

# AUTOMATION

PRODUCTS  
GROUP, INC.

**Operator's Manual**

## **MLS Series**

### **Mechanical Float Level Sensors**

Rev. B1, 4/07



**Automation Products Group, Inc.**

***APG...Providing tailored solutions for measurement applications***

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- **Warranty and Warranty Restrictions**

APG warrants its products to be free from defects of material and workmanship and will, without charge, replace or repair any equipment found defective upon inspection at its factory, provided the equipment has been returned, transportation prepaid, within 24 months from date of shipment from factory.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

No representation or warranty, express or implied, made by any sales representative, distributor, or other agent or representative of APG which is not specifically set forth herein shall be binding upon APG. APG shall not be liable for any incidental or consequential damages, losses or expenses directly or indirectly arising from the sale, handling, improper application or use of the goods or from any other cause relating thereto and APG's liability hereunder, in any case, is expressly limited to the repair or replacement (at APG's option) of goods.

Warranty is specifically at the factory. Any on site service will be provided at the sole expense of the Purchaser at standard field service rates.

All associated equipment must be protected by properly rated electronic/electrical protection devices. APG shall not be liable for any damage due to improper engineering or installation by the purchaser or third parties. Proper installation, operation and maintenance of the product becomes the responsibility of the user upon receipt of the product.

Returns and allowances must be authorized by APG in advance. APG will assign a Return Material Authorization (RMA) number which must appear on all related papers and the outside of the shipping carton. All returns are subject to the final review by APG. Returns are subject to restocking charges as determined by APG's "Credit Return Policy".

## • Introduction

The MLS series mechanical float level sensor is designed to be used in any open tank or vessel for top mounting and with all liquids compatible with stainless steel. This model is intended to provide emptying and filling control.

## • Specifications

### Electrical Characteristics

Max. Contact Rating.....	250 V, 10 AC / 250 V, 0.3 A DC
Withstand Voltage .....	1500 VAC 1 minute or more. (Between each terminal and non-charge part)
Insulation Resistance .....	100 M $\Omega$ or more (measured with 500 VDC megger between each terminals and non-charge part)

### Mechanical Characteristics

Buoyancy of Float .....	Approx. 2.10 N (SG = 1)
Allowable Impact .....	100 m/s <sup>2</sup>

### Operational Characteristics

Control Width .....	0.6 ~ 850 mm (see figure on page 6)
Specific Gravity .....	0.85 or more
Float Submersion .....	51 mm
Gap Between Rod and Float .....	4.5 mm

### Environment

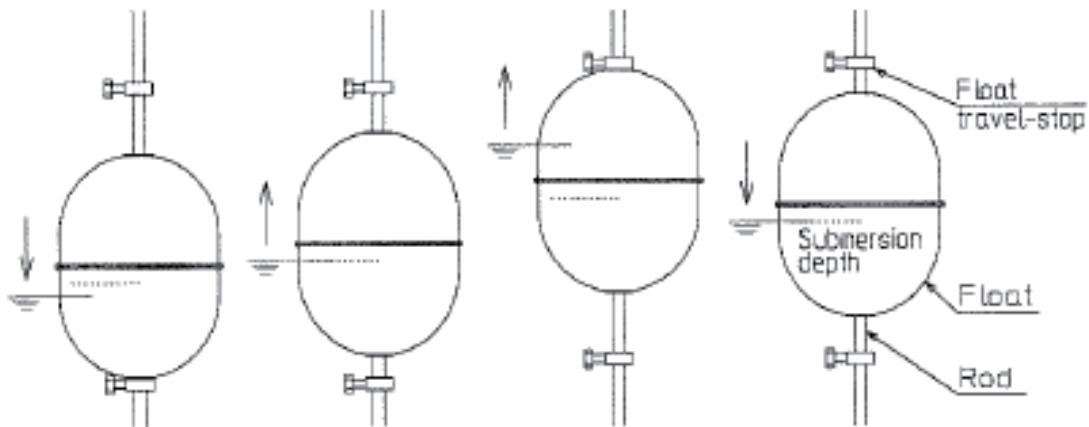
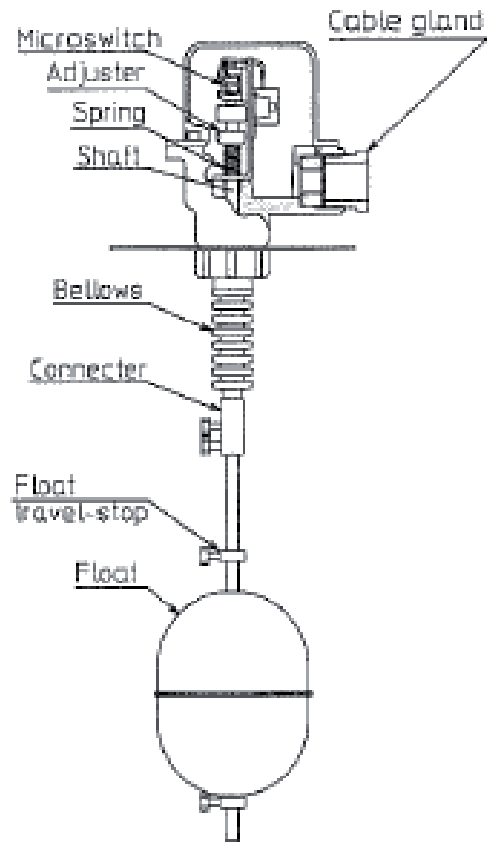
Working Temperature.....	0 to 80°C
Application .....	Leave open tank

