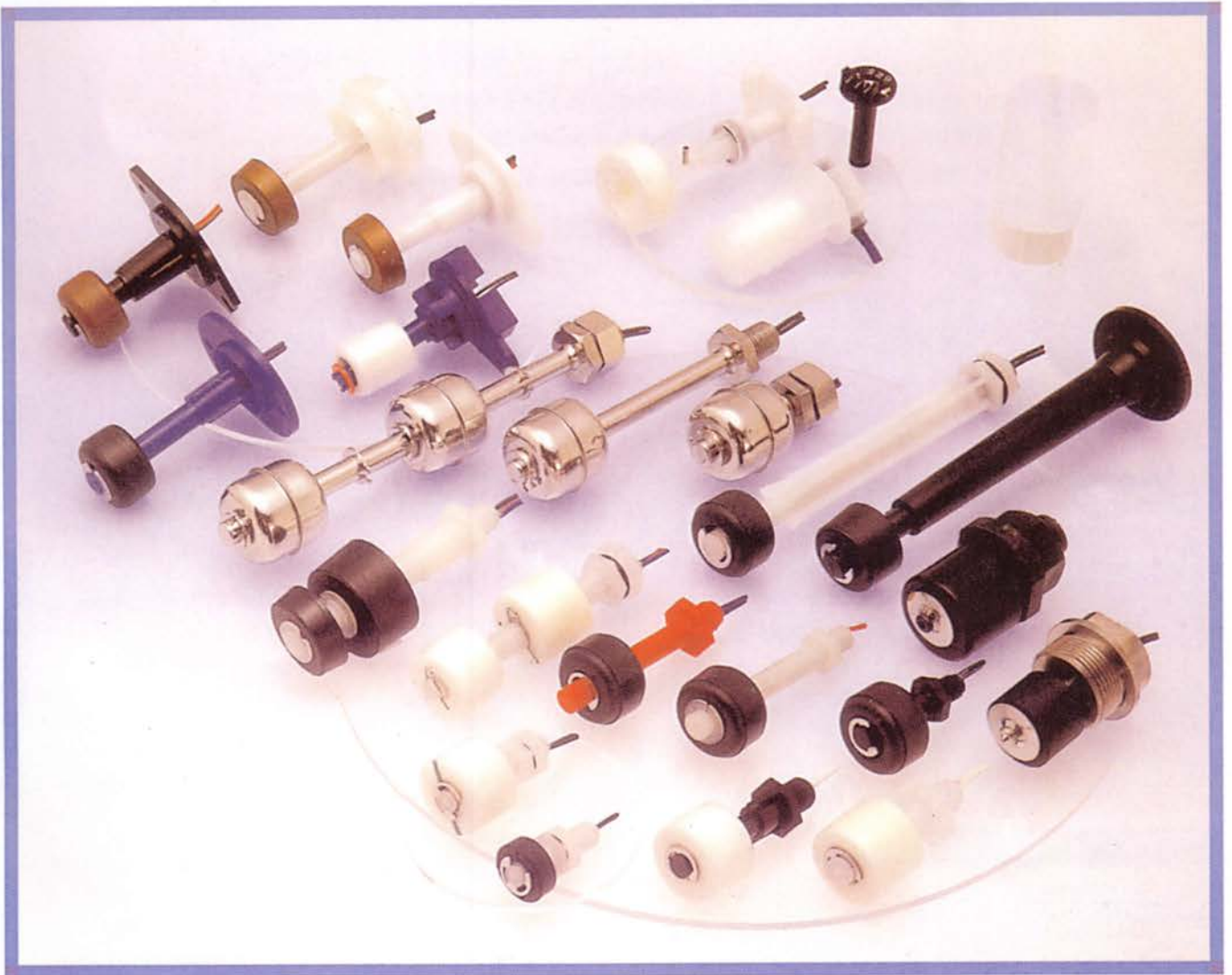


# ***Level Sensors***

# ***Flow Sensors***

*We are the innovative choice in sensing devices*



Products shown in this catalogue are the examples of our Japan ALEPH's standard products. They are also a guideline for developing and designing customised products to satisfy your needs.

We wish to know the technical information such as application, properties, conditions/environments for use and the mounting ways of your products, so as to make perfectly suited products to you. In order to serve you better, we have established "ALEPH's R&D Supporting System", which includes the steps of designing, making the products on the trial base, evaluating these products, and manufacturing the products on the commercial base to cater for all your needs.

You can utilise the unique "ALEPH's R&D Supporting System", which has a good reputation and satisfaction of many customers and can develop your special-purpose sensors as desired, and fabricate and assemble these sensors on a commercial base.

<b><i>CONTENTS</i></b>	<b><i>Page</i></b>
<b><i>Features</i></b>	<b><i>1</i></b>
<b><i>Level Sensors</i></b>	
<i>FS-3101 / 3201, FS-4101 / FS-4201</i>	<i>2</i>
<i>FS-6101 / 6205, FS-8101 / WF-01</i>	<i>3</i>
<i>FS-0033, FS-0159</i>	<i>4</i>
<i>FSD-02</i>	<i>5</i>
<i>ESL Series of a Side Mounted Type</i>	<i>6</i>
<b><i>Flow Sensors</i></b>	<b><i>8</i></b>
<b><i>Applications</i></b>	<b><i>10</i></b>
<b><i>Application Notes</i></b>	<b><i>11</i></b>

# Features

## 1. High Reliability

The reed switch has a high accuracy and resistance to bad external environments, because it is completely hermetically sealed.

## 2. Long Life

The reed switch has an infinite electric life, and does not suffer from any mechanical attack because of non-contact driving.

## 3. Variety of Applications

The reed switch exhibits stable operating characteristics under micro loading. Such characteristics permit to use various operating methods with combinations of magnets. There is a wide range of specifications, so that one can be easily used and applied.

