Technical Information

Introduction of YS1000 Series

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CONTENTS

YS1000 Series...........................................................................................................1
  Features ..................................................................................................................1
  Series Products .....................................................................................................4
    YS1000 Series Products .....................................................................................4
    YS1000 Series Software Product .....................................................................4
    YS1000 Series Products: Controllers ..............................................................5
    YS1000 Series Products: Other Instruments ...................................................6

YS1500 and YS1700 ..................................................................................................7
  Getting Started ....................................................................................................7
  Basic Operations ..................................................................................................8
  Color LCD Screen: Operation Display Examples .............................................9
  Shorter Casing and Lighter Weight ..................................................................12
  Fail-safe ...............................................................................................................13
  Specifications of YS1500 and YS1700 .................................................................17

YS1500 ....................................................................................................................18
  Control Functions ...............................................................................................18
  Block Diagram of Single-loop Mode .................................................................20
  Block Diagram of Cascade Mode .....................................................................22
  Block Diagram of Selector Mode .....................................................................24
  Self-tuning Function (STC) ..............................................................................26
  Adjustable Setpoint Filter (SVF) ....................................................................27

YS1700 ....................................................................................................................28
  Control Functions ...............................................................................................28
  Basic Control Module (BSC) ............................................................................29
  Cascade Control Module (CSC) .....................................................................30
  Selector Control Module (SSC) .......................................................................31
  Command and Calculation Module List .........................................................32

YS1000 Series ........................................................................................................35
  YSS1000 Setting Software ...............................................................................35
  Window Configuration of YSS1000 .................................................................36
  YSS1000 Function Overview .............................................................................37
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model and Suffix Codes</td>
<td>39</td>
</tr>
<tr>
<td>YS1000 Series Model and Suffix Codes</td>
<td>39</td>
</tr>
<tr>
<td>Housings for Replacement of Earlier Series</td>
<td>41</td>
</tr>
<tr>
<td>Difference in Form Depending on Suffix Code</td>
<td>42</td>
</tr>
<tr>
<td>Note on Using the YS100-compatible Case</td>
<td>43</td>
</tr>
<tr>
<td>Functional Restriction Depending on Suffix Code</td>
<td>44</td>
</tr>
<tr>
<td>Terminal</td>
<td>46</td>
</tr>
<tr>
<td>YS1500 and YS1700 Basic Type: Terminal Arrangements in Single-loop/Cascade/Selector Modes</td>
<td>46</td>
</tr>
<tr>
<td>YS1700 Basic Type: Terminal Arrangements in Programmable Mode</td>
<td>48</td>
</tr>
<tr>
<td>YS1700 Basic Type with Expandable I/O: Terminal Arrangements of Expanded I/O</td>
<td>50</td>
</tr>
<tr>
<td>YS1310 Indicator with Alarm</td>
<td>51</td>
</tr>
<tr>
<td>YS1350 Manual Setter for SV Setting</td>
<td>52</td>
</tr>
<tr>
<td>YS1360 Manual Setter for MV Setting</td>
<td>53</td>
</tr>
<tr>
<td>Communication</td>
<td>54</td>
</tr>
<tr>
<td>Supervisory Communication</td>
<td>54</td>
</tr>
<tr>
<td>Peer-to-Peer Communication</td>
<td>55</td>
</tr>
<tr>
<td>Open Network Connectivity</td>
<td>56</td>
</tr>
<tr>
<td>Application Note</td>
<td>57</td>
</tr>
<tr>
<td>Temperature and Pressure Compensation for Ideal Gas</td>
<td>57</td>
</tr>
<tr>
<td>Boiler Drum Level Control</td>
<td>58</td>
</tr>
<tr>
<td>Boiler Feedwater Treatment</td>
<td>59</td>
</tr>
<tr>
<td>Compressor Anti-surge Control</td>
<td>60</td>
</tr>
<tr>
<td>Comparisons</td>
<td>61</td>
</tr>
<tr>
<td>Q &amp; A</td>
<td>63</td>
</tr>
<tr>
<td>Dimensions</td>
<td>65</td>
</tr>
<tr>
<td>Dimensions of YS1000 Basic Type</td>
<td>65</td>
</tr>
<tr>
<td>Dimensions of YS1000 Basic Type with Expandable I/O</td>
<td>66</td>
</tr>
<tr>
<td>Dimensions of Expandable I/O Block and Expandable I/O Cable</td>
<td>67</td>
</tr>
<tr>
<td>Dimensions of Compatible Type for YS100</td>
<td>68</td>
</tr>
<tr>
<td>Dimensions of Compatible Type for YS80 Internal Unit</td>
<td>69</td>
</tr>
<tr>
<td>Dimensions of Compatible Type for YS80</td>
<td>70</td>
</tr>
<tr>
<td>Dimensions of Compatible Type for 100 Line</td>
<td>71</td>
</tr>
<tr>
<td>Revision Information</td>
<td>i</td>
</tr>
</tbody>
</table>
YS1000 Series

