SR1, SR3 Series Digital Controller
Instruction Manual

Please do not begin operating this product until you have read this instruction manual thoroughly and you understand its contents.

Safety Rules
For matters regarding safety, potential damage to equipment and/or facilities, additional instructions and notes are indicated by the following headings.

⚠️ WARNING
This heading indicates hazardous conditions that could cause injury or death of personnel unless extreme caution is exercised.

⚠️ CAUTION
This heading indicates hazardous conditions that could cause damage to equipment and/or facilities unless extreme caution is exercised.

NOTE
This heading indicates additional instructions and/or notes.

⚠️ WARNING
The SR1, SR3 series digital controller is designed for controlling temperature/humidity and other physical quantities of general industrial equipment. Avoid using it for control of devices upon which human life is dependant. When used, adequate and effective safety measures must be taken. No warranty is valid in the case of an accident arising from the use of this product without having taken such safety measures.

⚠️ CAUTION
• To avoid damage to connected equipment, facilities or the SR1, 3 itself due to a fault of the product, safety measures must be taken before usage, such as the installation of a fuse, an overheating protection device and the like.
• As a means to turn the power off, a switch or a breaker (which conforms with IEC 60947) should be installed in the external power circuit to be connected to the power terminal of the instrument.
• Since the instrument does not have a built-in fuse, do not forget to install a fuse in the power circuit to be connected to the power terminal. Fuse rating/characteristics: 250V AC 0.5A/medium lagged or lagged type.
Use a fuse which conforms with IEC 60127.

⚠️ CAUTION
• Do not use this instrument other than specified.
• Using the instrument other than specified may result in trouble with the instrument or may cause a fire.
• Voltage/current of a load to be connected to the output terminal should be within a rated range.
• Do not block the draft hole or allow dust and the like to stick to the case of the instrument for heat discharge. A rise in temperature or insulation failure may result in a reduction of the life of the product and/or problems with it or may cause a fire.
• Do not operate keys on the front panel with a hard or sharply pointed object. Operate the keys only by softly touching them by your finger tips.
• When cleaning the instrument, wipe it gently with a dry cloth. Never use solvent such as thinner.

1. Introduction
1-1. Check before Use and Confirmation of Model Codes
This product has been fully inspected for quality assurance prior to shipment. However, you are requested to make sure that there is no error, damage or shortage of delivered items by checking the model codes and the external view of the product.

Confirmation of Model Codes
Check the model codes affixed to the case of the product to ascertain if the respective codes designate what was specified when you ordered it, referring to the following code table.

<table>
<thead>
<tr>
<th>S R 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

1. Series code
SR1: 48x48mm DIN
SR3: 96x96mm DIN

2. Input
[8] Thermocouple, R.T.D., mV Voltage, Multi-input
[6] Voltage: -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V DC
* Will correspond to external mounting resistance of (250Ω) for current input.

3. Control output

4. Event
[1] 1×2

5. Remarks

2. About Installation
2-1. Installation
This instrument is created with the premise of being used by setting on the instrumentation panel. Therefore, please make sure that the user would not come in contact with the live part of the power terminals and the like.

2-2. Installation Conditions (environmental conditions)
Note:
This instrument should not be used in any of the places mentioned below. Selection of any of the places may result in trouble with the instrument, damage to it or even a fire.

① Where flammable gas, corrosive gas, oil mist and particles that can deteriorate electrical insulation are generated or abundant.
② Where the temperature is below -10°C or above 50°C.
③ Where the relative humidity is above 90% RH or below the dew point.
④ Where highly intense vibration or impact is generated or transferred.
⑤ Where the instrument is exposed to dew drops or direct sunlight.
⑥ Where the instrument is directly exposed to the air of the heater or the air conditioner.
⑦ Where the height is above 2000m.
2-3. Site selection
This instrument is specified to be used in the following environment conditions.
① Over voltage category II
② Degree of pollution 2 (IEC60664-1) (IEC 61010-1)
③ Where the height is below 2000m

2-4. Mounting
① Cut a hole for mounting the controller in the panel by referring to the cutout drawing in section 2-5.
② The panel thickness should be 1.0~4.0mm.
③ As the instrument is provided with pawls for fixing, just press it firmly from the front of the panel.
④ Please mount vertically in order to satisfy the dust-proof/drip-proof (NEMA4X, IP66) specification.

