



**MANUAL  
INSTALLATION - COMMISSIONING  
OPERATION - MAINTENANCE  
DOCUMENT REF. D1236**

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**Contact Details:**

Patol Limited  
 Archway House, Bath Road,  
 Padworth, Reading,  
 Berkshire.  
 RG7 5HR  
 Tel: +44 (0)1189 701 701  
 Fax: +44 (0)1189 701 700  
 Email: info@patol.co.uk  
 Web: www.Patol.co.uk

## 1. - Introduction

A heat detection system using Linear Heat Detection Cable (LHDC) can be installed near the rim seal of a floating roof tank. Due to the rise and fall of the floating roof, electrical connection between detection cable and the control panel can be problematic as standard cable cannot be used.

The Patol Automatic Cable Reeler provides the electrical connections between the LHDC and the Fire Alarm Control Panel.

The Automatic Cable Reeler is installed at the top of the tank. This is connected to the junction box located on the roof. The Automatic Cable Reeler adjusts for the movements of the roof, uncoiling cable as the level falls and winding cable when the level rises.

The mechanism is enclosed within a Stainless Steel AISI 316 cabinet. The connecting cable is resistant to chemical agents and high temperatures.

The unit is normally mounted in a vertical position but can be mounted horizontally when used with a directional change pulley.

A removable plate allows inspection and maintenance of the spring without the need to remove the unit.

## 2. Certifications

The Cable Reeler is supplied with the following certifications.

**IECEX Ex ia IIC T6 Ga/Gb**

(Applies for  $-40^{\circ}\text{C} \leq T_{amb} \leq +40^{\circ}\text{C}$ )

**IECEX Ex ia IIC T4 Ga/Gb**

(Applies for  $-40^{\circ}\text{C} \leq T_{amb} \leq +60^{\circ}\text{C}$ )

**ATEX II 1/3G Ex Ia IIC T6  $-40^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$**

## 3. Technical Features

Dimensions: HxWxD(mm) 400x450x150

Weight: ~25Kg

Materials:

Box: Stainless steel AISI 316

Internal spring: Carbon steel

Internal devices: ABS/Fibreglass

Type of Cable:

- 4 multi strand conductors 1mm<sup>2</sup>
- Flame retardant.
- External coating: Santoprene
- Dissipative external covering
- Resistant to chemical agents.
- Operating temperature:  $-40 + 60^{\circ}\text{C}$
- Maximum extension length: 23 Mt
- Total Resistance: 0.50Ω
- Total Capacitance spec.: 2nF
- Total Inductance spec.: 0.1mH
- External Insulation resistance: 0.035MΩ
- Maximum Operating Voltage: 48V

Junction Box: Stainless Steel AISI 316 150x150x80 Ex ia II C Certificated

Inside the Junction Box there are 4 through terminals 2.5mm<sup>2</sup> IECEX Certificated

For the input cable, the case has 2 x M20 cable gland entries.

It is obligatory to use cable glands that should have a superior safety protection level.

