XMT (XMZ) Series
Intelligent Digital Display
Controller Manual

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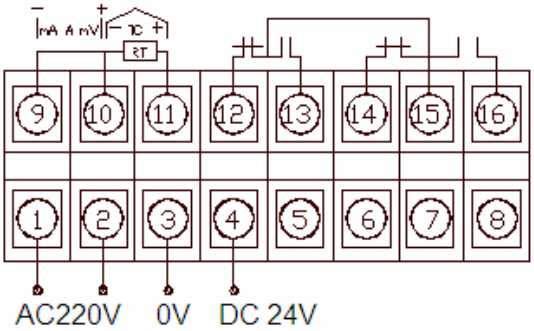
I. General Description

XMT (XMZ) series intelligent digital display controller is a kind of high performance intelligent apparatus; its main characteristic is as follows:

1. This apparatus applies to the sensor such as temperature, pressure, flow, humidity and liquid level or transmitter and various voltages and current input signal. It can display, control and transmitting for above mentioned parameters.
2. With linearizing microchip technology, it has higher precision in the range of entire measurement.
3. Can set control value for the upper and lower limit of each input signal, and this value will not be lost when power failure.
4. For thermocouple type sensor; it has a automatic temperature compensation in the range of 0℃~100℃.
5. It has a sensor broken line protection function.



XMT(48X96mm)Terminal wiring sketch
(other model refer to product)

II. The model selecting

this series of apparatus divides into two kinds of single display and regulate type, The input signals can be 3 line system resistance signals (thermometer and pressure meter etc.); Millivolt signal (couple meter, hall transmitter); Standard voltage , current signal; Alternating voltage , current signal etc.; Control type can be at 2-stage, 3-stage adjustment. Can convert various input signals to standard analog signal to send out.

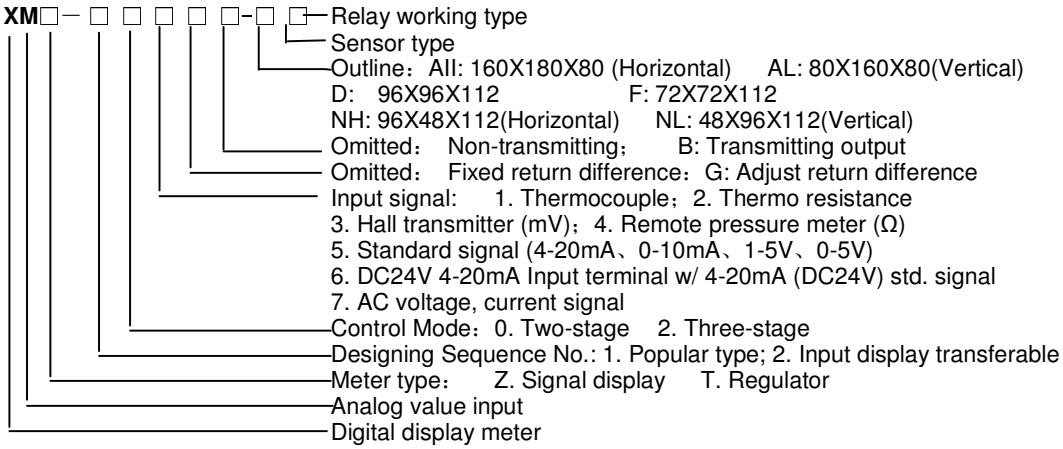


Illustration:

XMZ-101AH-K: Single display, popularize type, Thermocouple, without transmitter, AH type, K calibration number.

XMZ-102D-Pt100: Two-stage, popularize type, without transmitter, Thermocouple, D type, Pt100 calibration number

XMZ-205GAH: Two-stage, transferable type, standard signal input, without transmitter, adjustable return difference, AH model.

XMZ-204 F: Two-stage, transferable type, resistance remote pressure transmitter, without transmitter, F model.