2-5. External Dimensions and Panel Cutout
SR1 (48×48mm size)

SR 3 (96×96mm size)

Note: When installing without leaving space between instruments, dust-proof/drip-proof, (NEMA4X, IP66) specification would not be satisfied.

3. Wiring

WARNING
• Make sure to disconnect this product from any power source during the wiring operation. Otherwise an electric shock may result.
• To prevent an electric shock, do not touch wired terminals and other charged elements while they are being energized.
3. Terminal Arrangement Table

<table>
<thead>
<tr>
<th>Name of terminal</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power terminal</td>
<td>SR1 SR3</td>
</tr>
<tr>
<td>Output terminal</td>
<td>Contact: COM, SSR drive voltage/voltage/current: + Contact: NO, SSR drive voltage/voltage/current: –</td>
</tr>
<tr>
<td>Event output terminal</td>
<td>COM: Common terminal EV1: Event 1 output terminal (standard) EV2: Event 2 output terminal (standard)</td>
</tr>
</tbody>
</table>

Note: Shorting across B and B terminal will cause an error when thermocouple/voltage/current is inputted. If used with input current, apply supplied shunt resistor of 250Ω ±0.1% between input terminals (+, –).

4. Outline of Specifications

**Display**
- **Display accuracy** ± (0.5% FS+1digit)
- **Display accuracy maintaining range** 23±5°C
- **Measured value display range** Input range or −10~110% of measuring range

**Setting**
- **Setting method** By operating 4 keys on the front panel
- **Setting limiter** Within the measuring range, individual setting for higher and lower limits (Lower limit<Higher limit)

**Input**
- **Input type** Multi input (TC, Pt100, Jpt100, mA, mV)
- **PV bias** −1999~2000 Unit
- **PV filter** 0~100 seconds

**Control**
- **Control mode** Auto tuning PID control, manual control
- **Type of control output** Relay contact, SSR drive voltage, voltage, current
- **Output control characteristics** RA/DA switching
- **Output limiter** Lower limit: 0.0~99.9% Upper limit: lower limit +0.1~100.0%

5. Names and Functions of Parts on Front Panel

<table>
<thead>
<tr>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Measured value (PV) display</td>
</tr>
<tr>
<td>②</td>
<td>Target set value (SV) display</td>
</tr>
<tr>
<td>③</td>
<td>Action display lamps</td>
</tr>
<tr>
<td>④</td>
<td>Operating keys</td>
</tr>
</tbody>
</table>

**Event**
- **Output points** 2 points EV1, EV2
- **Contact rating** 240V AC 1A (resistive load)
- **Event type** Absolute values, deviations (higher, lower, higher/lower, within, outside)

**Event action**
- **On-Off action** Selectable from the 3-type standby mode

**General specifications**
- **Ambient temperature for operational condition** −10°C~+50°C
- **Supply voltage** 100~240V AC±10% 50/60Hz
- **Power consumption** Approximately 10VA
6. Explanation of Screens and Setting

6-1. How to change screens

- Power on
- Type display
  - Input type display
- Control output display
- Lower limit measured value display
- Upper limit measured value display
- PV/SV display
- Basic screen mode 0-0

Pressing the key continuously for 3 seconds calls the 1-0 initial screen of screen group 1.

*1: Input type display
  - Thermocouple: 
  - R.T.D: 
  - Voltage (mV): 
  - Voltage (V):

*2: Output type display
  - Contact: 
  - SSR drive voltage: 
  - Voltage: 
  - Current:

6-2. Mode 0 screen group

- Basic screen
- PV
- SV
- Output monitor screen
- PV
- OUT
- Auto tuning execution screen
- AT
- Event 1 action points
- Event 1 mode
- Event 2 action points
- Event 2 mode
- To the 0-0 basic screen

Pressing the key continuously for 3 seconds calls the 1-0 initial screen of screen group 1.