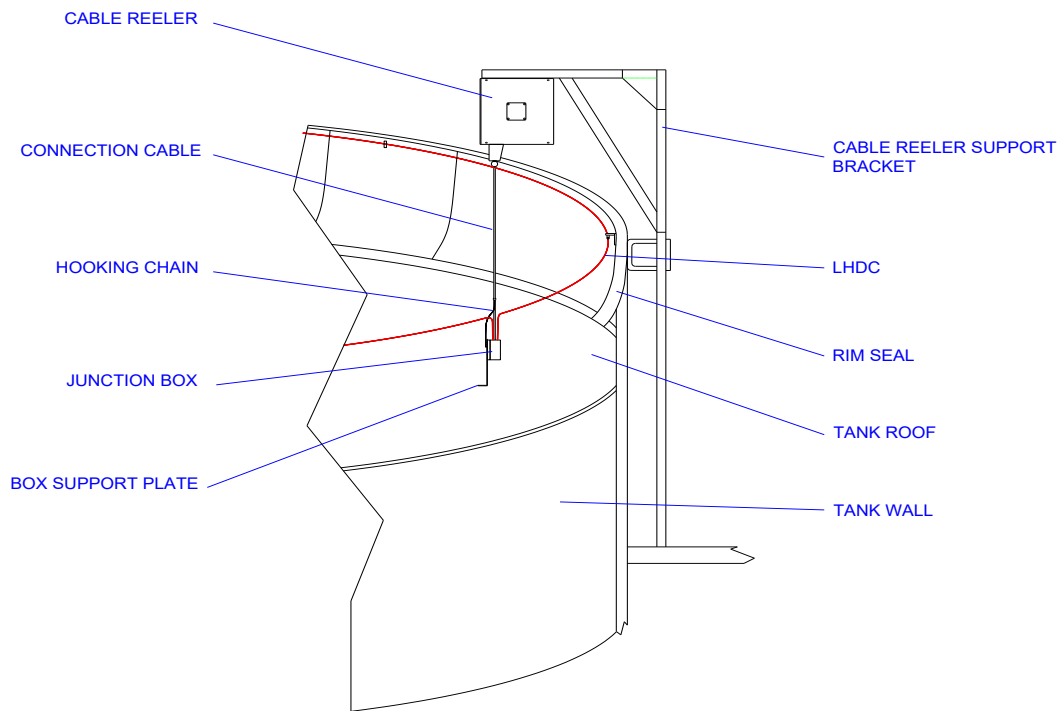
## 4. Installation of Cable Reeler

To allow the Cable Reeler to be correctly positioned, a support bracket needs to be assembled and fitted to the top of the tank. There is no standard bracket because each tank has different dimensions and each installation will require a customized bracket. It is left to the installation personnel to evaluate the best method of support.

An example is shown in fig.1.

The installation is typical of many others that have already been completed on various storage tanks.

**Figure 1**



## 5. Typical Connection of Cable Reeler

The Cable Reeler connects the LHDC system that protects the rim seal of floating roof tanks to the Fire Detection Control Panel.

Due to the nature of protection the LHDC is connected to an Intrinsic Safety barrier, ATEX/IECEX Certified, to limit the electrical energy transmitted to the LHDC.

Typical Elements of the plant are:

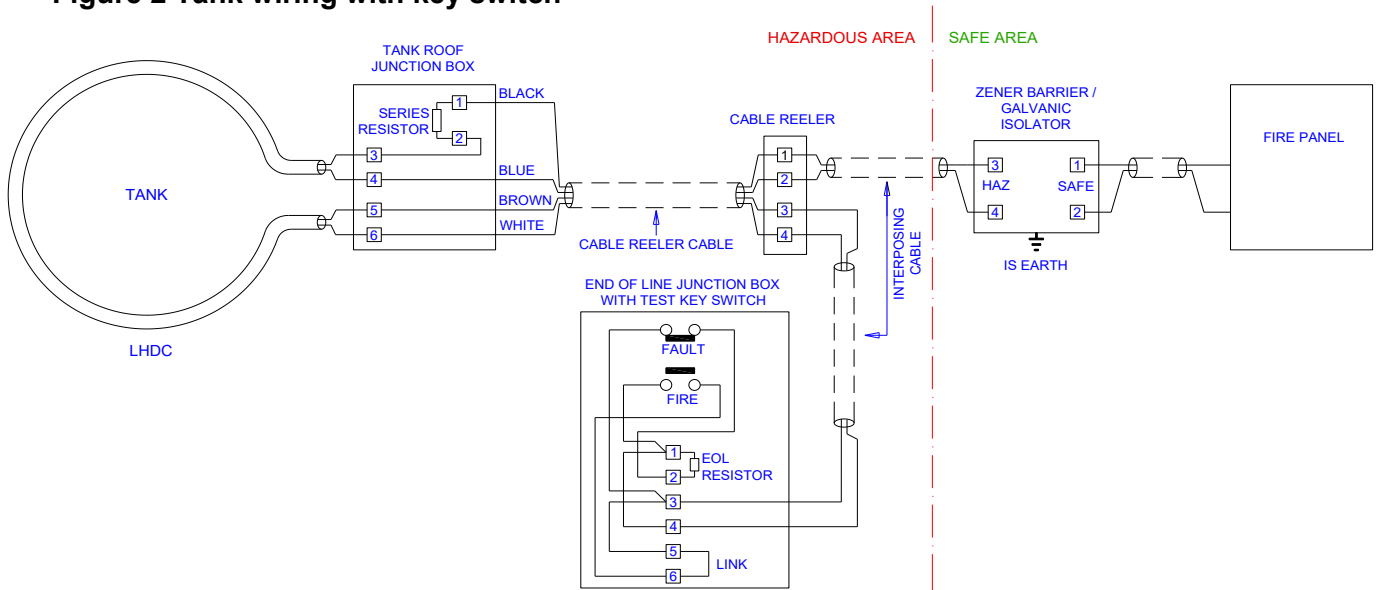
- Fire Detection Panel, or data acquisition unit to monitor the LHDC (normally located in a safe area).

