# SPMK51X Series Multi-function Process Calibrator

Whether for troubleshooting or normal maintenance or calibration, SPMK51X series of multifunction process calibrators will help you accomplish your tasks quickly and accurately.

## Product Characteristics

- **Variety of functions**
  Calibrate pressure, temperature, voltage, current, frequency, pulse, resistance. Both measurement and source functions.
- **Measurement and source functions**
  Measures 13 types of thermocouples and 11 types of RTDs and provides analog output with cold end compensation.
- **Data storage functions**
  No need to worry about data loss. Supports output methods such as step or program
- **Built-in HART function**
  It can calibrate and maintain HART-type instruments, and realize functions such as management of instrument basic information, range migration, zero point and full scale calibration (only for 516 and 518)
- **Support external pressure modules**
  SPMK SDP Pressure Module (only for 517 and 518) (Optional)
- **Task management function**
- **Analog transmitters**
  Generate precise electrical, temperature or pressure signals.
- **Provides commonly used tools**
  Thermal engineering treasure trove, user-built RTD library, temperature and pressure unit conversion.
- **Automatic cold-end compensation technology**
  Built-in cold end insulation module for fast tracking of temperature changes.
- **3.5-inch high-resolution TFT display**
- **Chinese and English languages available**
- **RS232 interface and open communication protocol**
- **Provide a 24VDC loop power supply with measurement and output isolated from each other**
- **Warranty: 1 year**

## Product Functions

| Function | | SPMK510 | SPMK516 | SPMK517 | SPMK518 |
|---|---|---|---|---|---|
| Measurement | Millivolts | ★ | ★ | ★ | ★ |
| | Voltage | ★ | ★ | ★ | ★ |
| | Current | ★ | ★ | ★ | ★ |
| | Frequency | | ★ | ★ | ★ |
| | Pulse | | ★ | ★ | ★ |
| | Resistance | | ★ | ★ | ★ |
| | On-off | ★ | ★ | ★ | ★ |
| | 11 RTDs | | ★ | ★ | ★ |
| | 13 thermocouples | | ★ | ★ | ★ |
| Source | Millivolt current | ★ | ★ | ★ | ★ |
| | Voltage | ★ | ★ | ★ | ★ |
| | Current | ★ | ★ | ★ | ★ |
| | Frequency | | ★ | ★ | ★ |
| | Resistance | | ★ | ★ | ★ |
| | Simulate 11 RTDs | | ★ | ★ | ★ |
| | Simulate 13 thermocouples | | ★ | ★ | ★ |
| Other Functions | HART communication | | ★ | | ★ |
| | External pressure module① | | | ★ | ★ |
| | Thermal book | | ★ | ★ | ★ |
| | Step programming output | ★ | ★ | ★ | ★ |
| | 24V loop current | ★ | ★ | ★ | ★ |
| | Simulating transmitter | | ★ | ★ | ★ |
| | RS232 communication | ★ | ★ | ★ | ★ |
| | Storage | ★ | ★ | ★ | ★ |

Note: SPMK510 millivolt voltage measurement and output range is wider Measurement range (-200~200)mV，Output range (-10~200)mV，Loop integrity test range (0~2000)Ω

① External pressure module means SPMK SDP Module produced by our company.

## Technical Parameters

**Electrical Signal Measurement Specifications (Ambient Temperature (20±5) °C, 1 year Accuracy)**

| Signal | | Range | Accuracy | Resolution |
|---|---|---|---|---|
| Current | | (-30-30)mA | ±(0.01%RD+0.005%FS) | 0.l μA |
| Voltage | | (-30-30)V | ± (0.01%RD+0.005%FS) | 0.l mV |
| Millivolts | | (-75-75)mV | ± (0.01%RD+0.005%FS) | 0.l μV |
| Resistance | R-3W | (0-400)Ω<br>(0-4000)Ω | ± (0.02% RD + 0.005% FS) | 1mΩ<br>10mΩ |
| | R-4W | (0-400)Ω<br>(0-4000)Ω | ± (0.01% RD + 0.005% FS) | 1mΩ<br>10mΩ |
| Frequency | | (1-50000)Hz | ± (0.005% RD + 0.002% FS) | 1Hz |
| Pulse | | 0-999999 | 1 pulse of earth | 1 |
| Switch (on/off) | | If the switch is equipped with an inspection voltage, the voltage range is (3~24)V | | |
| Thermocouples | | k、E、J、T、N、R、S、B、C、D、G、L、U | | |
| RTDs | | Pt1000(385)、Pt500(385)、Pt100(385)、Pt100(3916)、Pt100(3926)、Pt10(385)、Cu10(427)、Cu50(428)、Cu100(428)、Ni120(672)、Ni100(618) | | |
| Pressure range | | Refer to the Pressure Range Selection Chart (SPMK518, SPMK517 only). | | |