6-4. Mode 1 (Device maker setting screen group)

Pressing the key continuously for 3 seconds on the basic screen will proceed to the mode 1 screen group.

<table>
<thead>
<tr>
<th>Mode No.</th>
<th>Screen title</th>
<th>Setting range ( ) = initial value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-0</td>
<td>Initial screen</td>
<td></td>
<td>Initial screen</td>
</tr>
</tbody>
</table>
| 1-1      | Key lock setting | OFF 1–3 (OFF) | OFF: Key control possible for all screens  
1: Key control not possible for screens except user setting screen group  
2: Key control not possible for other than SV setting  
3: All key control not possible |
| 1-2      | Proportional band setting | OFF: 0.1–999.9% (3.0)  
Control output: During contact P=OFF (factory setting) | The width of proportional band will be set during the time of control.  
The smaller the proportional band, the larger the output difference for the deviation (gap between PV and SV). |

*When the key is pressed while the key is being pressed, the preceding setting screen is called back.
<table>
<thead>
<tr>
<th>Mode No.</th>
<th>Screen title</th>
<th>Setting range</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Hysteresis setting</td>
<td>1~999 Unit (20)</td>
<td>The width of hysteresis during ON-OFF control P=OFF Displays while setting.</td>
</tr>
<tr>
<td>1-4</td>
<td>Integral time setting</td>
<td>OFF, 1~6000 sec. (120) P or P+D control when OFF setting</td>
<td>Time setting to cancel the offset (deviation) which occurs during proportional control Integral action cannot take action when I=OFF: No display when P=OFF:</td>
</tr>
<tr>
<td>1-5</td>
<td>Derivative time setting</td>
<td>OFF, 1~3600 sec. (30) P or P+I control when OFF setting</td>
<td>Estimates the fluctuation of the outcome of control and will conduct correction. Integral action cannot take action when d=OFF: No display when P=OFF:</td>
</tr>
<tr>
<td>1-6</td>
<td>Manual reset setting When I=OFF is set</td>
<td>–50.0~50.0% (0.0)</td>
<td>Will correct the offset which occurred at proportional control manually. No display when P=OFF:</td>
</tr>
<tr>
<td>1-7</td>
<td>Target value function setting</td>
<td>OFF, 0.01~1.00 (0.40)</td>
<td>A function which controls the overshoot and undershoot when the target value is reached. The effect is large when 1.00 and small when 0.00. No display when P=OFF:</td>
</tr>
<tr>
<td>1-8</td>
<td>lower limit output limiter setting</td>
<td>0.0~99.9% (0.0)</td>
<td>Will set the control output of lower limit value.</td>
</tr>
<tr>
<td>1-9</td>
<td>higher limit output limiter setting</td>
<td>0<del>L+0.1</del>100.0% (100.0)</td>
<td>Will set the control output of higher limit value.</td>
</tr>
<tr>
<td>1-10</td>
<td>Proportional cycle time setting When Y, P is output</td>
<td>1~120 sec (Y: 30, P: 3) No display when I, V is output</td>
<td>The output of the proportional cycle will be set when contact and SSR drive voltage are outputted. No display if the type of the control output is current or voltage.</td>
</tr>
<tr>
<td>1-11</td>
<td>EV1 type Code setting</td>
<td>OFF, Hd~So (HD)</td>
<td>oFF : None Hd : Higher limit deviation lD : Lower limit deviation ad : Outside higher/lower limit deviations cd : Within higher/lower limit deviations HA : Higher limit absolute value LA : Lower limit absolute value So : Scale over</td>
</tr>
<tr>
<td>1-12</td>
<td>Hysteresis setting</td>
<td>1~999 Unit (5) Alarm code No display when So (So: scale over, see 6-3)</td>
<td>The width of hysteresis when alarm relay is ON and OFF:</td>
</tr>
<tr>
<td>1-13</td>
<td>EV 1 Standby action setting</td>
<td>1~4 (1) Alarm code No display when So</td>
<td>1: No standby action 2: Standby action only when power is applied 3: Standby action when power is applied or when changed to SV 4: Control mode (no standby)</td>
</tr>
<tr>
<td>1-14</td>
<td>EV 2 type Code setting</td>
<td>OFF, Hd~So (LD)</td>
<td>Same as EV1</td>
</tr>
<tr>
<td>1-15</td>
<td>EV 2 Hysteresis setting</td>
<td>1~999 Unit (5) Alarm code No display when So</td>
<td>Same as EV1</td>
</tr>
</tbody>
</table>

