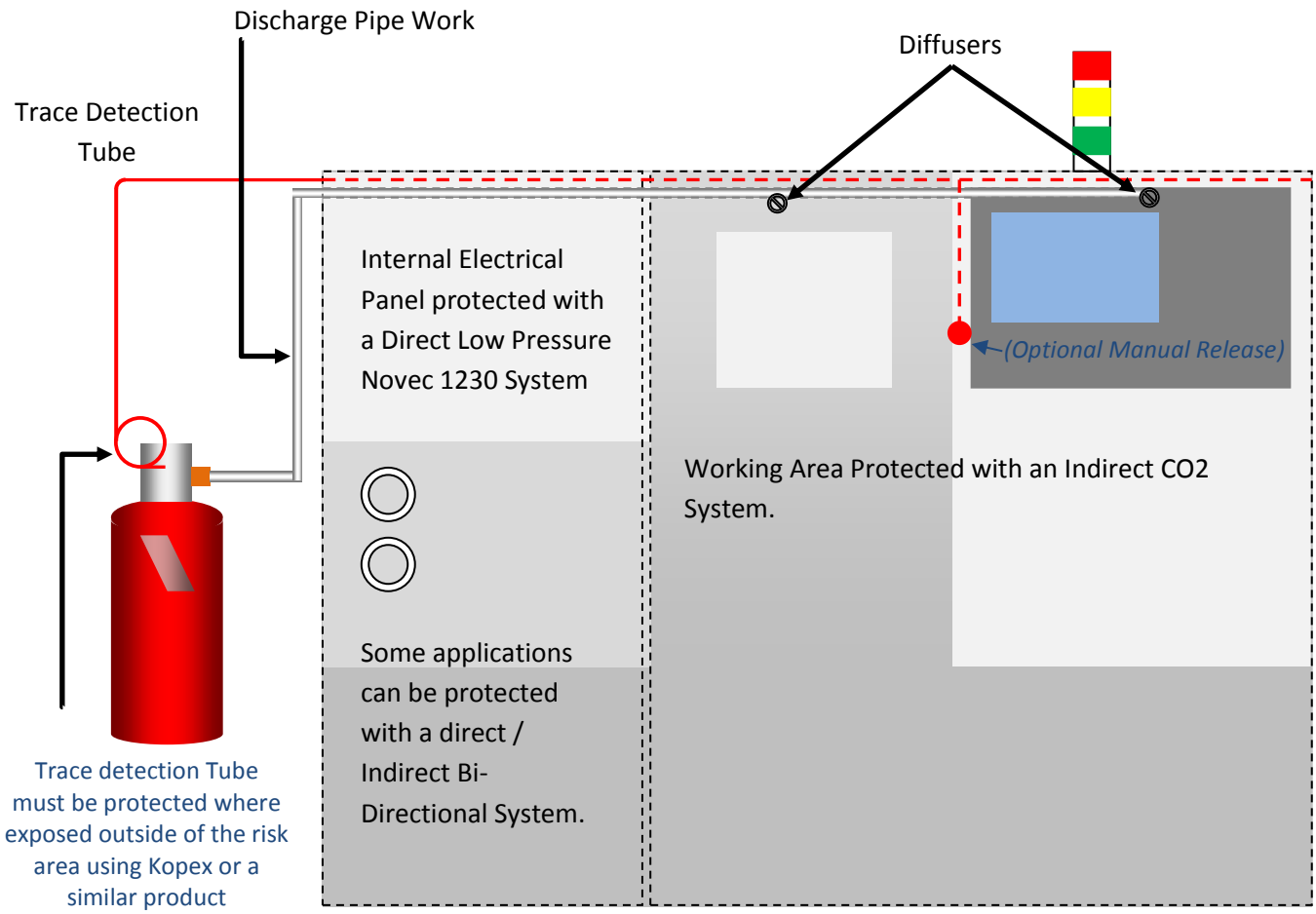


It is recommended wherever possible that Firetrace® cylinders be mounted vertically. Where vertical locating is not possible the systems can be mounted within 45° of vertical.