XMZ-121 AL-S: Three-stage, popularize type, Thermocouple, without transmitter, AL type, S calibration number.

XMZ-126 NH: Three-stage, popularize type, 3 types popularize type and 4-20 mA simulated quantity to input (tape DC24V) and NH model.

XMZ-127 BF: Three-stage, popularize type, alternating signal input, with transmitter output, F model.

XMZ-203 BD: Two-stage, transferable type, Hall transmitter, with transmitter output, D model.

XMZ-202 AH-Cu50: Two-stage, transferable type, thermal resistance, without transmitter, AH model, Cu50 calibration number.

III. Main Technical Parameter

1. The voltage of power source: AC220V (±15%); Power consumption: 3-4 W; Frequency: 50 Hz.
2. Ambient temperature: 0-50℃; Relative humidity: ≤85% (without corrosion gas condition);
3. Resolution capacity: Divide into 1 and 0.1 or 0.01according to measurement range;
4. Precision: 0.5%, 0.2%;
5. Input impedance: Current signal: ≤100 Ω; Voltage signal: ≥100KΩ; Resistance signal: The current passes through the measure resistance is less than 1 mA;
6. 4-digit 0.56 or 0.8 inches of LED display: In the range of 1999-9999, display the measurement value and upper and lower limit value;
7. Relay output contact capacity: 3A/220VAC or the 5A/24VDC resistance load;
8. Installation method: Flush mounting;
9. Overall size, mounting hole size for installation:

Item No.	model	Overall size	Mounting hole size
1	AH	160X80X80	$152^{+0.8}$X$76^{+0.7}$
2	AL	80X160X80	$76^{+0.7}$X$152^{+0.8}$

3	D	96X96X112	$92^{+0.7}X92^{+0.7}$
4	F	72X72X112	$67^{+0.7}X67^{+0.7}$
5	NH	96X48X112	$92^{+0.7}X44^{+0.5}$
6	NL	48X96X112	$44^{+0.5}X92^{+0.7}$

IV. Input Signal

1. Thermocouple signal: Calibration number is: K (0-1300℃) J (0-1200℃)
   E (0-1000℃) N (0-1300℃)
   S (0-1600℃) B (0-1800℃)
   R (0-1600℃) WRe (0-1600℃)
2. The signal of thermal resistance (3-line system input):

Calibration number is: Cu50 (-50.0-+150.0℃)
Cu100 (-50.0-+150.0℃)
Pt100 (-20.0-+200.0℃)
Pt100 (-200.0-+600.0℃)

3. Standard signal: 4-20 mA, 0-10 mA, 1-5 V, 0-10 V;
4. Input terminal can supply DC24V 2-line system signal of 4-20 mA: Input resistance: 100 Ω
5. Remote pressure signal: 3-line system resistance signal range: 15-360 Ω;
6. Alternating voltage, current signal: 500 V Alternating and direct current voltmeter.

V. Analog Quantity Output:

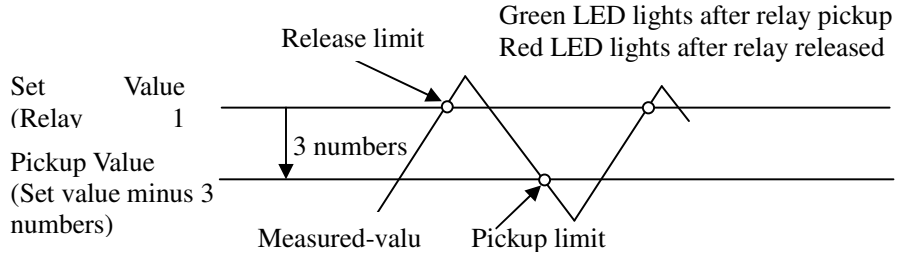
Convert sensor signal and various voltages, current signal to 4-20 mA, 0-10 mA, 1-5 V and 0-5 V standard signal.

