

# **LPCB Approved Gapmeter Type SGUV MK. 3**



**Thank you for purchasing this product from  
TT Electronics | Roxspur Measurement & Control**

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**General Note**

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### INTRODUCTION

The SGUV Mk.3 is a flow meter specifically designed to meet the requirement for a direct reading flow meter for use in automatic sprinkler, water spray or deluge systems. It is approved for regular monitoring and testing of such systems by the LPCB (Loss Prevention Certification Board), under their 'Rules for Automatic Sprinkler Installations' (LPS1045), in the UK.

The SGUV Mk.3 provides a robust, direct reading flow meter for 50, 80, 100, 150 & 200 mm pipelines and is suitable for use in both horizontal & vertical pipes, with the flow in any direction:

- Horizontally: Left to right  
Right to left
- Vertically: Upwards  
Downwards

Full bore Isolation valves are located in the by-pass loop, allowing meter isolation for filter cleaning & tube replacement.

The inline filter avoids clogging of the by-pass loop with any pipeline debris. In addition, a rodding device ensures that the secondary restrictor orifice remains clear of any smaller particles or algae.

Bleed/drain valves allow venting of trapped air or draining of the isolated Indicator by-pass loop.

### PRINCIPLES OF OPERATION

The SGUV Mk.3 is a combination of two simple measuring elements:

1. Installed in the main pipeline is a sharp edged orifice, mounted in a carrier ring. This assembly produces a pressure drop proportional to the square root of the flow.
2. Installed across the main orifice/carrier assembly is an Indicator by-pass loop containing an accurately calibrated restrictor (secondary orifice). This restrictor converts the main orifice pressure drop into flow rate, which is directly proportional to the main pipeline flow.

### MATERIALS OF CONSTRUCTION

**Carrier Assy** Orifice plate: Stainless steel, mounted In: Carrier, steel, red polyester powder coated in two styles.

**Indicator Assy** Back plate: Aluminium alloy, white powder coated.

Cover: Clear polished UV stabilised polycarbonate.

Isolation valves: full bore brass ball valve, bright nickel plated.

Rodding device: Bright nickel plated brass.

Filter element: Stainless Steel with 1.5mm perforations.

Filter housing: Polycarbonate.

Other pipes and connectors: copper and brass, bright nickel plated.

Seals: nitrile and polyurethane.

**Tube Assy** Tube: borosilicate glass with 100mm fused in ceramic scale.

Float: Stainless Steel.

Float stops: polypropylene.



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### SPECIFICATION

- Sizes** - 50, 80, 100, 150 & 200mm nominal bores
- Ranges** - See Table 1
- Mounting** - Either flange or grooved styles available flanged to suit BS10 Table 'E' (also suitable for Table 'D') flanges  
- Grooved to suit 'Victaulic®' grooved piping system  
- Other manufacturers products can be used providing they conform to the Victaulic® specification
- Accuracy** -  $\pm 5\%$  at various test flows specified by LPCB (see Table 1)
- Temperature** - Design, -30 to 80°C  
- Operation, 15°C
- Pressure** - Design, 30 bar g maximum @ 15°C, hydraulic operation, 12 bar g maximum @ 20°C
- Pressure Drop** - 65% of the orifice pressure loss (354" wg) is recovered at maximum flow
- Approval** - By LPCB to LPS1045 standard  
- LPCB Reference No's 088b/15 – 24 (see Table 2 for Platon Ref's)
- LPCB Listing** - Approved Fire & Security Products & Services  
- Part 5 – Automatic Sprinkler, Water Spray & Deluge Systems  
- Section 6 – Direct Reading Flow Meters



**Table 1—Flow Ranges**

LPCB Ref No.	Nominal Pipe Size (mm)	Flow Ranges dm <sup>3</sup> /min	Test Flows dm <sup>3</sup> /min	Accuracy @ Test Flows dm <sup>3</sup> /min
088b/1, 088b/6	50	150-750	500	$\pm 25$
088b/2, 088b/7	80	300-2300	800	$\pm 40$
			1300	$\pm 65$
088b/3, 088b/8	100	500-3500	1500	$\pm 75$
			2200	$\pm 110$
088b/4, 088b/9	150	900-8200	2500	$\pm 125$
			3500	$\pm 175$
			4500	$\pm 225$
088b/5, 088b/10	200	2500-12500	5000	$\pm 250$
			7000	$\pm 350$
			9000	$\pm 450$