As indicated in the above drawing when cylinders are fitted at an angle the gauge must face uppermost.

MOST FIRETRACE® SYSTEMS ARE NOT SUITABLE FOR HORIZONTAL MOUNTING.

Typical CNC Machine Installation

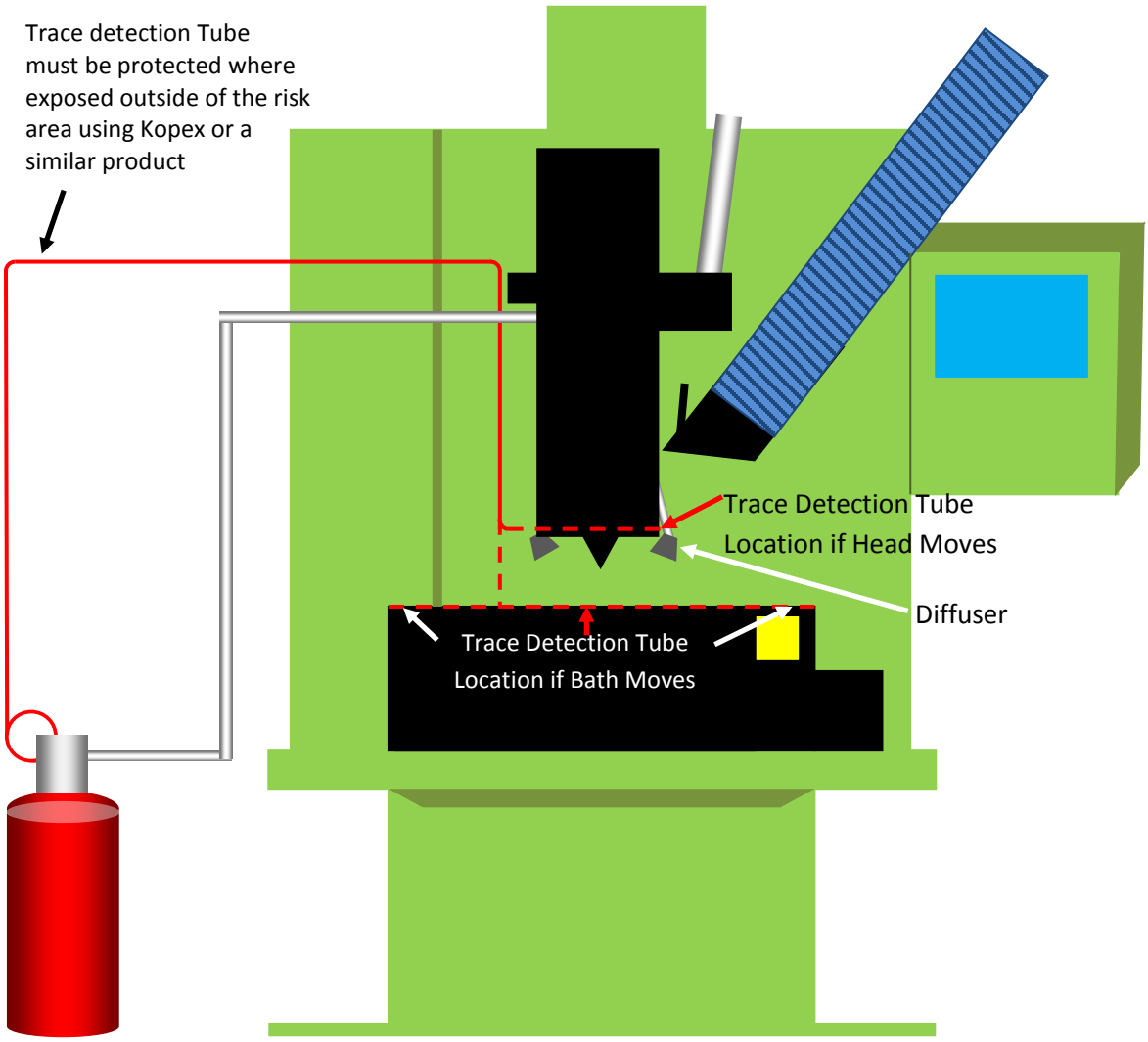


An Optional FT0124 Single Pressure Switch or FT0124/T75 twin Pressure Switch can be fitted to activate local or building alarm, plant shut down, compressed air shut down and / or extraction fan shut down in the event of system discharge.

