

## 20.5 The input characteristic and jumper setting of temperature module

### 20.5.1 Temperature module of thermocouple inputs

The characteristics of general purpose analog inputs of FB-2AJ(K)4/FB-4AJ(K)xx are identical to the FB-6AD's. Therefore it will not be explained here, please refer to Chapter 18 for details. This section will only tackle on the subject of temperature measuring. The functions and characters of temperature measurement circuit of FB-4AJ(K)xx are all the same as FB-2AJ(K)4's. The conversion character of which is graphically illustrated as follows. Please note that effective measuring range of J-type thermocouple falls in  $-200^{\circ}\text{C} \sim 750^{\circ}\text{C}$ , but is  $-200^{\circ}\text{C} \sim 900^{\circ}\text{C}$  for K-type. Therefore the marking scale below  $200^{\circ}\text{C}$  and over  $750^{\circ}\text{C}$  or  $900^{\circ}\text{C}$  on the conversion curve does not make sense. Also, it is not possible for temperature to fall below the absolute zero. No matter it's for unipolar/bipolar or  $1000^{\circ}\text{C}/500^{\circ}\text{C}$  span, the content of IR (R3840~R3903) at most it can reach 1842. For the scale exceeding 1842, it is treated for line broken check only.

Figure 1: Bipolar  $1000^{\circ}\text{C}$  input span

Jumper setting	10V	B
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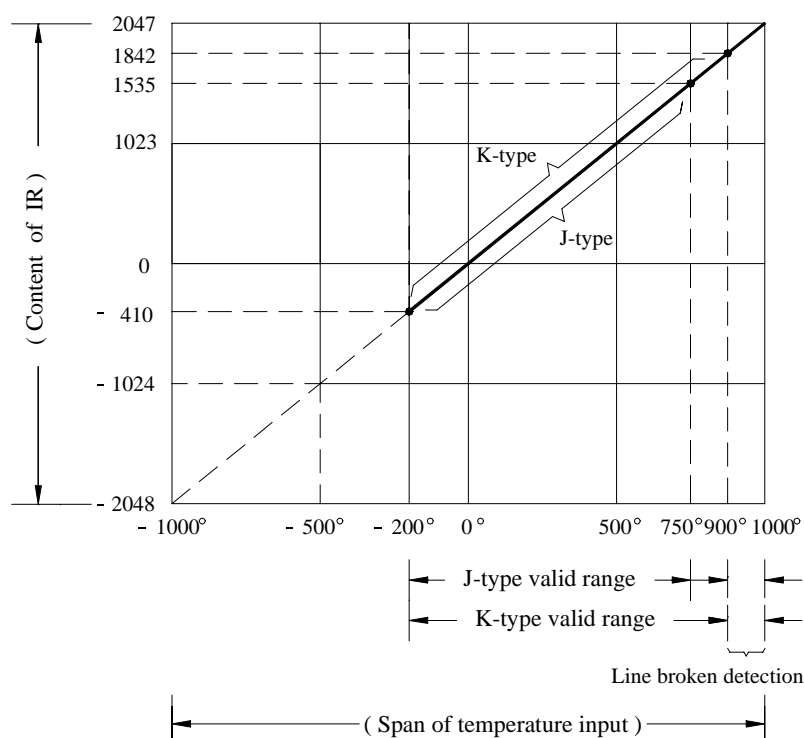


