DP1000G series is a graphic program controller employed high visibility 5.6” TFT color LCD display. Maximum 200 types of program pattern (Maximum 4000 steps) are stored and performance pattern is selectable. Control cycle of 0.1 sec, 5 digits display, high speed and high accuracy of ±0.1% indicating accuracy are realized.

**FEATURES**
- Employing clear 5.6” TFT color LCD display
  Graphic screen of pattern progress status, display of PV value/SV value/pattern/step/time and various monitor functions such as program progress enlarged display, enlarged data display and bargraph display are prepared.
- Easy program pattern settings on graphic screen
  Maximum 200 patterns/Maximum 4000 steps settings, pattern repeat, linking between patterns and endless program setting are available.
- Parameter settings per step
  Each parameter setting such as SV/PV start, guarantee soak and time signal is available per step.
- High performance and universal input
  Input selection from each range of thermocouple, DC voltage/current and resistance thermometer are available and unit has performance of 5 digit display, accuracy rating of ±0.1% and sampling period of 0.1sec.
- Storing settings in CF card
  Setting management is easy as all settings including setting program pattern and each parameter are stored in CF card and readout from it. PC software allows you to edit program pattern and parameter.
- Various control application functions
  Heating/cooling output is applicable as control output has ON-OFF pulse type, current output type, SSR drive pulse type and voltage output type.
- Abundant external input/output
  Unit with external input 16 points and external output 28 points enables function assignment. Synchronized operation with peripherals are easy. Serial communications interface and transmission signal output are also prepared.
- Interchangeable with DP series
  DP series are easily replaced with DP1000G which inherited characteristics of DP series such as function, operability and terminal arrangement/configuration.

**MODELS**

**Control mode (output No.1)**
1: ON-OFF pulse PID
2: ON-OFF servo PID (standard load spec)
3: Current output PID (general type 4 to 20mA DC)
5: SSR drive pulse PID
6: Voltage output PID (general type 0 to 10V DC)
8: ON-OFF servo PID (minimal load spec)
A: Current output PID (high accuracy type 4 to 20mA DC)
B: Current output PID (high accuracy type 1 to 5mA DC)
C: Voltage output PID (high accuracy type 0 to 10V DC)

**Control mode (output No.2)**
0: None
1: ON-OFF pulse PID*1
3: Current output PID (general type 4 to 20mA DC) *1
5: SSR drive pulse PID*1
6: Voltage output PID (general type 0 to 10V DC)*1
A: Current output PID (high accuracy type 4 to 20mA DC)*1
B: Current output PID (high accuracy type 1 to 5mA DC)*1
C: Voltage output PID (high accuracy type 0 to 10V DC)*1

**Communications interface**
0: None
R: RS232C (COM1)*OP
S: RS485 (COM1)*OP
A: RS422A (COM1)*OP
B: RS232C (COM1) + RS232C (COM2)*OP
C: RS485 (COM1) + RS232C (COM2)*OP
D: RS422A (COM1) + RS232C (COM2)*OP
E: RS232C (COM1) + RS485 (COM2)*OP
F: RS485 (COM1) + RS485 (COM2)*OP
G: RS422A (COM1) + RS485 (COM2)*OP

**Transmission signal output 1**
0: None
1: 4 to 20mA*OP
2: 0 to 1V*OP
3: 0 to 10V*OP
4: 1 to 5V*OP

**Transmission signal output 2**
0: None*2
1: 4 to 20mA*OP
2: 0 to 1V*OP
3: 0 to 10V*OP
4: 1 to 5V*OP

**Case color**
G: Gray
B: Black*OP

**Transmitter power supply**
0: None
1: Transmitter power supply*OP

*1 Selectable when control mode (output1) is 1,3,5,6,A,B,C.
*2 COM1 is exclusive use for rear port, COM2 is rear port and front port switchable.

*OP Option
### OPERATION SCREEN

- **Running status display at once**
  Running status display of pattern progress and PV/ SV/ MV/ variation.