**Table 2—LPCB & Platon No. Cross Referencing**

Flanged Carrier Ref's		Groove Carrier Ref's	
LPCB*	Platon ~	LPCB*	Platon ~
088b/1	F1/15	088b/6	F1/20
088b/2	F1/16	088b/7	F1/21
088b/3	F1/17	088b/8	F1/22
088b/4	F1/18	088b/9	F1/23
088b/5	F1/19	088b/10	F1/24

\*The LPCB ref No. appears on the carrier only.  
~The Platon ref No. appears on both the carrier & tube. Also, the tube & float assemblies of a particular NB are universal between the 2 carrier styles and therefore, carry both Platon Ref No's, i.e. F1/16 or F1/21

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### INSTALLATION

#### Prior to installation

1. Check the instrument for any transit damage. Any damage to the by-pass loop could increase resistance to flow and therefore render calibration inaccurate.
2. Re-check that the instrument is suitable for the chosen application.
3. Check that the box includes (for complete instruments only):
  - a) A carrier of either flanged or grooved style.
  - b) An indicator by-pass loop, assembled for Horizontal pipelines & left to right flows.
  - c) 1x tube & float assemblies (assembled in indicator housing).
4. Check that the Platon reference numbers on the carrier and glass tube are identical. i. e. F1/\*\* (see Table 2).
5. Remove any packing materials, as necessary, from any component.
6. For best accuracy ensure that the pipeline bores are smooth and that they match that of the carrier.
7. Select a location to ensure compliance with the Recommended Pipeline Configurations (see Fig 1 and Table 3).

### CARRIER INSTALLATION

#### Flanged Style

1. The carrier should be mounted inside the bolt circle of two flanges (see Specification).
2. Ensure the carrier is precisely centered in relation to the pipeline & flanges.
3. Ensure that the gaskets (not supplied) either side of the carrier has an inside diameter (I.D.) greater than or equal to the pipe nominal bore. Also ensure that when assembled no part of the gasket protrudes into the pipeline at any point.

#### Grooved Style

1. The carrier should be mounted to the pipeline using two appropriately specified joints.
2. Always lubricate gasket joints, so as to avoid pinching and leakage.

Both Carrier Styles

- 1. Ensure the carrier flow label matches the flow direction of the pipeline.
- 1. Ensure the process connections of the carrier protrude from the pipeline in the correct direction to ensure:
  - a) Vertical indicator assembly.
  - b) Readable viewing angle.

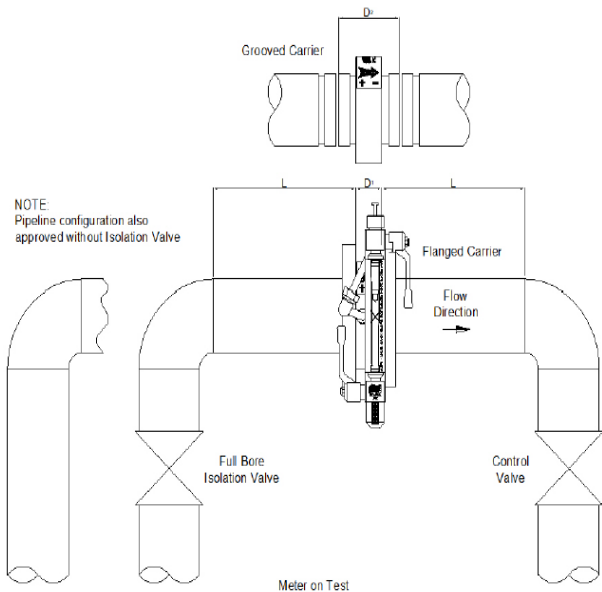
Indicator Installation

- 1. Based on the pipeline orientation and direction of flow, assemble the indicator by-pass loop, using the appropriate impulse pipe. Note the factory supplied set-up, is for horizontal, left to right flows.
- 2. Whatever the main pipeline configuration ensure that the Float moves freely in the glass tube and that the indicator is accurately vertical.
- 3. Rotate the indicator housing & glass tube, in relation to the rest of the indicator by-pass loop, to obtain the best viewing angle.

Table 3—Recommended Minimum Upstream & Downstream Pipe Lengths (See Fig 1).

