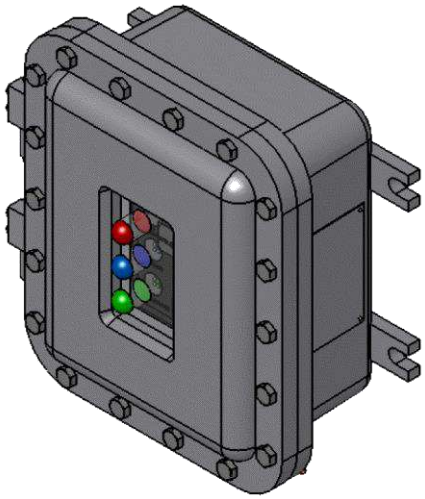
Part Number:
RM140W, Rev. 2
Issue Date: February 12, 2018
Supersedes: N/A

Part No 7470



OVERFILL PROTECTION & GROUNDING ASSURANCE

RM100

Installation & User Manual

GANTRY MOUNTED MONITOR FOR LOADING, ROAD, RAIL, PETRO-CHEMICAL & FOOD APPLICATIONS

TABLE OF CONTENTS

DESCRIPTION OF CHANGES TO MANUAL

DATE	BY	ISSUE	DETAILS
12/02/18	LB	M	Modified AUTO6w and 2W6w mode of operation in software version 1.12 for full compatibility with Scully and other 5w and 2w probes.
23/11/17	LB	L	Updated Table of Models (page 4) and Section 3.3 Selecting Mode of Operation to: - add AUTO6w and 2W6w mode of operation in software version 1.11 and 3.11 - change RM140W default mode of operation to AUTO6w.
24/03/17	LB	K	Updated IECEx, ATEX and FM Certification Details in Sections 1.3 – 1.5 Add Installation Sheet for IECEx and ATEX (Figures 8 & 9) Add RM100 EU Declaration of Conformity (Figure 10) Revised Maximum Input Voltage, 240V operation in Section 2 Add LED scrolling functionality for AUTO6 5-Wire Mode of Operation in Sec. 4.3 Total pages now 40
17/02/17	LB	J	Deleted Fax and Email and replaced with Liquip website in the header section Added ATEX and FM logo on page 1 Add RM140W in the Table of Models Available on page 4 Updated IECEx Marking and Parameters in Section 1.2 Deleted ATEX Certification Details in Section 1.3 Updated IECEx standards to current version in Section 1.5 Updated Item 10.2 in Section 1.5 to refer to IECEx Certification Details Updated M10 torque setting in Section 3.4 Updated Figure 6
27/08/10	JPM	I	Added 3.10.1 showing how to connect shields of GP204U. Add note in 5 re use of HTA series. Added additional troubleshooting info.
02/08/10	JPM	H	MDC 10-049- Added GP204U wiring details (fig 4), renumbered figures, added Table of Models Available, Updated Product Description, 4.4, 4.5 with new feature. Updated 3.4 with torque setting for M10. Update 1.2 Type of Protection.
16/11/09	BLW	G	- Add spare parts RM100-5K PCB Assembly Complete Kit.
01/10/09	BLW JPM	F	- ADD FM APPROVAL DETAILS. - Updated Section 4.9, 4.11, Figure 1, figure 3

TABLE OF FIGURES

TABLE OF MODELS AVAILABLE

The following part numbers can be ordered from Liquip International pre-configured for particular applications.

MODEL NUMBER	INPUT VOLTAGE	DIP SWITCH SETTING	SOFTWARE VERSION	APPLICATION
RM140D	240Vac	AUTO6+	1.X	Dip switches set for standard Australian use. Channels 3-8
RM140E	240Vac	NORM	1.X	Dip switches set for standard 8 channel applications
RM140E3	240Vac	NORM	3.X	Same as RM140E with bypass feature removed from software
RM140W	120Vac	AUTO6w (factory default)	1.12	Dip switches set for standard USA use. Channels 1-6 (non-EN13922 compliant)
		AUTO6	1.12 or earlier	Dip switches set for standard USA use. Channels 1-6 (EN13922 compliant)

PRODUCT DESCRIPTION

This manual provides important safety and technical information for the installation and operation of the Liquip International Pty Ltd RM100 Series Overfill Protection Monitor. It is recommended this manual is read and understood completely by the installing technician prior to commencing installation.

IMPORTANT
Installation of this product in a manner that deviates from the instructions contained in this manual may impair the protection provided by this product.

There are two models in the RM100 Series range.
RM140 – this is housed in a 100mm (4 inch) deep enclosure
RM160 – this is housed in a 150mm (6 inch) deep enclosure to allow room for future expansion

The electrical parts of RM100 are the same for all international requirements. The electronics have a Mains Voltage Selector to allow the installer to configure as required. There is no need to change the fuse for different input voltages.

RM100 is a primary safety device for protecting loading operations from overfilling. It performs two main functions: Grounding Monitoring and Overfill Monitoring. It is compatible with all common 2 and 5 wire electro-optical probes and thermistor overfill probes supporting up to 12 x 5 wire electro-optical overfill probes or up to 8 x 2 wire or thermistor overfill probes.

RM100 provides un-powered relay contacts for connection to control automation equipment for indicating Grounding of the vehicle and Permissive monitoring of dry probes.

RM100 is suitable for installation into Zone 1 hazardous locations with a potentially explosive atmosphere and Class I, Division 1 hazardous locations. Probe Outputs are Intrinsically Safe suitable for Zone 0 and Class I, Division 1. Please refer to the section Certification Details for more information.

Grounding of the vehicle is provided via the Intrinsically Safe outputs and is continuously monitored throughout operation.

By-pass of the Overfill Monitoring function is provided via a wireless coded security key. The Grounding Monitoring function cannot be by-passed.

NOTE: Bypass is not available with RM140E3

1 SAFETY & CERTIFICATION

1.1 Certification Information

RM100 is specifically designed to be compatible with all industry standard overfill equipment in service at the time of release. It has been tested and approved for IECEx, ATEX and FM that has the most stringent assessment certification requirements and is most widely recognised internationally.

1.2 IECEx Certification Details

Certificate:	IECEx TSA 05.0049X
Equipment:	RM100 Series Overfill Protection Monitor
Type of Protection:	Ex d [ia]
Markings:	Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66 OR Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66
Standards:	IEC 60079-0:2011 + Corr. 1:2012 & Corr. 2:2013 IEC 60079-1:2014 IEC 60079-11:2011 + Corr. 1:2012 IEC 60529:2013 + Corr. 1:2013 & + Corr. 2:2015

1.3 ATEX Certification Details

Certificate:	DEMKO 06 ATEX 140833X
Electrical Apparatus:	RM100 Series Overfill Protection Monitor
Markings:	CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66 OR CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66
Standards:	CENELEC EN 60079-0:2012 + A11:2013 CENELEC EN 60079-1:2014 CENELEC EN 60079-11:2012 CENELEC EN 60529:1991 + A1:2000 + A2:2013

1.4 FM Certification Details

Approval Body: FM Approved for US and Canada.
Hazardous Location: Class I, Division 1, Group C & D
Electrical Apparatus: RM100 Series Overfill Protection Monitor
Marking:

Explosionproof with I.S. Outputs
Intrinsically Safe Sécurité Intrinsèque Exia
Class I, Division 1, Group C & D, T6
Ta = -25°C to +60°C
Seal all conduits at the enclosure
Joindre tous les conduits au boitier.
Control Drawing: P59072
Nominal Input Supply: 110/240Vac, 50/60Hz, 20W
Max Input Supply: Um = 250Vac
Max Relay Contacts: Um = 250Vac, Im = 5A

Intrinsically Safe Entity Parameters

Total Combination - I.S. Output Pins 1-9 to 10 (GND)					
Gas Group	V_t (V)	I_t (mA)	P_t (W)	C_a (µF)	L_a (mH)
C	13.02	970	3.16	6	0.151
D	13.02	970	3.16	21.7	0.302

Individual - I.S. Output Pins 1-8 to 10 (GND)					
Gas Group	V_{oc} (V)	I_{sc} (mA)	P_o (mW)	C_a (µF)	L_a (mH)
C	13.02	121	394	---	---
D	13.02	121	394	---	---

Individual - I.S. Output Pin 9 to 10 (GND)					
Gas Group	V_{oc} (V)	I_{sc} (mA)	P_o (mW)	C_a (µF)	L_a (mH)
C	13.02	1.8	5.9	---	---
D	13.02	1.8	5.9	---	---

The use of multiple entity FM Approved probes, which have not been approved/certified in combination with one another, is restricted to the following conditions:

Ci + Ccable(total) shall not exceed Ca (total combination) of the associated apparatus.
Ccable consists of the combined capacitance of all cable connections including ground.

Li + Lcable(total) shall not exceed La (total combination) of the associated apparatus.
Lcable consists of the combined inductance of all cable connections cables including ground.

Additional instructions apply to equipment covered by FM Approval:

1. Installations in the US shall comply with the relevant requirements of the National Electrical Code® (ANSI/NFPA-70).
2. Installations in Canada shall comply with the relevant requirements of the Canadian Electrical Code (CSA C22.1).
3. Installation should be in accordance with Control Drawing P59072.
4. Cable gland connection must be a suitable NRTL tested cable for the appropriate Class and Division installation.
5. Cable connections are sealed at the enclosure.

1.5 Instructions specific to hazardous area installations

The following instructions apply to equipment covered by certificate numbers:

IECEx TSA 05.0049X
DEMKO 06 ATEX 140833X

Installation & maintenance shall be carried out in accordance with the applicable code of practice by suitably trained personnel.

The installation and use must comply with Liquip document P7470, "RM100 Installation & User Manual". Deviating from the manufacturer's instructions may compromise the safety of the product.

The equipment is rated with a Temperature Class T6 and is intended to be used in Zone 1 (EPL Gb) hazardous areas for Gas Group IIB or IIA.

The equipment is certified for use in ambient temperatures in the range -20°C to +70°C and should not be used outside this range.