Features

■ Color LCD
  • Easy to read thanks to a full-dot color LCD. To accommodate a variety of environmental conditions, a semi-reflective LCD ensures excellent visibility even when lit by outside light.
  • In addition to a meter display which is ideal for replacing traditional controllers with pointers, an event display is newly added.
  • The backlight can be switched on and off by a remote contact.

■ Improved Specifications
  • Specifications improved from YS100 Series.
    - Input/output accuracy:
      • Voltage input accuracy: ±0.2% → ±0.1%
      • Voltage output accuracy: ±0.3% → ±0.1%
      • Current output accuracy: ±1.0% → ±0.2%
    - Internal data format of input/output signals: 1/100 → 1/10,000
    - Resolution of internal calculations including PID calculation: 1/4,096 → 1/65,536
  • Greater flexibility in multi-function controller models (YS1700 and YS1500) that offer selectable control functions with no need of programming, such as single-loop control, cascade control, and auto-selector control:
    - Choice of sampling PI control
    - Various status inputs and outputs can be assigned to desired DI/DO points.
    - PV, SV, and MV can be selected for the transmission output.
  • More powerful control and calculation functions
    - IEEE754-format four-byte floating-point calculations enable actual values to be used in calculations.
    - Over 100 types of calculation modules are featured, including exponential and logarithmic functions, temperature compensation, and pressure compensation.
  • Enhanced alarm monitoring functions
    - High-high and low-low alarms are available with controller models (YS1700 and YS1500) that were previously available only with the indicator-with-alarm model.

■ Expandable Input/Output
  Choosing the basic type with I/O expandability enables future I/O expansion up to eight analog inputs, four analog outputs, and fourteen digital inputs and outputs.
Smaller Size for Flexible Installation

The size has been dramatically reduced for more flexible installation; mounting on a door is now possible.

- Depth: 250 mm (basic type)
- Weight: 1.6 kg (basic type)

Various Cases and Housings for Replacing Earlier Controllers

YS1000 Series controllers come in various cases and housings and so can replace earlier models without having to change the panel cutouts and depths.

Enhanced User Programming Capability (with optional YSS1000 setting software)

- Besides the well-established text programming, the new user-friendly function block programming allows the user to choose the desired method.
- Program capacity is increased to 1000 steps, two and a half times the previous model (YS170).
- The number of constant registers for the user program (Kn) is increased to 100.
- For programmed-setpoint control of the Model YS1700, two patterns can now be set.
- The PF key has an LED (Green) indicator that can be turned on and off by the user program.

Fail-safe

- Dual CPU
  During normal operation, the main CPU performs the control functions and the display CPU performs the display functions. If either CPU fails, the other CPU in the normal state will provisionally take over the functions performed by the failed CPU, to enable display and manual operations.
- Hard manual
  The hard manual circuit incorporated independently from the digital circuits enables the controller output to be adjusted manually in an emergency.

Security and Tools for Maintenance and Servicing

- Password protection
  Engineering parameters and the user program can be password-protected. When a password is set, the parameter or program contents cannot be viewed by others.
- Tools for calibrations (under development)
  - Calibration can be performed simply by following the guidance for calibrations displayed by the optional setting software for the YS1000 Series (Model YSS1000).
  - The calibration records can be saved to the YS1000 controllers themselves, and then loaded and printed as necessary later on.
Nonvolatile Memory for Memory Backup
No battery or capacitor is used for memory backup, facilitating maintenance.

AC/DC power supply resists power supply variation
The YS1000 Series controllers can be driven by either an AC (100 V) or DC (24 V) power supply, and with the DC supply connections, polarity does not matter. (Must be specified upon ordering if using a 220 V DC power supply.)