**Electrical Source Specifications (Ambient Temperature (20±5)℃， 1 year accuracy)**

| Signal | Range | Accuracy | Resolution |
|---|---|---|---|
| Current | (0-22)mA | ±(0.02% RD + 0.005% FS) | 0.1μA |
| Voltage | (0-12)V | ±(0.02% RD + 0.005% FS) | 0.1mV |
| Millivolts | (-10-100)mV | ±(0.02% RD + 0.005% FS) | 0.1μV |
| Resistance | (0-400)Ω<br>(400-4000)Ω | ±(0.02% RD + 0.005% FS)<br>±(0.03%RD+0.01%FS) | 1mΩ<br>10mΩ |
| Frequency | (0-50000)Hz | ±(0.005% RD + 0.002% FS) | 0.lHz |
| Pulse | 0-999999 | ±1pcs | 1 |
| 24VDC | (24±0.5)V Maximum belt load 50mA | | |
| Simulating Thermocouple | k, E, J, T, N, R, S, B, C, D, G, L, U | | |
| Simulating RTDs | Pt1000(385)、Pt500(385)、Pt100(385)、Pt100(3916)、Pt100(3926)、Pt10(385)、Cul0(427)、Cu50(428)、Cu100(428)、Ni120(672)、Ni100(618) | | |

**Measuring and Simulating thermocouple source temperature specifications using thermocouples (ambient temperature (20±5) ℃)**

| Thermocouple type | Reference | Temperature range (℃) | Tolerance temperature range (℃) | Maximum permissible error (℃) | |
|---|---|---|---|---|---|
| | | | | Measurement | Output |
| Type K | IEC584 | -270~1372 | -200~-100 | ±0.4 | ±0.6 |
| | | | -100~600 | ±0.3 | ±0.3 |
| | | | 600~1372 | ±0.4 | ±0.5 |
| Type E | IEC584 | -270~1000 | -200~-100 | ±0.3 | ±0.4 |
| | | | -100~600 | ±0.2 | ± 0.2 |
| | | | 600~1000 | ±0.2 | ±0.4 |
| Type J | IEC584 | -210~1200 | -210~-100 | ±0.3 | ±0.4 |
| | | | -100~1200 | ±0.3 | ±0.3 |
| Type T | IEC584 | -270~400 | -200~0 | P0.4 | S0.5 |
| | | | 0~300 | ±0.2 | ±0.3 |
| | | | 300~400 | ±0.2 | ±0.2 |
| Type N | IEC584 | -270~1300 | -200~-100 | ±0.5 | ±0.6 |
| | | | -100~1300 | ±0.4 | ±0.5 |
| Type R | IEC584 | -50~1768 | -50~100 | ±1.4 | ±1.5 |
| | | | 100~500 | ±0.6 | ±0.7 |
| | | | 500~1768 | ±0.7 | ±0.7 |
| Type S | IEC584 | -50~1768 | -50~100 | ±1.1 | ±1.2 |
| | | | 100~400 | ±1.0 | ±1.1 |
| | | | 400~1768 | ± 0.7 | ±0.8 |
| Type B | IEC584 | 0~1820 | 0~450 | ±3.8 | ±3.8 |
| | | | 450~800 | ± 0.9 | ±1.0 |
| | | | 800~1200 | ±0.6 | ± 0.7 |
| | | | 1200~1820 | ±0.6 | ±0.8 |
| Type C | ASTM E988 | 0~2315 | 0~1000 | ±0.6 | ±0.7 |
| | | | 1000~1800 | ±0.8 | ±1.0 |
| | | | 1800~2315 | ±1.2 | ±1.5 |

| | | | | | |
|---|---|---|---|---|---|
| Type D | ASTM E988 | 0~2315 | 0~100 | ±0.6 | ±0.6 |
| | | | 100~1100 | ±0.5 | ±0.6 |
| | | | 1100~2000 | ±0.8 | ±1.0 |
| | | | 2000~2315 | ±1.0 | ±1.4 |
| Type G | ASTM E1751 | 0~2315 | 0~200 | ±2.4 | ±2.5 |
| | | | 200~400 | ±0.5 | ±0.6 |
| | | | 400~1400 | ±0.4 | ±0.6 |
| | | | 1400~2315 | ±0.8 | ±1.0 |
| Type L | DIN43710 | -200~900 | -200~-100 | ±0.3 | ±0.5 |
| | | | -100~400 | ±0.2 | ±0.3 |
| | | | 400~900 | ±0.5 | ±0.6 |
| Type U | DIN43710 | -200~600 | -200~0 | ±0.5 | ±0.4 |
| | | | 0~600 | ±0.3 | ±0.5 |

Note: Thermocouple type C is WRe5-WRe26, Thermocouple type D is WRe3-WRe25.