- An Intrinsic Safety barrier or Galvanic Isolator located in a safe area or in a Certified Ex enclosure.

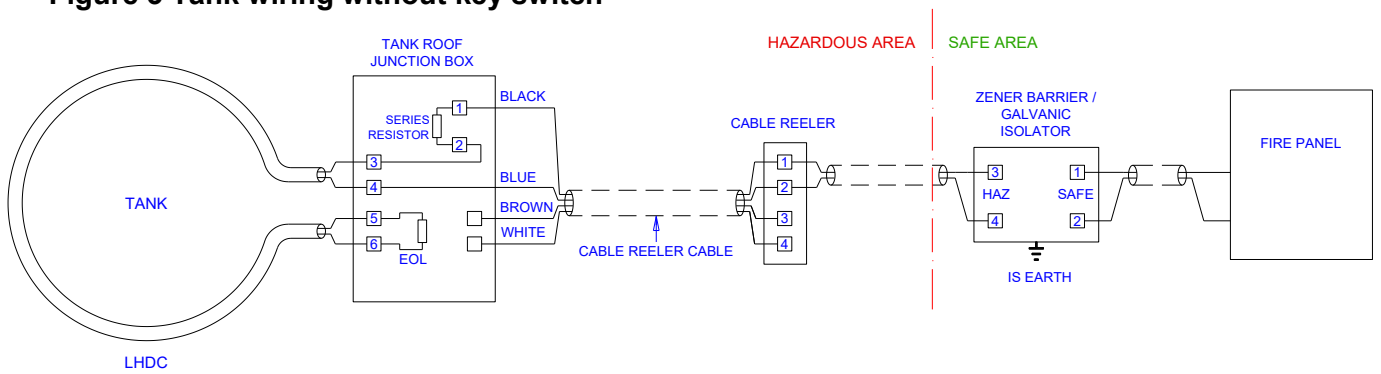
- Start and End of Line junction box, where the physical connection between the Cable Reeler and the LHDC is made.

- Linear Heat Detection Cable.

