

WATER LEVEL ALARM & PUMP ON/OFF CONTROL SYSTEM	
Industrial & Marine application	Model: WLAPC

INTRODUCTION

The Autonics magnetically operated Pump On/Off Water Level Control System are designed for External or Direct Mounting and provide the water level control functions requirement for steam boiler operating automatically under occasional supervision. The system design also satisfy the recommended requirements for such control as stated in Guidance Note PM5 issued by the Health & Safety Executive.

DESCRIPTION

The Control Systems provide for On/Off operation of the boiler feed pump, high and/or low water alarm and burner cut-out (or burner lock-out) and comprise: -

1. Low Water Level Alarm

Single switch model, for independent second low water level overriding alarm and burner lockout.

2. Dual Control

Two-switch model (standard), for pump control and first low water level alarm and burner cutout.

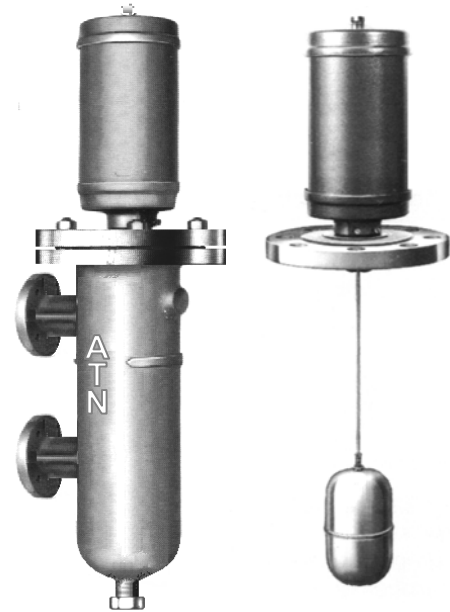
3. High, Low and Extra Low Water Level Alarm

Three-switch model for independent second low water level overriding alarm and burner lockout high water alarm.

The Control functions are affected by float controlled magnetically operated switch units. As the water level in the boiler falls or rises the switch units operate at pre-determined levels to give the appropriate function.

OPERATION

The float assembly carries at its upper end an actuating magnet, which is within a non-magnetic stainless steel tube, which extends into the switch enclosure. Each switch unit incorporates a fixed switch element and a pivoted permanent magnet. The actuating magnet rises and falls with the varying water level in the boiler attracts or repels the pivoted magnet in the switch unit to operate the snap action-switching element. Magnetic hold or gravity maintains switching.

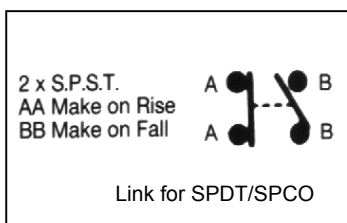


ELECTRICAL CHARACTERISTICS

The switch unit incorporates a single pole changeover element rated as follows: -

	AC	DC Resistive	Inductive
Maximum Voltage	440V	250V	250V
Maximum Current	5A	5A	*0.5A
Maximum Power	2000VA	100W	100W
Maximum Power Factor	0.4	-	-
Maximum Time Constant	-	-	40ms

**Maximum up to 2A dependent upon time constant of circuit, consult with Autonics.*



Switches must not be used for the direct starting of motors. Contacts should be wired in series with the operating coils of relays, contact starters or solenoid valves, and fused separately.

Two 25mm BS.4568 cable entries are provided for the electrical connections. A sufficient length of flexible cable must be fitted to permit easy removal of the switch head and float assembly for routine maintenance.

IMPORTANT

Switch units must not be used for connecting direct to pump motors.

PUMP ON/OFF DIFFERENTIAL

The switch unit has a water level differential of 25mm, between switching the pump On and Off. If a differential greater than the standard 25mm is desired, two switch units must be used. The minimum water level differential for two-switch pump control is 40mm. With one switch unit positioned 8mm. Above the other.

EXTERNALLY MOUNTED TYPES

These controls are designed for assembly in separate float chambers for mounting external to the boiler. (See fig.2)

SWITCH ADJUSTMENT

The switch units are mounted on support rods, which enables the operating water levels to be adjusted external to the float chamber. Each float chamber has a raised reference band, which provides a datum from which the required switch operating water levels are measured.

