



VRPWRF Series Intelligent RF Admittance Level Switches



Version 2018

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1. Summary:

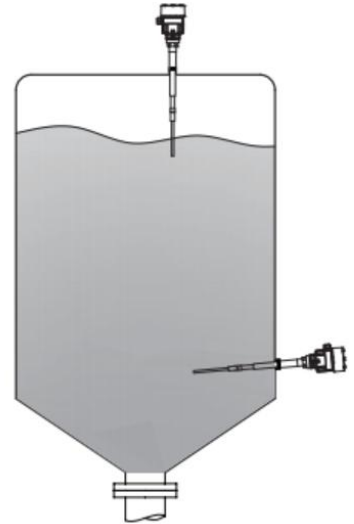
Intelligent RF admittance level switches are the best upgraded instruments which can substitute for those traditional RF admittance level switch and capacitive level switches. They are high-end instruments for position switch measurement. They feature stable performance and free of maintenance.

Traditional RF admittance level switch can only be set with adjusting the sensitivity knob, and it cannot show the parameters. Setting at field is complicated.

Our intelligent RF admittance level switch is equipped with a unique LCD from which the parameters and measured values can be read. During the setting at field, the level state either "Empty" or "Full" can be set with the built-in buttons. Therefore, they have been extensively used for the applications such as chemicals, plastic, thin film, feed, grains, rubber, liquid, waste water, sand, food, slurry, cement powder, painting, coal, solid particles, oil and paper pulp, etc.

2. Operation principle:

Dielectric property exists between the probe of a RF admittance level switch and the wall of a container, from which a bridge circuit is formed. RF oscillation signals from a oscillation circuit are input to the circuit. It is at a balance state when medium reaches and touches the probe, there is no signal output. While, it output signals when medium is filled up to between the probe and the wall of the tank because the dielectric property of medium is different from that of air, which causes unbalance of the bridge circuit.



3. Main technical parameters:

Model: VRPWRF211

Application: Liquid, solid level switch measurement

Length of probe: Standard: 350mm/500mm

Optional: 500mm – 3000mm on request and customized

Power supply: 24V DC ; 220V AC

Relative humidity: ≤85%

Output signal: two sets of normally open, normally closed contacts

Contact capacity: 24V DC/8A ; 220V AC/5A;

Ambient temperature: -40°C - +60°C

Medium temperature: -180°C - +200°C

Delay time: 0 - 99S (adjustable)

Protection grade: IP67

Probe material: stainless steel, PPS

Explosion proof: Ex d IICT6 Gb

Process connection: 3/4"NPT; flange

Mounting type: top mounted, side mounted



Model: VRPWRD212

Application: Corrosive liquid level switch measurement

Length of probe: Standard: 350mm/500mm

Optional: 500mm – 3000mm on request and customized

Power supply: 24V DC ; 220V AC

Relative humidity: ≤85%

Output signal: two sets of normally open, normally closed contacts

Contact capacity: 24V DC/8A; 220V AC/5A;

Ambient temperature: -40°C - +60°C

Medium temperature: -40°C - +150°C

Delay time: 0-99S (adjustable)

Protection grade: IP67

Probe material: Stainless steel, PTFE/FEP

Explosion proof: Ex d IICT6 Gb

Process connection: 3/4"NPT; flange

Mounting type: top mounted, side mounted



Model: VRPWRF213

Application: High temperature solid level switch measurement

Length of probe: Standard: 500mm

Optional: 500mm – 3000mm on request and customized

Power supply: 24V DC ; 220V AC

Relative humidity: ≤85%

Output signal: two sets of normally open, normally closed contacts

Contact capacity: 24V DC/8A; 220V AC/5A;

Ambient temperature: -40°C - +60°C

Medium temperature: -180°C - +500°C

Delay time: 0 - 99S (adjustable)

Protection grade: IP67

Probe material: stainless steel, PPS

Explosion proof: Ex d IICT6 Gb

Process connection: G1 1/2"A; flange

Mounting type: top mounted, side mounted



4. Installation requirements:

Basic requirements:

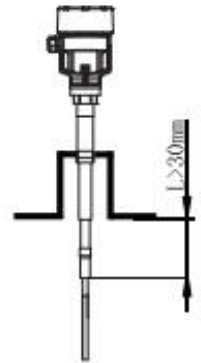
RF admittance level switch can be mounted at any possible position in a container. But, the probe cannot be inserted into medium directly. It is suggested that the distance between two probes should be at least 0.5m, no less when there are high and low alarms in one container. The points should be noted when a switch with a

flexible probe is used for low level control :

- A. The probe should be kept at least 30mm away from the wall;
- B. The top plate of a tank should be strong enough to bear the pull downward when a switch with steel cable probe is used to measure solid particles level.
- C. A fixing ring is recommended to be used at the end of steel cable probe so that the lateral force it bears will be minimum.

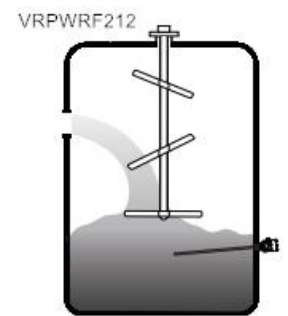
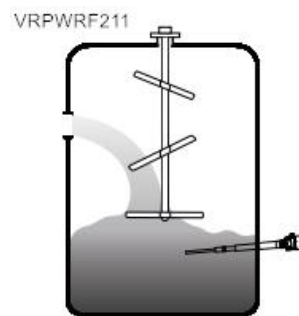
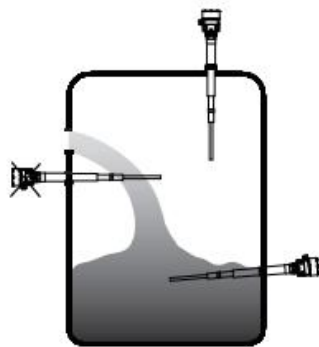
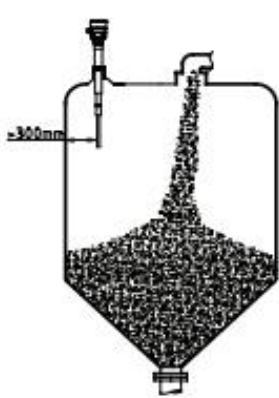
Mounting with a nozzle

Standard mounting, the insulated part of the probe should extend out from the nozzle end 30mm or more in order to avoid any possible malfunction caused by accumulation of medium in the nozzle. Furthermore, the sensitivity cannot be adjusted when the probe is too close to the nozzle.



Attentions when mounting:

- A. Probe should be kept away from wall of a tank at least 300mm, please refer to the picture below left 1.
- B. Switch cannot be mounted under a feed inlet to avoid any possible malfunction caused by impact of liquid fall when it is used for liquid level measurement. Please refer to the picture below left 2.
- C. Delay should be set to avoid any possible malfunction when there is a blender in a tank. Please refer to the pictures below left 3 and 4.



5. Electrical connection

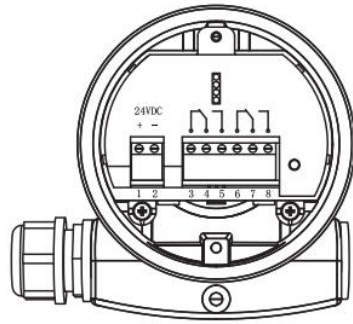
Power supply voltage: 24 V DC; 220 V AC

Suitable electrical cable: Regular cables are suitable as long as their O.D. is 5 – 9mm and the cable entry can be sealed properly.