The above shows a typical installation using an Indirect system, however, on some applications it may be possible to protect the working area and the electrical control panel using a direct/indirect bi-directional system.

This is not possible on all applications; please contact us for more information.

Typical Spark Eroder Installation



The graphic above is a pictorial representative of a typical CO2 installation on a Spark Eroder.
Different Spark Eroders require a slight change to the installation.
Should you require any additional information, please feel free to contact us.

An Optional FT0124 Single Pressure Switch or FT0124/T75 twin Pressure Switch can be fitted to activate local or building alarm, plant shut down, compressed air shut down and / or extraction fan shut down in the event of system discharge.

Firetrace® Automatic Detection Tubing

The Firetrace® Automatic Detection tubing is the key part of the system and acts as the detector to activate the valve.

The correct installation of the tubing is important to achieve optimum performance from the system.

The tubing must be mechanically protected outside the identified risk area and shall remain accessible to allow future servicing.

As heat rises, the Firetrace® tubing is most efficient when mounted directly above the risk. The tubing will activate at approximately 120 Degrees Centigrade and care must be taken to avoid attaching the tubing where temperatures above this are achieved during normal operation.

It is recommended that the tube is a minimum of 150mm away from exceptionally hot surfaces or fitted with additional sleeving to avoid false activation.

Firetrace® Detection Tube and Discharge Pipe Work Routing

As the Firetrace® detection tube is flexible the exact tube route can vary from application to application. The basis of the system design is to circumnavigate the risk / work area so that any potential risks are covered.

The discharge pipe work shall be installed so an unimpeded flow is allowed. Bending of the discharge tube must be done using pipe benders to avoid kinks. The discharge diffusers shall be located for maximum effectiveness on the fire.

Tube Fixings

The Firetrace® Automatic Detection tubing is the key part of the system and acts not only as the detector but in some cases as the delivery method for the extinguishant.

The correct installation of the tubing is important to achieve optimum performance from the system.

The tubing must be physically protected outside the identified risk area using Kopex or another flexible conduit and shall remain accessible to allow future servicing.

The detection tubing must to be adequately fixed to retain its position and withstand the vibration.

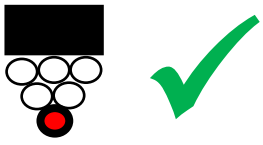
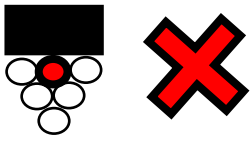
The tubing is a soft polymer and is susceptible to wear / chaffing when repeatedly rubbed against a hard or sharp surface. The tubing shall be protected using nylon Kopex at all fixing points and where it passes through holes.

The following photographs show both “Tyrap” and “P clip” fixings all of which are acceptable.

The Detection tubing shall be supported at maximum intervals of 150mm.

Always leave a small loop of tubing adjacent to the cylinder. Whilst this shall also be secured it must be releasable to allow future servicing of the cylinder.

Where the tubing is installed with a group of other cables/pipes it must be positioned on the underside of the loom and must never be located within the center of the loom.