## 4. Cost merits

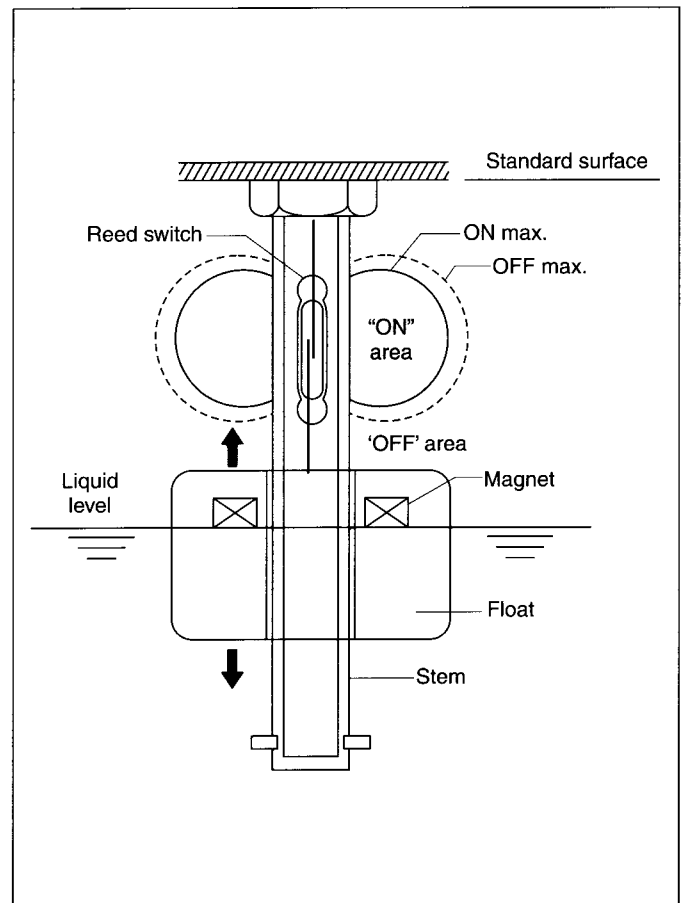
Circuit design for using a reed switch is easy and simple. Therefore a reed switch applied to equipment and devices can make the performance more reliable and durable. The total cost including maintenance and power consumption can be reduced.

### ■ Operating Principle

The level sensor - consists of a vertical stem and a free moving float containing a magnet. The vertical stem contains a reed switch which is activated by the proximity of the float.

### ■ Operating Standards

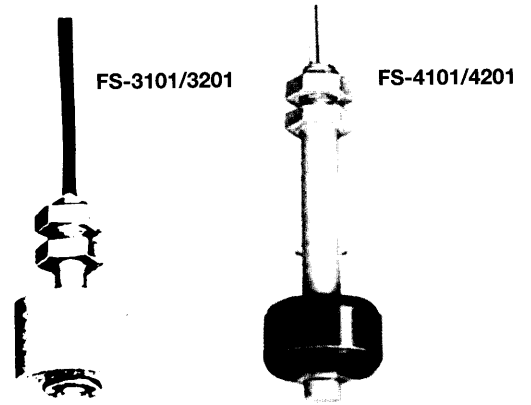
There are two types: the first type is in which the contact turns "ON" or "OFF" when the liquid level rises up, and the other type is in which the contact turns "ON" or "OFF" when the liquid level falls down. This diagram indicates the mounting surface as a base surface to show the distances from the base surface to the "ON" position and "OFF" position. The difference in the distance between the "ON" position and the "OFF" position is called a "correspondence difference". The "ON" distance, "OFF" distance and "correspondence difference" determines the operating standards. In the case where the liquid level moves up and down like rippling waves and the float moves in the same manner, the "ON" and "OFF" may be repeated. In this case, the level sensor having a good "correspondence difference" performance is more suitable to use.



# Level Sensor

**FS-3101/3201**  
**FS-4101/4201**

- Resin case (use in water and oil)
- Fitted by nut
- Single float type

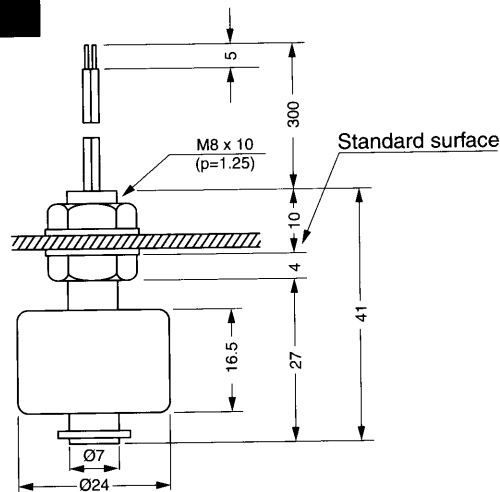


## ■ Specification

ITEM		FS-3101/3201	FS-4101/4201
Fluid Applicable		Water (1.0)	Kerosene (0.79)
Material	Case	PP resin	6 Nylon
	Float	PP resin	NBR (polyform)
Electrical Characteristic	Max. Switching Power	50W	50/10W
	Max. Switching Voltage	200V	200V
	Max. Switching Current	0.6A	0.6A
	Contact Withstand Voltage (DC)	250V	250V
	Contact Resistance	0.3Ω max.	0.3Ω max.
Operating Temperature		-10 to +60°C	-20 to +80°C

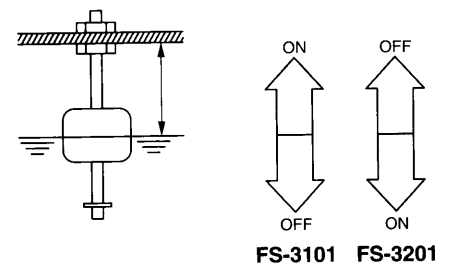
### FS-3101/3201

- Outline dimensions (unit : mm)



- Movement standard (unit : mm)

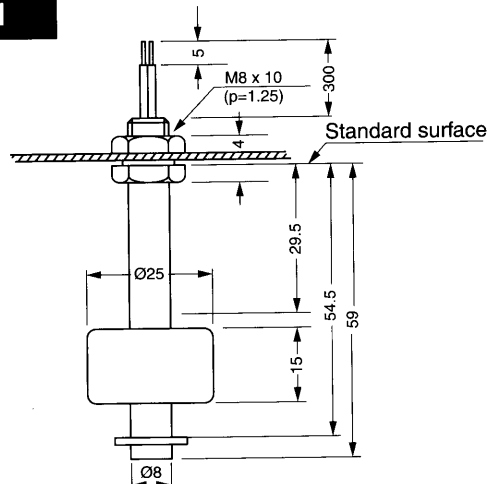
If reverse installed, the movement distance will be changed, please contact us for further information.