Figure 2: Bipolar 500°C input span

Jumper setting	5V	B
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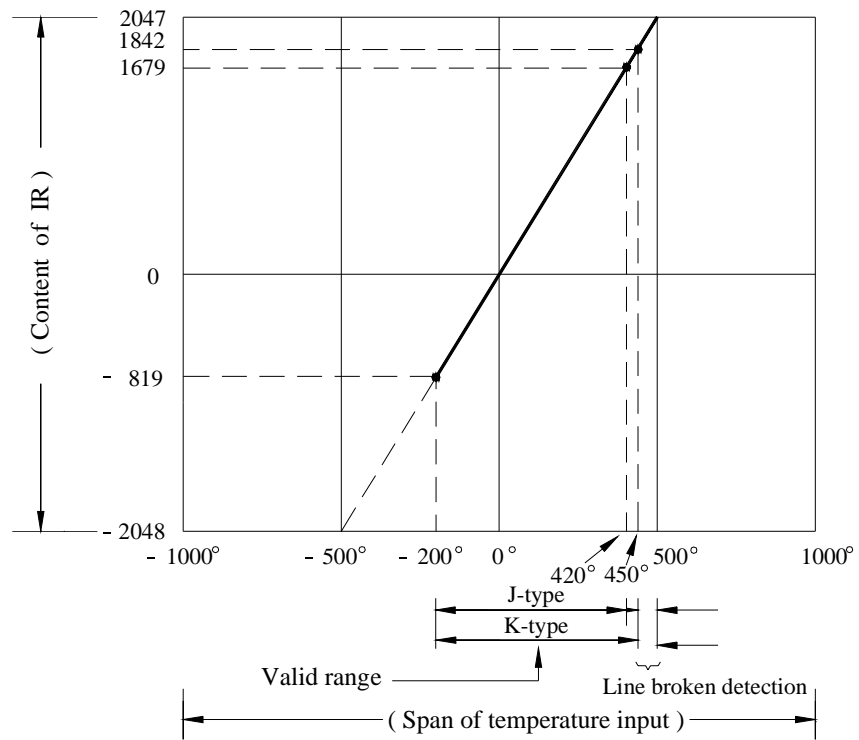


Figure 3: Unipolar 1000°C input span

Jumper Setting	10V	U
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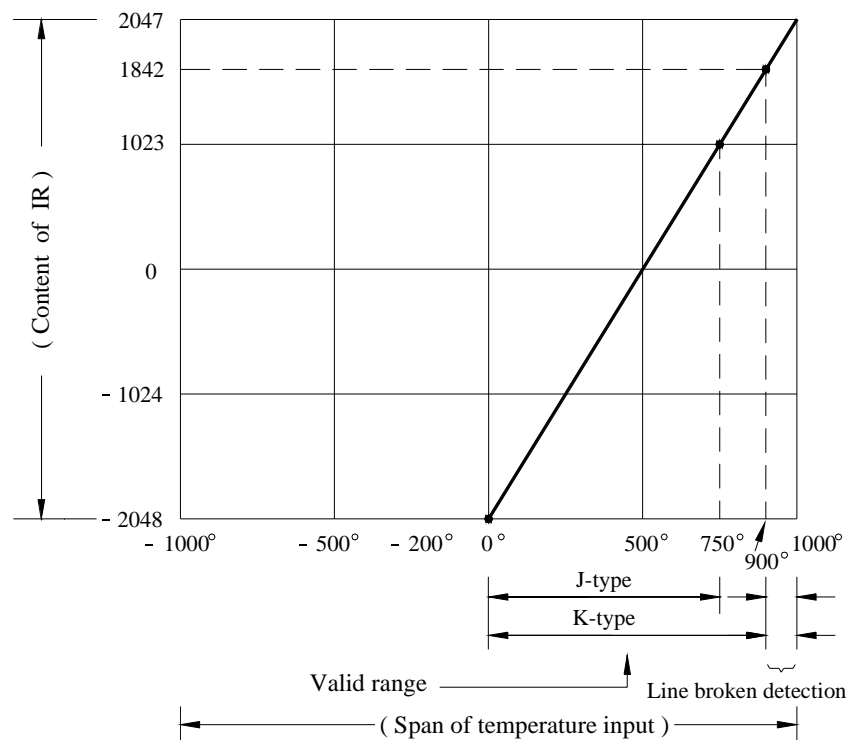
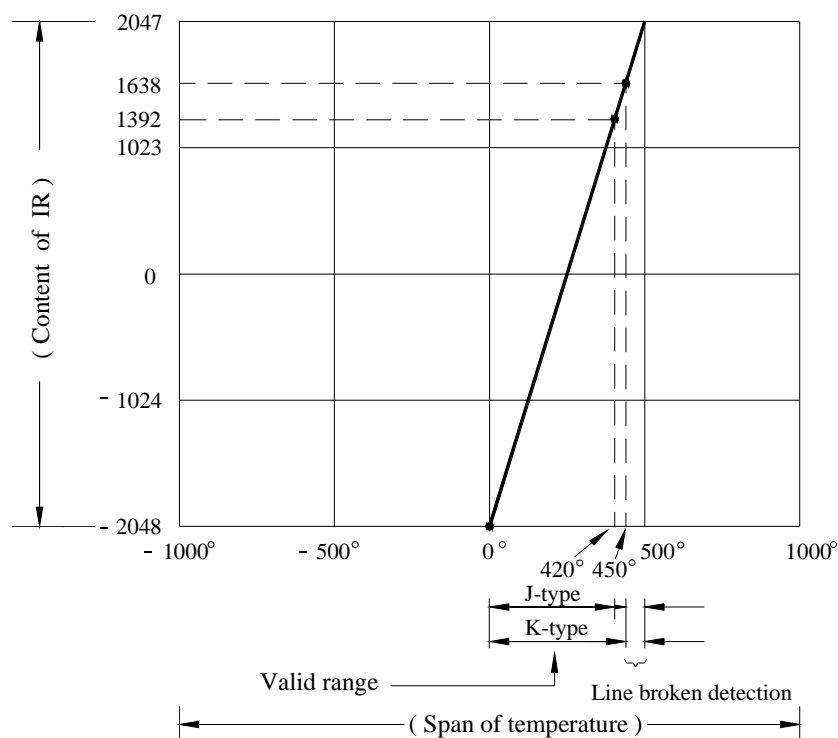