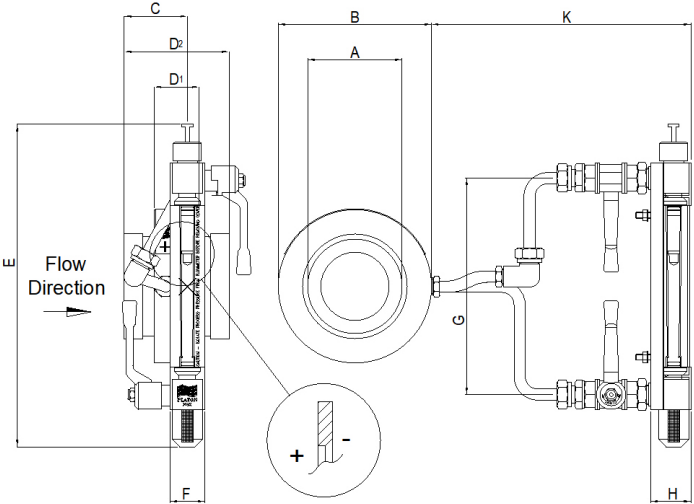
Carrier	Nominal Bore (mm) & Pipe Style Specification				
	50	80	100	150	200
	BS1387				BS3600
L	250	400	500	750	1000
D1 Flanged	38.1				
D2 Grooved	89.1			98.1	
	Min 5 x NB				

Figure 1  
Recommended Pipeline Configuration (See Table 3)



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Figure 2  
Horizontal Pipeline—Flow Left to Right



	Mm
A	=NB
B	PCD-Bolt Dia
C	55 max
D1	See Table 3
D2	
E	275 max
F	30
G	184
H	35
K	235 max