	FS-3101	FS-3201
ON	10.5 min.	17.5 max.
OFF	17.5 max.	10.5 min.

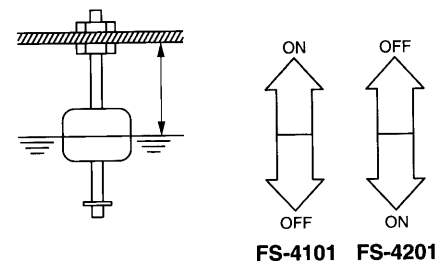
### FS-4101/4201

- Outline dimensions (unit : mm)



- Movement standard (unit : mm)

If reverse installed, the movement distance will be changed, please contact us for further information.

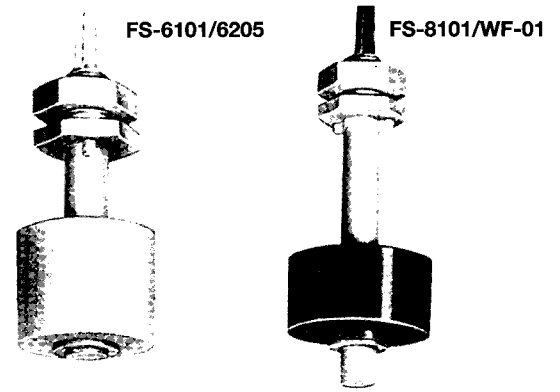


	FS-4101	FS-4201
ON	34.0 min.	44.0 max.
OFF	41.0 max.	35.0 min.

# Level Sensor

**FS-6101/6205**  
**FS-8101/WF-01**

- Resin case (use in water and oil)
- Fitted by nut
- Single float type

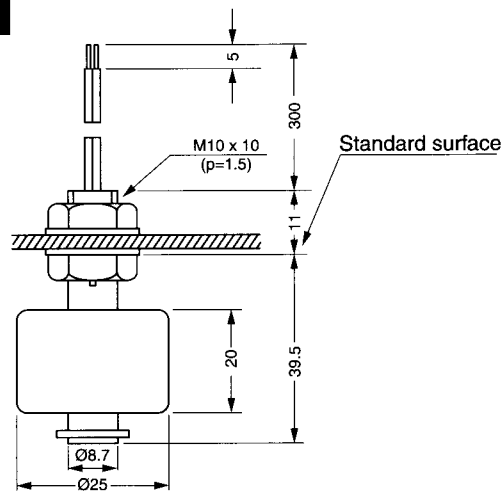


## ■ Specification

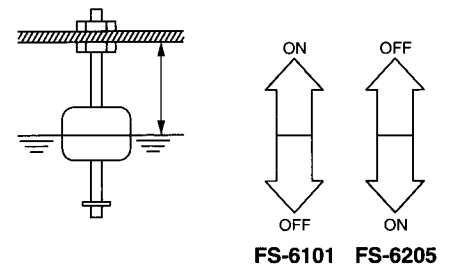
ITEM		FS-6101/6205	FS-8101/WF-01
Fluid Applicable		Water (1.0)	Kerosene (0.79)
Material	Case	PP resin	6 Nylon
	Float	PP resin	NBR (polyform)
Electrical Characteristic	Max. Switching Power	50W	10W
	Max. Switching Voltage	200V	200V
	Max. Switching Current	0.6A	0.5A
	Contact Withstand Voltage (DC)	250V	300V
	Contact Resistance	0.3Ω max.	0.2Ω max.
Operating Temperature		-10 to +60°C	-20 to +80°C

### FS-6101/6205

- Outline dimensions (unit : mm)



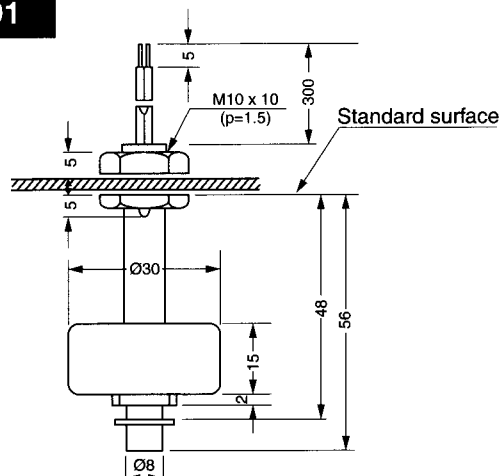
- Movement standard (unit : mm)  
If reverse installed, the movement distance will be changed, please contact us for further information.



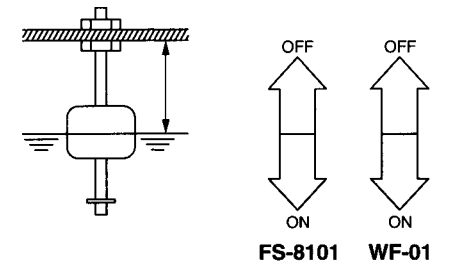
	FS-6101	FS-6205
ON	9.0 min.	21.0 max.
OFF	19.5 max.	14.0 min.

### FS-8101/WF-01

- Outline dimensions (unit : mm)



- Movement standard (unit : mm)  
If reverse installed, the movement distance will be changed, please contact us for further information.



