



## Technical Bulletin 005 – Plumbed-in FIA Technical List 16 – Installation Guide

SPA Design Fire Fighter systems are available in both electrically activated and mechanically activated configurations and are approved under FIA Technical List 16. These systems utilise a foam-based extinguishing agent, making them suitable for most competition vehicles.

The guidance provided in this document is intended to support the correct installation of the selected fire suppression system. It is important to note that onboard motorsport fire suppression systems are designed to slow the progression of a fire and provide occupants with additional time to safely evacuate the vehicle. They are not intended to prevent damage to, or preserve, the vehicle itself.

Given the wide range of vehicle designs and configurations used in motorsport, SPA Design cannot prescribe exact component locations for every application. Accordingly, this document outlines industry “best-practice” recommendations that are appropriate for most vehicles. If your specific installation cannot comply with these guidelines, please contact SPA Design Technical Support for further advice.

***Before commencing installation, ensure that all instructions are read and fully understood. The installation should be carefully planned with reference to the tables and system drawings provided. Do not cut any supplied tubing, nor the plugs and wiring harnesses associated with electrically operated systems, until the final positions of the cylinder, connectors, discharge nozzles, activation switches or pull cables, and power pack have been definitively established.***

Other References (available at <a href="http://www.spa-design.com">www.spa-design.com</a> )	
<b>TB004</b>	FIA TL 16 – Data Sheet
<b>TB006</b>	AFFF MSDS
<b>TB009</b>	System Care, Maintenance & Servicing

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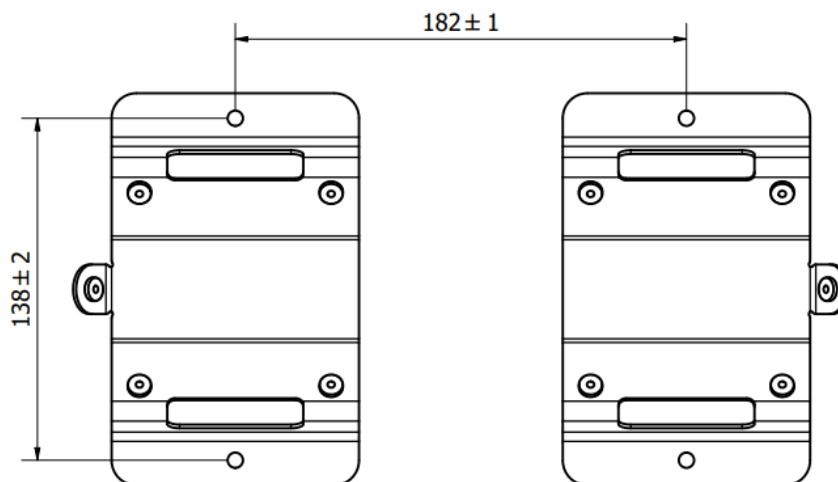
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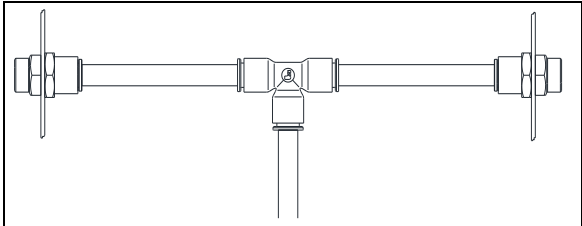
## Section 1 – Cylinder, Bracket and Straps – Both Variants

Item and System Type	Fixing Type and No.	Location and Fitting Guide
<b>Cylinder and Bracket – Stored Pressure Systems</b>	<p>Secure the assembly using 4xM6 bolts, nuts and washers. The use of anti-vibration washers and/or Nyloc nuts are highly recommended to prevent loosening under operational loads. AV mounts may be required to protect the cylinder in some cars where vibration is a known problem.</p>  <p><b>Figure 1 - AV Mount Fixing</b></p> <p><i>The use of self-tapping screws or inserts are NOT permitted.</i></p> <p>Correctly specified and fitted automotive chassis inserts are acceptable</p>	<p>Mount the bracket transversely within roll cage or safety cell in accordance with FIA Appendix J Art 253 7.2</p> <p>Select a location that minimises the risk of impact damage and avoids exposure to excessive heat to the system.</p> <p>Using the first bracket as a reference, mark the fixing hole positions, then determine the correct location of the 2<sup>nd</sup> bracket by referring to the drawing dimensions provided below.</p>
<b>T-Bolt Straps</b>	2x T-Bolt straps	Thread through provided slots in brackets and around the cylinder. Tighten T-bolts using spanner being careful not to damage the cylinder.



