

RML Retractable CIP Spray Nozzles

Information Pack

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ORIGINAL FILE

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1 Introduction

1.1 RML Retractable CIP Nozzles

The range of RML Retractable CIP Nozzles are specifically designed to meet the needs of modern automated plants, providing superior 'cleaning in place' (CIP) efficiency and functionality. Thousands of units are in use in many plants around the world. These units are manufactured in our precision engineering facility at 66 Norris Ave, Hamilton, New Zealand.

1.2 Design / Working Principals

The RML Retractable CIP Nozzle is commonly used in situations where equipment needs to be cleaned in place. In the default 'on product' state, the RML CIP Nozzle remains retracted, giving a smooth product surface. This is particularly important in applications such as powder dryer ducts and powder cyclones.

The unique RML spray nozzle design enables the nozzle to rotate during the cleaning cycle, ensuring maximum coverage and effectiveness of the spray profile.

1.3 Applications

The RML Retractable CIP Nozzle is used in any application where:

- It is hard to access or achieve good surface clean using traditional spray balls.
- A flush surface is required during production operation.
- An automated CIP is used and manual set up is not wanted.

1.4 Examples

- Powder Dryer Ducts
- Dryer Chambers
- Cyclones and Bag Houses
- Greasy Duct work
- Evaporative Flash Vessels
- Cooking Vessels
- Extraction Ducts
- Large processing machinery
- Fluid Bed Chambers



Model M901-0700

2 Model Descriptions & Feature Benefits

RML offers a range of models to suit the particular needs of the end user.

The range is not limited to what has been described here and any customer variations can be discussed with RML Design.

2.1 M901-0100

This model opens automatically when the fluid pressure exceeds 1.8bg. On completion of the CIP cycle, the unit has a slow closing spring device that ensures the nozzle remains open for 5 to 15 minutes after the CIP flow stops allowing the unit to drain. No pneumatic supply is required for actuation or closing. The clear polysulphone barrel allows a visual indication of the stem position.

2.2 M901-0137

This model is opened pneumatically. It has a fast acting spring close when the pneumatic and fluid pressure is withdrawn. The clear polysulphone barrel allows a visual indication of the stem position. The additional benefit of this model over the M901-0100 is that the air can be left on even after CIP is complete to ensure the unit remains open for the drying out phase. This model requires an air supply through a solenoid valve.

2.3 M901-0200

This model is actuated both open and closed pneumatically (ie no spring close). This allows the draining time to be accurately controlled by the factory's automation. The pneumatic barrel is stainless steel and the magnetic piston uses standard replacement parts. Positional feedback is available via standard reed switches mounted externally. This means the position of the nozzle can be monitored in the control logic for the drier. An air supply and solenoid valves are required to operate this unit.

2.4 M901-0300

The same as the M901-0200 but includes an indication flag extending from the top of the unit providing a visual indication of the stem position.

2.5 M901-0700

This model is principally identical to the M901-0300 although it has a fully machined external body, compared with the standard stainless cast finish.

2.6 M901-0800 (Deluge Nozzle)

This model is a Deluge Nozzle, opened and closed by a pneumatic cylinder. It has a directional nozzle that sprays in a 180 degree arc. The cast body is fully machined internally and externally. Positional feedback is provided via standard reed switches mounted externally. This unit is primarily used on spray dryers for fire systems.

2.7 M902-0900 (AS-I Certified)



This is the AS-i certified model, similar to the M901-0200 model, it is actuated pneumatically (open & close) and has positional feedback using an integrated RML circuit board with AS-i capabilities. The magnetic piston location sensing ensures the operation of the valve is fully monitored and any faults can be detected by the plant AS-i system. As a secondary fault indicator, three externally visible LED's (open=green, closed=amber & fault=red) are fitted to the RML circuit board can be used as a visual indicator to determine the state of the CIP Nozzle.

This model is the most recent addition in the evolution of fully machined RML CIP Nozzles and is available with either an M12 Electrical Gland or an M12 4-pin Electrical Connector.