The certificate number has an 'X' suffix that indicates that special conditions of certification apply. These conditions are;

1. All unused cable entires must be closed using suitably certified blanking elements
2. Any cable glands used must be separately and suitably certified
3. The enclosure must be installed to a rigid surface using the mounting means provided.
4. The installation and use must comply with Liquip document P7470, "RM100 Installation & User Manual".
5. Flameproof joints are not intended to be repaired.
6. The bolts used to secure the cover to the base shall be M10 x 1.5-6g of Grade 8.8 or better.
7. The equipment must be de-energised before opening the cover.
8. The equipment must not be opened when an explosive atmosphere may be present.
9. Wipe diffuser with damp cloth to reduce the potential for electrostatic discharge.
10. The conditions of safe use relevant to the intrinsically safe electronics internal to the enclosure apply as follows:
    9.1 The metallic enclosure shall be bonded to a protective earth conductor.
    9.2 The following input and output parameters shall be taken into account when connecting to external equipment:

Terminals	Description	Parameters for Ex db [ia Ga] IIA T6 Gb (-20˚C ≤ Tamb ≤ +70˚C) IP66	Parameters for Ex db [ia Ga] IIB T6 Gb (-20˚C ≤ Tamb ≤ +70˚C) IP66
Mains Power: Active (A) and Neutral (N) on mains terminal block	Maximum Power Supply Input Voltage	U_m = 250 V	U_m = 250 V
Relays: COM1, NC1, NO1 and COM2, NC2, NO2 on dry contact terminal block	Maximum Voltage and Current applied to relay dry contacts	U_m = 250 V I_m = 5 A	U_m = 250 V I_m = 5 A
Probes (Pins 1 to 8): Label positions 1 to 8 (OP1 to OP8) on terminal block J1	Maximum Output Voltage to probes	U_o = 13.02 V	U_o = 13.02 V
	Maximum Output Current to probes	I_o = 121 mA	I_o = 121 mA
	Maximum Output Power to probes	P_o = 0.394 W	P_o = 0.394 W
	Maximum external capacitance to probes	C_o = 22 μF	C_o = 6 μF
	Maximum external inductance to probes	L_o = 19.4 mH	L_o = 1.2 mH
	Maximum external inductance to resistance ratio to probes	L_o/R_o = 0.72 mH/Ω	L_o/R_o = 0.36 mH/Ω
Ground Assurance (Pin 9): Label position 9 (OP9) on terminal block J1	Maximum Output Voltage and Current to ground sensing wire	U_o = 13.02 V I_o = 1.8 mA	U_o = 13.02 V I_o = 1.8 mA
	Maximum external capacitance to ground sensing wire	C_o = 22 μF	C_o = 6 μF
	Maximum external inductance to ground sensing wire	L_o ≤ 1000 mH	L_o ≤ 1000 mH
	Maximum external inductance to resistance ratio to ground sensing wire	L_o/R_o = 48.5 mH/Ω	L_o/R_o = 24.3 mH/Ω

11. The apparatus shall not be installed in an environment subject to acetic acid vapours.

The ingress protection rating of this product requires that it be installed with a cover or hood to protect the equipment from rain.

Certification marking as detailed in drawing numbers P7464.

If the equipment is likely to come into contact with aggressive substances*, then it is the responsibility of the user to take suitable precautions** that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

* *Aggressive Substances:*
Acidic liquids or gases that may attack metals or solvents that may affect polymeric materials.

** *Suitable Precautions:*
Regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

2 ELECTRICAL SPECIFICATIONS

Power:	240V Operation
Minimum Input Voltage:	185 Vac
Maximum Input Voltage (Um):	250 Vac
In-rush Current:	2.2 A
Maximum Current:	400 mA
Normal Power Consumption:	8.6 W (No probe) 20W (8 x 2-wires probes)
Mains Power Fuse Rating:	250V @ 400mA anti-surge 1500A breaking capacity

Power:	110V Operation
Minimum Input Voltage:	85 Vac
Maximum Input Voltage:	135 Vac
In-rush Current:	2.3 A
Maximum Current:	400 mA
Normal Power Consumption:	8.6 W (No probe) 20W (8 x 2-wires probes)
Mains Power Fuse Rating:	250V @ 400mA anti-surge 1500A breaking capacity

Intrinsically Safe Signals:	
Nominal Voltage:	10.5V
Nominal Current:	116mA
Maximum Voltage:	13.02V
Maximum Current:	121mA

Outputs:	Ground Monitoring Relay
Contacts:	Common, Normally Open, Normally Closed
Maximum Voltage:	250 Vac
Maximum Load (*resistive**):	5 A
Maximum Load (*inductive***):	2.5 A
Maximum Power	100 VA
Relay Fuse Rating:	250V @ 5A anti-surge

Outputs:	Overfill Monitoring Relay
Contacts:	Common, Normally Open, Normally Closed
Maximum Voltage:	250 Vac
Maximum Load (*resistive**):	5 A
Maximum Load (*inductive***):	2.5 A
Relay Fuse Rating:	250V @ 5A anti-surge

** A resistive load has no capacitance or inductance e.g. lamps, controller inputs.*
*** An inductive load utilises electro-motive force and can create feedback power e.g. solenoids, electric motors.*

3 INSTALLATION

3.1 General Installation Information

1. Hazardous conditions may be present when working with Non-Intrinsically Safe voltages. Ensure the monitor is electrically isolated at the switchboard and gantry is made safe prior to opening the explosion-proof enclosure.
2. Only suitably qualified technicians should service these devices.
3. Long sleeve and pants protective clothing should be worn at all times. Clothing must be non-static generating. Any petroleum contact with skin should be washed off immediately.
4. Always follow manufacturer guidelines when working on electrical equipment. Failure to do so may void warranty or cause damage.
5. All electrical equipment, fittings and finished installation must meet all local regulations.
6. Use high quality waterproof conduit and fittings to IP66 minimum for all wiring and junction boxes.
7. Use waterproof flexible compound such as Silastic in all glands and non-waterproof joints. Use Teflon tape on gland threads.
8. Mount all equipment away from direct spray areas and out of direct sunlight. Try to select the most sheltered aspect.
9. Coat all terminals, exposed wire and joints with non-conducting grease after final testing to minimise corrosion.
10. Always fit some excess cable length into junction boxes and housings as practicable to allow for future servicing. When using multiple cables in a conduit always consider using cable with one or two extra conductors to allow for any future requirements.
11. Always completely segregate power and intrinsically safe wires into completely safe conduit and in accordance with I.S wiring rules.
12. Carry out a complete wiring check for accuracy and continuity before connecting power to any device.
13. Observe international and local legal requirements. In the event of conflicting instructions seek qualified advice before proceeding.
14. Check instruction manual for recommended cable type and torque settings.
15. Use of high quality, genuine tools for all electrical work results in higher quality finished installation.
16. Ensure adequate clearance around equipment being installed. This will provide for ease in future maintenance.
17. When bolting equipment into place, the use of Teflon tape or anti-seize compound on threads is advised.

3.2 Part Identification & General Layout

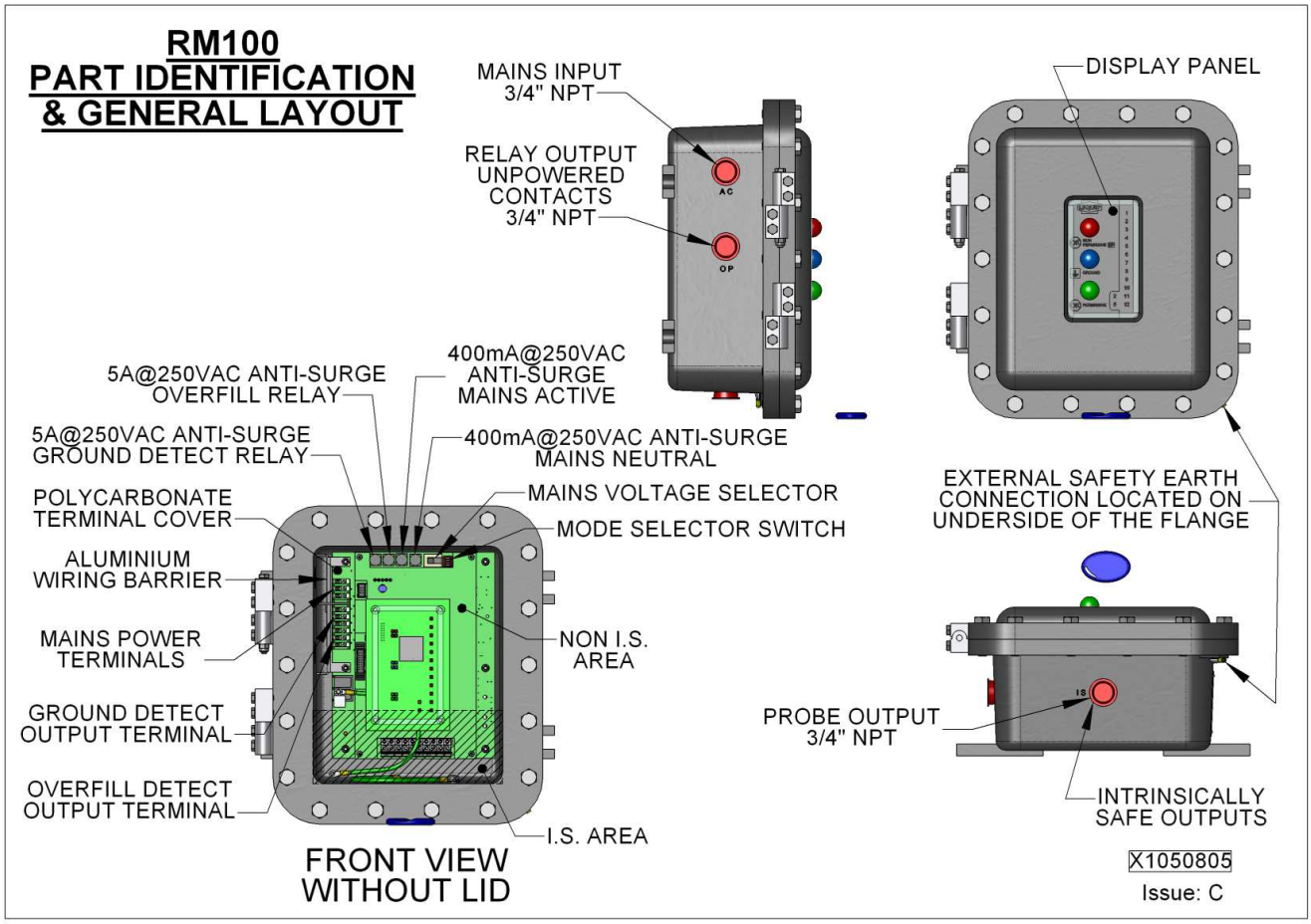


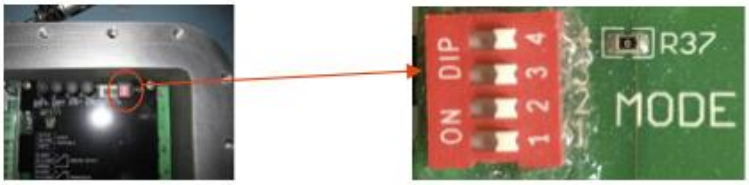
Figure 1. PART IDENTIFICATION & GENERAL LAYOUT

WARNING
To maintain the Intrinsic Safety of the electrical equipment, it is MANDATORY to re-install the aluminium barrier and the associated polycarbonate cover for the Mains Power and Relay terminals in the same manner supplied.
This barrier & cover eliminates the possibility of the mains wiring touching IS circuits in the event the wires become loose and fall free of the terminals.