**Figure 2 – Bracket Hole lengths**



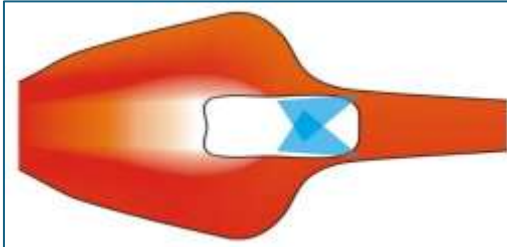
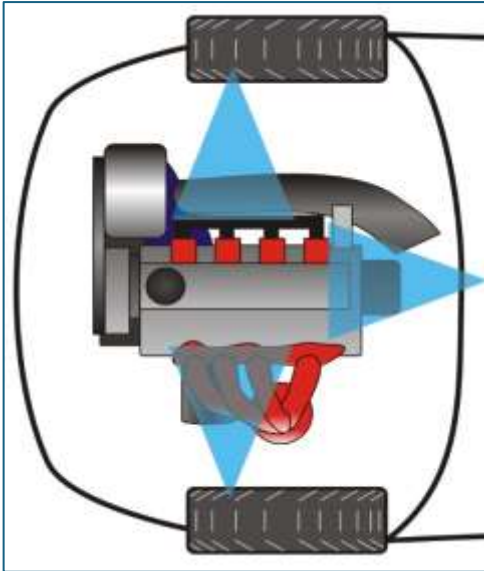
## Section 2 – Delivery Network – Tube and Connectors

Item and System Type	Fixing Type and No.	Location and Fitting Guide				
<b>Tube (8mm) – All Systems</b>	Supplied clips, cable ties or P-Clips as required	<p>Cut tube to pre-measured length using a dedicated tube cutter, taking note of Figure 5 and Section 6, ensuring that there are no sharp edges and that the tube remains circular. Do not use a hack saw or similar tool; this will leave a jagged edge which will damage the seals in connecting components.</p> <div>  </div> <p><b>Figure 3 - Correct T-Piece to Nozzle Arrangement (See also Section 6 - System Schematics)</b></p> <p>Hand form the tube taking care not to create a kink which could restrict flow. Minimum bend radius of the tube is shown below; SPA Design recommend doubling this figure, where possible, to avoid kinking.</p> <table border="1"> <thead> <tr> <th>Tube Ø</th> <th>Minimum Bend Radius</th> </tr> </thead> <tbody> <tr> <td>8mm</td> <td>25mm (50mm recommended)</td> </tr> </tbody> </table>	Tube Ø	Minimum Bend Radius	8mm	25mm (50mm recommended)
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<b>Connectors</b>	Push Fit	<p>Where supplied and required, drill a Ø13mm hole and install the bulkhead connector – (Electrical systems only)</p> <p>Route the tubing loosely within the vehicle and begin inserting the tube into the connectors. The tube must be pushed fully until a positive click is felt as it passed the sealing O-ring. Once correctly seated, the tube should not be able to be withdrawn without first depressing the connector’s release ring, confirming secure engagement.</p>				

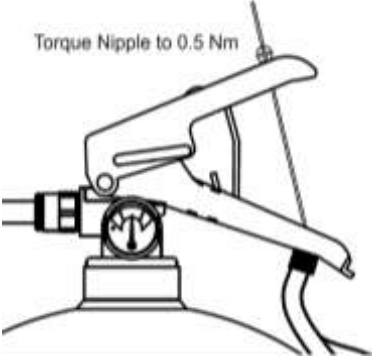
## Section 3 – Nozzles

The nozzles supplied with these systems generate an 80° fine mist spray pattern. Care must be taken to ensure that no structural components or vehicle hardware obstruct the discharge pattern. Each nozzle requires a Ø15.5 mm panel cut-out for installation. Nozzles must be rigidly secured to a bracket or panel and must not be supported by the discharge tubing alone. The associated tubing shall be mechanically supported using P-clips positioned approximately 75-100mm upstream of each nozzle to prevent vibration-induced fatigue.