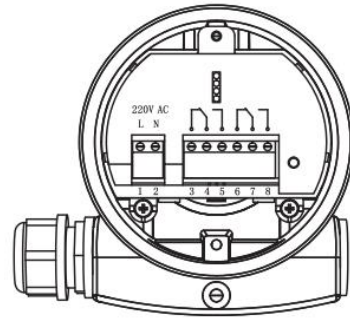
Wiring :

Please refer to the pictures at the top of next page (page 6)

- ① 1, 2: Power supply, ② 3, 6 normally close contact, ③ 4, 7 Common terminal, ④ 5, 8 normally open contacts



24 V DC



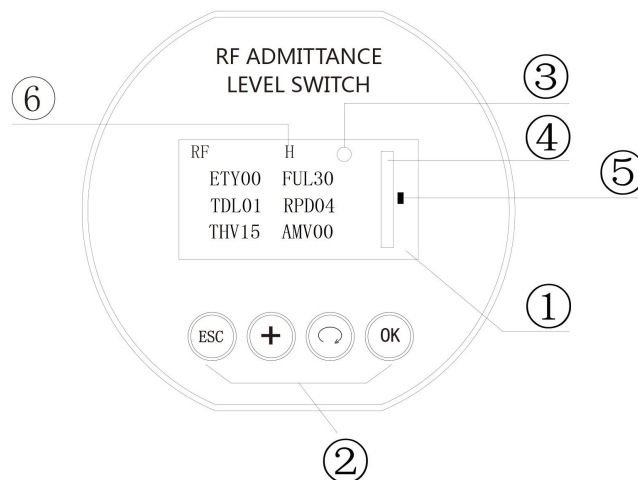
220 V AC

6. Debugging

A. Description on indication on display:

Debugging can be readily done with the four built-in buttons of the programmer, please refer to the picture below.

The display can be used as an indicator at field after the debugging, or it can be taken away.



① LCD display, ② Built-in buttons, ③ Relay working state, ○ Represents relay is at normally open ⊙ Represents relay is at being triggered and close, ④ Medium level indication, ⑤ Return difference indication, ⑥ High, low position adjusting.

Empty (00): The measured value or set value when a tank is empty

Full (30): The measured value or set value when a tank is fully filled

Delay (01): Delayed time of relay when it is triggered (Unit: second)

Threshold (15): The level value at which the switch is triggered

Being Triggered when there is medium = $\frac{(\text{Full value} + \text{Empty value} + \text{Return difference})}{2}$ note: Continuous holding time is longer or equal to the delay value.

Being Triggered when there is no medium = $\frac{(\text{Full value} + \text{Empty value} + \text{return difference})}{2}$ note: Continuous holding time is longer or equal to the delay value.

Measured value: The value which is measured (Indication with relative %)

B. Description on setting

There are built-in buttons at the display, “+”, “-”, “ESC”, “OK”, with which setting can be done.

a. Manually setting: Empty, full, delay, return difference

Press button “OK”, the instrument will be at the state of manually setting, where the parameters can be selected, set and revised manually.

Press button “OK” continuously, functions will be selected in order: Press button “OK”, select “Empty”, press button “OK” again, select “Delay”, press button “OK” once more, select “Return difference”. The color of the parameter which has been selected will become white. After a parameter is selected, press button “+” or button “-”, add “1” to the selected number or deduct “1” from the selected number respectively. And then press button “ESC” to exit setting state manually when the setting is finished, or the instrument will exit the setting state automatically without any button pressing within 2 minutes.