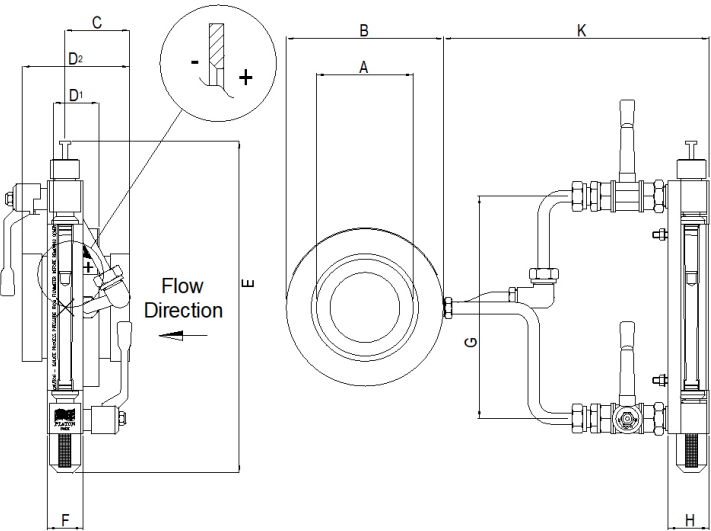


Figure 3  
Horizontal Pipeline—Flow Right to Left

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Figure 4

Vertical Pipeline—Flow Upwards

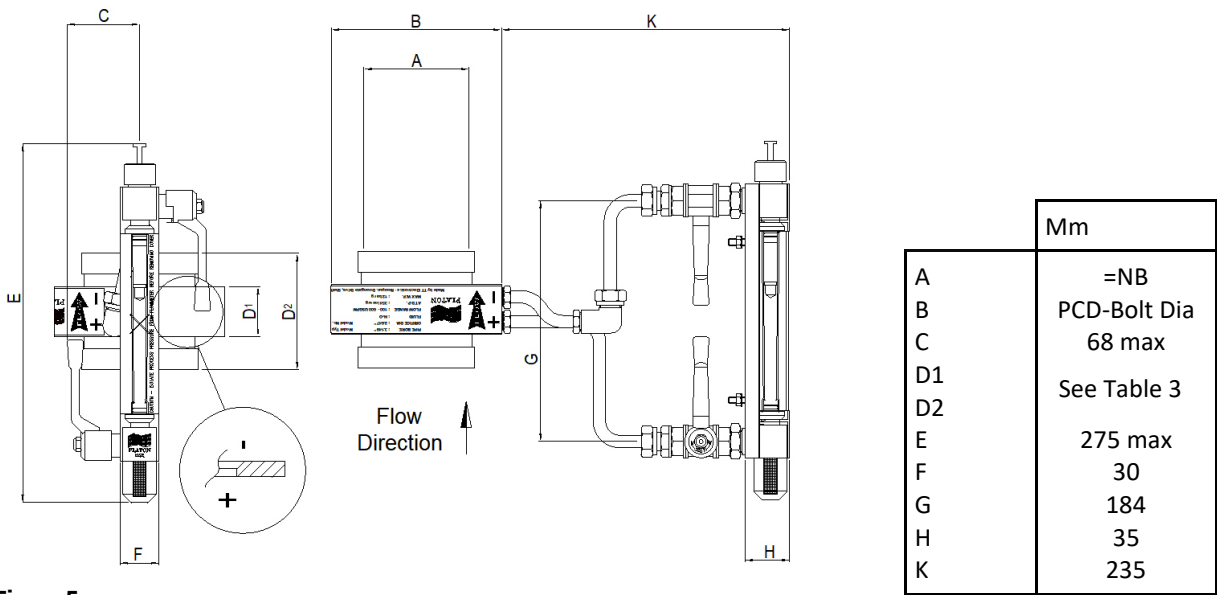
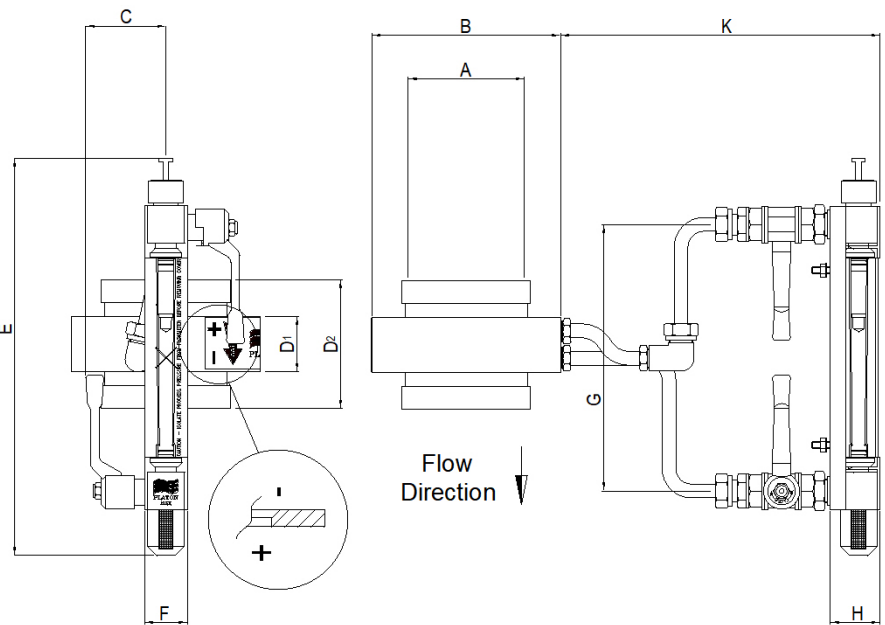


Figure 5

Vertical Pipeline—Flow Downwards



General Note

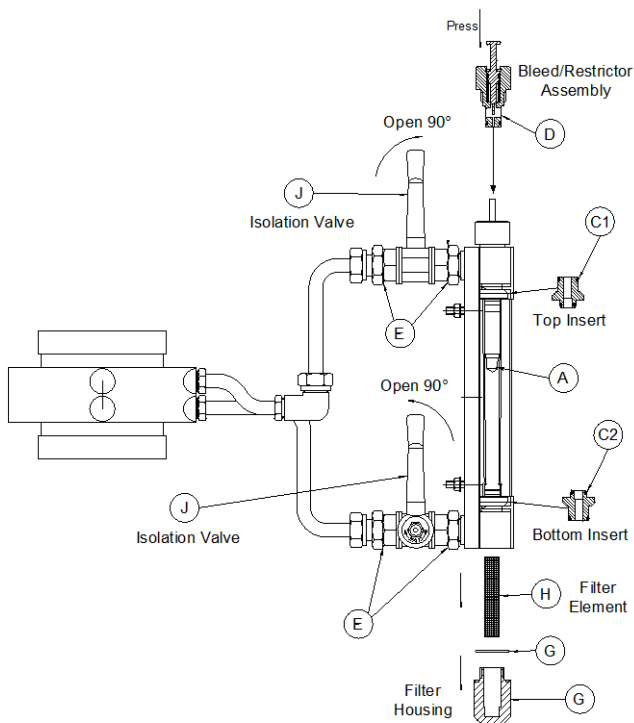
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### Operation