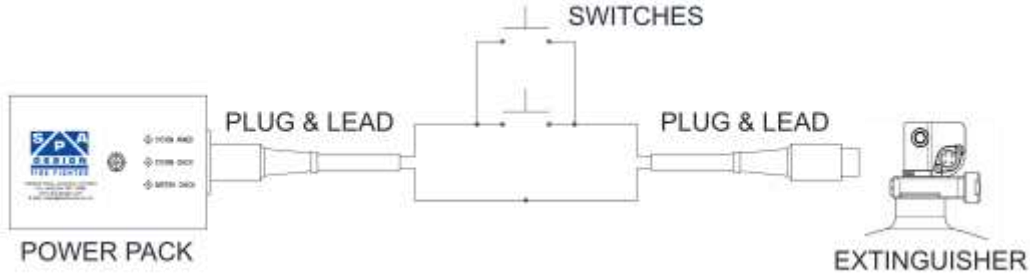
*Each nozzle type is specifically designed and optimised for use with its corresponding system. Substitution with alternative nozzle types is not permitted. All supplied nozzles must be installed as specified; the use of additional nozzles or the omission of any required nozzles is not allowed.*

System Type	Cockpit	Engine Compartment
<b>TL16 System with 5 nozzles</b>	<p>2 nozzles under the dashboard pointed downwards into the footwell or driver's midriff in open cars.</p> <p><i>Do not point at occupant's head.</i></p>  <p><b>Figure 4 - Track Only Nozzle Positions</b></p>  <p><b>Figure 5 - Rally Nozzle Positions</b></p>  <p><b>Figure 6 - Single Seat Nozzle Positions</b></p>	<p>The misting nozzles produce a fine high-volume spray that floods the engine bay. Carefully consider the position of the 3 engine compartment nozzles to cover the most likely source of ignition: induction, exhaust, fuel pump, injector rail, carburettors etc. Two nozzles should be placed on opposite sides of the engine, with the third at one end as shown below.</p>  <p><b>Figure 7 - TL16 Engine Bay Nozzle Positions</b></p>

## Section 4 – Activation Kit – Mechanical

Item and System Type	Location and Fitting Guide
<p><b>Pull Cable(s) – Mechanical Systems</b></p>	<p>Mechanical systems are supplied with 2 Bowden cables, one for internal activation and one for external activation. In closed-cockpit vehicles, both cables must be installed. In open-cockpit vehicles, installation requirements are regulation-dependent and may permit the use of either the internal cable alone or both cables.</p> <p>The pull cable bezels require a panel cut-out of <math>\text{Ø}10.5 - \text{Ø}11.5\text{mm}</math> for correct installation.</p> <p>For closed-cockpit vehicles, the external pull cable is typically mounted in the scuttle area and must be positioned near the electrical master cut-off switch. On open-cockpit vehicles, the external pull cable is normally located on the roll hoop. The supplied “E” identification sticker must be affixed immediately adjacent to the T-handle of the pull cable.</p> <p>The internal cable is generally installed on the dashboard near the electrical cut-off switch and must be readily accessible to the driver or co-driver while seated and fully restrained by the safety harness.</p> <p>Route the outer sheath of the Bowden cables into the brass ferrule on the handle and ensure that the cable nipple is secure on the other side of the handle. <b>Torque the nipple screw to at least 0.5 Nm.</b></p> <div style="text-align: center;">  </div> <p><b>Figure 8 – Mechanical Pull Cable Fitment</b></p> <p><i>Special care must be taken with routing to ensure no sharp bends or S-bends are introduced to the cable. This can significantly increase the effort required to pull the cable. Once the routing is decided upon, trial fit the cable without connecting to the extinguisher to test for smooth and easy operation. It is recommended that 10mm of slack is left to prevent accidental firing and so that scrutineers can confirm the cables are free.</i></p>

