

## IVC1-2PT-R 模块快速使用指南

IVC1-2PT-R 是用于液位检测和 NTC 电阻的信号检测模块，可分别将液位信息和温度信息转换成相应的电压输出，再通过 AD 转换设备即可获取当前液位值和温度值。

### 1 电源

IVC1-2PT-R 的输入电源是直流 24V(+/- 10%)，电流最大 15mA。

### 2 外观和结构尺寸

IVC1-2PT-R 模块用户端子，如下图所示：

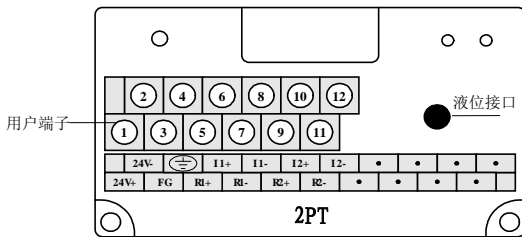


图 1 模块接口端子图

用户端子的定义见下表：

表 1 用户端子定义表

序号	标注	说明
1	24V+	模拟电源 24V 正极
2	24V-	模拟电源 24V 负极
3	FG	屏蔽地
4		正常情况不接线
5, 7	R1+, R1-	NTC 电阻接入端子
6, 8	I1+, I1-	NTC 电阻转换后的电压输出端子, I1-为参考地
10, 12	I2+, I2-	液位转换后的电压输出端子, I2-为参考地
9, 11	R2+, R2-	实际为空端子, 不接线
	液位接口	用于连接测量液位用的水管

**注意：**I1-和 I2-内部已短接，只需用其中一个端子即可。

结构：90mm（长）×60mm（宽）×67mm（高）。

提供 DIN 导轨安装方式。

### 3 接线

图一中的+24V、0V 端子接 24V 电源，R1+、R1-接 NTC 电阻的两端。I2+和 I2-作为液位传感器的电压输出信号，液位传感器上要套上用于采集液位压力的套管等附件。I1+和 I1-作为 NTC 电阻转换后的电压值。

## 4 计算关系

### 4.1 温度的计算

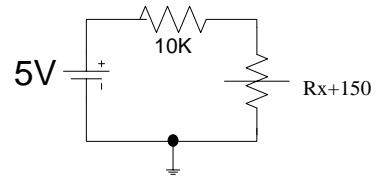


图 2 电阻-电压示意图

假设 NTC 电阻是  $R_x$ 。注意 I1+和 I1-的电压输出  $V_t$  是  $R_x+150$  欧电阻的压降。 $R_x$  计算公式如下，单位欧姆：

$$R_x = \frac{10150V_t - 750}{5 - V_t}$$

AD 读入电压值并转换后按相应型号的 NTC 电阻和温度的对应关系表计算温度。

### 4.2 液位的计算

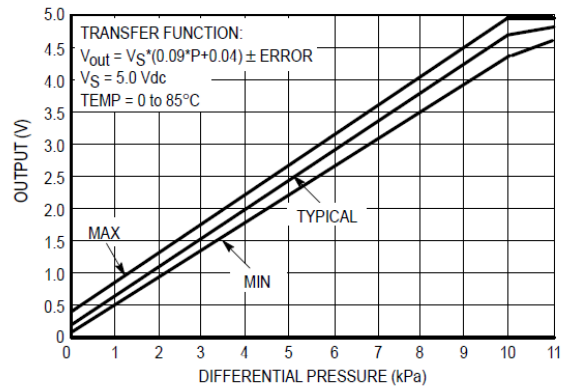


图 3 输出与压差的关系

如图三所示压差与输出成正比关系，最大测量范围 1m 水位。计算公式在图三的左上角。AD 转换成电压后，计算对应的压差值，再利用 1m 水柱 = 10kPa 的公式，即 1mm 水柱=10Pa，计算对应的液位。注意测量水管的选用和安装。

深圳市英威腾电气股份有限公司

地址：深圳市光明区马田街道松白路英威腾光明科技大厦

公司网址：www.invt.com.cn

版权所有，保留一切权利。内容如有改动，恕不另行通知。

# IVC1-2PT-R Module Quick Start Guide

IVC1-2PT-R is a signal detection module for liquid level detection and NTC thermistor, which can convert liquid level information and temperature information into corresponding voltage output respectively, and then obtain the current liquid level value and temperature value through the AD converter.