	FS-8101	WF-01
ON	39.5 min.	35 ±2
OFF	32.5 max.	5.5 ±2

# Level Sensor

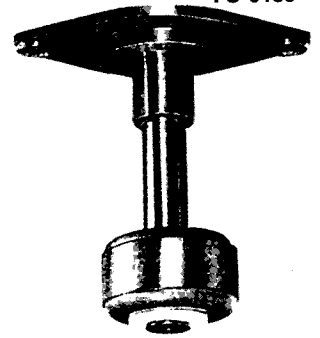
# FS-0033/FS-0159

- Resin case (use in water and oil)
- Fitted by nut
- Single float type

FS-0033



FS-0159

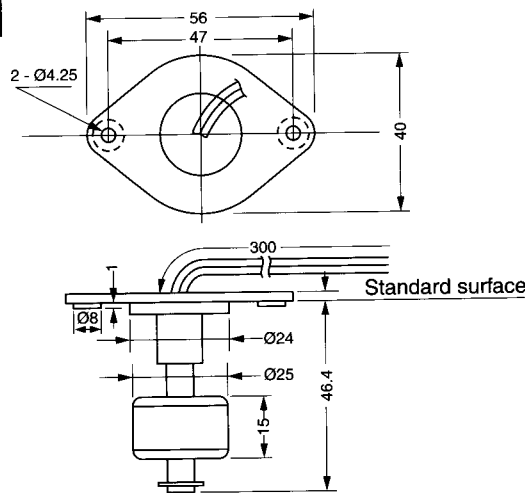


## ■ Specification

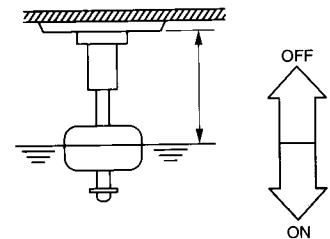
ITEM		FS-0033	FS-0159
Fluid Applicable		Water (1.0)	Kerosene (0.79)
Material	Case	PP resin	6 Nylon
	Float	PP resin	NBR (polyform)
Electrical Characteristic	Max. Switching Power	50W	10W
	Max. Switching Voltage	200V	200V
	Max. Switching Current	0.6A	0.5A
	Contact Withstand Voltage (DC)	250V	300V
	Contact Resistance	0.3Ω max.	0.2Ω max.
Operating Temperature		-10 to +60°C	-20 to +80°C

### FS-0033

- Outline dimensions (unit : mm)



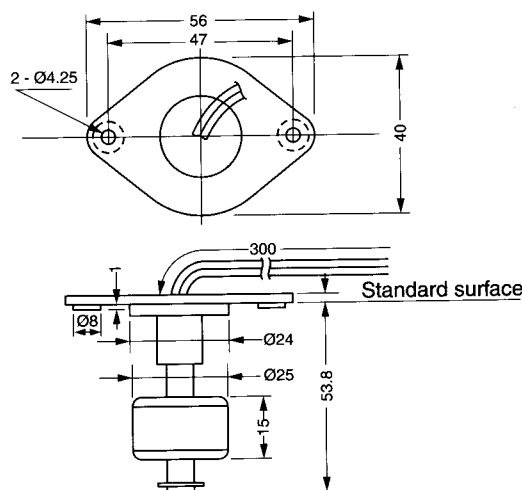
- Movement standard (unit : mm)



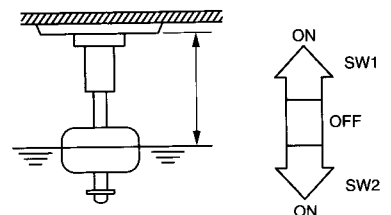
ON	29.0 min.
OFF	35.5 max.

### FS-0159

- Outline dimensions (unit : mm)

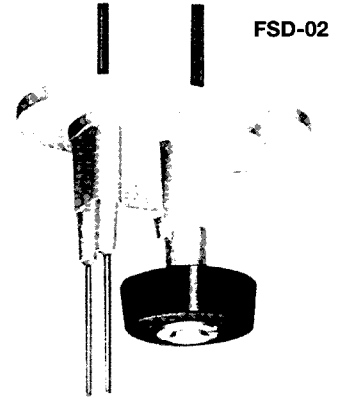


- Movement standard (unit : mm)



SW1 (upper limit)	ON: 19.0 min. OFF: 26.0 max.
SW2 (low limit)	ON: 40.7 max. OFF: 33.7 min.

- Resin case (use in oil)
- Fitted by flange
- For detection of two fluids  
(detect water and kerosene)

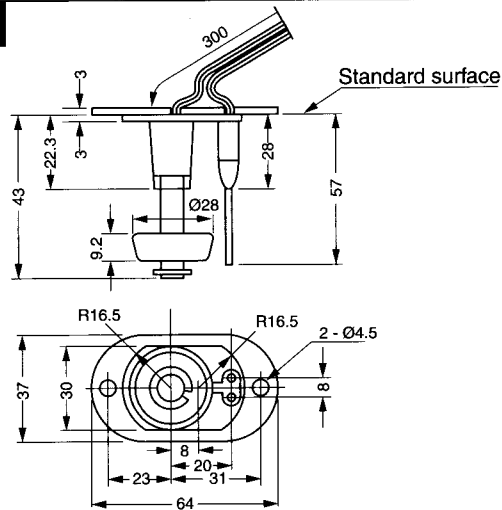


## ■ Specification

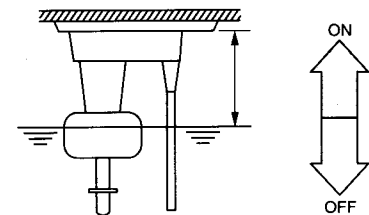
ITEM		FSD-02
Fluid Applicable		Kerosene (0.79)
Material	Case	6 Nylon
	Float	NBR (polyform)
Electrical Characteristic	Max. Switching Power	7W
	Max. Switching Voltage	100V
	Max. Switching Current	0.2A
	Contact Withstand Voltage (DC)	200V
	Contact Resistance	0.3Ω max.
Operating Temperature		-25 to +60°C

## FSD-02

- Outline dimensions  
(unit : mm)



- Movement standard (unit : mm)

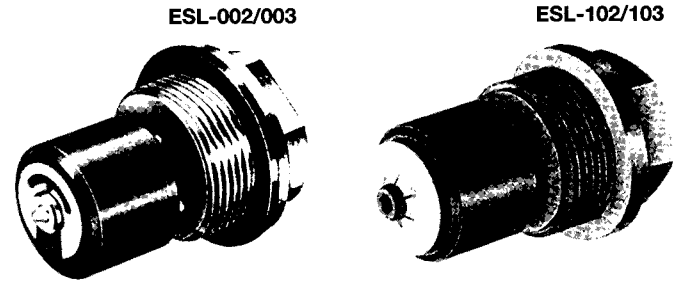


ON	24.3 min.
OFF	31.5 max.