2.8 M901-0500 (USDA Approved)

This is the USDA accepted model, designed to 3A Sanitary Standards, for use in factories requiring USDA status. It is pneumatically actuated (open and close) and has positional feedback using standard reed switches mounted externally.



Model M902-0900

3 Technical Information

3.1 General Construction

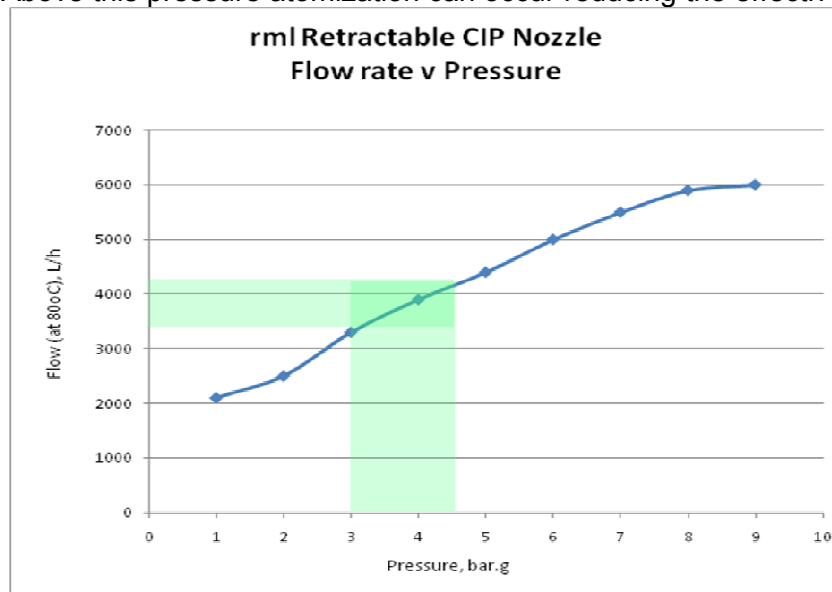
- Stainless Steel 304 body, spray stem and mounting adaptor.
- Stainless body is from a casting which is machined internally to achieve appropriate surface finish.
- Teflon bearings for durability.
- EPDM Seals (Viton optional).
- Polysulphone top barrel (M901-0100 and M901-0137 only)
- Grilamid TR 90 top cover tube (M901-0900 only)
- CIP inlet connection - RJT, DIN, or SMS.