## Section 5 – Activation Kit – Electrical

Item and System Type	Location and Fitting Guide
<p><b>Wiring – Electrical Systems</b></p>	<p>Switches are to be located as above for mechanical systems. Take care not to position the switches next to other parts of the vehicle which could be confused for the switch e.g. unused wiper towers. The switches require a Ø13.6mm panel cut out. The supplied “E” sticker should be fixed immediately next to the switch.</p> <p>Wire the system as per the diagram below. Circuit has no polarity, but it is recommended that the wire colours are matched for clarity and to aid troubleshooting.</p> <div>  <p>The diagram illustrates the electrical wiring for the activation kit. On the left is a rectangular box labeled 'POWER PACK' with the SPA Design logo and three terminals labeled '12V IN+', '12V OUT', and 'GND'. A 'PLUG &amp; LEAD' cable connects this to a central 'SWITCHES' unit, which is depicted as a rectangular box with two toggle switches on top. A second 'PLUG &amp; LEAD' cable connects the switches to an 'EXTINGUISHER' on the right, shown as a cylindrical device with a handle and a nozzle.</p> </div> <p style="text-align: center;"><b>Figure 9 – Wiring Schematic</b></p>



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## Section 6 – System Checking

System Type	Procedure
<b>All Systems</b>	Where fitted, verify that the pressure gauge indicates a reading within the centre of the scale. Cylinder pressure may vary with temperature because of normal expansion and contraction of the extinguishing agent; such variation is expected and does not indicate a fault.
<b>Mechanical</b>	With the safety pin left in place, check the operation of the pull cables by gently pulling the T-handle until the slack is taken up, then pushing the T-handle fully back into its housing. If any resistance or restriction is felt that could adversely affect extinguisher operation, review the cable routing and apply suitable lubrication as required until smooth, free movement is achieved.
<b>Electrical</b>	<p>Once the system has been wired in accordance with the wiring diagram in Section 5, a functional check must be performed to confirm that the system is capable of discharging. Before you start the check procedure, ensure that both the cylinder and the power pack are correctly connected.</p> <p>The power pack is fitted with a three-position switch on its front face, which provides battery and wiring diagnostic functions. Pulling the switch downward against its spring will activate the battery check and illuminate the AMBER LED.</p> <p><i><u>If the AMBER LED fails to illuminate, or immediately goes out, the battery MUST be replaced. Only a high-quality PP3 alkaline battery is to be replaced.</u></i></p> <p>With the switch in the central “SYSTEM TEST” position—this position only—the integrity of the wiring circuit can be checked. With the extinguisher connected, press one of the activation buttons; the green LED should illuminate. If the green LED does not illuminate, this indicates a break in the circuit. If the green LED illuminates before a firing button is pressed, a short circuit is present, and the system is permanently ‘live’.</p> <p><i><u>If this occurs, do not put the switch into the “SYSTEM ARMED” position as this will result in immediate discharge of the system.</u></i></p> <p>If the green LED fails to illuminate during testing, inspect the wiring thoroughly and verify it against the wiring diagram provided in Section 5.</p> <p>To arm the system, move the switch upward to the “SYSTEM ARMED” position. The red LED will illuminate, indicating that the system is live and ready for operation.</p> <p>To maximise battery life and reduce the risk of accidental activation, it is recommended that, when the vehicle is not in use, the switch is returned to the “SYSTEM TEST” position and the connector is unplugged from power pack.</p>

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## Section 7 – System Schematics