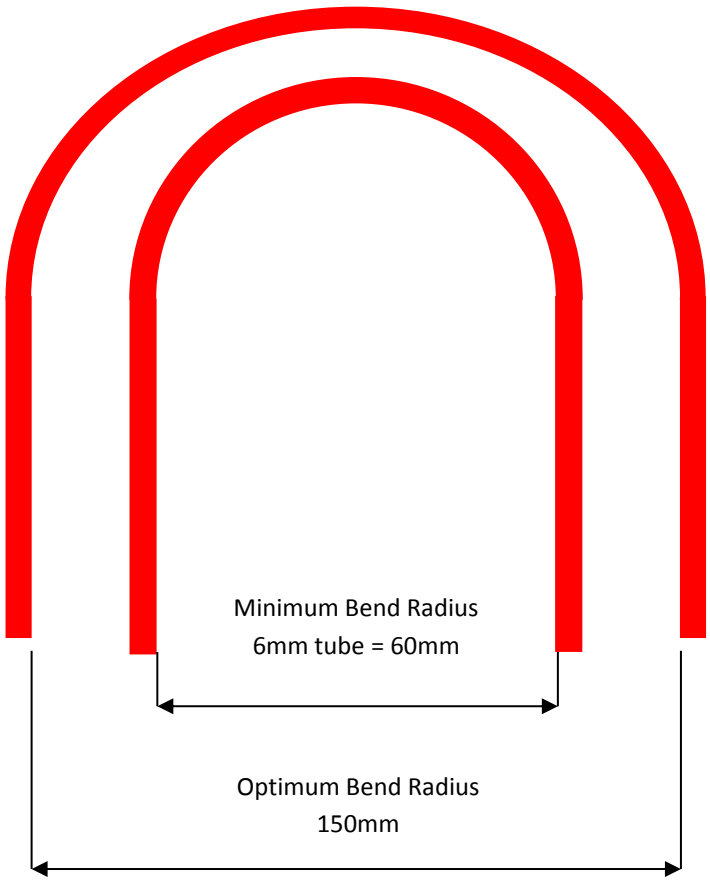



Tube bending radius

The Firetrace® tubing acts as the detector and, in some cases, provides the delivery of the extinguishant. It is imperative that the tubing is not kinked or crushed and the following minimum bending radius must be adhered to.

If the tubing is kinked or damaged in anyway then the Firetrace® tubing in that section must be replaced:

FT0115 Firetrace® tubing 6mm: **Minimum bending radius 60mm**



6mm Trace Detection Tube Components

FT 1511-6/4-1/8
1/8 Male Stud
(Shown with FT0113 Bonded Seal)

FT1540-6/4
Tee

FT1723-6/4
Anti Kink Spring Nut

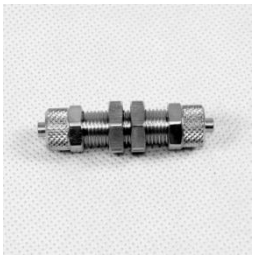
FT0269/2
INT Banjo

FT0253
Stop End

FT1580-6/4
Straight Connector

FT0268
Single Banjo

FT1590-6/4
Bulkhead Fitting



FT0269
Double Banjo

FT0254/1
In-Line Commissioning Adapter

All compression fittings must be secured in the following manner:

a) Cut the tube end ensuring the cut is clean and free from burrs. Check that no debris/ swarf is left in the tube.

b) Place the nut over the end of the tube with its threaded section towards the end of the tube.

c) Push the tube fully home into the body.

d) The nut shall be tightened finger tight and then using a 12mm Spanner pinched up to firm hand tightness

e) Slacken off the assembly and inspect end to ensure flange has formed correctly then reconnect and tighten down to ensure an effective seal.

Method of Assembly

1. Tubing must be cut off square.

2. Insert tubing into tubing nut.

3. Offer the tubing to the fitting so that the tubing bottoms on the tubing stop. (*this requires a firm push if cold*)

4. Hold the tubing in contact with the tubing stop and screw the tubing nut down to the recommended torque. *(torque = 5.7 Nm)*

5. Slacken off the assembly and inspect end to ensure flange has formed correctly then reconnect to fitting and tighten down to ensure an effective seal.