IMPORTANT
Do not remove the circuit boards from the enclosure. Do not dismantle the circuit board assembly. Incorrect handling and/or re-assembly may impair the protection provided by this product.

3.3 Selecting Mode of Operation

The Mode Selector Switch has been provided to allow the installing technician to force the monitor to operate in a specific mode. Below is a table showing all switch settings and modes available.



MODE	ID	Switch 1	Switch 2	Switch 3	Switch 4
2-Wire & 5-Wire Auto Sense 8 x 2-Wire Channels 12 x 5-Wire Channels Ground monitoring Overfill monitoring	NORM	OFF	OFF	OFF	OFF
2-Wire & 5-Wire Auto Sense 6 x 2-Wire Channels (1 to 6) 12 x 5-Wire Channels Ground monitoring Overfill monitoring	AUTO6	ON	OFF	OFF	OFF
5-Wire Only 0 x 2-Wire Channels 12 x 5-Wire Channels Ground monitoring Overfill monitoring	5W	OFF	ON	OFF	OFF
2-Wire Only 8 x 2-Wire Channels 0 x 5-Wire Channels Ground monitoring Overfill monitoring	2W8	OFF	OFF	ON	OFF
2-Wire Only 6 x 2-Wire Channels (3 to 8) 0 x 5-Wire Channels Ground monitoring Overfill monitoring	2W6+	ON	OFF	ON	OFF
2-Wire & 5-Wire Auto Sense 6 x 2-Wire Channels (3 to 8) 12 x 5-Wire Channels Ground monitoring Overfill monitoring	AUTO6+	OFF	OFF	OFF	ON
2-Wire Only 6 x 2-Wire Channels (1 to 6) 0 x 5-Wire Channels Ground monitoring Overfill monitoring	2W6	OFF	OFF	ON	ON
Ground Monitor Operation: Ground monitoring only.	GND	ON	ON	ON	ON

2-Wire & 5-Wire Auto Sense 6 x 2-Wire Channels (1 to 6) 12 x 5-Wire Channels Ground monitoring Overfill monitoring non-EN13922 compliant	AUTO6w	ON	ON	OFF	OFF
2-Wire Only 6 x 2-Wire Channels (1 to 6) 0 x 5-Wire Channels Ground monitoring Overfill monitoring non-EN13922 compliant	2W6w	OFF	ON	ON	ON

3.4 Fastener Torque Settings

For optimum service life and reliability of operation, Liquip recommend tightening all RM100 fasteners to the following torque settings;

FASTENER DESCRIPTION	TOOL	TORQUE (Nm)
Main PCB Assembly Standoffs M4 x 6.5mm thread M/M 10mm Hex Body 50mm Long	10mm Socket	1.5 Nm +/- 0.1 Nm
Main PCB Assembly Retaining Nuts and standoffs M4		1.5 Nm +/- 0.1 Nm
Window Retaining Bracket Screws 10-24 UNC-28 x 5/8”	Screwdriver Phillips No.2	1.5 Nm +/- 0.1 Nm
Display PCB Mounting Screws, ground screws M4 x 6mm Phillips	Screwdriver Phillips No.2	1.5 Nm +/- 0.1 Nm
Enclosure Cover Retaining Bolts M10 x 35mm	17mm Socket	35 Nm +/- 2 Nm

NOTE: When the lid is closed and the bolts are tightened to the correct torque the maximum gap between the lid and base should be 0.08mm.

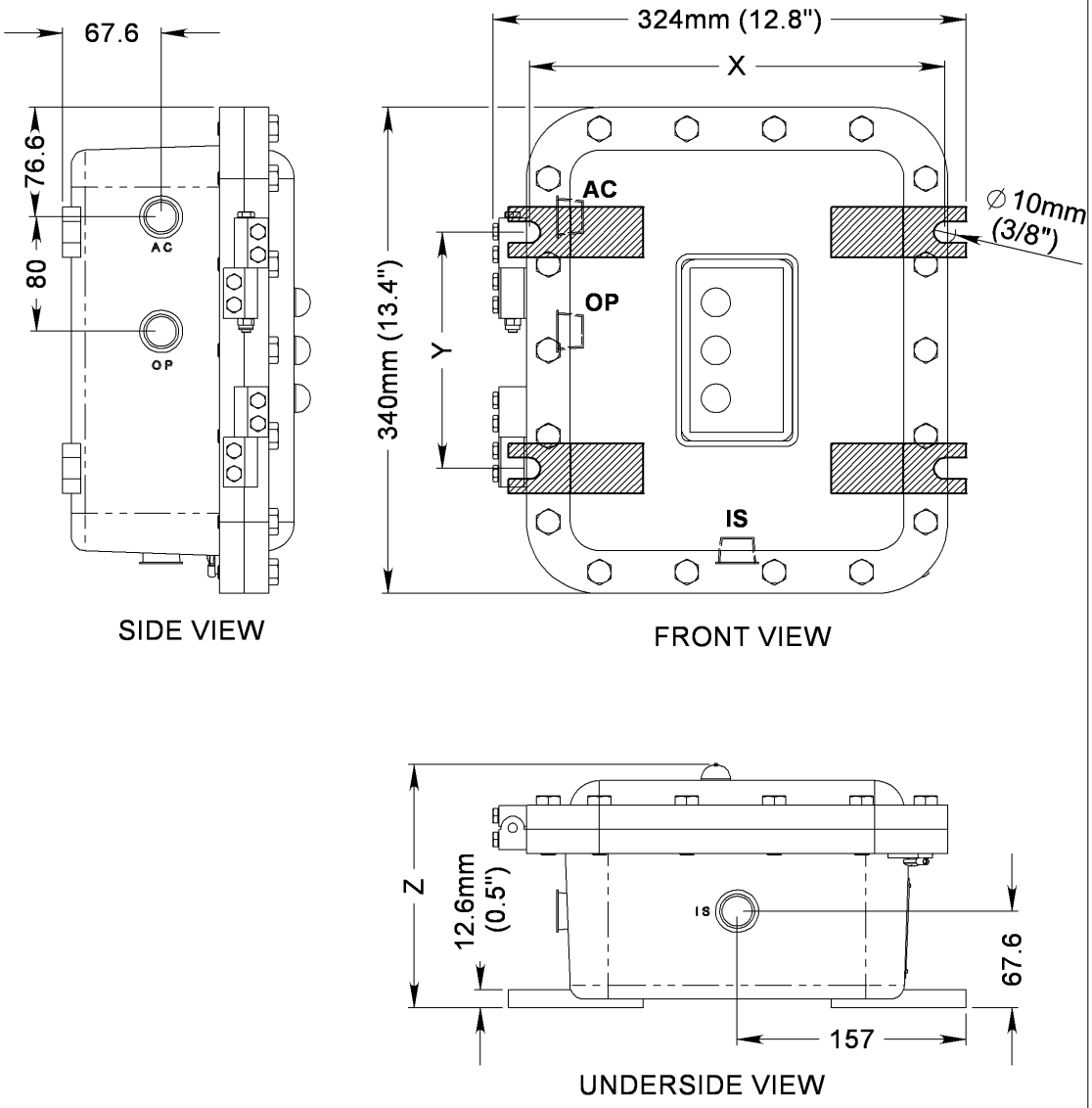
3.5 Mounting RM100

When choosing a mounting position for RM100, it is important to consider the following;

a. Mains power wiring must enter the enclosure through the top left hand gland hole marked “AC”. The aluminium barrier design allows for the wires to enter through this hole and only be connected to the adjacent terminals.
b. Output relay wiring must enter/exit the enclosure through the bottom left hand gland hole marked “OP”. The aluminium barrier design allows for the wires to enter through this hole and only be connected to the adjacent terminals.
c. Intrinsically Safe wiring must exit the enclosure from the gland hole marked “IS” located at the bottom.

Maximum bolt diameter for mounting the RM100 enclosure is 10mm (3/8”).
Minimum bolt diameter for mounting the RM100 enclosure is 8mm (5/16”).

Figure 2. RM100 MOUNTING POINTS



Model	X	Y	Z	Internal Volume
RM140	285mm (11.2")	165mm (6.5")	170mm (6.7")	6.2L
RM160	275mm (10.8")	165mm (6.5")	220mm (8.7")	8.9L

LIQUIP

RM100 MOUNTING POINTS AND OVERALL DIMENSIONS

X1050905
Issue: B

3.6 IP Rating

The RM100 housing is rated IP66. It is totally protected against dust ingress. It will withstand some high pressure water hosing from all directions. Some limited ingress is permitted under these conditions.

Direct sunlight onto the enclosure of RM100 will cause a large variation in the maximum and minimum temperature the RM100 will endure in a day. This can cause the enclosure to “breath” air in as the enclosure cools.

Even though RM100 has been designed to be robust and reliable in normal service, to guarantee long-term protection of the electronics inside the enclosure, the RM100 must be mounted under cover to provide protection from the elements.

3.7 Electrical Installation

All local national and state regulations related to Electrical and Hazardous Area installations must be strictly followed.

LIGHTNING PROTECTION
To ensure the Overfill Protection control system is not damaged or electrical safety compromised by a lightning strike, it is recommended ALL wiring entering and exiting the RM100 enclosure be protected by earthed metal conduit of either rigid or flexible construction.

It is recommended the installation be completed in accordance with one of the following standards/practices;

IECEx

- AS/NZS3000 Australia/New Zealand Wiring Rules
- AS1076.3 Installation & Maintenance of Electrical Appliances & Equipment for Explosive Atmospheres.
- IEC60079-14 Electrical installations in hazardous areas (other than mines).

ATEX

- EN60079-14 Electrical apparatus for explosive gas atmospheres. Electrical installations in hazardous areas (other than mines).

FM

- ANSI/NFPA 70 National Electrical Code.
- ANSI/ISA RP12.06.01 Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
- CSA C22.1 Canadian Electrical Code.