VI. The Control Value Setup, Observe and Output for Popularize Type Apparatus

1. Mode Key (►): Cycling selects certain digit(s) position of the upper and lower limit value.
2. Up Key (▲): Press this key can change the value of flashed digit(s).
3. Set value: After stopping operation the key for 8 seconds, set value will be stored automatically, the apparatus enters into measure state.
4. Observation of the set value: Under measure state, directly press Up Key can inspect the upper and lower limit or return difference value. It will resume to measure display automatically after 8 seconds.
5. Output control (4 modes), control value set:

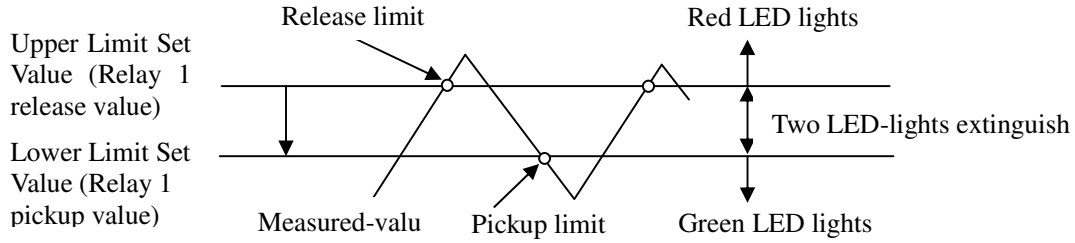
(1) Two-stage control: Single relay (relay 1 effective, relay 2 invalid), output a group of normal open, normal close switching value. The relay will be classified two types according to its act dead zone:

Type 1 (Fixed return difference type relay at dead zone): Set 3 numbers return difference in advance at dead zone. Only one control value is set (i.e. relay 1-release value) (green light gleams). Relay 1 pickup value signifies that the release value minus 3 numbers (see sketch). This type controller is as routine controlling meter, ordinary apply to single limit control (such as temperature, humidity, pressure etc.) or single limit alarm.



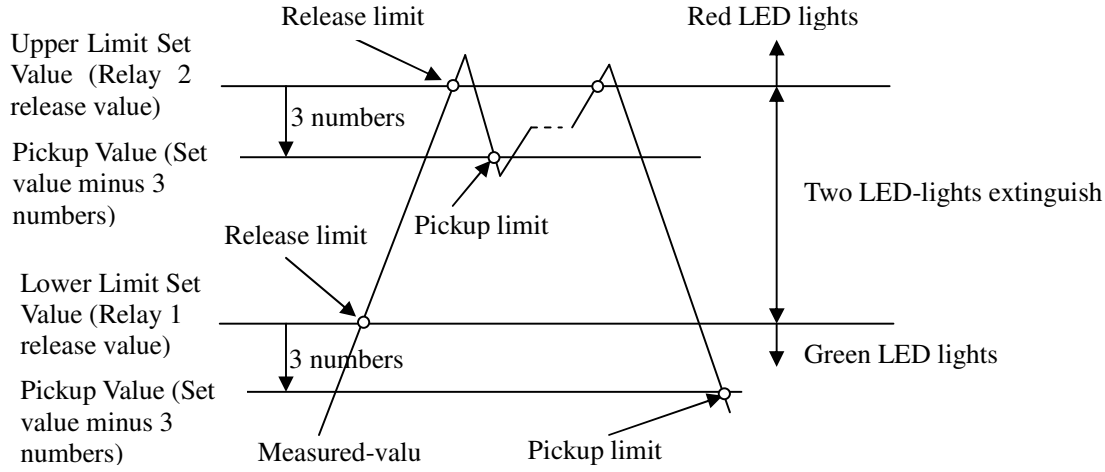
Two-stage Fixed Return Difference Relay 1 Action Sketch

Type 2 (Return difference adjustable type relay at dead zone): Two control values should be set, one is for lower limit set value (i.e. relay 1-pickup value) (green light gleams); another one is for the upper limit set value (i.e. relay 1-release value) (red light gleams). The relay 1 pickup and release values can be adjusted freely within displayed range (refer to the sketch). This type controller is as single relay wide band controlling meter, suitable to apply the upper and lower water level limit control and the refrigerating control.