MATERIALS

The materials of the principal components are: -

Float Chamber and Cover : Cast iron to BS.1452 Grade 260, or Cast Steel to BS.1540-161 Grade 480, as Applicable.

Guide Tube and Float Rod : Stainless Steel 316 to B.S.970, Grade 321 S 20.

Float : Stainless Steel 316 to B.S.970, Grade 321 S 20.

INSTALLATION

Full instructions for the installations of the Control System are given in instruction manual, but the following points should be noted: -

- The float chambers have 25mm. Bore connections flanged to BS.4504 as given in the Table of Dimensions. The connecting pipes between the float chamber and the boiler must be not less than 25mm. Nominal bore and as short as possible.
- The wiring to the Pump On/Off Control and Water Level Alarm Chamber must be suitable for temperatures of at least 140°C.
- Two M20 x 1.5 conduit entries are provided in the Switch Enclosure of each Control and Alarm Chamber.
- All terminal blocks are of the screw clamp type with wire protectors.
- It is a requirement of BS.759 that provision be made to blow through the float chamber and connecting pipes to test their operation and to prevent the accumulation of deposits. The means provided must be so arranged that the water connection to the boiler cannot be shut off unless the drain connection to the chamber is open. The Autonics Sequencing Valve has been specially designed design to meet these requirements and we strongly recommend that this valve be fitted to the water connection of all float chambers-See Data Sheet No H3 for full details.

We also recommend that isolating valves be fitted in the steam connection to the float chambers to facilitate maintenance. BS.759 requires that such isolating valves must be capable of being locked in the open position.

Table 2: Dimensions in millimeters-Externally Mounted Types

Type Ref. No.	Type of Control	Chamber Material	Flanged Conn.	A	B	C	D	E	Max. Working Pressure
141C	Low water level alarm	Cast Iron	DN 100 PN16	270	65	12.5	220	140	14 Bar
142C	Dual control								
143C	High, Low, Extra Low level alarm								
221C 321C	Low water level alarm	Steamless Steel ASTMA 269	DN 100 PN40	270	65	12.5	235	140	32 Bar
222C 322C	Low water level alarm								
223C 333C	High, Low, Extra Low level alarm								