Dust- and splash-proof IP54 Faceplate
Tougher environmental resistance

CE Mark (for basic type and compatible type for YS100)

FM Non-incendive Explosion Protection (optional for basic types only)

Communication (optional)
- Ethernet (Modbus/TCP; for basic types only)
- RS-485 (PC-link, Modbus, Peer-to-Peer communication, and YS protocol; unavailable for YS80 internal unit-compatible type)
- DCS-LCS communication

Compatibility with YS100 Series
Setting and control operations can be done with the same feel.
Series Products

YS1000 Series Products

- **YS1500 Indicating Controller**  
  Incorporates fundamental control functions required for PID control, and the necessary functions are to be selected in accordance with the user’s purpose. The available functions include those functions for input signal processing, such as square root extraction and linear segment conversion, and feed-forward calculation. Cascade and selector control is also possible.

- **YS1700 Programmable Indicating Controller**  
  A programmable controller in which control and computational functions are coded in concise language by the user. Each YS1700 can run two PID control calculations simultaneously and output the respective 4–20 mA output signals. The YS1700 can also be used as a multi-function controller without programming, in the same way as for the Model 1500 introduced below.

- **YS1310 Indicator with Alarm**  
  Indicating alarm monitor for two inputs for simultaneous monitoring of both loops. High-high, high, low, and low-low alarms can be detected for each of the two inputs, and logical ANDs or ORs of arbitrary alarms can be set. From among these, a total of six alarms can be assigned to alarm output contacts.

- **YS1350 Manual Setter for SV Setting**  
  A manual loader used to output a setpoint signal to a controller. Its operation mode is switched over between cascade and manual by operation mode keys (C and M) or a status input, and a status identification output is provided as standard.

- **YS1360 Manual Setter for MV Setting**  
  A manual loader used to output a control signal to an actuator of a final control device. Its operation mode is switched over between cascade and manual by operation mode keys (C and M) or a status input, and a status identification output is provided as standard.

YS1000 Series Software Product

- **YSS1000 Setting Software for YS1000 Series**  
  YSS1000 is a software product used to create and set YS1000 series parameters and user programs from a PC. It also enables tuning and user program monitoring to be made through communication with the YS1000.
YS1000 Series Products: Controllers

- **YS1500 Indicating Controller**
  Incorporates fundamental control functions required for PID control, and the necessary functions are to be selected in accordance with the user’s purpose. The available functions include those functions for input signal processing, such as square root extraction and linear segment conversion, and feed-forward calculation. Cascade and selector control is also possible.

- **YS1700 Programmable Indicating Controller**
  A programmable controller in which control and computational functions are coded in concise language by the user. Each YS1700 can run two PID control calculations simultaneously and output the respective 4–20 mA output signals. The YS1700 can also be used as a multi-function controller without programming, in the same way as for the Model 1500 introduced below.

*1 AI: 5 for the program mode of the YS1700.
YS1000 Series Products: Other Instruments

- **YS1310 Indicator with Alarm**
  Indicating alarm monitor for two inputs for simultaneous monitoring of both loops.
  High-high, high, low, and low-low alarms can be detected for each of the two inputs, and logical ANDs or ORs of arbitrary alarms can be set. From among these, a total of six alarms can be assigned to alarm output contacts.

- **YS1350 Manual Setter for SV Setting**
  A manual loader used to output a setpoint signal to a controller. Its operation mode is switched over between cascade and manual by operation mode keys (C and M) or a status input, and a status identification output is provided as standard.

- **YS1360 Manual Setter for MV Setting**
  A manual loader used to output a control signal to an actuator of a final control device. Its operation mode is switched over between cascade and manual by operation mode keys (C and M) or a status input, and a status identification output is provided as standard.
YS1500 and YS1700

Getting Started

When using a YS1000 Series controller for the first time, follow the procedure below.

[Diagram of process flow]

- Unpack the instrument and check the specifications.
- Installation
- Will you create user programs?
  - Yes: Create user programs using YSS1000 Setting Software (PC).
  - No: YS1500 or YS1700
- Turn ON power supply
- Select the function selection mode
  - There are the following three function selection modes:
    - Single loop mode
    - Cascade mode
    - Selector mode
- Select the programmable mode
- Write user programs
- Set up engineering constants
- Start tuning/operation
- Steady operation

Tuning/operations can be set using the YSS1000 Setting Software.
Basic Operations

Display Access Sequence and Operation Keys

YS1000 Series displays are composed of three groups:

1. Operation display group
   Consists of LOOP displays used to change the operation mode, SV setting, and MV setting during control operation; TREND displays that show the PV, SV, and MV trend graphs; ALARM displays that show alarm details; the DUAL display that shows the statuses of two loops simultaneously (allowing user operation for one loop at a time, however); and METER displays that show the PV, SV, and MV values with the respective pointers on meter scales.