# Side Installed Type Level Sensor

ESL-002/003  
ESL-102/103

- Fitted by screw
- Metal or PP resin case

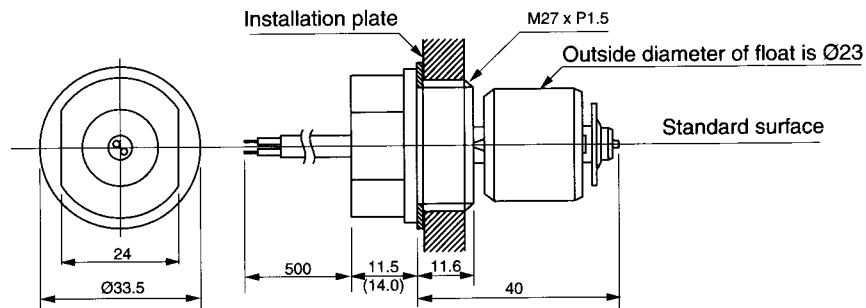


## ■ Specification

ITEM		ESL-002/003	ESL-102/103
Fluid Applicable		Water (1.0) or pneumatic oil (0.88)	Water (1.0)
Material	Case	Plated with Copper-Nickel	PP resin
	Float	NBR (polyform)	NBR (polyform)
Electrical Characteristic	Max. Switching Power	10W	10W
	Max. Switching Voltage	100V	200V
	Max. Switching Current	0.25A	0.25A
	Contact Withstand Voltage (DC)	200V	250V
	Contact Resistance	0.2Ω max.	0.3Ω max.
Operating Temperature		-30 to +150°C *1	-20 to +90°C *1

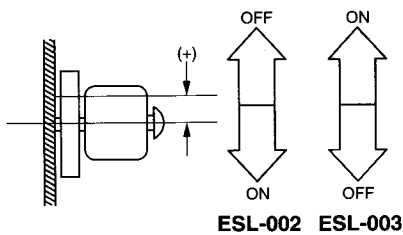
\*It is also available for use in oil when changed to 6 Nylon case, please contact us.

## ■ Outline dimensions (unit : mm)



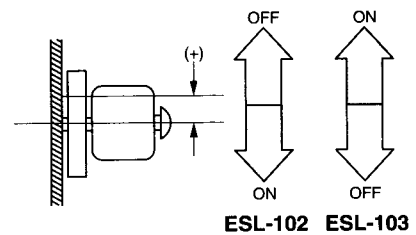
\*( ) is dimension of resin case (ESL-102/103)

## ■ Movement standard (unit : mm)



	ESL-002		ESL-003		
	Water	P. oil		Water	P. oil
ON	+10.0 max.	+11.5 max.	OFF	+9.0 max.	+10.5 max.
ON	+2.0 min.	+3.0 min.	OFF	+1.0 min.	+2.0 min.

## ■ Movement standard (unit : mm)



	ESL-102		ESL-103	
	Water		Water	
OFF	+10.0 max.	ON	+9.0 max.	
ON	+2.0 min.	OFF	+1.0 min.	



# Side Installed Type Level Sensor

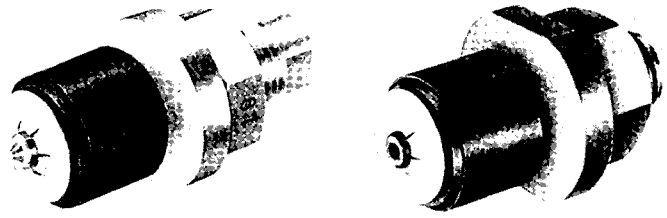
ESL-032/033

ESL-132/133

- Fitted by screw
- Metal or PP resin case

ESL-032/033

ESL-132/133



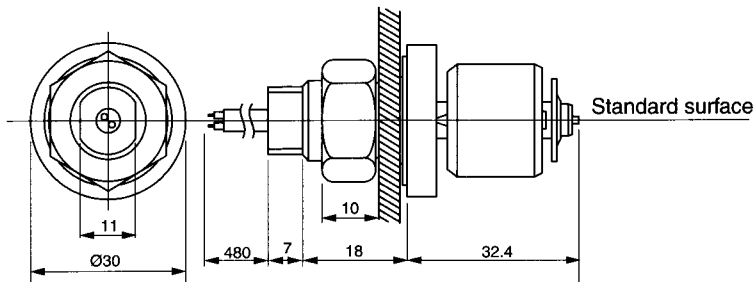
## Specification

ITEM		ESL-032/033	ESL-132/133
Fluid Applicable		Water (1.0) or pneumatic oil (0.88)	Water (1.0)
Material	Case	Plated with Copper-Nickel	PP resin
	Float	NBR (polyform)	NBR (polyform)
Electrical Characteristic	Max. Switching Power	10W	10W
	Max. Switching Voltage	100V	100V
	Max. Switching Current	0.25A	0.25A
	Contact Withstand Voltage (DC)	200V	200V
	Contact Resistance	0.2Ω max.	0.2Ω max.
Operating Temperature		-30 to +150°C *1	-20 to +100°C *1

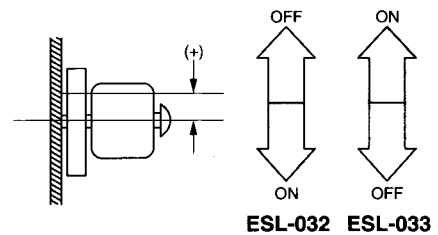
\*It is also available for use in oil when changed to 6 Nylon case, please contact us. \*1 : When used in pure water, operating temperature will become +70°C.