- **Trend screen**
  Enlarged trend display of PV and SV

- **Enlarged data screen**
  Enlarged display of PV/SV

- **Bargraph screen**
  Bargraph display of PV/ SV/ MV

- **Pattern setting screen**

- **Step parameter setting screen**

### KEY ARRANGEMENT

- A/M
- RUN
- RESET
- DISP
- ESC
- FNC
- STOP
- ADV
- MENU
- ENT

- Direction key
**PROGRAMMING SPECIFICATIONS**

**Input specifications**

- **Input types**: DC voltage: ±10mV, ±20mV, ±50mV, ±100mV, ±5V, ±10V  
- DC current: 20mA  
- Thermocouple: B, R, S, K, E, J, T, N, L, WRe5-WRe26, W-FeCr-Al, NiCr-Ni, CuNi-Cu, Pt1000, Pt100, Pt50, NiCo  
- Resistance thermometer: Pt100, Pt1000, Pt50, Pt-Co  

**Accuracy rating**

- Refer to the table of measuring range and accuracy ratings.

**Reference junction compensation accuracy**

- K, E, T, J, N, Pt100, Pt1000, Pt50, Pt-Co  
- ±0.5°C or less

- Other than above: ±1.0°C or less

**Sensor correction**

- Selectable by 0.1time resolution of the target resolution

**Burnout**

- Burnout available for thermocouple, DC voltage, and resistance thermometer

**Ramp rate**

- -99.999 to 99.999

**Time**

- 0 to 99999, decimal point linked with scaling

**Operation function**

- Square roots calculation
- Log operation
- Digital filter: 0 to 9999 sec
- PID value: Automatic setting by auto tuning or Manual setting

**PID parameter setting change**

- Changeable during operation

**Parameter setting change**

- Target value, time, ramp rate, PID, ARW, guarantee soak, output limit, output variation limit, alarm, sensor

**Additional function**

- Pattern link, circle function, parameter edit

**Alarm specifications**

- Number of set points: 4 points + 4 points (for extended assignment setting)

**Control specifications**

- Control switching period: Approx. 0.1 (initial value) / 0.2 / 0.3 / 0.5 sec

- Control type: OFF pulse type, ON-FN servo type, current output type, SSR drive pulse type, voltage output type

- PID value:
  - Automatic setting by auto tuning or Manual setting
  - P: 0 to 999.9% (for 2 position operation)
  - I: 0 to 9999 sec (for 0 to 1 operation)
  - D: 0 to 9999 sec

- Auto tuning:
  - AT1: Set by the target value during operation
  - AT2: Preset the step interval coaxial 8 types
  - AT3: Preset 8 automatic selection types for SV interval
  - AT4 to AT6: Setting for the 2 outputs type

- On-off pulse type:
  - Output signal --- On-off pulse conductive signal (relay contact)
  - Output capability --- Resistance load 100 to 240VAC
  - Minimum load 5 VDC, 10mA or more

- Off-servo type:
  - Output signal --- On-off pulse conductive signal (relay contact)
  - Minimum load 5 VDC, 1mA or more

- Feedback resistance --- Upper 0 to 2kΩ
- Contact protection --- Compact CR element built-in

- Current output type:
  - Output signal --- 4 to 20mA or 0 to 5mA
  - Load resistance --- 750Ω or less
  - Minimum load --- 10mA or more
  - Power --- 100mV or less

- Voltage output type:
  - Output signal --- 0 to 10 VDC
  - Output capability --- Upper 0 to 100.0%, Lower 0 to -10.0%
  - Maximum load --- 50mA or less

- SSR drive pulse type:
  - Output signal --- On-off pulse voltage signal
  - At ON --- 12VDC ±20% (maximum 20mA)
  - At OFF --- 0.9VDC or less

- Sampling period:
  - Approx 0.1 sec

- Measuring current:
  - Resistance thermometer input --- Approx 1mA (with measuring range)

- Total number of steps:
  - Up to 4000 steps

- Pattern set type:
  - Target temp (SV)/Time or Ramp rate/Time
  - Pattern set type --- Target temp (SV)/Time or Ramp rate/Time

- Parameter registration:
  - Each parameter is selectable per step

- Number of steps:
  - Up to 199 steps per pattern

- Number of patterns:
  - Up to 200 patterns

- Total number of steps:
  - Up to 4000 steps

- Start temperature:
  - Select either PV start or arbitrary set value start

- Target value (SV) correction:
  - -99999 to 99999, decimal point linked with scaling