*When the key is pressed while the key is being pressed, the preceding setting screen is called back.*
<table>
<thead>
<tr>
<th>Mode No. Screen title</th>
<th>Setting range ( ) = initial value</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-16 EV 2 Standby action setting</td>
<td>1~4 (1) Alarm code No display when So</td>
<td>Same as EV1</td>
</tr>
<tr>
<td>1-17 Control output characteristics setting</td>
<td>rA/dA (rA)</td>
<td>Switching the characteristics of control action rA : heating/humidify (reverse action) dA: cooling/dehumidify (direct action)</td>
</tr>
<tr>
<td>1-18 SV lower limiter setting</td>
<td>Lower limit value of measuring range (0.0) within measuring range SV_L&lt;SV_H</td>
<td>In case a narrower setting range of target value than a measuring range is used, a lower limit value is set.</td>
</tr>
<tr>
<td>1-19 SV higher limiter setting</td>
<td>Higher limit value of measuring range (800.0)</td>
<td>In case a narrower setting range of target value than a measuring range is used, a higher limit value is set. (It can prevent erroneous setting in a risky range and has some other advantageous effect.)</td>
</tr>
<tr>
<td>1-20 PV bias value Setting Screen</td>
<td>–1999~2000 Unit (0/0.0)</td>
<td>This value is used to correct an input error from a sensor or the like. The displayed value will change based on the set number. When a bias is given, control is also carried out with a corrected value.</td>
</tr>
<tr>
<td>1-21 PV Filter time setting screen</td>
<td>0~100 sec (0)</td>
<td>Incase input changes conspicuously or noise continues, PV filter is used to mitigate such undesirable effect. When 0 second is set, filter does not function.</td>
</tr>
<tr>
<td>1-22 Measuring range code setting screen</td>
<td>Multi: 01<del>76 (05) HV: 81</del>86 (86) ((05), (86): Default value)</td>
<td>Each code represents a combination of an input type and a measuring range. (Refer to 9. Table of Measuring Range Codes)</td>
</tr>
<tr>
<td>1-23 Input unit setting screen</td>
<td>C/F (˚C)</td>
<td>Select the temperature unit for sensor input and register by SCL key. This screen is not displayed when linear input (mV, V or mA) is set.</td>
</tr>
<tr>
<td>1-24 Input scaling Lower limit value setting</td>
<td>–1999~9999 unit (0.0)</td>
<td>A lower limit value of scaling of linear input is set and registered by SCL key. (For sensor input, the screen is for monitoring only and setting is not possible.)</td>
</tr>
<tr>
<td>1-25 Input scaling Higher limit value setting</td>
<td>SCL+10~SCL+5000 (100.0)</td>
<td>A higher limit value of scaling of linear input is set and registered by SCL key. (For sensor input, the screen is for monitoring only and setting is not possible.)</td>
</tr>
<tr>
<td>1-26 Input scaling Decimal point setting</td>
<td>None~0.001 digit on the right of decimal point (0.0)</td>
<td>The position of decimal point during linear input scaling is set and is registered by SCL key. (For sensor input, the screen is for monitoring only and setting is not possible.)</td>
</tr>
</tbody>
</table>

*Sensor Input: Thermocouple, R.T.D. input
Linear Input: Voltage (mV, V) input
7. Event Action

7-1. Deviation Alarm

The alarm action point will change along with the Target set value (SV). For example, when the target set value is 20°C, +10 should be set for higher limit deviation alarm in order to put an alarm in action at 30°C and higher. To put an alarm action at 30°C and lower when the target set value is 100°C, −70°C should be set for higher limit deviation alarm.