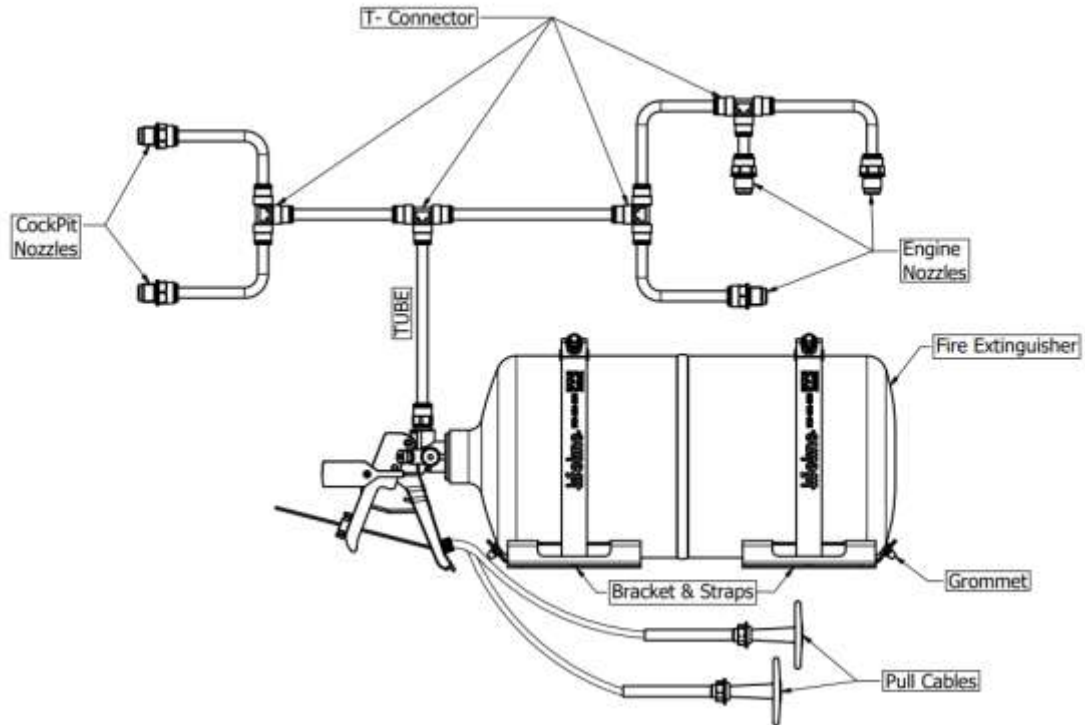


Figure 10 – TL16 Mechanical System - 6000-001-011

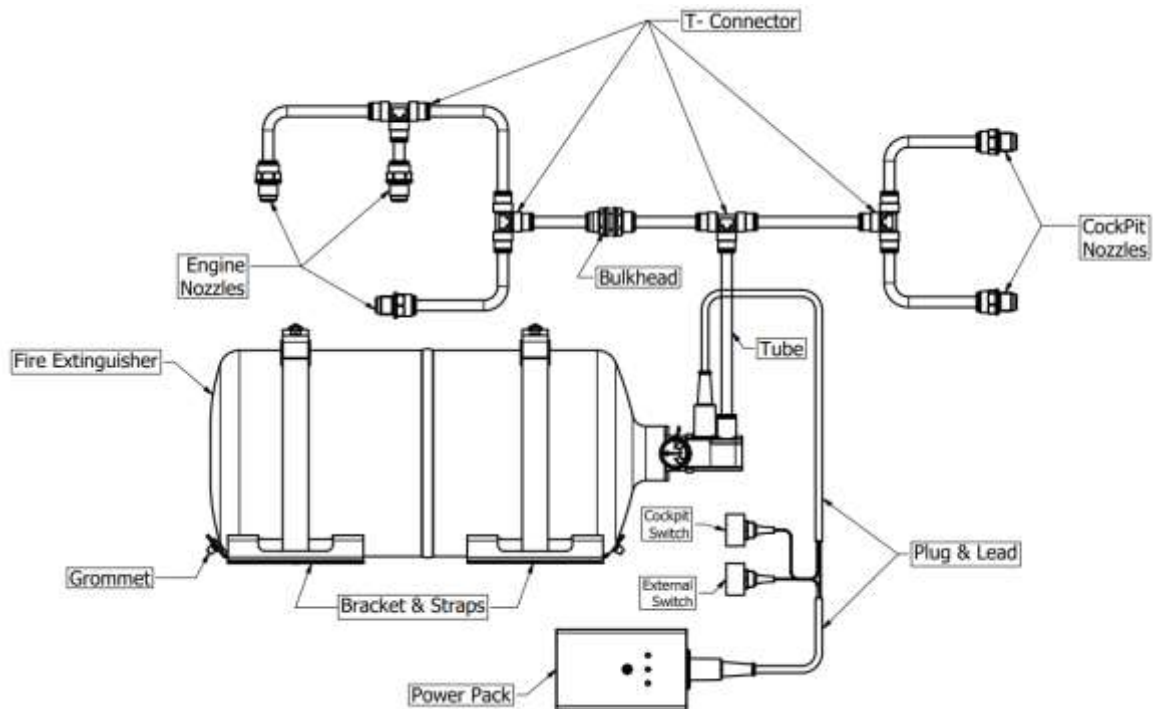


Figure 11 – TL16 Electrical System - 6000-001-012