### Other

Construction .....	IP42
Terminal Box .....	Phenol (Cover: Polypropylene)
Wetted Parts.....	304 Stainless Steel (Bellows: Polychloroprene Rubber)
Cable Inlet.....	Equivalent JIS F 20a (G 3/4)

• **Operating Principle**

The float travels between both float stops. The microswitch does not actuate until it reaches either stops. The lower level is actuated by the weight of the float. The upper level is actuated by the force against buoyancy of the float. Hence, the hysteresis established between stops.



## • Installation

### Unpacking

The MLS Series has been thoroughly inspected and carefully packed at the factory to prevent damage during shipment. When unpacking, exercise due care not to subject the instrument to mechanical shock. After unpacking, visually check the instrument exterior for damage.

Note the following points:

- Do not bend and pull the shaft extremely during installation.
- Make sure that the float type level switch is according to ordering specifications.
- Protector of metal made is put between tip of shaft and microswitch to avoid mechanical shock during shipment. Remove the protector certainly before using.

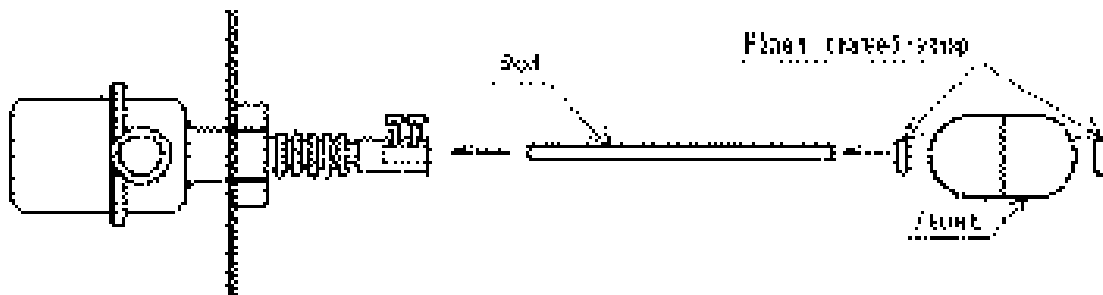
### Installation Location

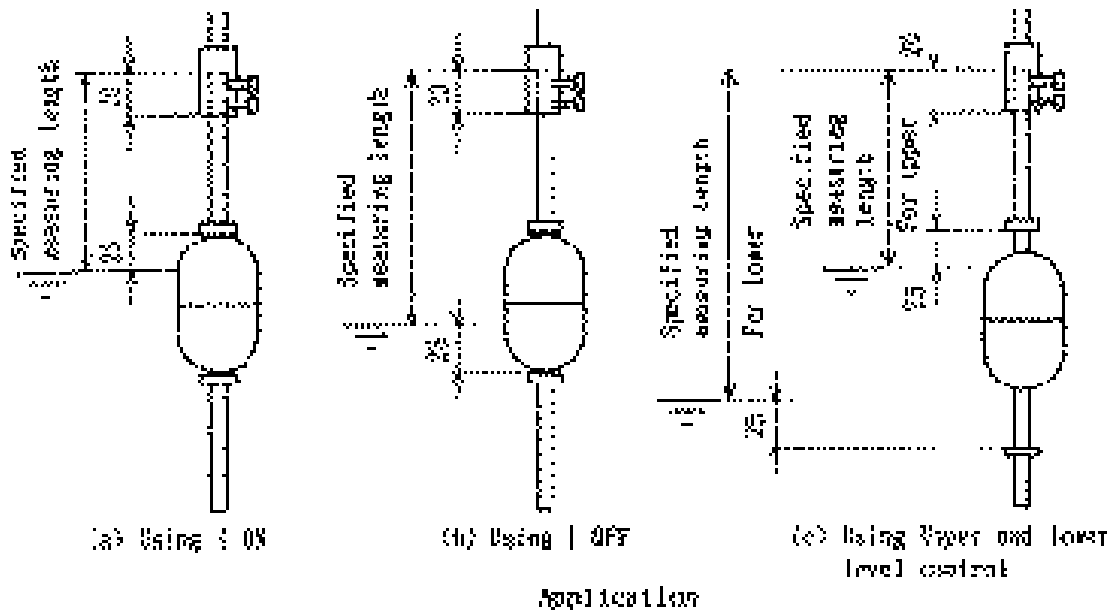
This switch should be installed in an area where the following conditions:

- Provide ample space for maintenance/inspection.
- Low relative humidity and no exposure to moisture.
- No corrosive gases (such as  $\text{NH}_3$ ,  $\text{SO}_2$ ,  $\text{Cl}_2$  and so on.)
- No excessive vibration

### Assembly

Usually, the MLS is set to specified measuring length before shipment. When not specified, each parts are packed severally. In that case, proceed to assemble as follows.

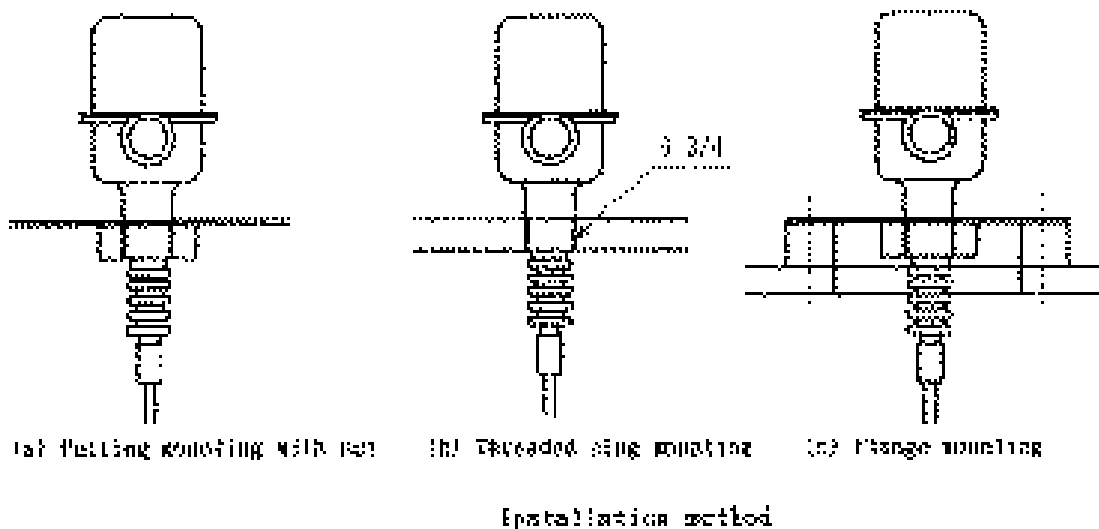




Notes:

- Setting length is adjusted at SG = 1.  
When SG of liquid is not 1, reset both float travel-stops due to changing the actuation level according to length of the actual level.
- Do not cut and do not join the rod. Otherwise the level switch may malfunction.

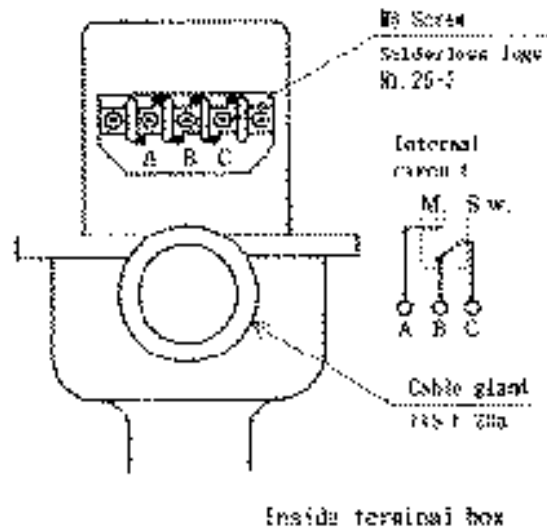
Installation Method



## • Wiring

Note:

- This switch contact is S.P.D.T. by microswitch.
- Do not exceed the contact ratings.
- Install solderless lugs fitted to M3



## • Technical Notes

- This switch shall be mounted vertically.
- When there are surface wave motion, install stilling tube.

## • Maintenance/Inspection

The following annual servicing tasks should be carried out on the switch:

- Visually check the switch exterior for damage.
- If sediment or other foreign matter are stained on wetted parts of switch, keep wetted parts of switch clean.
- Connect ohmmeter or electronic buzzer to terminals, check the switch actuation corresponding to float operation.