3.2 Operating Parameters

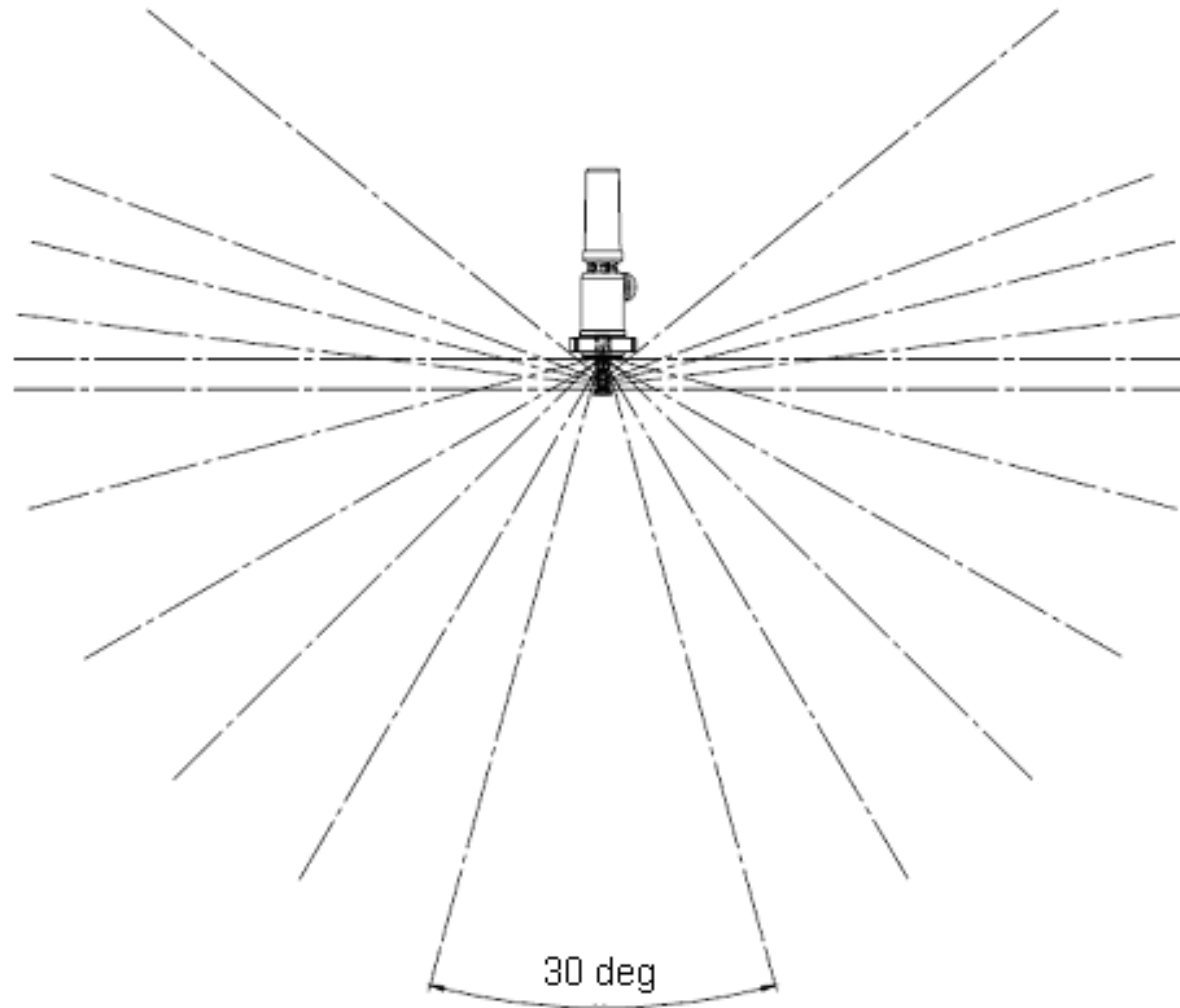
Maximum operating temperature is 120°C.
Compressed air at 6b.g