Commissioning Instructions IHPC

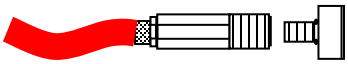
Warning Firetrace® CO2 & N2 cylinders contain high pressure .Proceed with caution.
Do not turn valve FT0117/1 until system is fully commissioned.
Do not remove outlet blanking cap until cylinder is properly secured.

This procedure shall be read in conjunction with design layout for Indirect High Pressure systems earlier in this booklet.

Do not turn valve FT0117/1 until system is fully commissioned

Locate cylinder and firmly secure with bracket provided

Connect Trace detection tube, tighten silver nuts and secure with appropriate clips

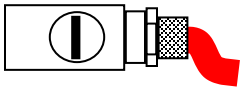
Remove gauge FT0107/1 from end of line gauge adapter FT0118/1 

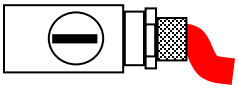
Fit Schrader adapter FT0172 and pressurise to **17 Bar / 245 psi using a Nitrogen cylinder or air pump, r**emove Schrader adapter FT0172 and refit gauge FT0107/1

Using tape, mark the location of the needle on the pressure gauge *(Mid Green)* and **leave system for a minimum of ten minutes per metre of Trace detection tube to check for leaks on the Trace detection tubing.**

Install FT0184 8mm diffuser pipework, connect to cylinder using FT0167 Adaptor. When installation is complete, disconnect FT0167 from cylinder and fit blank cap

When satisfied pressure is good and no leaks have occurred open Isolate valve FT0117/1 **slowly**.

 **CLOSED**

 **OPEN**

Remove blank cap and reconnect FT0184 8mm discharge pipework.

System is now live

Optional FT0124 pressure switch can be fitted in spare gauge adapter on head assembly or at end of line

Please note system will not operate with isolate valve in closed position

To Commission Indirect High Pressure Firetrace® Systems with Integrated Isolate Valve (IHPCINT)

Warning Firetrace® CO2 & N2 cylinders contain high pressure. Proceed with caution.
Do not turn Integrated Isolate valve until system is fully commissioned.
Do not remove outlet blanking cap until cylinder is properly secured.

This procedure shall be read in conjunction with document basic design layout for Indirect High Pressure systems with integrated isolate valve.

Do not turn integrated isolate valve until system is fully commissioned.

Locate cylinder and firmly secure with bracket provided.

Connect Trace detection tube, tighten silver nuts and secure with appropriate clips.

Remove gauge FT0107/1 from either the side of the cylinder or end of line gauge adapter FT0118/1 if fitted.

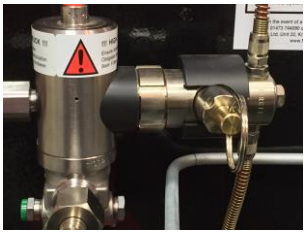
Fit Schrader adapter FT0172 and pressurise to **17 Bar / 245 psi using a Nitrogen cylinder or air pump,** remove Schrader adapter FT0172 and refit gauge FT0107/1.

Using tape, mark the location of the needle on the pressure gauge *(Mid Green)* and **leave system for a minimum of ten minutes per metre of Trace detection tube to check for leaks on the Trace detection tubing.**

Install FT0184 8mm diffuser pipework, connect to cylinder using FT0167 Adaptor. When installation is complete, disconnect FT0167 from cylinder and fit blank cap.

When satisfied pressure is good and no leaks have occurred, remove the gauge from the side of the valve, insert valve key (FTINTVK) and turn **slowly**.

CLOSED



OPEN

Remove blank cap and reconnect FT0184 8mm discharge pipework.

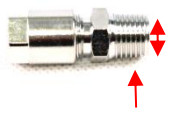
System is now live

Optional FT0124 pressure switch can be fitted in spare gauge adapter on head assembly or at end of line.