Figure 3. RM100 WIRING DIAGRAM

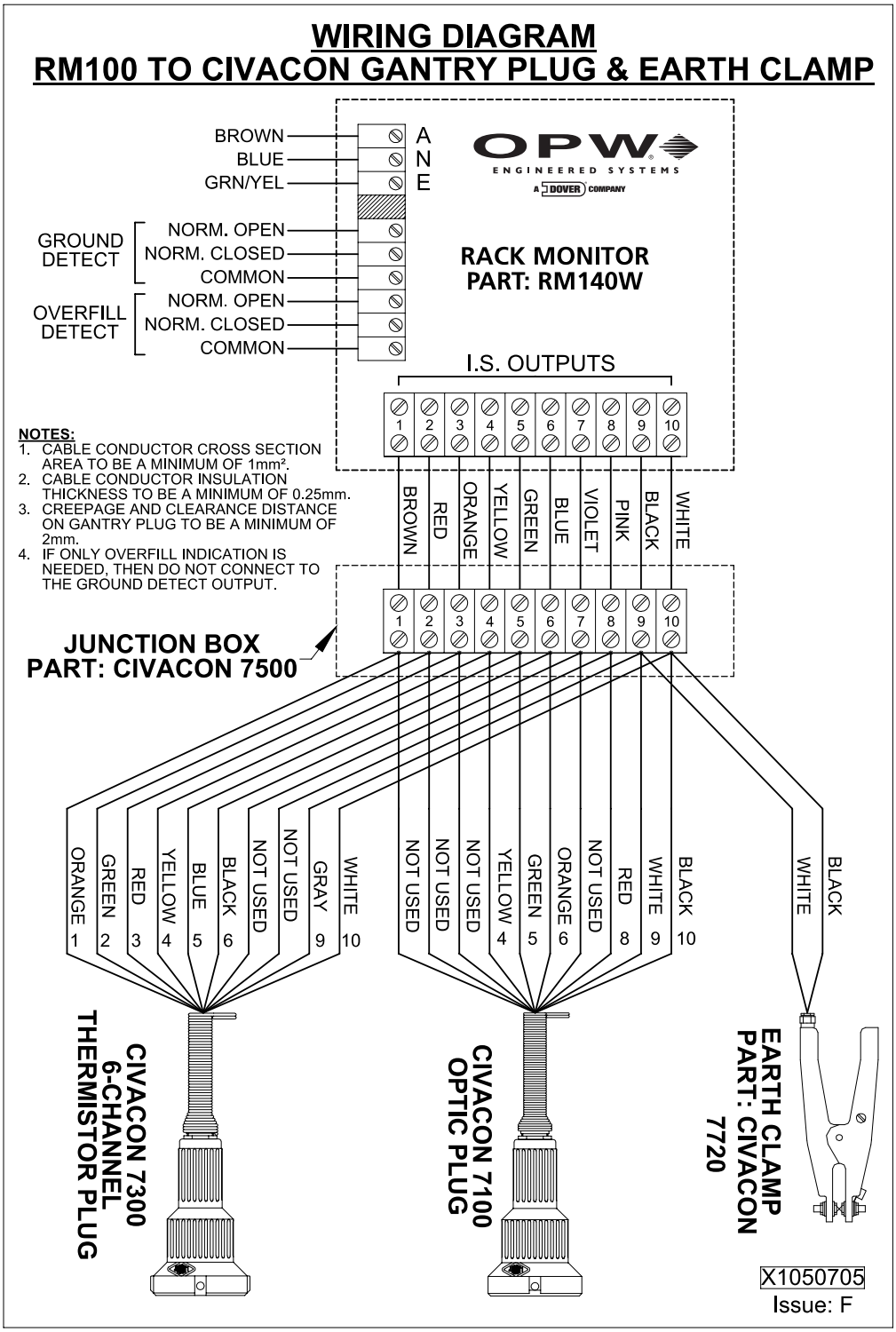


Figure 4. RM100 WIRING DIAGRAM WITH GP204U

WIRING DIAGRAM,
RM140W TO CIVACON GANTRY PLUG 7300C (8-Channel)

PIN	CIVACON 7300C (8-Channel)		PIN	RM140W
1	Brown		1	Brown
2	Green		2	Red
3	Red		3	Orange
4	Yellow		4	Yellow
5	Black		5	Green
6	Blue		6	Blue
7	Violet		7	Violet
8	Orange		8	Gray/Pink
9	Gray		9	Black
10	White		10	White

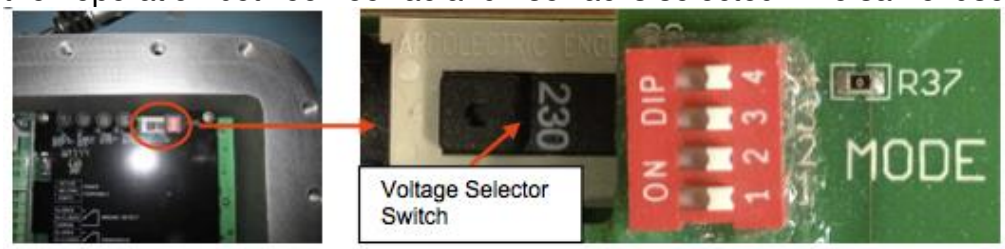
3.8 Mains Power Installation

Mains power supplied to RM100 should be protected through an individual circuit-breaker or suitable fuse/switch arrangement. A maximum rating of 1A is recommended for this purpose. International standard industrial practice of distributing power through remotely located switchboards is recommended.

Recommended Conductor Size = 18AWG (0.78mm2)

Mains power wiring must enter the enclosure through the upper left hand gland hole marked “AC”. The aluminium barrier design forces the wires to enter through this hole and to be connected only to the adjacent terminals.

Ensure the Mains Voltage Selector is switched to the correct position for the mains voltage to be connected. If “230” is visible, operation between 185Vac and 275Vac is selected. If “115” is visible, then operation between 85Vac and 135Vac is selected. The same fuse is used for both voltages.

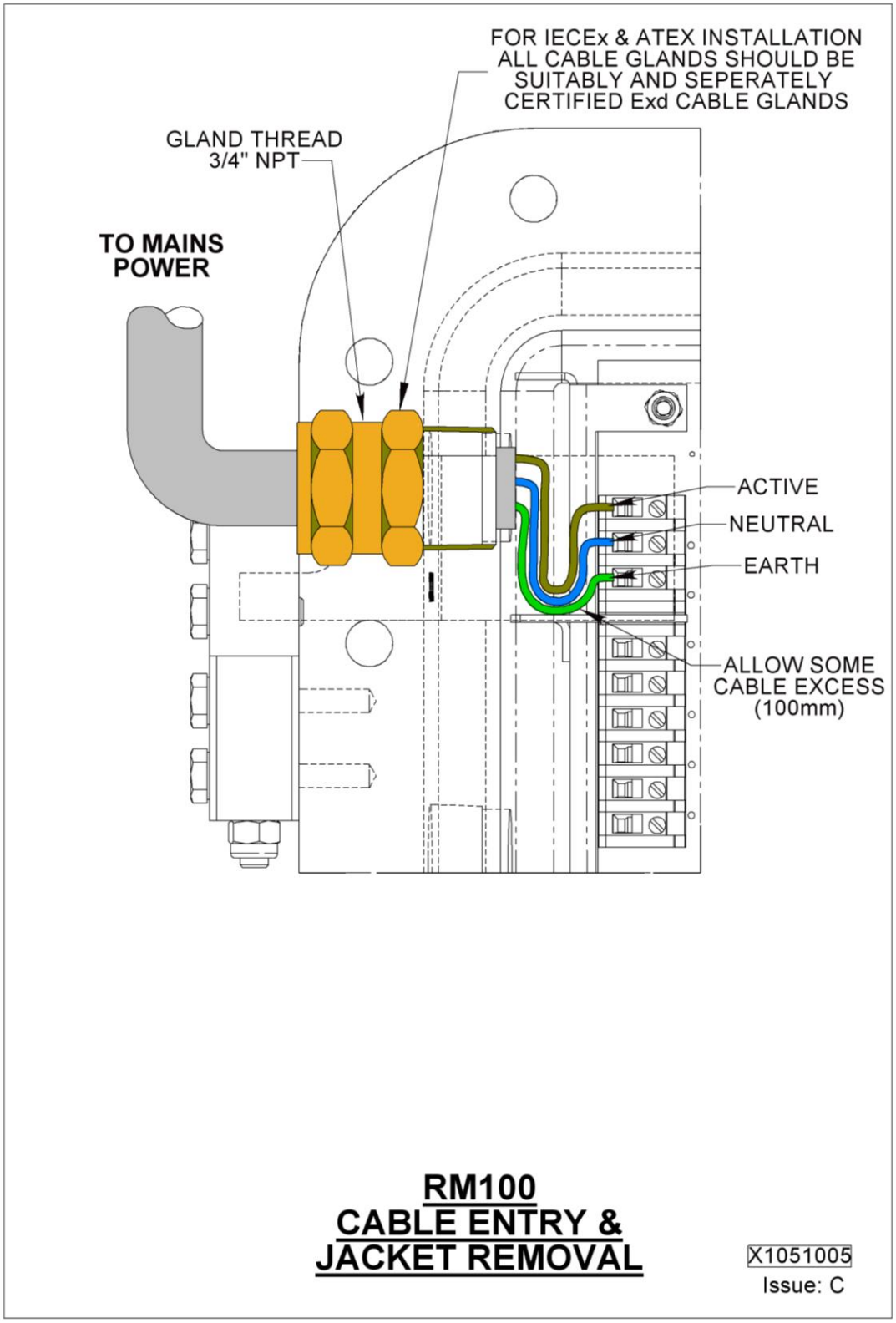


Power is connected to the three Ex terminals located at the top left of the electronic assembly. The Ex terminals are designed to work best with bare conductors with no ferrules or crimp connectors fitted. Connect wires using the following connection scheme.

Description	Colour	Mains Terminal
Line	Brown	A (active)
Neutral	Blue	N (neutral)
Earth	Green/Yellow	E (earth)

It is recommended the cable jacket be removed from where the cable enters the enclosure from the gland. This allows for easy handling of individual wires and stowage of excess wire during installation. Ensure the individual wire insulation is not damaged. Refer to figure 5.

Figure 5. CABLE ENTRY & JACKET REMOVAL



3.9 Relay Output Installation

Two output relays are provided to allow connection of other equipment to control the filling operation.