3.3 Pressure vs. Flow Graph (Type C Models only)

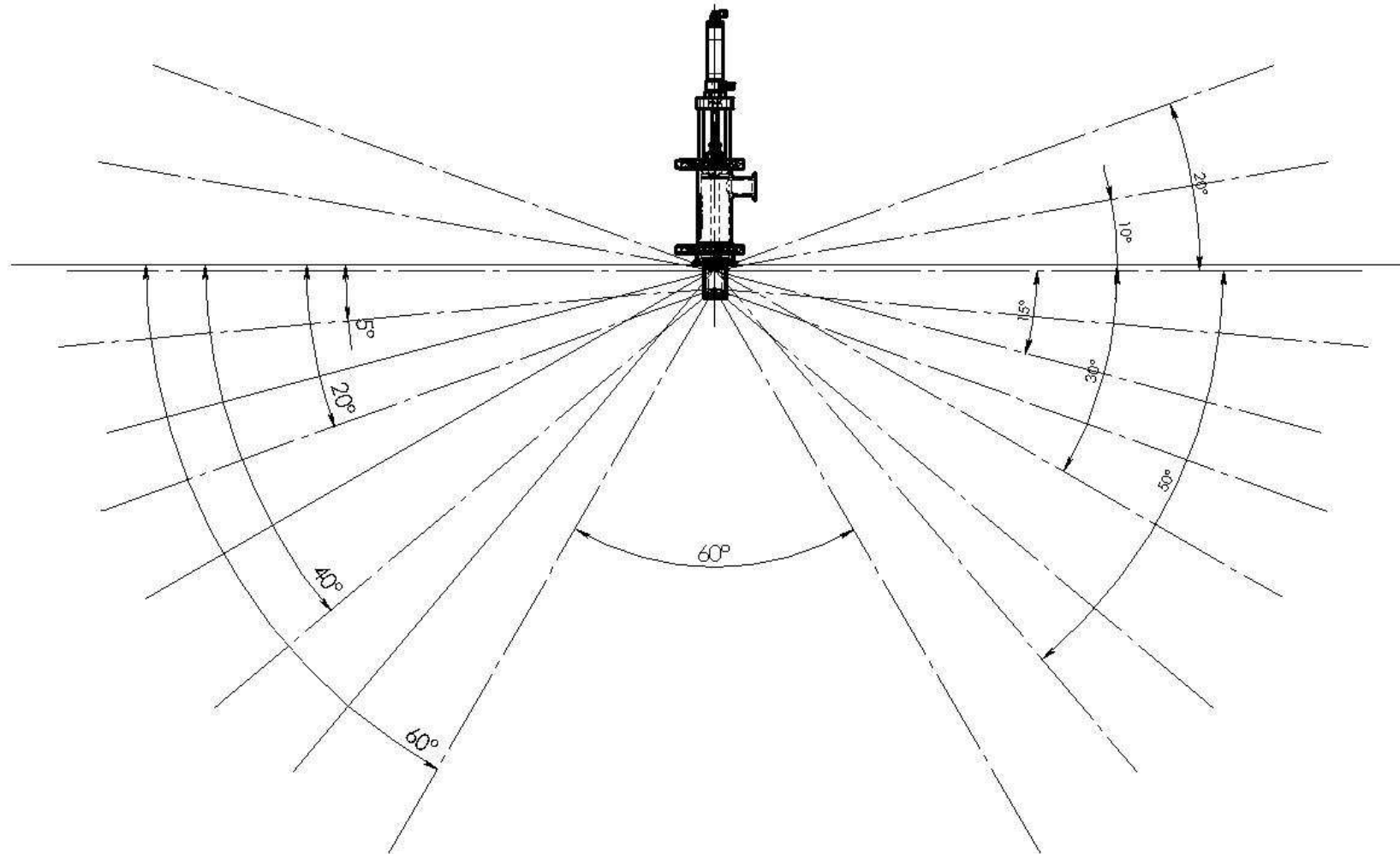
Recommended Fluid Pressure = 3 to 4.5 bar gauge.
Above this pressure atomization can occur reducing the effectiveness of the nozzle.



3.4 Spray Pattern (Type C Models) Wetting Range – 2.5m (radius)



3.5 Spray Pattern (USDA Model only) Wetting Range – 2.5m (radius)

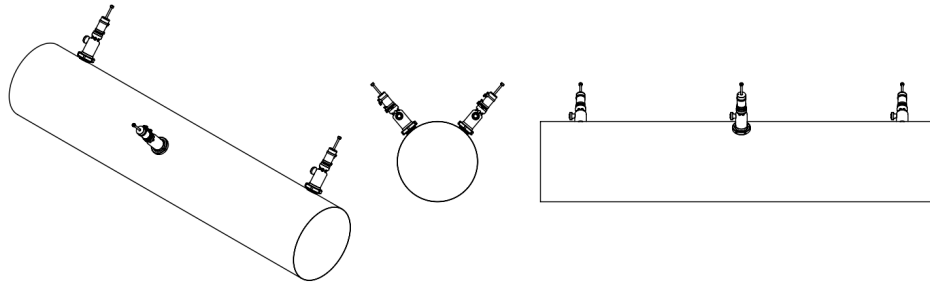


4 Placement Calculation Guide

This information is intended as a guide only. The specific needs of each application should be considered in the design of the CIP system.

4.1 Horizontal Ducts

RML Retractable CIP Nozzles should be installed 10° to 40° from vertical, alternating along the top of the duct.