### ESL-032/033

- Outline dimensions (unit : mm)



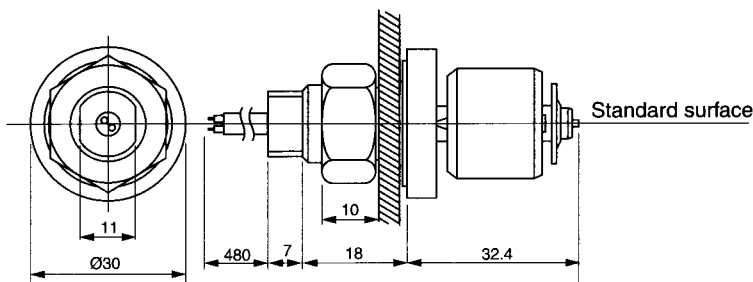
- Movement standard (unit : mm)



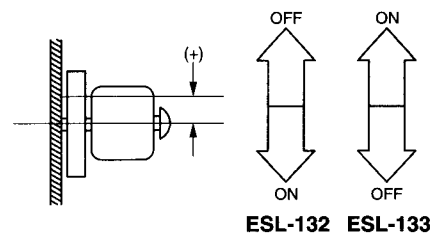
ESL-032			ESL-033		
	Water	P. oil		Water	P. oil
ON	+10.0 max.	+11.5 max.	OFF	+9.0 max.	+10.5 max.
ON	+2.0 min.	+3.0 min.	OFF	+1.0 min.	+2.0 min.

### ESL-132/133

- Outline dimensions (unit : mm)



- Movement standard (unit : mm)



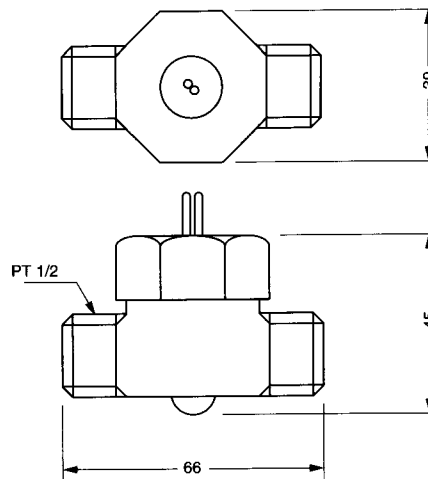
ESL-132		ESL-133	
	Water		Water
OFF	+10.0 max.	ON	+9.0 max.
ON	+2.0 min.	OFF	+1.0 min.

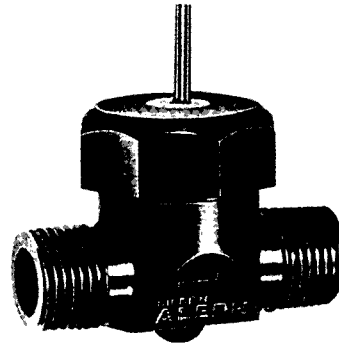
- Flow sensor characterised by its small, light and low cost design using plastic case and reed switch as sensor.
- The use of reed switch ensures long operation lifetime in various conditions. It provides stable flow sensing output for years of continuous operation.
- Application: Water cooling system control of various machines, flow control in various processes, pump, water supplier, water heater, etc.

## ■ Specification

ITEM		RPS-110511-101	RPS-111011-101	RPS-111511-101	RPS-112011-101
Detection Flow Rate (litre/min.)	ON	Equal to or less than 0.68	1.0 ±0.4	1.5 ±0.4	2.0 ±0.5
	OFF	Equal to or more than 0.25	0.7 ±0.4	1.0 ±0.4	1.5 ±0.5
Withstanding Pressure		8kgf/cm <sup>2</sup>			
Pressure Dissipation		below 0.2/cm <sup>2</sup> (when in 10 litre/min.)			
Electrical Characteristic	Max. Switching Power	5W			
	Max. Switching Voltage	100V			
	Max. Switching Current	0.25A			
	Contact Withstand Voltage (DC)	250V			
	Contact Resistance	0.2Ω max.			
Operating Temperature		-10 to +80°C			
Applicable Fluid		Water			
Material		Case: PP, 6 Nylon Spring: SUS Float: PP, 6 Nylon Filling Plastic: Epoxy Sensing Switch: Reed Switch			
Sensing Flow		1 to 7 litre/min. adjustable			