Two-stage Adjustable Return Difference Relay 1 Action Sketch

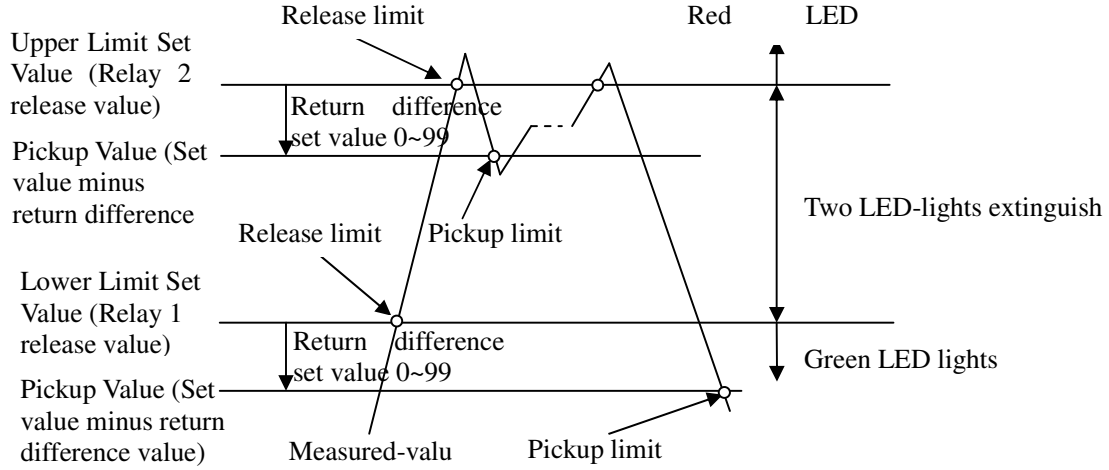
(2) Three-stage control: Dual-relay (relay 1 and relay 2), output two groups of normal open, normal close switching values. The relay will be classified two types according to its act dead zone:
Type 1 (Fixed return difference type relay at dead zone): Set 3 numbers return difference in advance at dead zone. Two control values should be set, one is for lower limit set value (i.e. relay 1-release value) (green light gleams); another one is for the upper limit set value (i.e. relay 2-release value) (red light gleams). The both two relays pickup values signify that the release value minus 3 numbers (set by controller automatically) (refer to the sketch). This type controller is suitable for two group control (for example, in the heating system, the relay 1 use for increase the temperature and the relay 2 for the constant temperature maintaining control); or for two groups alarm (such as, the relay 1 is as lower limit alarming, the relay 2 is for upper limit alarm); or one group for control and another group for alarm (such as the relay 1 is as control, the relay 2 is for alarm).



Three-stage Fixed Return Difference Relay 1、2 Action Sketch

Type 2 (0~99 numbers adjustable return difference type relay at dead zone): Set 0~99 numbers freely at dead zone. The lower limit value, upper limit value and return difference value should be set respectively. One is for relay 1-release value (green light gleams); another one is for the relay 2-release value (red light gleams); the third one is for setting the return difference value within the

range of 0~99 numbers (both red and green lights extinguish). The two relays pickup values equals that the release value minus the return difference value respectively (refer to the sketch). The difference of this type controller is that it can change the dead zone values through the setting of the return difference; others are same with the type 1 controller.



Three-stage Adjustable Return Difference Relay 1、2 Action Sketch

VII. Input Display Transferable Controller

This controller applies to the standard signal of 4-20 mA, 1-5 V or 0-10 mA, 0-5 V input; It can set the display value corresponding to its various input signals of lower limit (4 mA , 0 mA , 1 V , 0 V) value and full scale value (20 mA , 10 mA , 5 V).