4.2 Vertical Ducts

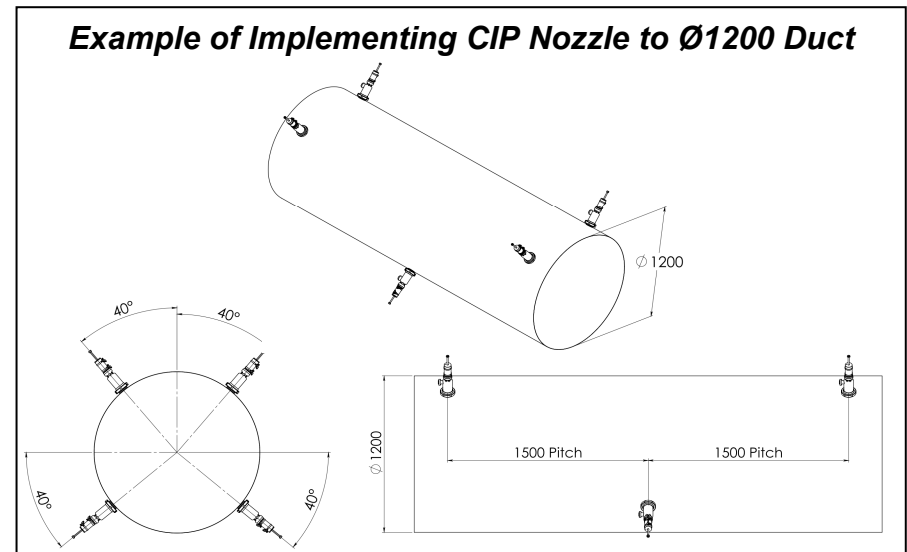
RML Retractable CIP Nozzles should be installed on equal spacing around the top half of the duct and use a cascade effect to clean the duct beyond to impact zone.

4.3 Pitch Between Nozzles

Duct Diameter	Pitch
250mm to 500mm	1000mm to 1500mm
500mm to 2500mm	1500mm to 2500mm

4.4 Number of Nozzles per Pitch

Duct Diameter	Number of Nozzles per Pitch
250mm to 500mm	1
500mm to 1000mm	1
1000mm to 1750mm	2
1750mm to 2500mm	3



4.5 Mounting Adaptors

The RML Retractable CIP Nozzles are mounted to the duct or vessel by means of a special weld adaptor. There are two types of adaptors available.

M901-0108 Type A (Pulled T mounted) is recommended for ducts under 1 meter in diameter. Fabricating this adaptor requires an 83mm ID 'T' to be pulled from the duct and butt welded.



M901-0101 Type B (Flush mounted) is recommended for ducts over 1 meter in diameter and for flat surfaces. Fabricating this adaptor requires a 100mm diameter hole, to be cut and flush welded inside and out.