1. Ensure that the filter (H) is clean.
2. Check that no pipe debris is obstructing the restrictor by pressing the restrictor cleaning valve (D).
3. Bleed all air from the indicator by-pass loop before taking any flow readings.
4. Make sure that the isolating valves (J) are fully open before taking any flow reading.
5. Read the top edge of the float.
6. When not in use the isolation valves should be closed and the Indicator by-pass loop drained. Once the unit has been fully drained all the bleed/drain valves should then be closed.

**Figure 6**  
**General Assembly**



#### General Note

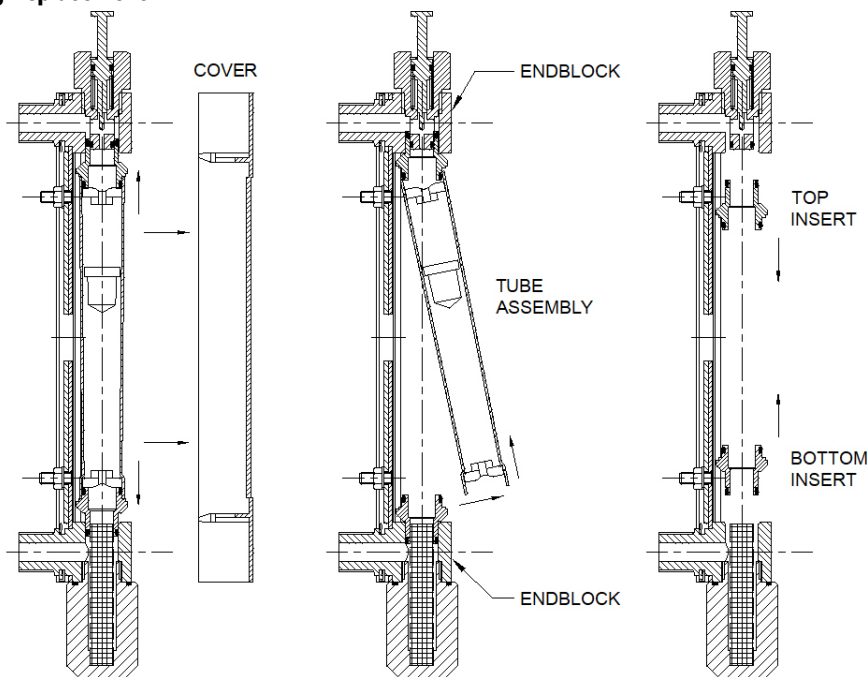
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### MAINTENANCE

#### Glass Tube Cleaning or O-ring/Glass Tube Replacement (See Fig 7)

1. Cover Removal: Pull forward evenly with both hands until the clip section is released.
2. Tube Removal: Carefully move the Tube upwards until the top insert is fully engaged in the top End block.
3. Carefully move the bottom insert down until it is fully engaged in the bottom End block.
4. Carefully move the Tube downwards and gradually pull the bottom forwards until released from the top insert.
5. Insert Removal: Withdraw the inserts by pulling towards each other, until clear of the end blocks.
6. O-Ring Replacement: This should be carried out carefully ensuring that no surfaces are damaged. Lubricating the O-Rings using a small amount of suitable grease is advisable.
7. Insert Replacement: Reverse stage , ensuring both fully engaged in End blocks.
8. Tube Replacement: Locate the top of the Tube onto the top insert and carefully move the Tube upwards and gradually push the bottom backwards until fully engaged on the top insert. Holding the Tube squarely on the top insert, move the bottom insert up until the O-Ring just meets the bottom of the Tube. Holding the bottom insert firmly in place, move the top insert (& tube) downwards until the Tube is fully engaged on the bottom insert.
9. Cover Replacement: Reverse stage 1.

**Figure 7**  
**Tube Cleaning &**  
**O-Ring Replacement**



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### Filter Cleaning or O-ring/Filter Element Replacement (See Fig 6)

1. Unscrew filter housing from bottom endblock.
2. Back wash Housing & Filter assembly using clean water.
3. As necessary change the O-rings (G) or Filter (H).
4. Reassemble in reverse order.