1. The transmitting set for Input display value

Through the input signal transferable setting, it can set the standard signal of lower limit (4 mA , 0 mA , 1 V , 0 V) value and full scale value (20 mA , 10 mA , 5 V) to any displayed figures within the display scope (-1999~9999). The operation details are as following:

When press Mode key (►), the LED window displays PP00, and the first P flashes, press UP key(▲), change the display to PP18, again press Mode key (►), both the first digit nixie tube and the lower limit indicator flashes, now the input signal lower limit display value can be set by press UP key(▲); The same with other digits value setting through press the Mode key (►) and UP key(▲). (When setting the values, the first digit value cycled from 0 to 9, "-" and -1; and the last three digits are from 0 to 9). Through the Mode key (►) and UP key(▲), adjust the display value corresponding to the lower limit input signal. When the last digit (4^{th}) nixie tube flashes, press Mode key (►) again, the first digit nixie tube and upper limit indicator flash, right now, the input signal full scale display value can be set. The set procedure is same with above. After finishing the set procedure for about 8 seconds, the controller recover to the normal working condition and the set values are stored automatically.

2. The correctness of the display value for the lower and upper full scale limit

Due to the differences of the output value for each transmitter, a differentia between the lower limit or full scale display value and the expected value will be existed. It is necessary to make correctness for the display value as following:

(1) Lower limit display value correct:

Connect the transmitter to the input end of the controller, let the transmitter output the lower limit value (4 mA, 0 mA, 1 V and 0 V), now if the display value and the lower limit display setting value is same, then it's not necessary to make adjustment for the lower limit display value, if not do it as following:

(a) The display value is lower than expected value:

For instance, when the input value is 4 mA, the original low limit display set value is for 1000, but the actual display value is 980, at this condition, should reset the low limit display set value as before; the only difference is that now the set value should be the difference value (20) between the 1000 and 980 plus the original value (1000), i.e. the new set value is 1020. Input 4 mA again after setting, now the actual display value will be changed to 1000.

(b) The display value is higher than expected value:

For instance, when the input value is 4 mA, the original low limit display set value is for 1000, but the actual display value is 1031, at this condition, should reset the low limit display set value as before; the only difference is that now the set value should be the difference value (31) between the 1000 and 1031 minus from the original value (1000), i.e. the new set value is 969. Input 4 mA again after setting, now the actual display value will be changed to 1000.

(2) Full scale display value correct:

Connect the transmitter to the input end of the controller, let the transmitter output the full scale value (20 mA, 5 V), now if the display value and the full display setting value is same, then it's not necessary to make adjustment the full display value, if not do it as following:

(a) The full scale display value is lower than expected value:

For instance, when the input value is 20 mA, the original full scale display set value is for 4000, but the actual display value is 3970, at this condition, should reset the full scale display set value as before; the only difference is that now the set value should be the difference value (30) between the 4000 and 3970 plus the original value (4000), i.e. the new full scale set value is 4030. Input 20 mA again after setting, now the actual display value will be changed to 4000.

(b) The full scale display value is higher than expected value:

For instance, when the input value is 20 mA, the original full scale display set value is for 4000, but the actual display value is 4028, at this condition, should reset the full scale display set value as before; the only difference is that now the set value should be the difference value (28) between the 4000 and 4028 minus from the original value (4000), i.e. the new full scale set value is 3972. Input 20 mA again after setting, now the actual display value will be changed to 4000.

3. The output control value setting

When press Mode key (►), the LED window displays PP00, and the first P flashes, again press Mode key (►), both the first digit nixie tube and the lower limit indicator flashes, now the relay control value can be set.