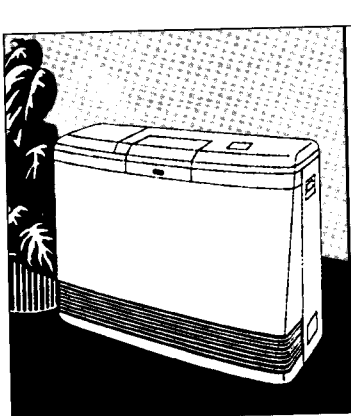
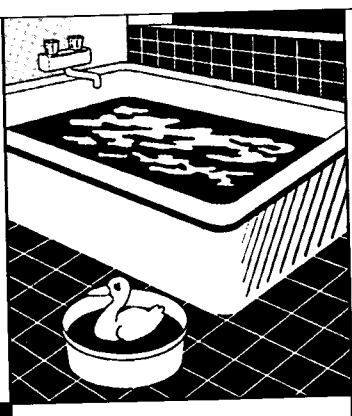
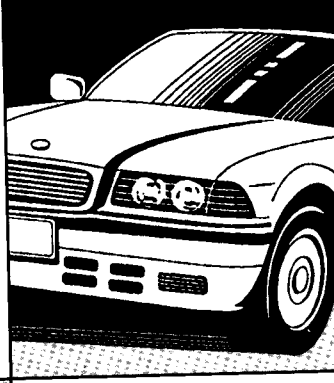
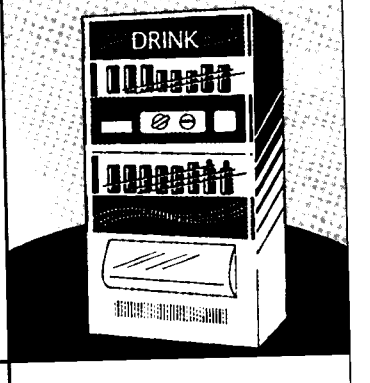
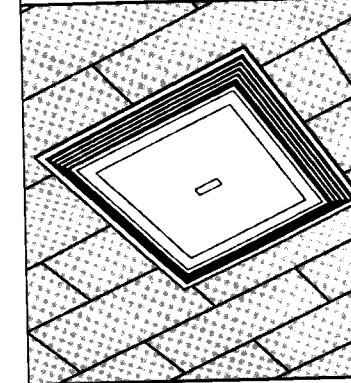
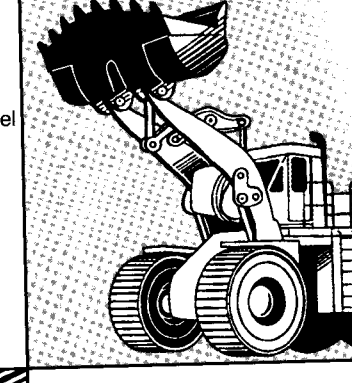
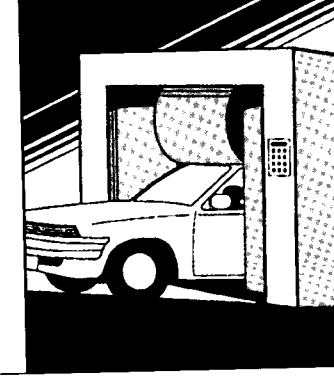
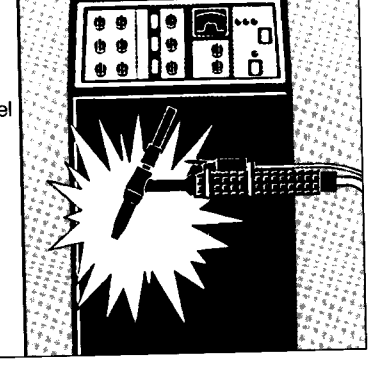
## ■ Outline dimensions (unit : mm)





ITEM		RPS-112511-101	RPS-113011-101	RPS-113511-101
Detection Flow Rate (litre/min.)	ON	2.5 ±0.5	3.0 ±0.5	3.5 ±0.5
	OFF	2.0 ±0.5	2.4 ±0.5	3.0 ±0.5
Withstanding Pressure		8kgf/cm <sup>2</sup>		
Pressure Dissipation		below 0.2/cm <sup>2</sup> (when in 10 litre/min.)		
Electrical Characteristic	Max. Switching Power	5W		
	Max. Switching Voltage	100V		
	Max. Switching Current	0.25A		
	Contact Withstand Voltage (DC)	250V		
	Contact Resistance	0.2Ω max.		
Operating Temperature		-10 to +80°C		
Applicable Fluid		Water		
Material		Case: PP, 6 Nylon Spring: SUS Float: PP, 6 Nylon Filling Plastic: Epoxy Sensing Switch: Reed Switch		
Sensing Flow		1 to 7 litre/min. adjustable		

# Examples of Applications

	<p><b>Domestic Appliance</b> Fan Heater Humidifier Air Conditioner</p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of remaining amount of kerosene</li> <li>• Detection of inclusion of different liquid</li> <li>• Detection of liquid level</li> </ul>		<p><b>House Equipments</b> Bath Toilet Boiler Solar system</p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of liquid level</li> <li>• Detection of liquid flow</li> </ul>
<p><b>Automobiles</b></p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of radiator liquid level</li> <li>• Detection of liquid washer surface</li> <li>• Detection of engine oil level</li> <li>• Detection of brake oil level</li> </ul>		<p><b>Vending Machine</b></p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of remaining amount of liquid</li> </ul> <p>&lt;Flow Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of plugging of pipelines</li> </ul>	
	<p><b>Air Conditioner</b></p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of drain liquid level</li> </ul>		<p><b>Construction Machinery</b></p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of radiator liquid level</li> <li>• Detection of engine oil level</li> <li>• Detection of brake oil level</li> <li>• Detection of working liquid level</li> <li>• Detection of transmission oil level</li> </ul>
<p><b>Car Washer</b></p> <p>&lt;Level Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection of water level</li> </ul>		<p><b>Welding Machine</b></p> <p>&lt;Flow Sensor&gt;</p> <ul style="list-style-type: none"> <li>• Detection cooling water level</li> </ul>	

# Application Notes

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## ■ Tightening Torque

When fitting a sensor, tighten with a torque of 6kg/cm or less. In the case of mounting facing downward, check the material and the shape of surface prior to installation. In addition, avoid tools transferring shock such as pneumatic screw drivers.

## ■ Liquid Used

The switching levels (ON point/OFF point) in this catalogue are for stipulated liquids. Depending upon the type of liquid used, switching levels will change. In addition, when used in a high viscosity liquid, the floating action may not be smooth. Consult us if using in a special liquid. Also, when liquids other than the stipulated ones are used, deterioration of materials may occur. Therefore, please consult us.

## ■ Shock

When a sensor falls from a height of 30cm or more to the floor, characteristics such as pull-in value (ON point), the drop-out value (OFF point) and the current value will change. Therefore, please handle it carefully.

## ■ Interference From External Magnetism

In the case of the tank being of a magnetic substance and the distance between the float magnet and the tank is small, the position of actuation may be affected. In addition, when the sensor is used near a source generating a strong magnetic field such as a transformer or a motor, switching positions may be influenced depending upon the force of the magnetic field. Therefore, confirm the actual operating conditions and environment (by means of test instrument).

## ■ Protection of Contact Point

### 1. Inductive load

When an inductance such as a motor, a coil or an electromagnetic solenoid are used as a load, be careful not to create a back electromotive force of several hundred volts on opening/closing the contact point of the reed switch, thereby, deteriorating the life of the contact point dramatically due to discharging. In order to prevent this, an arc-preventing circuit such as a CR circuit, varistor or a diode are necessary.