### By-pass Loop Air Removal (See Fig 6)

1. Close the isolation valve nearest to where the air was observed.
2. Open the Bleed Valve at the top endblock.
3. Close the bleed valve when the air has been removed.
4. Open the isolation valve.

### Spares

The instruments should not require maintenance to replace parts if the instrument is used in accordance with these instructions. However spare parts are available to meet most needs as detailed below:

For Complete Instruments, see Table 4.

For Major Assemblies, see Table 5.

For Components & Sub-Assemblies, see Table 6.

Complete assembled Instruments consist of a:

- Carrier of flanged or grooved style includes: carrier, process pipes, ferrules & nuts.
- Tube & float assembly of a flow range to suit the nominal bore of the carrier includes: tube, float and top & bottom float stops.
- Indicator by-pass loop includes: parts starting at elbows that join to carrier process pipes, except tube & float assembly.

**Table 4—Complete Instrument**

NB	Flanged		Grooved	
	Part No.	Weight (kg)	Part No.	Weight
50	LPCB-F1/15	4.25	LPCB-F1/20	4.65
80	LPCB-F1/16	5.10	LPCB-F1/21	5.50
100	LPCB-F1/17	6.45	LPCB-F1/22	7.40
150	LPCB-F1/18	8.50	LPCB-F1/23	9.75
200	LPCB-F1/19	11.00	LPCB-F1/24	13.60

**Table 5—Major Assemblies**

NB	Carrier		Tube & Float		By-pass
	Flanged	Grooved	Flanged	Grooved	
50	LPCBC312	LPCBC314	LGTF-F1/15	LGTF-F1/20	LPCB1
80	LPCBC512	LPCBC514	LGTF-F1/16	LGTF-F1/21	
100	LPCBC612	LPCBC614	LGTF-F1/17	LGTF-F1/22	
150	LPCBC812	LPCBC814	LGTF-F1/18	LGTF-F1/23	
200	LPCBC912	LPCBC914	LGTF-F1/19	LGTF-F1/24	

\*The tube & float assemblies of a particular NB are universal between the 2 carrier styles. Two sets of codes have been included for simplicity. However, all tubes, for each NB & carrier style, carry both Platon Ref No's. (See Table 2).

**Table 6—Component & Sub-assemblies (See Fig 6)**

Item	Description	Qty/Assy	Part No.
A	Tube & Float Assy	1	See Table 5
C1	Insert O-Rings - Tube to Insert	2	K23026*
C2	Insert O-Rings - End Connector to Insert	2	K23056*
D	Restrictor Cleaning Valve Assy	1	54150/MK3
E	Polyurethane Seals	4	K28115*
F	Bonded Seals	6	K23014*
G	Filter O-Ring1	2	K23170*
H	Filter Element	1	56272/MK3
I	Filter Assembly (Includes G & H + Housing, End Connectors & Caps)	1	54149/MK3
J	Isolation Valves	2	K49356

\*Sold in packs of 10's

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### Returns & Warranty

Before returning any goods to TT Electronics, you must obtain a Returns form containing a unique returns (CA) authorization number. Failure to do so will result in the goods being returned to you, without any inspection, etc. To obtain this form, contact the QA department of our Sheffield office and by return the form will be faxed to you.

On receipt of the Returns form, fill in any required fields and return it with the goods to the Sheffield office. It is advisable to keep a copy of this form (with authorization no.) for reference purposes.

If the goods have come into contact with any processes or environments that may be harmful to a user, then COSHH Regulations must also be observed. It is requested that a Material Safety Data Sheet (MSDS) is also supplied with returned goods, if this is likely to be the case. If not provided and the goods are suspected of being contaminated, they will be returned to you.

On receipt of the appropriate documentation, the goods will be examined and assessed in accordance with the terms of any Warranty agreement.

### Repairs

Prior to any repair work being carried out, you will be informed of our findings and any charges that may be incurred.

### Replacement

Prior to the supply of any replacements, you will be informed of our findings and any charges that may be incurred.

No replacements will be sent prior to receiving the goods back from you, unless an Order number is supplied to cover the cost of the new unit/s. After inspection, etc. of the returned goods, a Credit may be issued, based on our findings.

### Warranty (extract from Terms and Conditions)

The warranty period is normally 12 months from the date of shipment, except as agreed at the time of sale.

Any misuse of the goods will void any warranty.

For full Warranty and other Contract details, refer to our "Terms & Conditions."

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