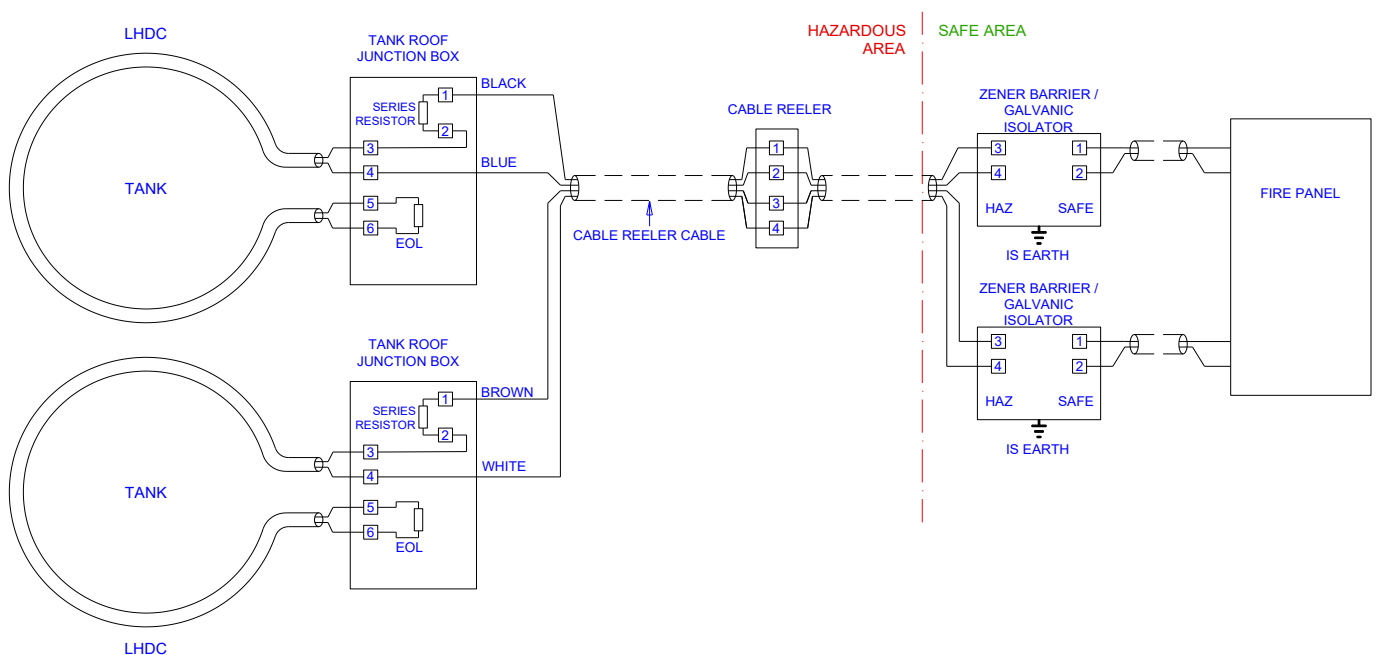
**Figure 2 Tank wiring with key switch**



**Figure 3 Tank wiring without key switch**



**Figure 4 Tank wiring twin LHDC without key switch**



## 6. Inspection of Cable Reeler

### 6.1 Inspection of Spring Pin

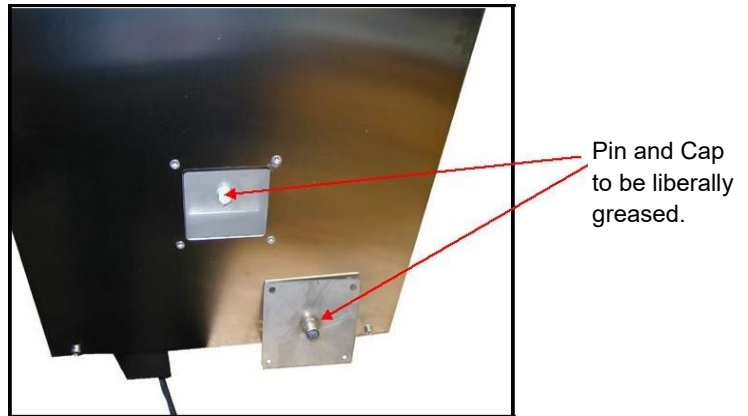
With the cable Reeler in the operating position, the opening of the connection cable is oriented downward, and the Cable Reeler is placed vertical to the connection Junction Box located on the floating roof.

Leaving the Cable Reeler in the operating position, unscrew the screws of the spring pin inspection cover.