**Measuring and Simulating RTD source temperature specifications using RTDs (ambient temperature(20±5)°C)**

| Thermocouple type | Reference | Temperature range (℃) | Tolerance applicable temperature range (℃) | Maximum permissible error (℃) | | |
|---|---|---|---|---|---|---|
| | | | | Measurement | | Output |
| | | | | 3W | 4W | |
| Pt1000 (385) | IEC751 | -200~850 | -100~200 | ±0.13 | ±0.08 | ±0.29 |
| | | | 200~600 | ±0.24 | ±0.13 | ±0.45 |
| | | | 600~840 | ±0.32 | ±0.19 | ±0.56 |
| Pt500 (385) | IEC751 | -200~850 | -100~200 | ±0.22 | ±0.16 | ±0.35 |
| | | | 200~600 | ±0.35 | ±0.22 | ±0.56 |
| | | | 600~850 | ±0.39 | ±0.28 | ±0.69 |
| Pt100 (385) | IEC751 | -200~850 | -100~200 | ±0.18 | ±0.14 | ±0.18 |
| | | | 200~600 | ±0.27 | ±0.18 | ±0.27 |
| | | | 600~850 | ±0.36 | ±0.29 | ±0.36 |
| Pt100 (3926) | Minco Application Aid #18 | -200~850 | -100~200 | ±0.18 | ±0.14 | ±0.18 |
| | | | 200~600 | ±0.27 | ±0.18 | ±0.27 |
| | | | 600~850 | ±0.36 | ±0.29 | ±0.33 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pt100 (3916) | JIS1604 | -200~850 | -100~200 | ±0.18 | ±0.14 | ±0.18 |
| | | | 200~600 | ±0.27 | ±0.18 | ±0.27 |
| | | | 600~850 | ±0.35 | ±0.29 | ±0.35 |
| Pt10 (385) | IEC751 | -200~850 | -100~200 | ±0.68 | ±0.64 | ±0.68 |
| | | | 200~600 | ±0.85 | ±0.82 | ±0.85 |
| | | | 600~850 | ±0.98 | ±0.89 | ±0.98 |
| Cu100 (428) | JB/T8623—1997 | -50~150 | -50~150 | ±0.15 | ±0.10 | ±0.16 |
| Cu50 (428) | JB/T8623—1997 | -50~150 | -50~150 | ±0.19 | ±0.17 | ±0.20 |
| Cu10 (427) | Minco Application Aid #18 | -100~260 | -100~260 | ±0.65 | ±0.58 | ±0.65 |
| Ni120 (672) | Edison curve #7 | -70~270 | -70~270 | ±0.08 | ±0.06 | ±0.08 |
| Ni100 (618) | DIN43760 | -70~190 | -70~190 | ±0.10 | ±0.07 | ±0.10 |

## General Technical Indicators

| | |
|---|---|
| **Display** | 6-digit display |
| **Usage environment** | Ambient temperature (-10 ～ 50)°C; Relative humidity <90% non-condensing;<br>Atmospheric pressure(86～106)kPa.a |
| **Storage environment** | Ambient temperature(-20～60)℃; Relative humidity <90% non-condensing |
| **Power supply mode** | AC and DC power supply (battery power is recommended for good measurement and output) |
| **Dimensions** | 208mm(L)x101mm(W)x55mm(H) |
| **Weight** | 0.7kg |
| **Warranty** | 1 year |

## Ordering Information

SPMK510/ SPMK516/SPMK517/SPMK518 multifunction process calibrators.

## Accessories(included)

| Serial number | Description | QTY | Picture |
|---|---|---|---|
| 1 | Main product | 1 pc |  |
| 2 | Power Adapter | 1 pc |  |
| 3 | Chargeable Lithium battery | 1 pc |  |
| 4 | Test leads | 3 set |  |
| 5 | Pressure module connection cable (Only for SPMK517, SPMK518) | 1 pc |  |
| 6 | type compensation conductor<br>(Only for SPMK516, SPMK517, SPMK518) | 1 pc |  |
| 7 | Dedicated short routes | 1 pc |  |
| 8 | User's manual | 1 pc | |
| 9 | Calibration test reports | 1 pc | |

## Optional Accessories

| Serial number | Description | QTY | Picture |
|---|---|---|---|
| 1 | SDP Pressure module<br>(Only for SPMK517, SPMK518) | |  |
| 2 | SDP Pressure module test report | | |
| 3 | Cold End Compensation Assembly (Optional E, Person T, N, R, S, B, C, D, G, L, U) | | |