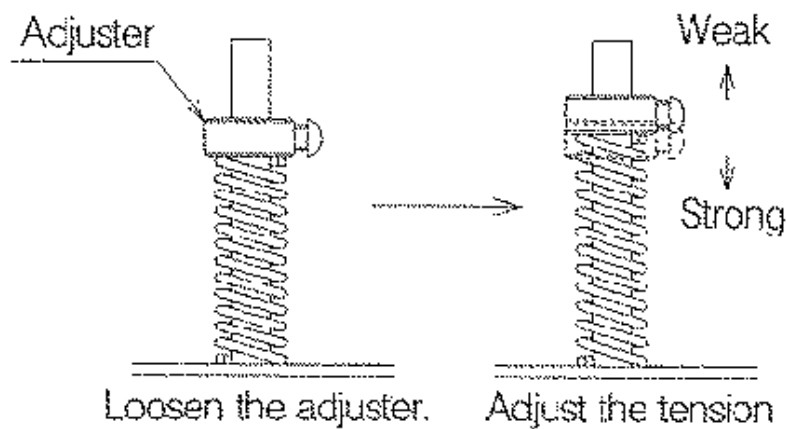
Reinstall and rewiring the switch after maintenance/inspection in accordance with the Installation and Wiring sections of this manual.



- **Adjustment Procedure**

The tension adjuster is located on one end of the shaft (see the dimension drawing in this manual). The spring operating tension is factory set, but may require adjustment on site, especially if the length of the operating rod is changed. Correct operation should be checked and the spring tension should be adjusted if necessary.

- If the switch operating position is higher than the desired level, lower the adjuster a little.
- If the switch operating position is lower than the desired level, raise the adjuster a little.



## • Trouble Shooting

Use the following information to troubleshoot the malfunctioning sensor. If the remedies are unsuccessful, ask APG for repair or replacement.

### Problem

Liquid exceeds the actuation level, but switch does not activate

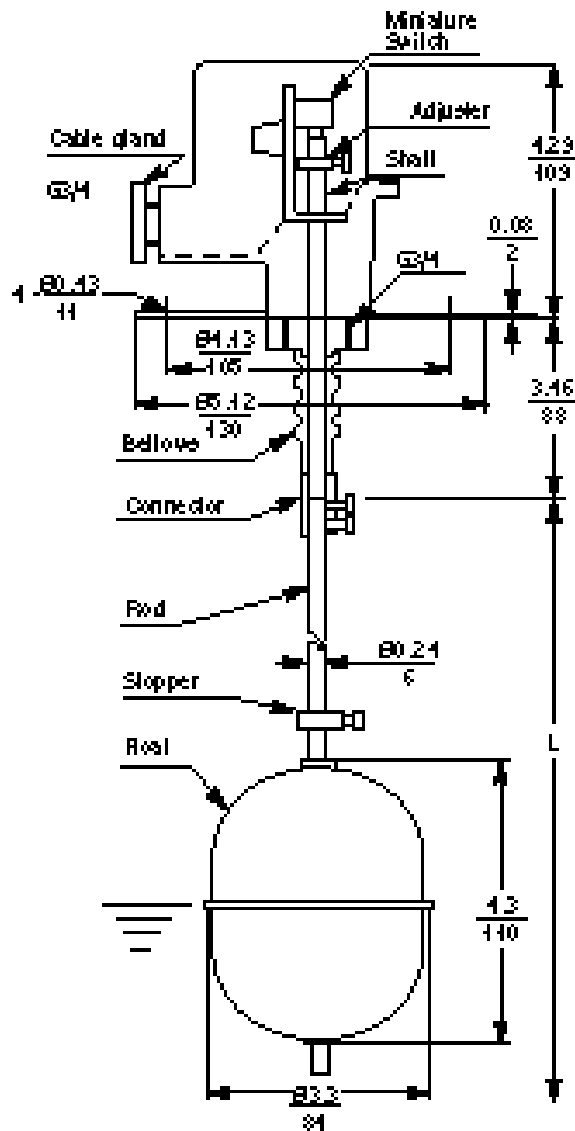
Possible Causes	Remedies
SG is larger than 0.85	Choose another technique
Miswiring	Wire correctly
Set for improper float travel-stop	Adjust position according to "Assembly"
Liquid immerse in float	Replace the switch
Affected by deposit	Clean the switch
Microswitch is damaged	Replace the microswitch

### Problem

Liquid does not exceed the actuation level, but switch activate

Possible Causes	Remedies
Miswiring	Wire correctly
Set for improper float travel-stop	Adjust position according to "Assembly"
Affected by deposit	Clean the switch
Microswitch is damaged	Replace the microswitch

• Dimensions – in./mm



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