Please note system will not operate with isolate valve in closed position

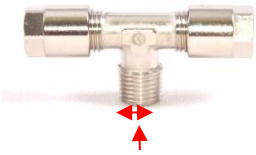
Discharge Pipe Work Fittings

FT1050-8-1/4
1/4 Male Stud



FT1250-8
Bulkhead

FT1000-8-1/4
Male Tee



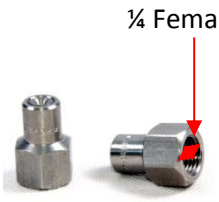
FT1020-8-1/4
¼ Male Elbow

FT1210-8
Tee

FT0167
Co2 Nut Assembly

FT1220-8
Elbow

FT0284
AFFF Foam Diffuser



FT1230-8
Straight Connector

FT0184
8mm Anodised steel
discharge tube
Supplied in 3m lengths

Pressure Switches

Firetrace® Pressure switch (FT0124 & FT0124/T75) Optional

The optional Firetrace® pressure switch is used to monitor the system pressure and will activate in the event of a pressure drop.

The switch can be introduced and removed from the cylinder whilst it is under pressure. This allows its operation to be proven both during commissioning and future servicing.

The Pressure switch is fitted with a black rubber “o ring” which provides the air tight seal. This ‘o` ring must be lubricated with silicone grease and free of any dirt or debris. Failure to ensure the ‘o` ring is clean can lead to a leak which will require the system needing replacement.

The switch shall be screwed into the cylinder hand tight ONLY.

The switch contains both normally open & normally closed contacts.

Always leave a small loop of spare cable adjacent to the pressure switch to allow future removal.

FT0124/T75 Twin Monitoring Switch.

Switch 1 Set at 5 bar falling.
Switch 2 Set at 7 bar falling.

Common - Brown
Normally open - Grey
Normally closed - Black
Earth - Green/yellow

Single Pressure Switches

Switching is effected by means of a micro-switch rated at 5A 250v AC

(Not suitable for use on 440v AC)
Tighten HAND TIGHT ONLY

Range	5 - 35 bar
Hysteresis	2.5 bar
Temperature	-10°C to +80°C
Thread	M10 x 1.0 x 12.5 with O ring

FT0124 Monitoring Pressure Switch set at 5 bar falling

Common	Brown
Normally Open	Grey
Normally Closed	Black
Earth	Green / Yellow

FT0124/1 Discharge Confirmation Pressure Switch
Set at 3.5 bar rising

Common	Brown
Normally Open	Black
Normally Closed	Grey
Earth	Green / Yellow

(Please note this switch is non-latching)

Service and Maintenance

Firetrace® Limited recommends a visual inspection of a Firetrace® system at least every three months and fully serviced annually by a competent engineer.

The following checks shall be carried out on a 3 monthly inspection.

- Check the pressure gauge is reading mid-green.
- Carry out a visual check of the trace detection tube.
- Ensure physical changes of protected areas haven't affected cylinder suitability.
- Check external surface of the cylinder for evidence of rust or corrosion.
- Report any potential problems immediately.

The following checks shall be carried out on an annual inspection of a Firetrace® High Pressure System.

- Check cylinder mounting bracket and fixings for soundness.
- Check external surface of the cylinder for evidence of rust or corrosion.
- Check cylinder date stamp to ascertain discharge test date. *(10yr interval)*
- Ensure physical changes of protected areas haven't affected cylinder suitability.
- Isolate the system by turning the isolate valve so it is 90° to the detection tube.
- Remove discharge pipe work and fit the blank cap.
  If there is no blank cap present, DO NOT WORK ON THE SYSTEM
- Locate and check the pressure gauge is reading mid-green on the end of line adapter.
- Remove the pressure gauge to test correct operation.
- Drain the detection tube by carefully depressing the Schrader core in the end of line gauge adapter.
- Remove the detection tube from the cylinder ensuring the isolate valve doesn't turn.
- Remove the pressure switch to check operation. *(where applicable)*
- Check the correct operation of any telemetry. *(where applicable)*
- Remove the cylinder and check weigh. *(tolerance +/- 5% of full weight)*
- Mark cylinder label accordingly.
- Replace cylinder and follow commissioning instruction in training and reference manual.
- Report any potential problems immediately.

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