7-2. Absolute Value Alarm

An alarm action point is set by an absolute value. For example, when the measured value exceeds 100°C, 100°C should be set for higher limit absolute alarm in order to put an alarm in action at 100°C and higher. To put an alarm in action at 70°C and lower 70°C should be set for lower limit absolute alarm.

In case of absolute value alarm, the alarm only works for the measured value (PV) with no relation to the target set value (SV).

7-3. Standby Action (Mode 1-13)

This is used to withhold alarm action even when an alarm action point is reached when power is applied and to put the alarm in action on the alarm action point after a target set value (SV) is reached.

7-4. Standby action code table

1: No standby action
2: Standby action only when power is applied
3: Standby action when power is applied or when changed to SV
4: Control mode (no standby)

8. Before starting up

Before operation, check the wiring and set the items listed below by the setting methods of the screen groups. However, for factory-set items and items already set by equipment manufacturers, preparation is unnecessary.

1. Checking of Wiring

Check that the wiring connected to the terminals is carried out properly.

2. Application of Operating Power

Apply operating power. The controller is energized and the data display and other lamps light.

3. Setting of Measuring range and input type

Select input type, code and register by from the setting range codes of Mode 1 screen (1-22) “Measuring range selection setting screen.” In the case of current and voltage input, the measuring range of lower limit values, higher limit values opposed to input signals and the position of decimal point will be set.

4. Setting of control type

In the case of ON-OFF (two positions) action, call the mode 1 (1-2) “Proportional band setting” screen and select and register OFF. If used with PID auto tuning, setting can remain unchanged.

5. Setting of Control Output Characteristics

Select either heating (RA) or cooling (DA) characteristics from mode 1 (1-17) “Control output characteristics setting” screen.

6. Setting of Event (EV1, EV2) Action Type

Select and register a code for either mode 1 (1-11, 1-13, 1-14, 1-16) “Alarm code” or “Alarm standby code”.

Note: When input types, measuring range is selected and changed, all the set data concerning measuring range will be initialized.
9. Table of Measuring Range Codes

<table>
<thead>
<tr>
<th>Input type</th>
<th>Code</th>
<th>Measuring range (°C)</th>
<th>Measuring range (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>01</td>
<td>0 ~ 1800</td>
<td>0 ~ 3300</td>
</tr>
<tr>
<td>R</td>
<td>02</td>
<td>0 ~ 1700</td>
<td>0 ~ 3100</td>
</tr>
<tr>
<td>S</td>
<td>03</td>
<td>0 ~ 1700</td>
<td>0 ~ 3100</td>
</tr>
<tr>
<td>K</td>
<td>04</td>
<td>-199.9 ~ 400.0</td>
<td>-300 ~ 750</td>
</tr>
<tr>
<td></td>
<td>05</td>
<td>0.0 ~ 800.0</td>
<td>0 ~ 1500</td>
</tr>
<tr>
<td></td>
<td>06</td>
<td>0 ~ 1200</td>
<td>0 ~ 2200</td>
</tr>
<tr>
<td>E</td>
<td>07</td>
<td>0 ~ 700</td>
<td>0 ~ 1300</td>
</tr>
<tr>
<td></td>
<td>08</td>
<td>0 ~ 600</td>
<td>0 ~ 1100</td>
</tr>
<tr>
<td>T</td>
<td>09</td>
<td>-199.9 ~ 200.0</td>
<td>-300 ~ 400</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>0 ~ 1300</td>
<td>0 ~ 2300</td>
</tr>
<tr>
<td>PLII</td>
<td>11</td>
<td>0 ~ 1300</td>
<td>0 ~ 2300</td>
</tr>
<tr>
<td>WRe-5-26</td>
<td>12</td>
<td>0 ~ 2300</td>
<td>0 ~ 4200</td>
</tr>
<tr>
<td>U</td>
<td>13</td>
<td>-199.9 ~ 200.0</td>
<td>-300 ~ 400</td>
</tr>
<tr>
<td>L</td>
<td>14</td>
<td>0 ~ 600</td>
<td>0 ~ 1100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multi</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pn100</td>
<td>31</td>
<td>-200 ~ 600</td>
<td>-300 ~ 1100</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>-100.0 ~ 100.0</td>
<td>-150.0 ~ 200.0</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>-50.0 ~ 50.0</td>
<td>-50.0 ~ 120.0</td>
</tr>
<tr>
<td></td>
<td>34</td>
<td>0.0 ~ 200.0</td>
<td>0.0 ~ 400.0</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>-200 ~ 500</td>
<td>-300 ~ 1000</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>-100.0 ~ 100.0</td>
<td>-150.0 ~ 200.0</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>-50.0 ~ 50.0</td>
<td>-50.0 ~ 120.0</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>0.0 ~ 200.0</td>
<td>0.0 ~ 400.0</td>
</tr>
</tbody>
</table>