- Fast-forward function:
  - Program fast-forward function provided

- End output:
  - Select either constant value control or fixed output

- Parameter registration:
  - Each parameter is selectable per step

- Sequence programming:
  - PID constant --- 8 types, or 8 automatic selection types for SV interval (excluding dead band, ARW upper/lower limits, and output preset)
  - Output limit (upper/lower) / output limit value (upper/lower) / types for each, or 8 automatic selection types for SV interval
  - Guarantee soak 8 types
  - Wait time alarm 8 types
  - Alarm 8 types for each (a set of 4points)
  - Time signal 30 types, all ON, all OFF, reverse phase, repeat in a step
  - Sensor correction/mass flow target value 8 types

- Cascade primary controller:
  - Output (%) = x control operation value + b + c * set value a, c: 0.00 to 1.00, b: -100.0 to 100.0
  - Operation activation control output 1/2, transmission output 1/2
Setting range: -99999 to 99999, decimal point linked with scaling
Dead band: 0.1 times of set resolution
Delay setting range: 1 to 10 times
Output type: Relay contact output 4 points --- (A contact, 1 common)
Contact capacity --- Resistance load 100 to 240VAC 30VDC, 3A or less
Inductive load 100 to 240VAC 30VDC, 1.5A or less
External output signal assignment 4 points (for extended assignment setting)
Alarm reset: Alarm can be cleared during occurrence

**EXTERNAL OUTPUT SIGNAL SPECIFICATION**
Number of output: 28 points (function assignment per point)
Output type: Open collector output (24V DC, up to 50mA)
Time signal output: Default assignment --- 18 points
Output type --- ALL/ON/ ALL-OFF/ maximum of 30 types per step
Status output: Default assignment --- 10 points
Output type --- RUN/STOP, ADV, RESET, WAIT, FAST, END, ALM/ALM, SV-UP, SV-DOWN
Selective assignment --- Pattern/ step No.-BCD output
Alarm output: Selective assignment --- 8 types
Output type --- AL1 to AL8

**EXTERNAL INPUT SIGNAL SPECIFICATION**
Number of inputs: 16 points (function assignable per point except external drive input)
Input type: Non voltage contact (contact capacity 12V DC, 2mA or more)
External power supply specification 12/24V DC ON when power is applied (up to 12mA/point)
External drive input: Default assignment --- 5 points
Input type --- RUN/STOP, ADV, RESET, WAIT, FAST
Selective assignment --- Circle pulse (program operation)
External A/M switching, alarm reset, PV hold, SV hold
Pattern select input: Default assignment --- 10 points
Input type --- 10 types of 1, 2, 4, 8, 10, 20, 40, 80, 100, 200
Selection method --- Select the number from 1 to 200 using BCD code

**DISPLAY SPECIFICATION**
Screen: 5.6”TFT color LCD
Display content: Operation screen
Home screen --- Pattern progress, pattern/step No., numeric data, status, time signal, alarm
Enlarged data screen, bargraph screen, trend screen, D/O/DI screen
Setting screen --- Pattern/sequence setting, various parameter setting, memory card setting setting, maintenance, setting lock, communications, setting change during operation
LCD backlight: 4 brightness adjustment levels

**SETTING AND OPERATION SPECIFICATION**
Operation key type: MENU, DISP DIRECTION key, ENT, ESC, FNC, RUN, STOP, ADV, RESET, A/M
Setting and operation method:
Setting --- Menu calling/ cursor selection method
Operation --- Direct key operation (combined with FNC)
Menu setting:
Mode 0 (Execution steps setting)
Mode 1 (Operation status selection)
Mode 2 (Pattern and sequence)
Mode 3 (PID/alarm)
Mode 4 (Output/control)
Mode 5 (Input)
Mode 6 (Time signal/guarantee soak)
Mode 7 (Transmission)
Mode 8 (Communications)
Mode 9 (Memory card)
Mode 10 (Enhanced setup)
Mode 11 (Maintenance)
Mode 12 (Help)
Operation:
Operation start/stop (RUN/STOP), operation reset (RESET), Stepping operation (ADV), auto/manual switching (A/M).
Display operation:
Switching between operation screens
HOME screen (registered operation screen) automatic display
Engineering port:
Serial port on the front panel
(Custom cable connection)

**MEMORY CARD SPECIFICATION (Card is optional)**
Memory media: Compact flash (CF) card
Memory size: Up to 2 GB
Saved data: Setup parameters, program patterns
All data (for auto loading)

Function: Save/read/delete/verify
For program patterns, individual or all pattern save/delete selectable
Card format (simple format)