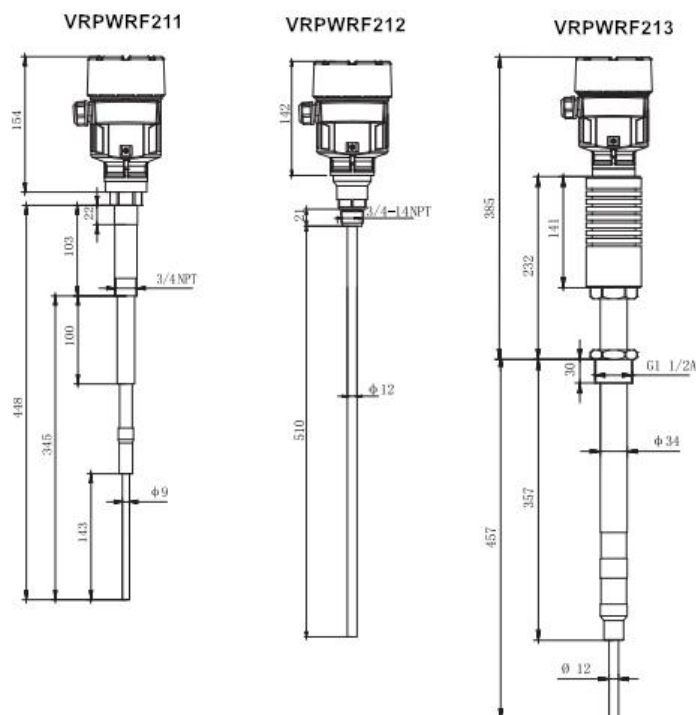
b. Setting with shortcut button

Setting “Full” value: Press button “ESC” and button “+” simultaneously, the current measured value will be set as “Full” value. (it is done usually when there is full of medium in a tank).

Setting “Empty” value: Press button “ESC” and button “-” simultaneously, the current measured value will be set as “Empty” value. (It is done usually when a tank is empty).

Restoring system default value: Press button “+” and button “-”, “Empty” value, “Full” value, delay value and return difference will be restored the default value.

7. Dimensions:



8. Specification

General information

Model	VRPWRF211	VRPWRF212	VRPWRF213
Process connection	3/4" NPT	3/4" NPT	G1 1/2" A
	Flange	Flange	Flange
Probe material	Stainless steel/ PPS	Stainless steel/ PTFE/FEP	Stainless steel/ceramic

Housing material: Aluminium

Display window material: PC

Earthing terminal material: Stainless steel

Seal material: Viton

Weight:

VRPWRF211: 1.2 Kg (Depends on process connection type and housing material)

VRPWRF212: 1.2 Kg (Depends on process connection type and housing material)

VRPWRF213: 3 Kg (Depends on process connection type and housing material)

Power supply: 24 V DC; 220 V AC

Output signal: Two sets of normally open and normally closed contacts


Contact capacity: 24 V DC/8A; 220 V AC/ 5A

Output delay: 0 – 99 seconds

Cable entry: M20*1.5 (cable O.D. 5 – 9mm), M20*1.5 (blind plug)


9. Model selection:

VRPWRF211

Code	Explosion proof			
P	Standard (Nonexplosion proof)			
D	Flame proof (Ex d IIC T6 Gb)			
Code	Thread size (process connection) and probe material			
NA	3/4" NPT + Stainless steel 304			
NB	3/4" NPT + Stainless steel 316			
Y	Customized			
Code	Flange grade, size and material			
<div><div><div>Material</div><div>Grade & size</div><div>Code</div></div></div>			<div><div>Stainless steel 304</div><div>(Face flange)</div></div>	<div><div>Stainless steel 316L</div><div>(Face flange)</div></div>


DN40, PN16	AA	AB
DN50, PN16	BA	BB
DN65, PN16	CA	CB
DN80, PN16	DA	DB
DN100, PN16	EA	EB
ANSI 1.5", 150IB	AAM	ABM
ANSI 2", 150IB	BAM	BBM
ANSI 2.5", 150IB	CAM	CBM
ANSI 3", 150IB	DAM	DBM
ANSI 4", 150IB	EAM	EBM
No request for process conn.	X	
Special request or customizing	Y	
Code	Process temperature	
P	-180℃ - +200℃	
Code	Electronic unit	
2	24 V DC	
3	220 V AC	
Code	Housing material/ enclosure protection grade	
L	Aluminium, IP67	
Code	Cable entry	
M	M20*1.5	
N	1/2" NPT	
Code	Programmer/display	
V	with	
X	without	
Code	Length of probe	
A	350mm	
B	500mm	
Y	Customized	

VRPWRF212

Code	Explosion proof		
P	Standard (Nonexplosion proof)		
D	Flame proof (Ex d IIC T6 Gb)		
Code	Thread size (process connection) and probe material		
NA	3/4" NPT, stainless steel 304		
NB	3/4" NPT, stainless steel 316L		
Y	Customized		
Code	Flange size, grade and material		
<div><div>Material</div><div>Stainless steel 304 (Face flange)</div></div> <div><div>Size & grade</div><div>Code</div></div>			
DN40, PN16			AA
			AB