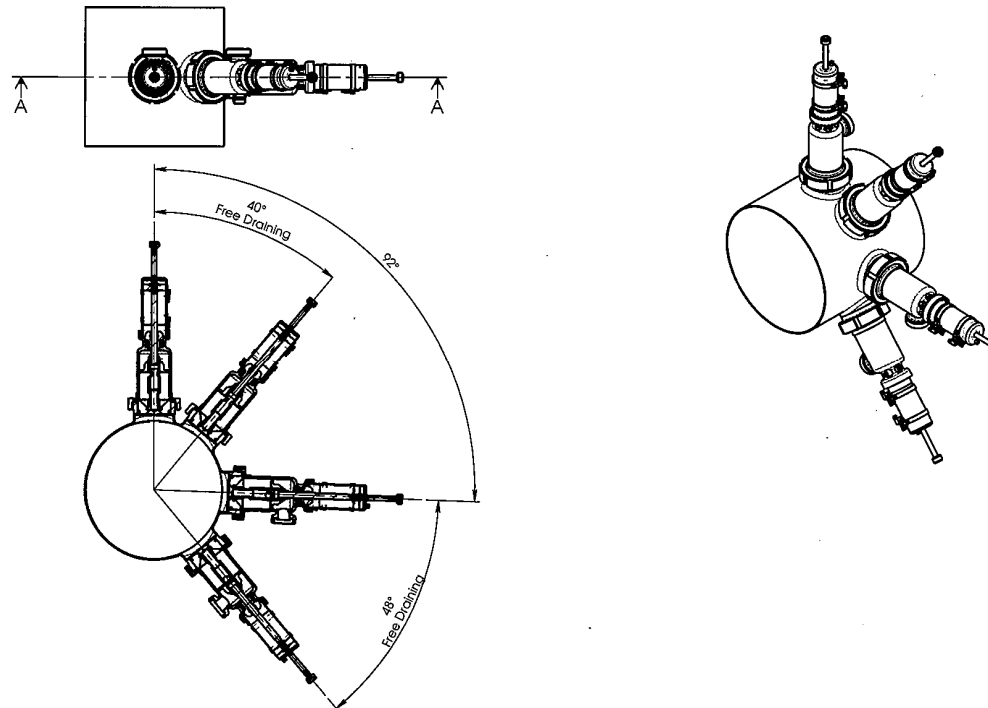


The units should be inserted and securely connected to the adaptor using the supplied union fitting.



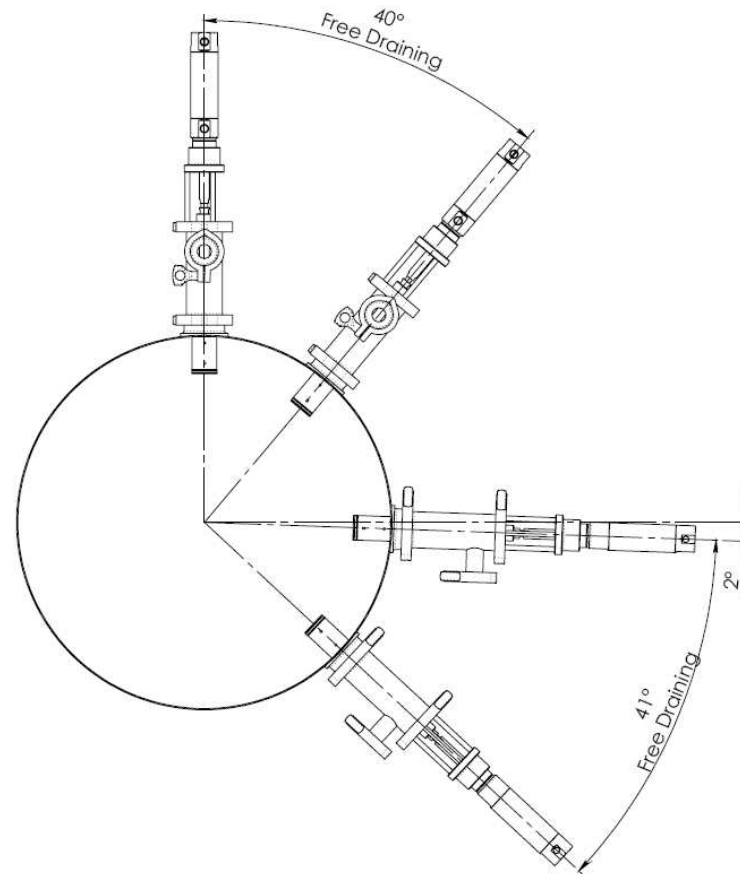
4.6 Free Draining Positions (Type C Model)

The diagram below shows extents of the possible mounting locations around a duct at which the solution will drain freely back out through the inlet of the Nozzle.



4.7 Free Draining Positions (USDA Model)

The diagram below shows extents of the possible mounting locations around a duct at which the solution will drain freely back out through the inlet of the nozzle.



5 Further Documentation

Installation and commissioning: There is a brochure that details the installation and commissioning considerations for these units.

Maintenance and Service: There is service instruction documentation available for each model of unit, which details the procedure for the disassembly and maintenance of the unit. It also includes a list of spare parts and assembly drawings.

Safety HAZOP documentation:

Risk Assessment

The maintenance engineer should ensure they have become familiar with the risk assessment brochure relating to these units.

Copies of this risk assessment can be obtained free of charge from RML prior to commencing maintenance.

(sales@rmlengineering.com).

Warning !! – Safety Precautions

In all installations the unit must be connected to services and fluid lines using appropriate fittings, by a suitably qualified person. The unit must not be livened unless it is completely and securely connected to the inline position. At no time should fluid be pumped through the unit while it is removed from the mounting connection, as this exposes people in the vicinity of the unit to risks from spraying fluid.