R.T.D.      
10 ~ 100    
0 ~ 10     
0 ~ 20      
0 ~ 50      
10 ~ 50     
0 ~ 100     

Initial value: 0.0 ~ 100.0
Span: 10 ~ 5000 count
Position of decimal point: None
1, 2 or 3 digits on the right of decimal point
Lower limit value = Higher limit value

10. Maintenance and Troubleshooting

10.1. Procedure of Maintenance Replacement and Matters Be Attended to (Steps for replacing defective items)

① Confirmation of Model Code:
Check the model code of the component part in trouble. (Open the control box, and you can find an appropriate code in the model label affixed to the instrument case.)

② Inquiry on Input Data:
Ask the manufacturer if input data (control data of external
operation, event output, set value of position, etc. at the time when an error occurs) is necessary or not.

③ Confirmation of Present Wiring Condition:
Check and record the present wiring condition. Please note that in case input data is necessary for control, the same control operation as before is not possible with a replaced product unless such data is input.

④ Confirmation of Present Input Data:
When data is not known, call the input data for the product, check and record it. In case input data is required, the same control operation as before is not with a replaced product unless such data is input.

⑤ Repair of Present Product or Procurement of New Product:
In case the product in trouble is removable from the site of installation, remove and have it repaired. If it is not possible, arrange to acquire a new product for replacement.

⑥ Setting before Starting Operation:
When replaced by a new product, check the wiring, apply power and set items as described in 8. Before Starting Up.

10.2. Cause of Trouble and Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Error code is displayed.</td>
<td>Refer to “Error Codes, Causes and Remedies”</td>
</tr>
<tr>
<td>2</td>
<td>Displayed PV value seems to be incorrect.</td>
<td>Refer to “Error Codes, Causes and Remedies”</td>
</tr>
<tr>
<td>3</td>
<td>Problem with power supply and wiring connection.</td>
<td>Refer to “Error Codes, Causes and Remedies”</td>
</tr>
<tr>
<td>4</td>
<td>Keylock is in effect.</td>
<td>Check key lock.</td>
</tr>
<tr>
<td>5</td>
<td>ON-OFF action of control output is too fast.</td>
<td>Change the OFF set for two-position type ON-OFF action.</td>
</tr>
</tbody>
</table>

10.3. Error Codes, Causes, and Remedies

<table>
<thead>
<tr>
<th>Input measured value problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen display</td>
</tr>
<tr>
<td>LLLL (LLLL)</td>
</tr>
<tr>
<td>BBBB (HHHH)</td>
</tr>
<tr>
<td>C JLL (GJLL)</td>
</tr>
</tbody>
</table>

The contents of this manual are subject to change without notice.