**GENERAL SPECIFICATION**
Rated power voltage: 100 to 240V AC 50/60Hz (universal power supply)
Maximum power consumption: 45VA
Reference operation condition:
Ambient temperature humidity range --- 21 to 25°C, 50 to 60%RH
Power voltage --- 100V AC ±1.0%
Power frequency --- 50/60Hz ±0.5%
Attitude --- Left/right ±3°, forward/backward ±3°
Warm-up time --- 30 minutes or more
Normal operation condition:
Ambient temperature humidity range --- -10 to 50°C, 10 to 90%RH
Power voltage --- 90 to 264V AC
Power frequency --- 50/60Hz ±2%
Attitude --- Left/right ±1°, forward/backward ±1°
Transportation condition:
At the packed condition on shipment from our factory
Ambient temperature humidity range --- -20 to 60°C, 5 to 90%RH (No dew condensation)
Vibration --- 10 to 60Hz 0.5g (4.9ms/s²) or less
Impact --- 400 (362ms²/m) or less
Storage condition: Ambient temperature humidity range --- -20 to 60°C, 5 to 90%RH
(No dew condensation)
Power failure protection:
The settings are kept using EEPROM and lithium battery backed up RAM

Insulation resistance:
Between secondary terminal and protection conductor terminal --- 500V DC 20MΩ or more
Between primary terminal and protection conductor terminal --- 500V DC 20MΩ or more
Between primary terminal and secondary terminal --- 500V DC 20MΩ or more
Withstand voltage:
Between secondary terminal and protection conductor terminal --- 500V AC for 1minute
Between primary terminal and protection conductor terminal --- 1500V AC for 1minute
Between primary terminal and secondary terminal --- 1500V AC for 1minute
Protection: Conformed to IP54
Case assembly material:
Case, Front bezel, input/output terminal board --- Fire-retardant polycarbonate resin
External input/output, transmission input/output, communications terminal board --- PBT
Color:
Front bezel, case --- Gray or black
Terminal cover:
Standard provision
Weight:
Approx 1.7kg
Mounting:
Panel mounting
Terminal screw:
M3.5 (M3 for external input/output, transmission output, communications terminal board)

**SOFTWARE**
DP-G parameter editing software
- Program pattern editing / file management / printing
- Setting parameter editing / file management / printing
- "CF" card reading / storing for DP-G

**OPTION SPECIFICATION**
Transmission signal output
Number of outputs: Up to 2 points
Output signal: 4 to 20mA DC (load resistance 400Ω or less)
0 to 1V DC (load resistance 50kΩ or more)
1 to 5V DC (load resistance 50kΩ or more)
0 to 10V DC (load resistance 50kΩ or more)
+1 to 5V DC for secondary transmission output

Transmitter power supply (Insulation type)
Power voltage: 24V DC
Current capacity: Up to 30mA
Communications interface:
Number of communications points:
Up to 2 points
Communications type:
RS232C, RS422A, RS485
*COM2 for front and rear switching
Protocol:
MODBUS/PRIVATE
## MEASURING RANGES

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>Scale range</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>0.0 to 1820.0°C</td>
</tr>
<tr>
<td>R</td>
<td>0.0 to 1760.0°C</td>
</tr>
<tr>
<td>0.0 to 1200.0°C</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.0 to 1760.0°C</td>
</tr>
<tr>
<td>K</td>
<td>-200.0 to 1370.0°C</td>
</tr>
<tr>
<td>0.0 to 600.0°C</td>
<td></td>
</tr>
<tr>
<td>-200.0 to 300.0°C</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>-270.0 to 1000.0°C</td>
</tr>
<tr>
<td>0.0 to 700.0°C</td>
<td></td>
</tr>
<tr>
<td>-270.0 to 300.0°C</td>
<td></td>
</tr>
<tr>
<td>-270.0 to 150.0°C</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>-200.0 to 1200.0°C</td>
</tr>
<tr>
<td>-200.0 to 900.0°C</td>
<td></td>
</tr>
<tr>
<td>-200.0 to 400.0°C</td>
<td></td>
</tr>
<tr>
<td>-100.0 to 200.0°C</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>-270.0 to 400.0°C</td>
</tr>
<tr>
<td>-200.0 to 200.0°C</td>
<td></td>
</tr>
<tr>
<td>WR5-WR26</td>
<td>0.0 to 2310.0°C</td>
</tr>
<tr>
<td>W-WR26</td>
<td>0.0 to 2310.0°C</td>
</tr>
<tr>
<td>NiMo-Ni</td>
<td>-50.0 to 1410.0°C</td>
</tr>
<tr>
<td>CR-AuFe</td>
<td>0.0 to 280.0K</td>
</tr>
<tr>
<td>N</td>
<td>0.0 to 1300.0°C</td>
</tr>
<tr>
<td>Pirh40-Pirh20</td>
<td>0.0 to 1880.0°C</td>
</tr>
<tr>
<td>Platinelll</td>
<td>0.0 to 1390.0°C</td>
</tr>
<tr>
<td>0.0 to 600.0°C</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>-200.0 to 400.0°C</td>
</tr>
<tr>
<td>-200.0 to 900.0°C</td>
<td></td>
</tr>
</tbody>
</table>