Figure 5



Figure 6

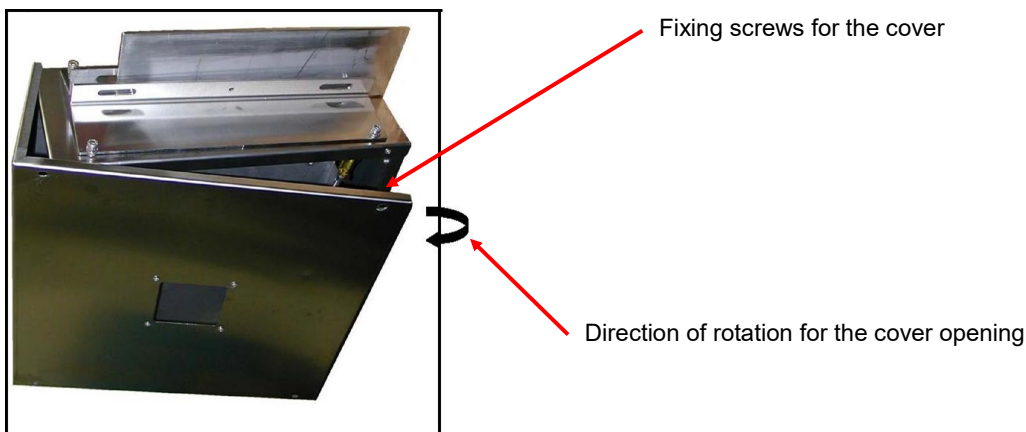


With reference to Fig.6, verify that the spring pin has been well greased. If it is not, put grease on both spring pin and the cap welded on inspection cover.

### 6.2 Inspection of Spring

Without mounting the cover of the spring pin, unscrew the locking screws of the Cable Reeler cover, and remove, according to the rotation direction indicated in figure 7

Figure 7



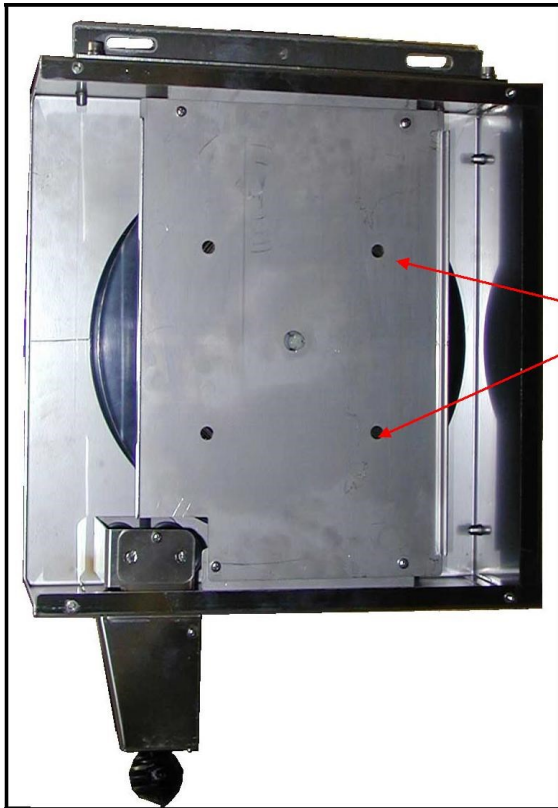
It is not necessary to remove it from its support structure to gain access to the inside of the Cable Reeler. It is not possible to access the cable connection or the internal reel by removing this cover.

### WARNING:

**DO NOT REMOVE THE COVER OF THE SPRING FOR ANY REASON. SERIOUS INJURY COULD OCCUR. IF THERE IS DAMAGE TO THE SPRING IT WILL BE NECESSARY TO REPLACE THE COMPLETE REELER.**

Once opened the Cable Reeler looks as shown below, in figures 8 & 9. The rewinding spring is fixed on an internal plate. The internal plate has four holes that are used to verify the presence of lubricant on the spring and, if required, to apply lubrication.

**Figure 8**



Holes for inspection

**WARNING:**

**THE CABLE REELER IS NOT DUST OR MOISTURE PROOF. THE SPRING IS MADE OF CARBON STEEL. ALTHOUGH THE SPRING IS PROTECTED, IT IS IMPORTANT TO PERIODICALLY INSPECT FOR THE PRESENCE OF OIL ON THE SPRING.**