## 1 Power supply

The input power supply of IVC1-2PT-R is DC 24V (+/- 10%) and the max. current is 15mA.

## 2 Appearance and structural dimensions

The user terminals of the IVC1-2PT-R module are shown in the following figure.

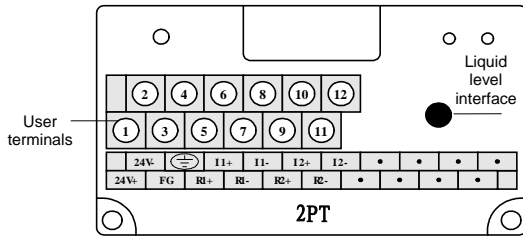


Figure 1 Module interface terminal diagram

Definitions of user terminals are shown in the following table.

Table 1 User terminal definition table

No.	Label	Description
1	24V+	Analog power supply 24V positive pole
2	24V-	Analog power supply 24V negative pole
3	FG	Shield ground
4	⊕	No wiring is performed under normal conditions
5, 7	R1+, R1-	NTC thermistor wiring terminals
6, 8	I1+, I1-	Voltage output terminal after NTC thermistor conversion, I1- indicates reference ground.
10, 12	I2+, I2-	Voltage output terminal after liquid level conversion, I2- indicates the reference ground
9, 11	R2+, R2-	Empty terminal, no wiring is performed.
	Liquid level interface	Used to connect the water pipe for measuring the liquid level.

**Note:** I1- and I2- are already shorted internally, so only one of which needs to be used.

Structure: 90mm (L) × 60mm (W) × 67mm (H).

DIN rail mounting method is available.

## 3 Wiring

The +24V and 0V terminals are connected to the 24V power supply, and R1+ and R1- are connected to both ends of the NTC

thermistor, as shown in Figure 1. I2+ and I2- are used as the voltage output signals of the liquid level sensor, and the liquid level sensor shall be covered with accessories such as casings for collecting the liquid level pressure. I1+ and I1- are used as the voltage value after NTC thermistor conversion.

## 4 Calculation relations

### 4.1 Calculation of temperature

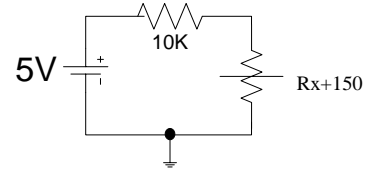


Figure 2 Resistance-voltage diagram

Assume that the NTC resistance is Rx. Note that voltage output Vt of I1+ and I1- is voltage drop of Rx+150 ohm resistance. Rx is calculated as follows. Unit: ohms:

$$R_x = \frac{10150V_t - 750}{5 - V_t}$$

The AD converter reads the voltage value and converts it to calculate the temperature according to the corresponding relation table of NTC resistance and temperature of the corresponding model.

### 4.2 Calculation of liquid level

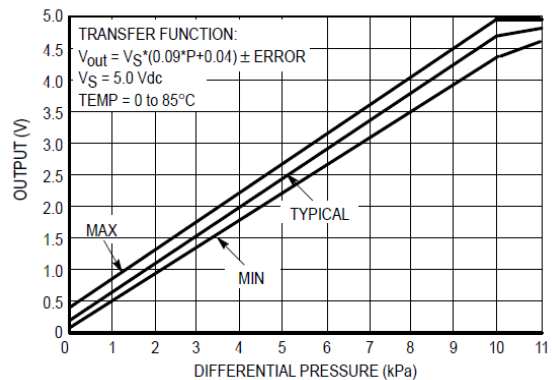


Figure 3 Output versus differential pressure

As shown in Figure 3, the differential pressure is proportional to the output, and the max. measuring range is 1m water level. The formula is shown in the upper left corner of Figure 3. After converting into voltage through the AD converter, calculate the corresponding differential pressure value. And then calculate the corresponding liquid level by using the formula (1m water column = 10kPa), i.e. 1mm water column = 10Pa. Pay attention to the selection and installation of water pipes.

Shenzhen INVT Electric Co., Ltd.

Address: INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China

Website: www.invt.com

All rights reserved. The contents in this document are subject to change without notice.