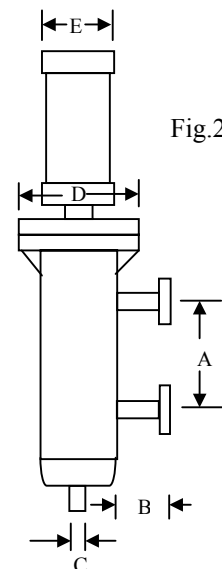


Fig.1 Dimensions and Recommended Levels

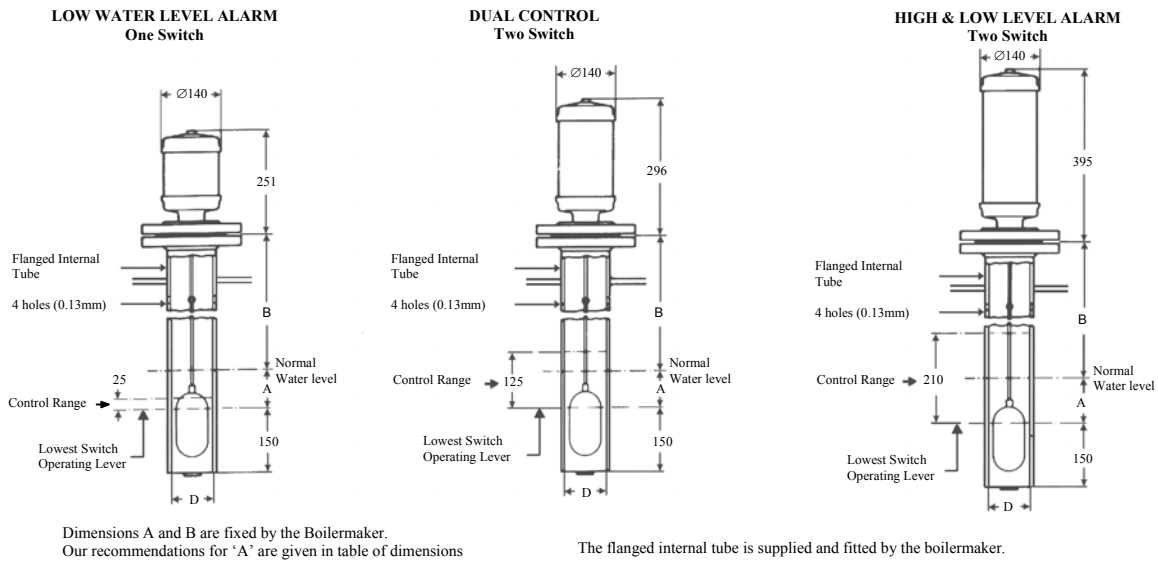


Table 2: Dimensions in millimeters – Direct Mounted Types

Type Ref. No.	Type of Control	Mounting Flange	Recommended normal water level A	B	D	Maximum Working Pressure
221N 321N	Low Water Level alarm	DN 100 PN40	90	Fixed by Boilermaker	Maximum inside dia. of internal Tube 100	32Bar
222N/322N	Dual Control		85			
223N 323N	High, Low Extra Low & Level Alarm		105			

INSTALLATION

Fig.1 shows the Controls mounted on a flanged tube, which serves to guide the float and protect it from the effects of ebullition under steaming conditions.

Full instructions for the installations of the Control System are given in manual but the following points should be noted: -

- The wiring to the Pump No/Off Control and Water Level Alarm switch enclosure must be suitable for temperatures of at least 140°C.
- Two M20 x 1.5 conduit entries are provided in each Switch Enclosure.
- All terminal blocks are of the screw clamp type with wire protectors.
- Sufficient length of flexible conduit/cable must be provided such that the complete Switch Enclosure can be lifted clear of the Mounting Flange.

CONTROL PANEL (Optional Item) SERIES 2000

A control panel can be supplied on request to meet customer requirements or alternatively, when it is desired that the switch units operate at low voltage (24V). Particulars on application we design this for safety purpose by operating at 24VDC and it show a clear water level alarm for High, Normal, Low & Extra Low by a indicator light bulb on mimic diagram. The panel also equip with High & Low level siren, and extra low level baby siren. The linkage of fan FF, FD, ID and Feed water pump operating status.



ORDERING

When ordering please state: -

1. Boiler Maximum Working Pressure.
2. Whether High Water Level Alarm is required.
3. The required pump On/Off water levels differential if greater than the standard 25mm.
Also, for Externally Mounted Type:
4. Whether a Relay Module is required for each chamber.
5. Whether a Sequencing Valve is required for each chamber.

Instructions for installation, Commissioning, Testing and Maintenance refer to instruction manual: -

- Externally Mounted Types.
- Direct Mounting Type.

DIRECT MOUNTED TYPES

These controls are designed for mounting direct to the boiler with the float operating within the boiler. For recommended levels see Fig.1.

Ordering Information							
WATER LEVEL ALARM AND PUMP ON/OFF CONTROL SYSTEM							
	<u>OPERATING PRESSURE (Maximum Pressure)</u> 14 – 14 Kg/cm ² (Max. 16 Kg/cm ²) 22 – 22 Kg/cm ² (Max. 40 Kg/cm ²) 32 – 32 Kg/cm ² (Max. 64 Kg/cm ²)						
	<u>NUMBER OF SWITCH REQUIRE</u> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">1 – 1 unit</td> <td style="width: 33%;">3 – 3 unit</td> <td style="width: 33%;">5 – 5 unit</td> </tr> <tr> <td>2 – 2 unit</td> <td>4 – 4 unit</td> <td>6 – 6 unit</td> </tr> </table>	1 – 1 unit	3 – 3 unit	5 – 5 unit	2 – 2 unit	4 – 4 unit	6 – 6 unit
1 – 1 unit	3 – 3 unit	5 – 5 unit					
2 – 2 unit	4 – 4 unit	6 – 6 unit					
	<u>CHAMBER</u> C – with chamber Nil - N SC – Standard Chamber Please specify the center to center or the standard 270mm center to center will be given.						
Model	<div style="border: 1px solid black; padding: 5px; display: inline-block;">WLAPC-</div>						

Distributor:

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