Output relay wiring must exit the enclosure through the lower left hand gland hole marked “OP”. The aluminium barrier design allows only for the wires to enter through this hole and to be connected to the adjacent terminals.

The contacts are un-powered. The installer may connect voltage or ground to the Common (COM) terminal only. Output is provided through the Normally Open (NO) or the Normally Closed (NC) contacts.

INDUCTIVE LOADS
Inductive loads can produce a form of power “feedback” due to electromotive force (emf) associated with electrical current flowing in a coil of wire. This power feedback is unpredictable and may exceed the specifications of the relay contacts. If this occurs, damage may occur to the relay contacts causing incorrect operation of the output relays.
DO NOT EXCEED THE STATED SPECIFICATIONS.
Liquip International has implemented “Triple Fail-Safe” technology to protect against relay contact failure.
Types of inductive loads include (but not limited to) solenoids, relays and motors.

Note: The overfill detect relay is slaved to the ground detect relay so that if there is no ground detected the overfill relay will also be activated. I.E. The overfill detect output will only go permissive if there is both a good ground AND all overfill probes give permissive.
If separate ground detection is not needed the terminal automation system can be connected to the overfill detect relay only.

3.10 Intrinsically Safe Signals Installation

Intrinsically Safe wiring must exit the enclosure from the gland hole marked “IS” located at the bottom.

It is highly recommended a junction box be used to provide connection to gantry cables and the grounding clamp. If the gantry cable is damaged during operations or through normal “wear and tear”, the cable may be replaced safely without de-commissioning of the loading bay and surrounding areas. This is due to all signals in the junction box being Intrinsically Safe and there is no need to open the explosion-proof enclosure.

IMPORTANT
Opening the RM100 Enclosure exposes unsafe voltages. Ensure the installation is suitably isolated and made safe prior to opening the Explosion Proof enclosure.

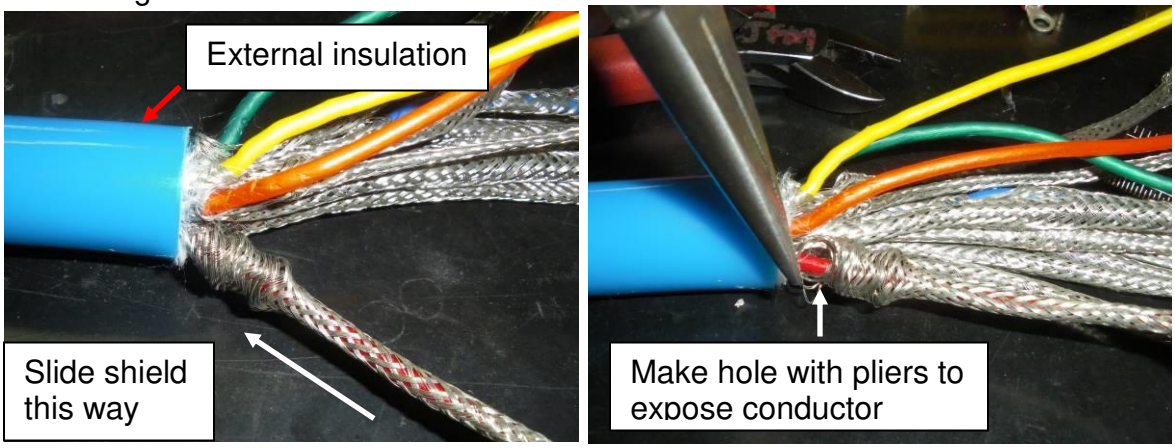
The wiring diagram (Figure 3 and Figure 4) shows all of the ways RM100 can be connected for 2-wire, 5-wire, thermistor and/or Grounding Monitoring operations. Liquip offers 2 junction boxes to suit most applications. The part numbers of all junction boxes are listed on the wiring diagram.

For GP204U Gantry plugs use Figure 4.

All three-cable options (GP104, GP103, EAC201) can be connected at the same time for optimum flexibility of loading operations.

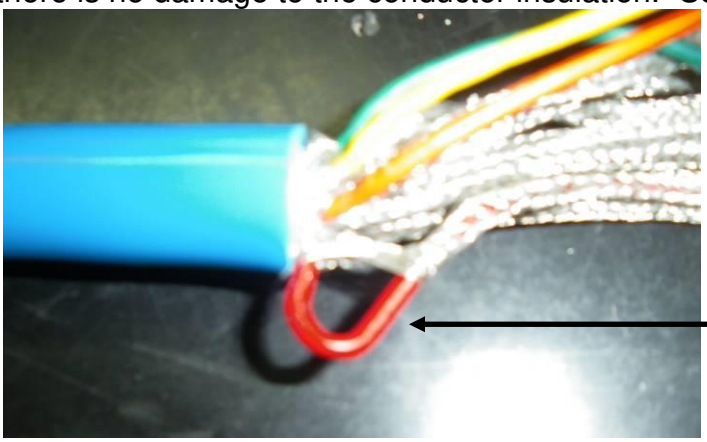
3.10.1 Additional Instructions for GP204U
The following instructions are Liquips’ suggested method of connecting the GP204U individually shielded cable when using a JB100 or JB103. In all cases you should refer to local standards for Electrical installations in hazardous areas to ensure all conditions are complied with.

1. Remove approximately 80mm of the external (Blue) insulation if it is not already removed ensuring that the internal conductors and screens are not damaged.
2. Slide the braid of an individual conductor back so that it bunches near the external insulation. See figure below.



3. With a pair of long nose pliers separate the shielding at the base of the wire until the internal conductor is exposed. See figure above.

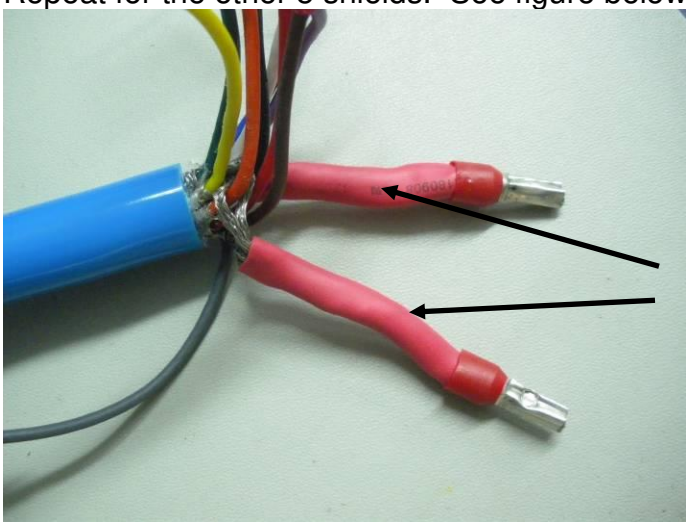
4. Using the pliers pull the internal conductor through the hole until it is completely free. Ensure there is no damage to the conductor insulation. See figure below.



5. Repeat for the remaining 9 conductors.

6. Gather 5 of the shields together, twist them and crimp them in a bootlace ferrule, either 6mm^2 or 10mm^2 depending on how neatly they are twisted. Place heatshrink over the bundled shields.

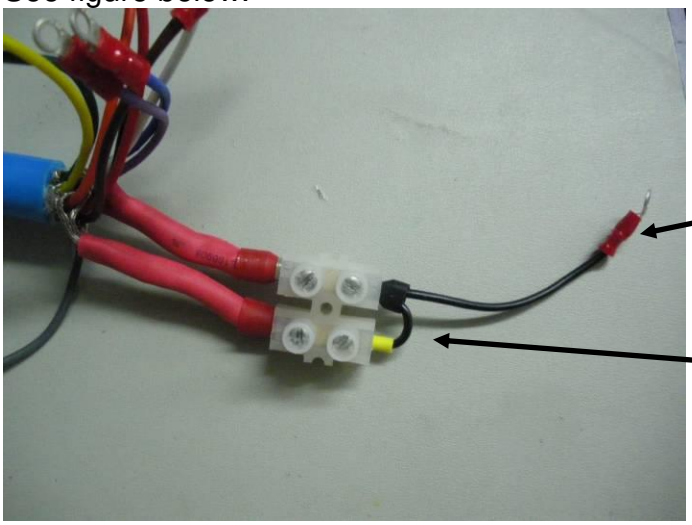
7. Repeat for the other 5 shields. See figure below.



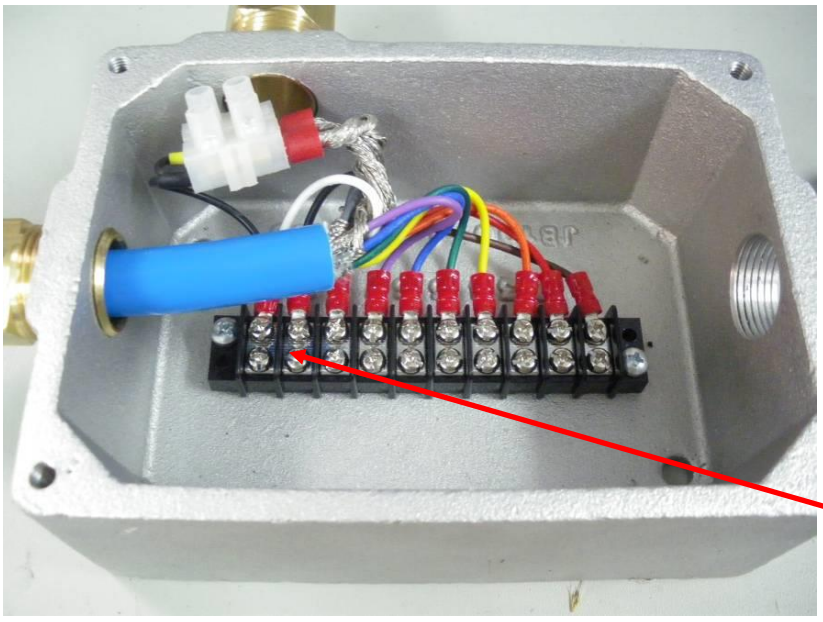
8. Ensure the cables are pushed through the hole in the JB100 or JB103 before proceeding any further.

9. Screw the ferules into a 2 way tunnel connector of the appropriate size. Using a minimum of 1mm^2 cable short between the 2 terminals and add a wire of approx 80mm from one of the terminals. Ensure the cable ends are fitted with bootlace ferrules or similar to secure the loose strands. Fit an M3 lug to the loose end of the wire from the tunnel connectors.

See figure below.