### 2. Capacitive load

When it is used with a capacitive load such as a condenser load, a lamp load and a cable load, a surge suppressor and a protection resistance are necessary in order to prevent welding of the contact point due to surge current exceeding the capacity of the contact point of the reed switch.

# **Memorandum**

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# Conditions of Purchase

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## 1. Change of Specifications

Please note in advance that the specifications/contents of the products shown in this catalogue may be partly changed for the purpose of improvement.

## 2. Agreement of Specification

In your adoption of the product shown in this catalogue, including products partly changed in their specification as requested, we will make an agreement with you noting that the equipments/apparatuses containing the adopted product mounted therein are necessarily identified in the specification. Otherwise, we will not be able to fulfil our responsibility, even when any breakdown in functions or trouble on safety of the product occurred in the equipments/apparatuses.

## 3. Use Methods/Conditions/Environments

In using the adopted product referred to in paragraph 2 above, please draw your attention to the use methods/conditions/environments indicated in the agreed specification. If the products are used under the wrong ranges of the use methods/conditions/environments, beyond the range indicated in the agreed specification, and it results in the occurrence of any difficulties with the product liability, we will not be able to fulfil our responsibility for the damages due to the difficulties.

## 4. Term of Guarantee

The term of guarantee of the products is one (1) year from the delivery date when they were delivered to the place as requested by a buyer.

## 5. Range of Guarantee

If the breakdown due to our responsibility occurred during the term as indicated in the preceding paragraph, the broken part(s) is(are) exchanged with a fresh part(s) or repaired at our responsibility, except for cases (1) to (4) as follows:

- (1) User handled it improperly or incorrectly;
- (2) The breakdown was not caused by the products themselves;
- (3) The products were reformed/improved by other persons or companies other than our company; and
- (4) The breakdown was inevitably caused by disasters such as natural disasters.

Furthermore, the "guarantee" referred to herein is applied to the damage of the products themselves, but not to the damage derived by the break down of the products.

## 6. Range of Service

The price of the products does not involve our service charge for sending our technical persons to you. Our service charges are incurred for the following cases:

- (1) For our arranging or setting and adjusting of the product, and our attending to the test operation;
- (2) For maintenance, adjustment and repairing by us; and
- (3) For technical guidance or education by us to your technical persons.

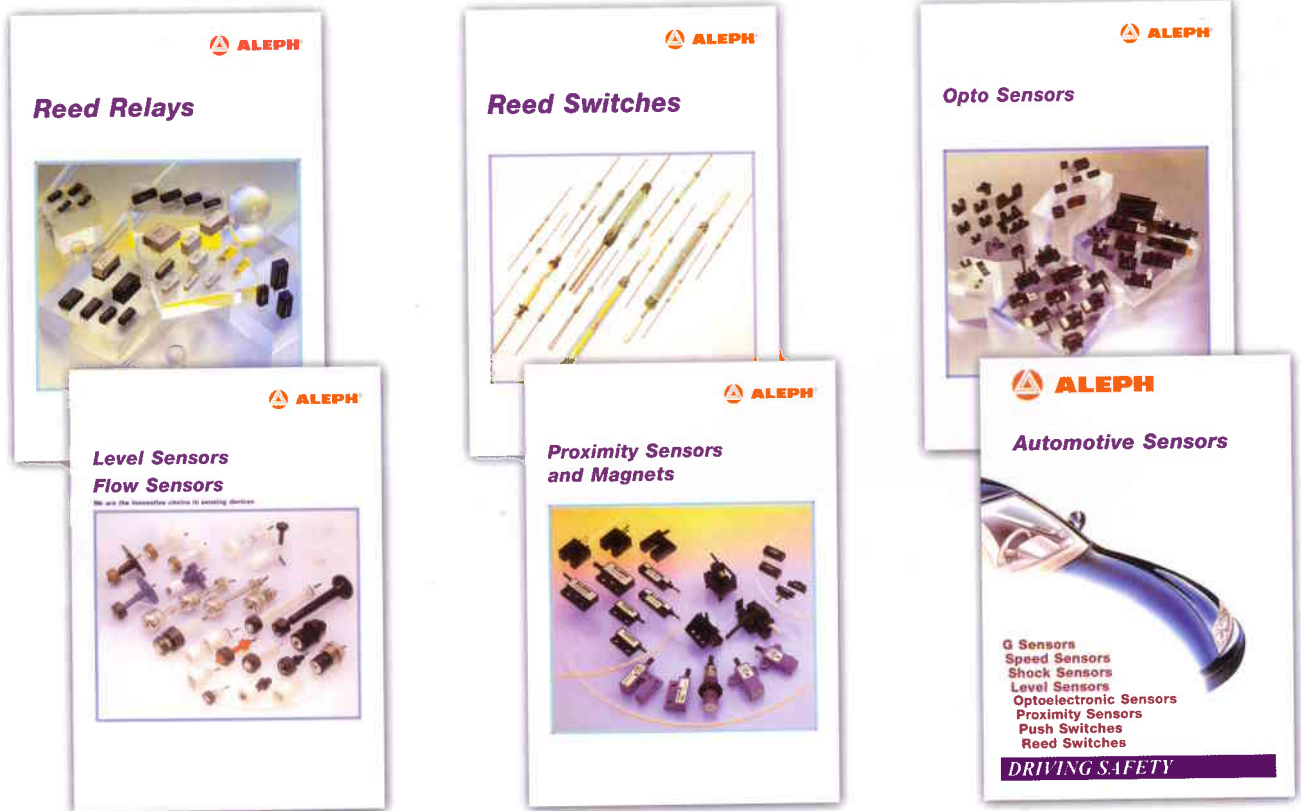
## 7. Copyright

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Aleph manufactures and supplies:

- Reed Relays
- Reed Switches
- Opto Sensors
- Level, Flow and Pressure Sensors
- Proximity Sensors and Magnets
- Automotive Sensors

## **ALEPH COMPONENT PRODUCT CATALOGUES**



For further information on any of these products, please contact your local Aleph sales office given below:



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