Figure 4: Unipolar 500°C input span

Jumper setting	5V	U
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## 20.5.2 Temperature module of 3-wires RTD inputs

The characteristics of general purpose analog inputs of FB-2AH(T)4 are identical to the FB-6AD's. Therefore it will not be explained here, please refer to Chapter 18 for details. This section will only tackle on the subject of temperature measuring. By setting the jumper (JP2) to select the measurement range; if setting the jumper at 10V position, the temperature range is  $-49.8^{\circ}\text{C} \sim 146.6^{\circ}\text{C} / -57.6^{\circ}\text{F} \sim 295.9^{\circ}\text{F}$  (DIN) or  $-48.9^{\circ}\text{C} \sim 143.9^{\circ}\text{C} / -56.0^{\circ}\text{F} \sim 291.0^{\circ}\text{F}$  (JIS) and if the jumper at 5V position, the range is  $-12.3^{\circ}\text{C} \sim 83.6^{\circ}\text{C} / 9.9^{\circ}\text{F} \sim 182.5^{\circ}\text{F}$  (DIN) or  $-12.0^{\circ}\text{C} \sim 82.1^{\circ}\text{C} / 10.4^{\circ}\text{F} \sim 179.8^{\circ}\text{F}$  (JIS). Please refer to section 20.3.3 for details. The conversion character of this module is illustrated as follows.

Figure 5: Bipolar  $-49.8^{\circ}\text{C} \sim 146.6^{\circ}\text{C}$  (DIN) 、 $-48.9^{\circ}\text{C} \sim 143.9^{\circ}\text{C}$  (JIS)