## ACCURACY RATINGS

<table>
<thead>
<tr>
<th>Input type</th>
<th>Accuracy rating</th>
<th>Exception</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>R, S</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>T/C</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>WR5-WR26</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>W-WR26</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>NiMo-Ni</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>Platinnell</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>CR-AuFe</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>Pirh40-Pirh20</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
<tr>
<td>DC voltage / current</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>R T D</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>Pt100</td>
<td>±0.1%±1digit</td>
<td>Measuring range of -100 to 100°C ±0.2%±1digit</td>
</tr>
<tr>
<td>Old Pt100</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>JPt100</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>JPt50</td>
<td>±0.1%±1digit</td>
<td></td>
</tr>
<tr>
<td>Pt-Co</td>
<td>±0.2%±1digit</td>
<td></td>
</tr>
</tbody>
</table>

* Accuracy converted to the measuring range under the reference operation condition. Reference junction compensation accuracy is added to thermocouple.
* WRe5-WRe26, W-WRe26, NiMo-Ni, Platinnell, CR-AuFe, Pirh40-Pirh20 : ASTM Vol.14.03
* U, L : DIN43710-1985
* JPt50 : JIS C 1604-1981
■ TERMINAL ARRANGEMENT

Control output terminals (Output1)

Current/voltage/SSR drive pulse type (+) 
Current/voltage/SSR drive pulse type (-)

Control output terminals (Output2)

Current/voltage/SSR drive pulse type (+) 
Current/voltage/SSR drive pulse type (-)

■ EXTERNAL INPUT/OUTPUT TERMINALS

Time signal output terminals

<table>
<thead>
<tr>
<th>Time signal output terminals</th>
<th>Status output terminals</th>
<th>External drive input terminals and pattern selection input (BCD code) terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS 1 : 1B LOAD</td>
<td>ADV : 3C LOAD</td>
<td>ADV : 4C ADV : 4C ADV : 4C</td>
</tr>
<tr>
<td>TS 2 : 1C LOAD</td>
<td>RESET : 3D LOAD</td>
<td>RESET : 4D RESET : 4D RESET : 4D</td>
</tr>
<tr>
<td>TS 3 : 1D LOAD</td>
<td>WAIT : 3E LOAD</td>
<td>WAIT : 4E WAIT : 4E WAIT : 4E</td>
</tr>
<tr>
<td>TS 4 : 1E LOAD</td>
<td>FAST : 3F LOAD</td>
<td>FAST : 4F FAST : 4F FAST : 4F</td>
</tr>
<tr>
<td>TS 5 : 1F LOAD</td>
<td>END : 3G LOAD</td>
<td>END : 4G END : 4G END : 4G</td>
</tr>
<tr>
<td>TS 6 : 1G LOAD</td>
<td>ALM-WAIT : 3H LOAD</td>
<td>ALM-WAIT : 4H ALM-WAIT : 4H ALM-WAIT : 4H</td>
</tr>
<tr>
<td>TS 8 : 1I LOAD</td>
<td>SV-UP : 3J LOAD</td>
<td>SV-UP : 4J SV-UP : 4J SV-UP : 4J</td>
</tr>
<tr>
<td>TS 10 : 2B LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 11 : 2C LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 12 : 2D LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 13 : 2E LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 14 : 2F LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 15 : 2G LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 16 : 2H LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 17 : 2I LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
<tr>
<td>TS 18 : 2J LOAD</td>
<td>*COM: Common to time signal output</td>
<td></td>
</tr>
</tbody>
</table>

■ DIMENSIONS

Panel cutout

Specifications subject to change without notice. Printed in Japan (F) 2018. 8