**FOR INSPECTION AND THE LUBRICATION, USE THE INSPECTION HOLES.**

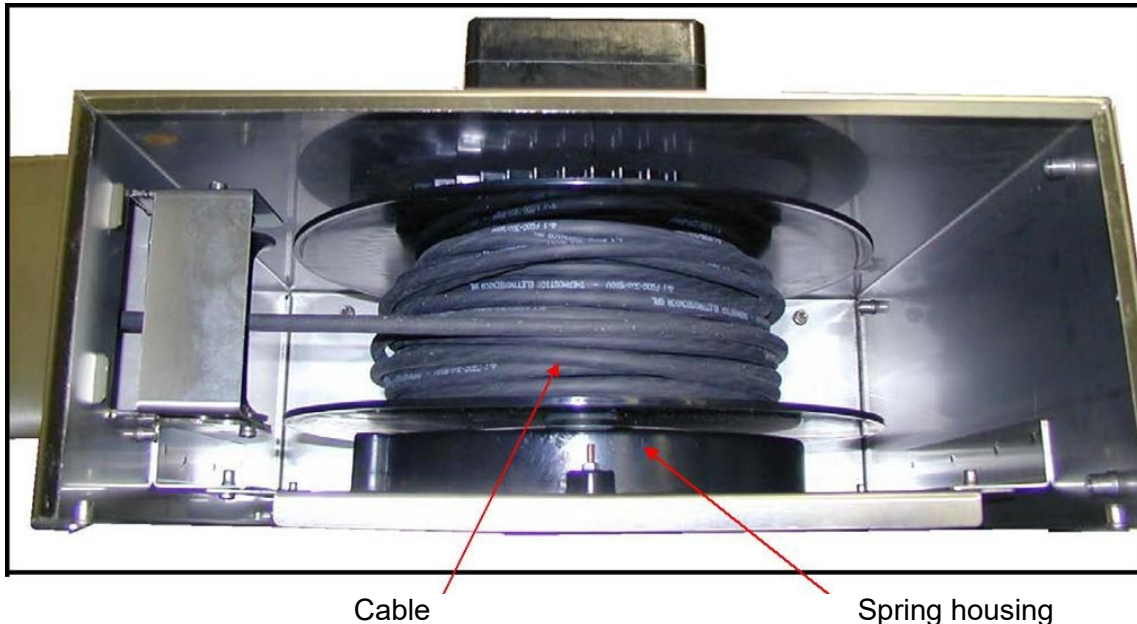
**Figure 9**



Holes for inspection

After confirming that the spring and other grease points have been lubricated, perform a visual inspection of the condition of the electrical cable and of the cable exit roller to make sure that the reel and cable can move freely during the winding operation

Figure 10



**WARNING:**

**FOR THE SAFETY OF INSTALLATION OR MAINTENANCE STAFF, THE SPRING COVER OF THE REELER MUST NOT BE REMOVED. THE SPRING IS UNDER TENSION AND IF OPENED COULD SEVERELY INJURE ANYONE WORKING ON IT. IF THERE IS REASON TO SUSPECT THE SPRING IS DAMAGED THE COMPLETE CABLE REELER MUST BE REPLACED. UNDER NO CIRCUMSTANCE SHOULD WORK BE CARRIED OUT ON THE SPRING OR ANY OF ITS COMPONENTS.**

## 7. Maintenance

The maintenance activity of the Cable Reeler consists of performing the checks and application of lubrication if required as described at section 6.

The frequency of the maintenance activity is strictly related to the environmental conditions of the country of installation. Due to the fact that the inspection of the pin and of the spring can be carried out without removing the Cable Reeler, it is recommended that during the period immediately after installation, regular inspections (i.e. once a week) are carried out to verify the impact of the environmental conditions on the spring. It is essential that a regular maintenance/lubrication schedule is established. The frequency of inspection and lubrication will vary depending on the environmental conditions experienced in the country of installation. Failure to set a maintenance schedule to suit the environmental conditions will cause premature failure of the spring.

**WARNING:**

**THE APPLICATION OF THIS EQUIPMENT, EXPECTS A VERY SLOW MOVEMENT OVER TIME BETWEEN THE SLIDING ELECTRICAL CONTACTS AND VERY LOW POWER AMONG THE SAME SLIDING CONTACTS. IT CAN LEAD TO A SYSTEM MALFUNCTION OVER TIME DUE TO THE GENERATION OF OXIDE ON THE CONTACTS.**

**IN ORDER TO PREVENT THIS, IT IS ADVISABLE TO CARRY OUT A QUICK “SCROLLING” ON A MONTHLY BASIS, FOR A PERIOD OF AT LEAST ONE MINUTE, BY EXTRACTING AND RELEASING THE ELECTRICAL CABLE COMING OUT OF THE CABLE REEL FOR A LENGTH OF AT LEAST 2 METRES.**

Figure 11. Detail of Connection of Cable Reeler and Support Structure