Jumper setting 10V

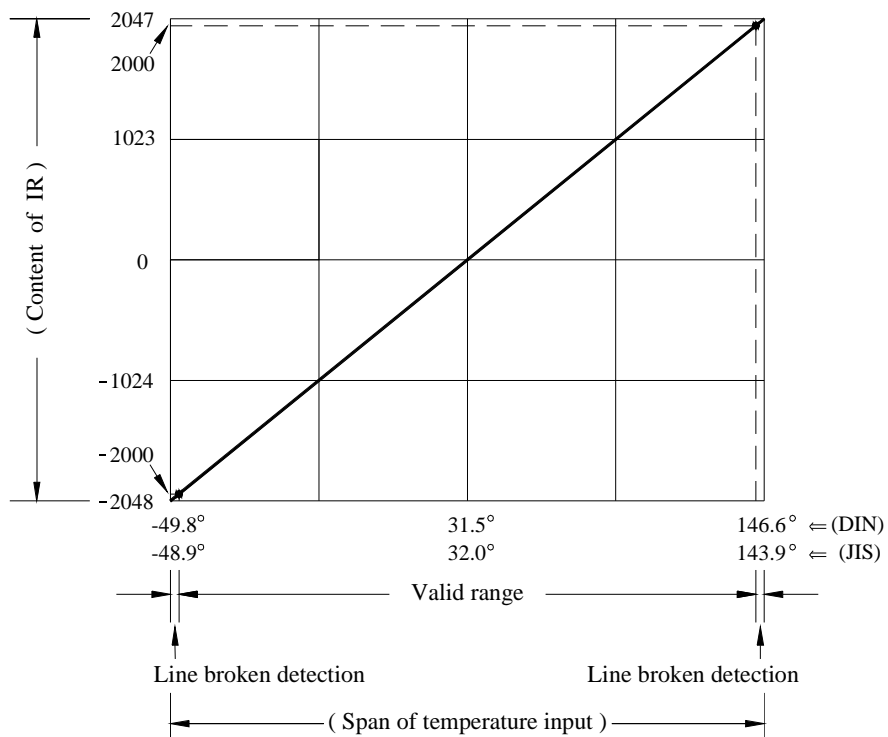
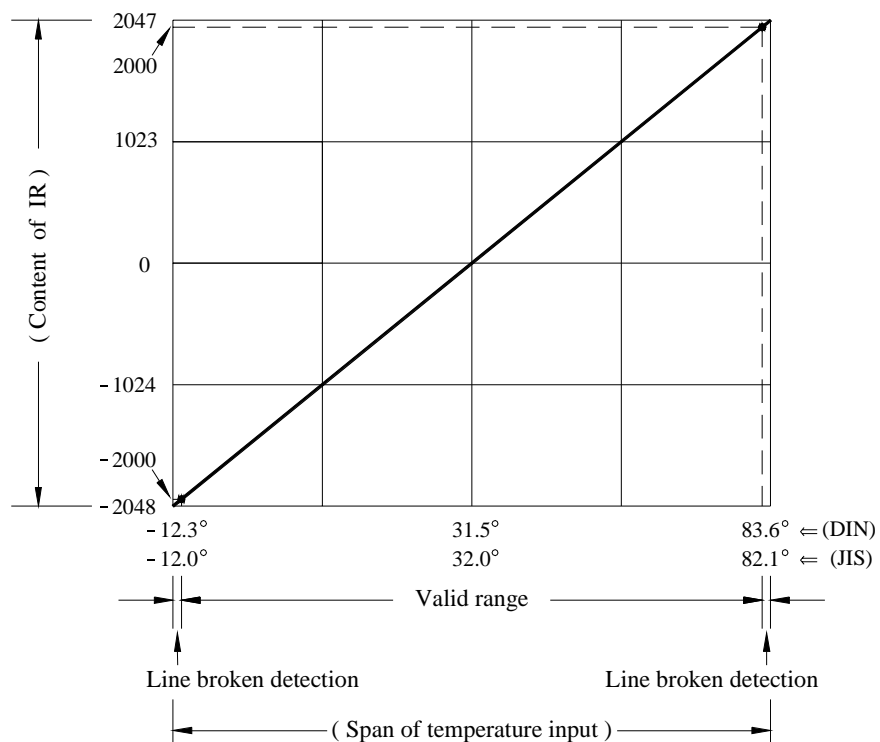


Figure 6: Bipolar  $-12.3^{\circ}\text{C} \sim 83.6^{\circ}\text{C}$  (DIN) 、 $-12.0^{\circ}\text{C} \sim 82.1^{\circ}\text{C}$  (JIS)

Jumper setting 5V



## 20.6 Notifications for the operation of temperature modules

### A、Matching with the version of main unit

The temperature measuring module FB-4AJ(K)xx must run under the main unit with OS version V.3.30 or later that it can work correctly.

The temperature measuring modules FB-2AJ(K)4 and FB-2AH(T)4 must run under the main unit with OS version V.3.43 or later that it can work correctly.

Note: To tell the version of the main unit, you can just open up the cover on center of the module and check the sticker bearing print out like

FB-MAC  
V3.xx

or

FB-MU  
V3.xx

The "V3.xx" indicates the OS version of the main unit.

### B、FB-2AJ(K)4/FB-2AH(T)4 can not be used together with FB-4AJ(K)xx module or FB-8AD analog input module.

### C、FB-4AJ(K)xx can be installed alone only; it can not exist together with other analog input module or temperature measuring module.

### D、The unipolar processing of FB-2AJ(K)4 and FB-4AJ(K)xx

The minimum value (0V or 0mA) for unipolar analog input is expressed as -2048 and maximum value is 2047. For easier processing of the calculation, it is necessary to add up the content of IR (R3840~R3903) with a deviation value of 2048, hence to adjust the unipolar analog input value to be 0~4095.

### E、FB-2AH(T)4 only supports bipolar analog input; it means the resolution will be half if the input is unipolar signal

## 20.7 Instructions explanation and program example for temperature measurement and PID temperature control of FB-PLC

The followings are the instructions explanation and program example for temperature measurement and PID temperature control of FB-PLC.