10. Screw the loose end from the tunnel connector to pin 10 in the JB100 / JB103. See figure below.



11. Connect the remaining conductors as per normal wiring procedure.

3.11 Safety Earth Bonding

3.11.1 Internal Safety Earth Bonding

INTERNAL SAFETY EARTH
To meet IECEx, ATEX and FM requirements, it is MANDATORY to attach a Safety Earth wire to the interior of the enclosure. This provides a secondary low-resistance earth path in the event of mains earth wire failure.
Liquip P/N: 6985 & 7000 Safety Grounding Harness is used for this purpose.
The Safety Grounding Harnesses are factory fitted to specific requirements.
Do not alter the Safety Grounding Harness installation.

3.11.2 External Safety Earth Bonding

EXTERNAL SAFETY EARTH
To meet ATEX and IECEx requirements, it is MANDATORY to attach a Safety Earth wire to the exterior of the enclosure. This provides a secondary low-resistance earth path in the event of mains earth wire failure.
10-11AWG (4.0mm^2 minimum) wire is recommended for this purpose.
The maximum impedance from this point to the main power system earth must be less than 1 Ohm.

The location of the grounding point is shown in figure 1. It is located on the underside of the flange and a crimp lug is pre-installed in the factory. This may be changed to suit different cable sizes.

4 MONITOR FUNCTIONS & INDICATORS

4.1 Power Up

When power is applied to the RM100, the microprocessor first enters a self-test routine. The following steps occur during the self-test.

1. All LEDs on the display panel are tested.
2. The version of firmware is displayed on the front panel by flashing the Channel Indicator that corresponds to the digit in the number e.g. If the indicator flashes CH1, then CH2, the firmware IS version 1.2.
3. Several internal hardware checks are performed.
4. The monitor enters Ground Monitoring mode.

4.2 Ground Monitoring

RM100 monitors the grounding of the vehicle continuously under all modes of operation. The Ground Monitoring function of RM100 takes priority over all other functions. This means RM100 will switch to **RED** “NOT PERMISSIVE” indicator under any condition the vehicle grounding is compromised.

When RM100 determines the vehicle grounding is “good”, it will change the state of the Ground Monitoring relay and light the **BLUE** “GROUND PERMISSIVE” indicator on the display panel. RM100 now begins Overfill Monitoring in conjunction with Ground Monitoring.

It is not possible to by-pass the Ground Monitoring function. This is to ensure it is not possible to load a vehicle if it is not properly grounded. Loading of hydrocarbon material generates very large electro-static charges and must be dissipated to avoid sparks between the vehicle and grounded items.

4.3 Overfill Protection Monitoring

For proper overfill monitoring, all vehicles that connect to RM100 must be wired according to one of the following standards/practices;

EN 13922
API RP1004

While waiting for a probe to be connected, RM100 monitors for both 2-wire and 5-wire systems simultaneously.

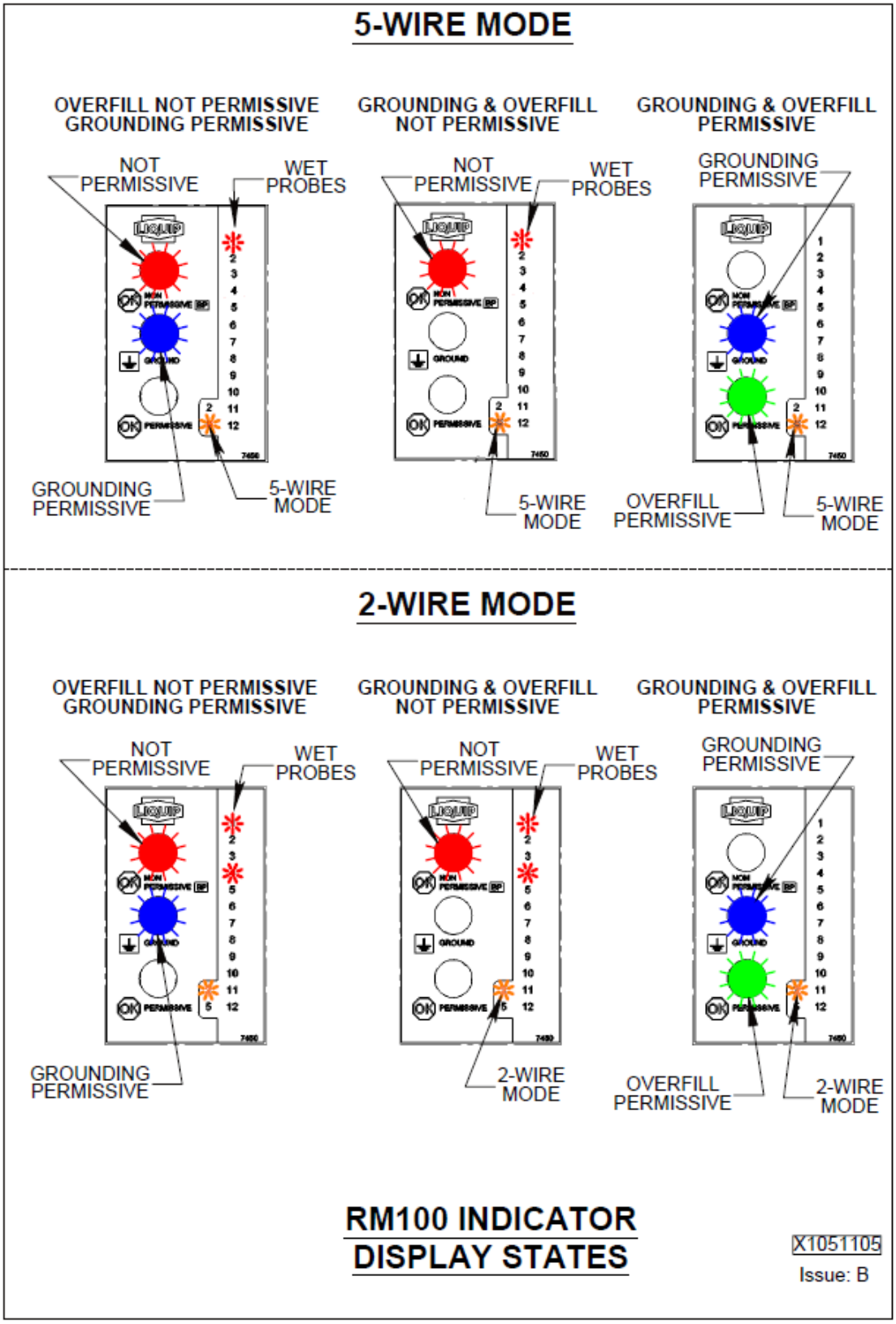
When a vehicle is connected, RM100 will switch to the appropriate mode for the electrical load sensed. The Mode Indicator on the Display Panel will light up either **2** or **5** to indicate the mode detected.

When all connected probes are dry, RM100 will switch the Overfill Monitoring Relay to “PERMISSIVE”. The **RED** “NOT PERMISSIVE” indicator will be extinguished and the **GREEN** “PERMISSIVE” indicator will light up.

If one or more probes are detected as wet, RM100 will switch the Overfill Monitoring Relay to “NOT PERMISSIVE”. The **GREEN** “PERMISSIVE” indicator will be extinguished and the **RED** “NOT PERMISSIVE” indicator will light up.

For AUTO6, 5-Wire Mode, The LED compartment indicator will continuously scroll for the unused compartments indicating no probes connected. The total number of “DRY” probes connected is determined from the total number of unlit LED compartment indicator. A steadily lit LED indicator means that the probe on that particular compartment is either “WET” or is having some wiring problems.

Figure 6. RM100 DISPLAY STATES



4.4 By-Pass Mode

NOTE: Bypass Mode is not available on any units with Ver. 3.X firmware. This currently includes RM140E3 monitors.

It is possible to by-pass the Overfill Monitoring Function of RM100. A coded wireless By-Pass Key is supplied for this purpose.

To enter By-Pass Mode, the key must be passed once over the Display Panel so the key passes close to the glass. The optimum area for the wireless communications to occur is marked on the Display Panel as “BP”.

When RM100 enters By-Pass Mode, the **BLUE** “GROUND PERMISSIVE” indicator will remain lit (RM100 is still monitoring the vehicle grounding). The **RED** “NOT PERMISSIVE” indicator and the **GREEN** “PERMISSIVE” indicator will flash. Both Mode Indicators (**2** & **5**) will also be lit. All Diagnostic Channel Indicators will remain extinguished.

IMPORTANT
RM100 remains in By-Pass Mode while the truck is connected.
RM100 returns to normal operation when the truck is disconnected.

By-pass Mode is ended when;
a. When the plug is disconnected from the truck.
b. The By-Pass Key is passed once over the Display Panel when RM100 is in By-Pass mode.

4.5 Self-Test Mode

NOTE: Self Test Mode is not available on any units with Ver. 3.X firmware. This currently includes RM140E3 monitors.

RM100 can be forced to re-start and perform it’s self-test without powering down. The By-Pass Key is used to enter Self-Test Mode.

IMPORTANT
To avoid problems exterior to RM100 affecting the self-test, ensure no vehicle is connected during the self-test.

In a similar manner as when entering By-Pass Mode, pass the By-Pass Key over the Display Panel 3 times within 5 seconds.

All monitoring functions of RM100 will be reset, the start-up self-test will be performed, and RM100 will return to normal operating mode depending on the DIP Switch settings.

5 COMMISSIONING

Prior to powering up RM100 for the first time after installation, it is important the following steps are followed;

1. All wiring is visually inspected to ensure the wire connections match those in the RM100 Wiring Diagram.

2. All wiring is visually inspected to ensure there are no exposed conductors or damaged insulation.

3. Ensure the gantry plug is not connected to anything.

4. Apply power to RM100.

5. RM100 will start-up and enter Grounding Monitoring Mode.

6. Ensure the **RED** “NOT PERMISSIVE” Indicator is lit.

7. Check the Automation Control System for “NOT PERMISSIVE” signal.

8. Connect a suitable tester to the gantry plug and perform the PERMISSIVE test. Liquip recommend using the following testers;
   HTA204 – Two-wire truck and rack monitor portable tester.
   HTA503 – Five-wire truck and rack monitor portable tester.
   It is possible to commission RM100 using a vehicle that has known good wiring and sensors.

NOTE: If using HTA204 or HTA503 to test the ground button must be pressed at the same time as the gantry button or the RM100 will show non-permissive.