DN50, PN16	BA	BB
DN65, PN16	CA	CB
DN80, PN16	DA	DB
DN100, PN16	EA	EB
ANSI 1.5", 150IB	AAM	ABM
ANSI 2", 150IB	BAM	BBM
ANSI 2.5", 150IB	CAM	CBM
ANSI 3", 150IB	DAM	DBM
ANSI 4", 150IB	EAM	EBM
No request for process conn.	X	
Special request or customizing	Y	
Code	Medium temperature	
P	-40℃ - +130℃	
Code	Electronic unit	
2	24 V DC	
3	220 V AC	
Code	Housing material/ Enclosure protection grade	
L	Aluminium, IP67	
Code	Cable entry	
M	M20*1.5	
N	1/2" NPT	
Code	Programmer / Display	
V	With	
B	Without	
Code	Length of probe	
A	350mm	
5	500mm	
Y	Customized	

VRPWRF213

Code	Explosion proof			
P	Standard (Nonexplosion proof)			
D	Flame proof (Ex d IIC T6 Gb)			
Code	Thread size (process connection) and probe material			
NA	G11/2" A + Stainless steel 304			
NB	G11/2" A + Stainless steel 316			
Y	Customized			
Code	Flange grade, size and material			
<div>Material</div> <div>Grade & sizeCode</div>		Stainless steel 304 (Face flange)		Stainless steel 316L (Face flange)
DN40, PN16		AA	AB	
DN50, PN16		BA	BB	
DN65, PN16		CA	CB	

DN80, PN16	DA	DB
DN100, PN16	EA	EB
ANSI 1.5", 150IB	AAM	ABM
ANSI 2", 150IB	BAM	BBM
ANSI 2.5", 150IB	CAM	CBM
ANSI 3", 150IB	DAM	DBM
ANSI 4", 150IB	EAM	EBM
No request for process conn.	X	
Special request or customizing	Y	
Code	Process temperature	
P	-180℃ - +500℃	
Code	Electronic unit	
2	24 V DC	
3	220 V AC	
Code	Housing material/ enclosure protection grade	
L	Aluminium, IP67	
Code	Cable entry	
M	M20*1.5	
N	1/2" NPT	
Code	Programmer/display	
V	with	
X	without	
Code	Length of probe	
B	500mm	
Y	Customized (500mm < L ≤ 3000mm)	

10. Information requested when inquiry

Customer information

Company: _____ Contact person: _____

Address: _____ Post code: _____

Telephone: _____ Fax: _____

Mobile phone: _____ E-mail: _____

Date: _____

Certificate

- ☐ Standard type (non-explosion proof)
- ☐ Intrinsically type (Ex ia IIC T6 Ga)
- ☐ Explosion proof type (Ex d IIC T6 Gb)

Tank/container information:

Tank type: ☐ Storage tank ☐ Reaction tank

☐ Separation tank ☐ Marine tank

Tank structure:

Tank material :

Tank pressure :

Tank size:

Height of tank: m

Diameter of tank: m

Top of a tank:

☐ Arch ☐ Flat top ☐ Open ☐ Conic top

Bottom of a tank:

☐ Tapered ☐ Flat ☐ Inclined ☐ Arc

Installation position:

☐ Top ☐ Side ☐ Bypass pipe ☐ Wave guide pipe

Extension pipe (important information):

Extension pipe height (Length): mm,

Extension pipe diameter: mm

Measuring medium:

Medium name: ☐ Liquid ☐ Solid ☐ Mixed

Medium temperature: °C Dielectric constant:

Adhesive: ☐ Yes ☐ No Stirring: ☐ Yes ☐ No

Process connection:

Thread: ☐ G1½" ☐ 1½" NPT ☐ G1" A ☐ 1" NPT ☐ 3/4" NPT

☐ Flange (DN=) ☐ Flange (ANSI=)

Power supply:

☐ 24V DC ☐ 220V AC

Output:

Two sets of normally open and normally close contacts

Display:

☐ With display and programmer
☐ Without display and programmer

RF switches of 2018

RF switch of version 2016

Photos of practical Application cases of RF admittance switch of version 2016





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