(1) Two-stage control: Single relay operates (relay 1 works, relay 2 not function) only one control value is set. During both the first digit nixie tube and the lower limit indicator flashes, can set this value. The same with other digits value setting through press the Mode key (►) and UP key(▲). (When setting the values, the first digit value cycled from 0 to 9, "-" and -1; and the last three digits are from 0 to 9). Thorough the Mode key (►) and UP key(▲), adjust the control value of the relay operation.

(2) Three-stage control: Double relays operate (relay 1 and relay 2), i.e. lower and upper limit control values are set. During both the first digit nixie tube and the lower limit indicator flashes, can set lower limit control value, same with the two-stage control procedure. When the last digit (4^{th}) nixie tube flashes, press Mode key (►) again, the first digit nixie tube and upper limit indicator flash, right now can set the upper limit control value, the procedure is same with before. After finishing the set procedure for about 8 seconds, the controller recover to the normal working condition and the set values are stored automatically.

VIII. The Installation of Controller

Before installation of the controller, should inspect its model, calibration number, measure scope and sensor whether it is consistent. Then, directly push controller in mounting hole. Wiring method refers to the sketch at the back board.

IX. The Order Notice of Controller

1. Explains controllers' model.

2. Describe input signal or sensor model and measure scope in detail.
3. Special specifications order can be customized from factory directly.
4. The warranty period is one year after delivery.

X. The Brief Introduction for the Main Products

1. XMT, XMZ series intelligent digital display controller
2. XJY series intelligent digital multi-input polling meter (160 X80X80 standard overall size)

The meter divides into 2-16 loops according to polling monitoring point, 15 different types of specifications. It can execute the manual and automatic polling monitoring.

3. Timer relay

The products divide into single delay timer, double delay timers and time totalizer: DIN international standard overall size: 48X48X85, 72X72X112 is adopted.

4. Counter, Tachometer, frequency meter and raster

Can preset positive and negative counting, magnification ratio, decimal position, single and double relay output alarm. 4, 6 and 8 digits display (48X48X85, 72X72X112 and 96X96X112).
Can preset rotational speed value, magnification ratio, decimal, single and double relay output alarm. 4 and 6 digits display (48X48X85, 72X72X112 and 96X96X112).
Can preset frequency value, magnification ratio, decimal, single and double relay output alarm. 4 and 6 digits display (48X48X85, 72X72X112 and 96X96X112).
Can preset displacement value, magnification ratio, decimal, single and double relay output alarm. 6 digits display (96X96X112).

5. ZN4725 series AC/DC voltmeter, ammeter and standard signal meter

It is adopted DIN 96X48X112 international standard size 3 and half digits 0.56” LED digital display. ZN4735 series of digital panel meter can be used directly in measure alternating and direct voltage and current. If matches with inductance transformer it can measure 5-2000 A alternating current, matches current divider, it can measure 2-2000A direct current. Match standard signal transmitter to be used to measure temperature, humidity, acidity, pressure, liquid level, displacement etc. All measure signals can be converted to standard signal (4-20 mA, 0-10 mA, 1-5 V and 0-5 V) to transmit output.

6. LK Series Digital Panel Meter

This series of panel meter divides into 3, 3 and half, 4 and half digits according to its display digits. According to display size, divide into 0.3 inches, 0.56 inches, 0.8 inches and 1 inch. It has perfect linear characteristics and high input impedance. It is a good performance and high precision DC voltmeter. This meter uses a high-precision voltage reference source with temperature automatic compensation function, so it has a small temperature coefficient and works stability. It is widely used on the measurement of voltage, current, temperature, humidity, acidity, luminosity, and pressure and displacement signals.
Model LK5130: input DC voltage is ±99.9mV (nominal as 0.1V or 100mV), it is also can be customized to the models of measure range of 1V, 10V, 100V and etc.
Model LK5135: input DC voltage is ±199.9mV (nominal as 0.2V or 200mV), it is also can be customized to the models of measure range of 2V, 20V, 200V and etc.