9. Ensure the **BLUE** “GROUND PERMISSIVE” indicator and the **GREEN** “PERMISSIVE” indicator is lit.

10. Check the Automation Control System for “GROUND PERMISSIVE” and Overfill “PERMISSIVE” signals.

11. Disconnect the tester.

12. Check the Red “NOT PERMISSIVE” indicator is lit and the **BLUE** “GROUND PERMISSIVE” indicator and the **GREEN** “PERMISSIVE” Indicator are extinguished.

6 TROUBLESHOOTING

SYMPTOM	CAUSE	SOLUTION
Display does not light up when mains power is switched on.	Mains voltage is not present at terminals.	Check mains power distribution panel. Ensure connected correctly & circuit breakers are on.
	Faulty cable connection.	Check display cable is connected correctly & is not damaged.
	Fuse blown. a) Mains power surge. b) Incorrect wiring. c) Component failure. d) Incorrect fuse installed.	a) Install UPS. b) Refer Section 4: Installation for correct wiring details. c) Replace electronic assembly. d) Refer Section 3: Electrical Specifications for correct fuse details.
Blue Grounding Indicator does not light up when truck is connected.	Poor connection between pins 9 & chassis or pin 10 & chassis inside truck plug.	Ensure the truck plug is installed according to manufacturers instructions..
	Gantry plug is not installed correctly.	Ensure gantry plug is connected according to the wiring diagrams contained in this manual.
	Pins of gantry plug are sticking due to ingress of dirt into housing.	Dismantle gantry plug and clean pins and housing thoroughly.
Green Overfill Permissive Indicator does not light up when truck is connected.	Truck has a wet probe.	By-pass Overfill Monitoring.
	Truck has a faulty probe	Replace faulty probe.
	Gantry plug is connected incorrectly.	Ensure gantry plug is connected according to the wiring diagrams contained in this manual.
	Pins of gantry plug are sticking due to ingress of dirt into housing.	Dismantle gantry plug and clean pins and housing thoroughly.
Green Permissive does not light up, channels 1 & 2 show wet in 2 wire mode (in Australia) but truck wiring is OK	The dip switch settings are incorrect.	Set dipswitch setting to AUTO6+ (Australia only)

SYMPTOM	CAUSE	SOLUTION
Green Permissive does not light up, channels 7 & 8 show wet in 2 wire mode (in Australia) but probes on truck tests OK	Truck plug is wired incorrectly	Wire truck plug correctly. Compartment 1 is wired to pin 3, compartment 2 is wired to pin 4 etc
Permissive obtained with one or more wet overfill probes.	DIP switch settings for Grounding Only	Change DIP switch settings to desired mode according to Section 4.3
Moisture inside enclosure.	Water leaking through gland threads.	Ensure correct gland threads have been. Ensure gland and/or enclosure threads are not damaged.
	Water leaking through gland seals.	Ensure correct gland has been selected for that cable diameter. Ensure seals are not damaged.
	Water leaking through flange.	Cover bolts not sufficiently tightened. Flange o-ring has been damaged.
	Water leaking through display window.	Display window has been dislodged or damaged.
	No visible reason. Monitor is exposed to extreme variations of temperature in the presence of water.	Position monitor away from direct sunlight & weather.
Permissive cannot be obtained with known good/dry probes.	DIP switch set to select 2 or 5 wire system in conflict with system in use.	Change DIP switch settings to desired mode according to Section 4.3.
Green indicator is lit, but output relay does not change state.	Output relay fuse has blown.	Replace output relay fuse with type recommended.
	Output relay is connected incorrectly.	Ensure source voltage is connected to COMMON and output is connected to NC or NO terminals.
	Output relay is faulty.	Check load driven by the output relay. Load cannot exceed the performance specifications stated in this manual. Contact Liquip representative.

SYMPTOM	CAUSE	SOLUTION
RM100 will not enter BYPASS mode.	By-pass key not being “read”.	Ensure By-pass Key is being passed over the correct spot on the display in the correct manner. Ensure correct Liquip supplied key is being used. High powered radio frequency electromagnetic fields in immediate vicinity. Ensure Display circuit board is correctly installed and operational. Software version does not support bypass. SW Ver 3.X does not support BYPASS

7 SPARE PARTS & ACCESSORIES

WARNING:
Incorrect handling and/or re-assembly of the RM100 monitor may impair the protection provided by this product. For this reason Liquip only supplies replacement electronics as a complete assembly.

5542	Fuse 5A (250V @ 5A)
6987	Fuse 400mA (250V @ 400mA) 1500A breaking capacity
6983	Wireless Security Bypass Key
6985	RM100 Safety Ground Harness
RM100-3	RM100 Aluminium Safety Barrier
RM100-4	RM100 Polycarbonate Terminal Cover
RM100-5K	RM100 PCB Assembly Complete Kit RM100-5 (power, IS circuit, cover) + 6959 (Display PCB)

For more information regarding parts and accessories, contact Liquip using the following document references.

GP103	3 Bayonet Gantry Plug
GP104	4 Bayonet Gantry Plug
GP204U	4 Bayonet Gantry Plug with individually shielded cable - uncurled
JB100	Junction Box with 2 threaded gland entries
JB103	Junction Box with 3 threaded gland entries
HTA204	Two-wire Optical Hand Tester
HTA503	Five-wire Optical Hand Tester
EAC201	Liquip Earth Clamp
LDP102	Two-wire Overfill Probe
LDP105	Five-wire Overfill Probe
AGP102, AGP202	Two-wire All Glass Probe
AGP205	Five-wire All Glass Probe

7.1 RM100-5 Electronic Assembly Removal/Replacement

WARNING:
Avoid touching any electronic components unless suitable precautions have been taken. Electrostatic Discharge (ESD) may occur resulting in damage to the electronics.

Removal

1. Ensure power to the RM100 unit has been isolated and the area made safe prior to opening the enclosure.

2. Remove the two (2) screws holding the polycarbonate Safety Barrier and lift away from Mains Power and Relay Output wiring terminals. Loosen all terminals and pull wires clear from their sockets.

3. Loosen all IS terminals and pull wires clear from their sockets.

4. Remove RM100 Safety Ground Harness from the circuit board terminal.

5. Remove the six (6) nylock nuts and associated washers.
   NOTE: Avoid letting the assembly fall when the fasteners have been removed.

6. Holding the assembly by the top cover, gently pull the assembly clear of the stand-offs.

7. Immediately place the electronic assembly into ESD safe packaging prior to moving away from the enclosure.

Replacement

1. Inspect the packaging for the replacement electronic assembly. Ensure the ESD safe packaging is properly sealed and shows no sign of damage.

2. Remove the electronic assembly from the packaging. Take care to support the assembly in such a way that does not bend the circuit board or puts undue strain on any components.

3. Inspect the electronic assembly for signs of damage. Report any damage immediately to your sales representative.

4. Holding the assembly by the top cover, gently push the assembly onto the stand-offs.

5. Re-fit and tighten the six (6) washers and nylock nuts. Do not over-tighten.

6. Replace Mains Power, Relay Output and IS wires into their original position. Tighten terminals and check each wire is firmly held by the contacts.

7. Ensure the RM100 Safety Ground Harness is properly connected.

8. Re-fit the safety barrier.

7.2 6959 Display PCB Removal/Replacement

Removal

1. Ensure power to the RM100 unit has been isolated and the area made safe prior to opening the enclosure.

2. Disconnect the display PCB. Open the latches on the Display PCB connector allowing them to eject the connector.

3. Remove the four (4) mounting screws and associated washers. Take care to avoid letting the display PCB falling when mounting screws have been removed.

4. Place the PCB into ESD packaging prior to moving away from the enclosure.

Replacement

1. Inspect the packaging for the replacement display PCB. Ensure the ESD safe packaging is properly sealed and shows no sign of damage.

2. Remove the display PCB from the packaging. Inspect the electronic assembly for signs of damage. Report any damage immediately to your sales representative.

3. Ensure the display is positioned with the Permissive indicator to the top and facing towards the glass. Make sure the display PCB cable is clear of the mounting points. Re-fit & tighten the four (4) PCB mounting screws. Do not over-tighten.

4. Ensure there are no twists in the cable. Push the display cable connector into the main electronic assembly connector receptacle. The receptacle is keyed to avoid incorrect connection. Push the connector firmly into the receptacle until the latches lock down over the connector. Do not push too hard so the PCB flexes.

5. Close enclosure. Fit & tighten the cover retaining bolts. Ensure correct torque settings are used (refer section titled “Mounting RM100”)

Figure 7. FM CONTROL DRAWING

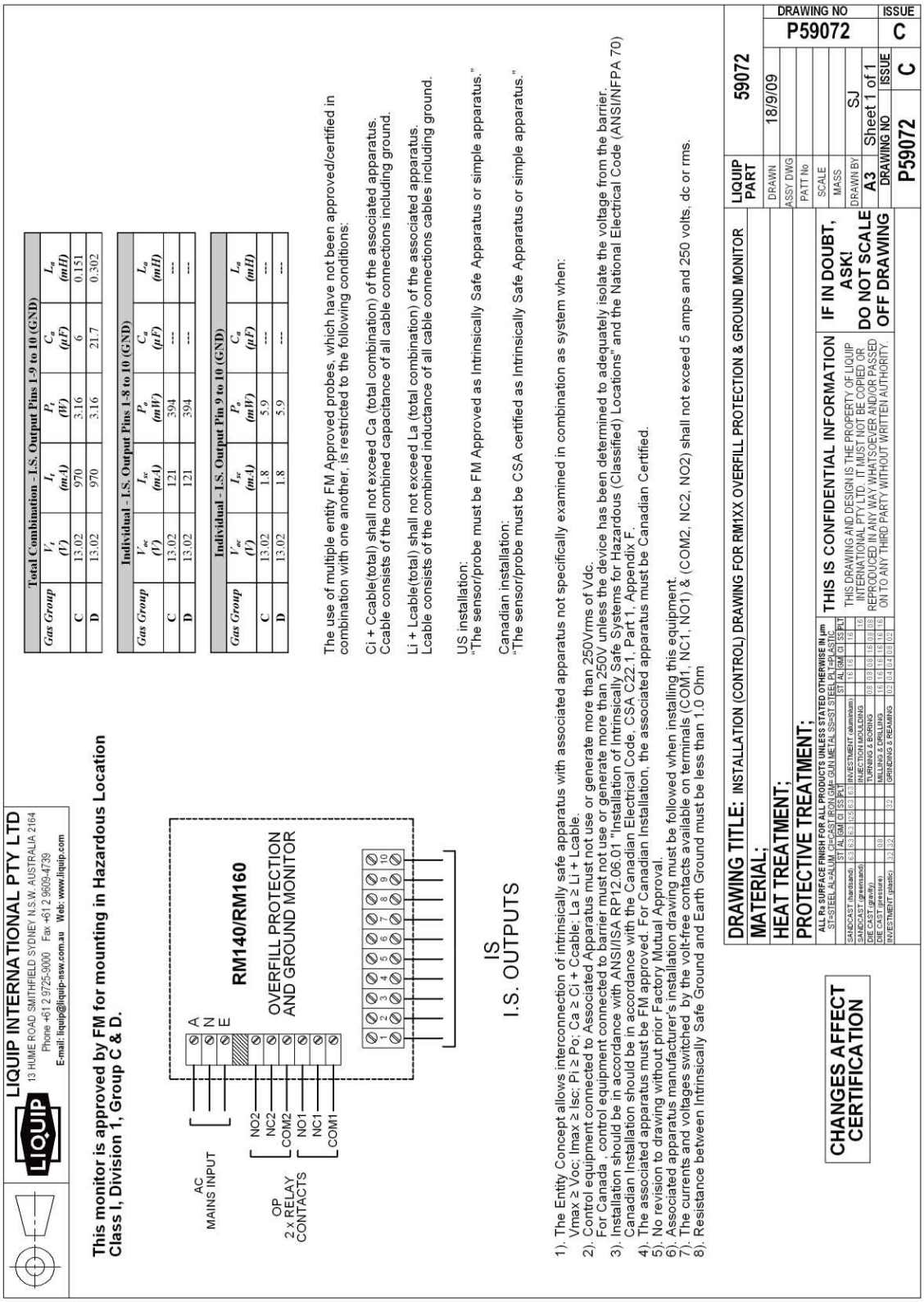


Figure 8. RM100 INSTALLATION SHEET FOR IECEX

LIQUIP — PART OF OPW

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RM100 Overfill Protection Monitor

INSTALLATION SHEET FOR IECEx **PART N°: LIQ59113**

SAFETY CERTIFICATIONS:

IECEx Certificate: IECEx TSA 05.0049X

Markings: Ex db [ia Ga] IIB T6 Gb
(-20°C ≤ Tamb ≤ +70°C) IP66

Ex db [ia Ga] IIA T6 Gb
(-20°C ≤ Tamb ≤ +70°C) IP66

CHANGES AFFECT CERTIFICATION

Ambient Temperature: -20°C to +70°C

RM100 Series Overfill Protection Monitor is approved to the following standards:

IEC 60079-0:2011 + Corr. 1:2012 & Corr. 2:2013
IEC 60079-11:2011 + Corr. 1:2012
IEC 60079-1:2014
IEC 60529:2013 + Corr. 1:2013 & Corr. 2:2015

INSTALLATION:

1. All unused cable entries must be closed using suitably certified blanking elements.
2. Any cable glands used must be separately and suitably certified.
3. The enclosure must be installed to a rigid surface using the mounting means provided.
4. The installation and use must comply with Liquip document P7470, "RM100 Installation & User Manual".
5. The equipment must be de-energized before opening the cover.
6. The equipment must not be opened when an explosive atmosphere may be present.
7. The conditions of safe use relevant to the intrinsically safe electronics internal to the enclosure apply as follows:
   7.1. The metallic enclosure shall be bonded to a protective earth conductor.
   7.2. The following input and output parameters shall be taken into account when connecting to external equipment (refer to the following table):

Terminals	Description	Parameters for Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66	Parameters for Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66
Mains Power: Active (A) and Neutral (N) on mains terminal block	Maximum Power Supply Input Voltage	U_m = 250 V	U_m = 250 V
Relays: COM1, NC1, NO1 and COM2, NC2, NO2 on dry contact terminal block	Maximum Voltage and Current applied to relay dry contacts	U_m = 250 V I_m = 5 A	U_m = 250 V I_m = 5 A
Probes (Pins 1 to 8): Label positions 1 to 8 (OP1 to OP8) on terminal block J1	Maximum Output Voltage to probes	U_o = 13.02 V	U_o = 13.02 V
	Maximum Output Current to probes	I_o = 121 mA	I_o = 121 mA
	Maximum Output Power to probes	P_o = 0.394 W	P_o = 0.394 W
	Maximum external capacitance to probes	C_o = 22 µF	C_o = 6 µF
	Maximum external inductance to probes	L_o = 19.4 mH	L_o = 1.2 mH
	Maximum external inductance to resistance ratio to probes	L_o/R_o = 0.72 mH/Ω	L_o/R_o = 0.36 mH/Ω
Ground Assurance (Pin 9): Label position 9 (OP9) on terminal block J1	Maximum Output Voltage and Current to ground sensing wire	U_o = 13.02 V I_o = 1.8 mA	U_o = 13.02 V I_o = 1.8 mA
	Maximum external capacitance to ground sensing wire	C_o = 22 µF	C_o = 6 µF
	Maximum external inductance to ground sensing wire	L_o ≤ 1000 mH	L_o ≤ 1000 mH
	Maximum external inductance to resistance ratio to ground sensing wire	L_o/R_o = 48.5 mH/Ω	L_o/R_o = 24.3 mH/Ω

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Figure 9. RM100 INSTALLATION SHEET FOR ATEX

LIQUIP — Leading The Way in Fluid Handling Solutions Worldwide

RM100 Overfill Protection Monitor

INSTALLATION SHEET FOR ATEX **PART N°: LIQ59114**

SAFETY CERTIFICATIONS:

ATEX Certificate: DEMKO 06 ATEX 140833X

Markings: CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66

CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66

CHANGES AFFECT CERTIFICATION

Ambient Temperature: -20°C to +70°C

RM100 Series Overfill Protection Monitor is approved to the following standards:

CENELEC EN 60079-0:2012 + A11:2013
CENELEC EN 60079-11:2012
CENELEC EN 60079-1:2014
CENELEC EN 60529:1991 + A1:2000 + A2:2013

SPECIFIC CONDITIONS OF USE:

1. All unused cable entries must be closed using suitably certified blanking elements.
2. Any cable glands used must be separately and suitably certified.
3. The enclosure must be installed to a rigid surface using the mounting means provided.
4. The installation and use must comply with Liquip document P7470, "RM100 Installation & User Manual".
5. Flameproof joints are not intended to be repaired.
6. The bolts used to secure the cover to the base shall be M10 x 1.5-6g of Grade 8.8 or better.
7. The equipment must be de-energized before opening the cover.
8. The equipment must not be opened when an explosive atmosphere may be present.
9. Wipe diffuser with damp cloth to reduce the potential for electrostatic discharge.
10. The conditions of safe use relevant to the intrinsically safe electronics internal to the enclosure apply as follows:
    - 10.1. The metallic enclosure shall be bonded to a protective earth conductor.
    - 10.2. The following input and output parameters shall be taken into account when connecting to external equipment (refer to the following table):

Terminals	Description	Parameters for Ex II 2 (1) G Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66	Parameters for Ex II 2 (1) G Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66
Mains Power: Active (A) and Neutral (N) on mains terminal block	Maximum Power Supply Input Voltage	U_m = 250 V	U_m = 250 V
Relays: COM1, NC1, NO1 and COM2, NC2, NO2 on dry contact terminal block	Maximum Voltage and Current applied to relay dry contacts	U_m = 250 V I_m = 5 A	U_m = 250 V I_m = 5 A
Probes (Pins 1 to 8): Label positions 1 to 8 (OP1 to OP8) on terminal block J1	Maximum Output Voltage to probes	U_o = 13.02 V	U_o = 13.02 V
	Maximum Output Current to probes	I_o = 121 mA	I_o = 121 mA
	Maximum Output Power to probes	P_o = 0.394 W	P_o = 0.394 W
	Maximum external capacitance to probes	C_o = 22 µF	C_o = 6 µF
	Maximum external inductance to probes	L_o = 19.4 mH	L_o = 1.2 mH
	Maximum external inductance to resistance ratio to probes	L_o/R_o = 0.72 mH/Ω	L_o/R_o = 0.36 mH/Ω
Ground Assurance (Pin 9): Label position 9 (OP9) on terminal block J1	Maximum Output Voltage and Current to ground sensing wire	U_g = 13.02 V I_g = 1.8 mA	U_g = 13.02 V I_g = 1.8 mA
	Maximum external capacitance to ground sensing wire	C_g = 22 µF	C_g = 6 µF
	Maximum external inductance to ground sensing wire	L_g ≤ 1000 mH	L_g ≤ 1000 mH
	Maximum external inductance to resistance ratio to ground sensing wire	L_g/R_g = 48.5 mH/Ω	L_g/R_g = 24.3 mH/Ω

RM100 Overfill Protection Monitor Installation Instructions_ATEX_LIQ59114.doc Issue: A 24/03/2017 Page 1 of 1

Figure 10. RM100 EU DECLARATION OF CONFORMITY

LIQUIP

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EU DECLARATION OF CONFORMITY

MANUFACTURER:	LIQUIP INTERNATIONAL PTY LTD 13 Hume Road, Smithfield, NSW 2164, Australia Tel: +61 2 9725 9000
MODEL:	RM100
PRODUCT DESCRIPTION:	Gantry Mounted Overfill Protection Monitor Electrical Equipment for use in potentially explosive atmospheres
ATEX CERTIFICATE:	DEMKO 06 ATEX 140833X
MARKING:	CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIB T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66 CE 0518 Ex II 2 (1) G Ex db [ia Ga] IIA T6 Gb (-20°C ≤ Tamb ≤ +70°C) IP66
EU-TYPE EXAMINATION CERTIFICATE:	UL International Demko A/S. Notified Body No. 0539 Lyskaer 8, P.O. Box 514, DK-2730 Herlev, Denmark
QUALITY ASSURANCE:	Sira Certification Service. Notified Body No. 0518 Rake Lane, Eccleston, Chester, CH4 9JN, UK
HARMONISED STANDARDS:	CENELEC EN 60079-0:2012 + A11:2013 CENELEC EN 60079-1:2014 CENELEC EN 60079-11:2012 CENELEC EN 60529:1991 + A1:2000 + A2:2013
EU DIRECTIVES:	ATEX Directive 2014/34/EU EMC Directive 2014/30/EU

I hereby declare that the above mentioned equipment is in conformity with the provisions set forth by the above European Union Directives.

For and on behalf of Liquip International Pty. Ltd.

Stephen Hudson
Engineering Manager

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