2. Tuning display group
   Consists of displays used to view and change control parameters such as P, I, and D, and monitor input and output signal levels.

3. Engineering display group
   Consists of displays used to set controller configurations, and view and change various registers and table settings, set input specifications, and set the password.

Switching Display

Follow the procedure below to switch the display.

1. Turn on the power. An operation display appears.
2. Keep pressing the SHIFT key and press the Page (a) key. Each time you press the Page key, the display changes. The display changes sequentially from an operation display, Tuning Menu, to Engineering Menu, then back to an operation display.
Color LCD Screen: Operation Display Examples

### LOOP Display

- **Tag number**: 
- **Display title**: 
- **P-register display**: 
- **PV digital display**: 
- **SV digital display**: 
- **MV digital display**: 
- **HH pointer, PH pointer**: 
- **Alarm generation display**: 
- **control status display**: 
- **LL pointer, PL pointer**: 
- **Cascade setting input value**: 
- **or cascade input value**: 
- **PV underflow**: 
- **ML pointer**: 
- **MV valve direction**: 
- **MV underflow**: 
- **MV bar, MV scale**: 
- **Operation status display**: 
- **Engineering units**: 
- **100% value of scale**: 
- **PV overflow**: 
- **Key LOCK status display**: 
- **SV pointer**: 
- **PV bar**: 
- **PV bar scale**: 
- **PF key function display**: 
- **0% value of scale**: 
- **MH pointer**: 
- **MV valve direction**: 
- **MV overflow**: 

### METER Display

- **Tag number**: 
- **Display title**: 
- **PV, SV, MV digital display**: 
- **HH pointer, PH pointer**: 
- **LL pointer, PL pointer**: 
- **ML pointer**: 
- **MV valve direction**: 
- **MV pointer**: 
- **Operation status display**: 
- **Control status display**: 
- **PV meter scale**: 
- **Scale factor**: 
- **Key LOCK status display**: 
- **PV pointer**: 
- **SV pointer**: 
- **Numerical scale**: 
- **Main scale marks, subscale marks**: 
- **Engineer unit**: 
- **PF key function display**: 
- **MH pointer**: 
- **MV valve direction**: 
- **MV meter scale**: 

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Mar.30,2007-00
**TREND Display**

- Tag number
- Display title
- Trend data 1 to 4 digital display
- Trend data 1 to 4 trend display
- Time span scale
- Trend display time span
- MV display
- Operation status display
- Engineering units
- 100% value of scale
- Key LOCK status display
- Trend data 1 to 4 pointer
- Scale marks
- PF key function display
- 0% value of scale

**ALARM Display**

- Tag number
- Display title
- Item title
- Alarm lamp
- Alarm item
- Unacknowledged alarm marks
- Software key function display
- MV display
**DUAL Display**

- Tag number
- Operation status display
- Display title
- PV, SV, MV digital display (Inverse display: Operation loop)
- Loop number
- Engineering units
- Control substatus
- PV overflow
- PV bar scale
- SV pointer
- HH pointer, PH pointer
- PF key function display
- LL pointer, PL pointer
- 0% value of scale
- PV undreflow
- MV display

**EVENT Display**

- Events are overlaid for display if multiple events occur simultaneously.
- Set using the YSS1000 Setting Software
- Clearing guide display (fixed display)
Shorter Casing and Lighter Weight

The reduced size and weight make it easier to design compact instrument panels and replace existing controllers.

**TIP**

In addition to the YS1000 standard case and housing, various cases and housings compatible with those for earlier series are available for easy replacement.
Fail-safe

Redundant Output Backup

Dual-CPU configuration + hard manual

With dual-CPU construction (main CPU and display CPU), manual control capability and display continues even if an abnormality occurs on one of the CPUs. If controller self-diagnostics detects a control circuit failure, the controller can suspend analog/digital output, switch to manual mode and allow manual control by operator.

<table>
<thead>
<tr>
<th>Functions</th>
<th>Failure area</th>
<th>Main CPU fail</th>
<th>Display CPU fail</th>
<th>All CPU and Control Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control with &quot;Hard manual&quot;</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Manual operation with front keys</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Display for PV and SV</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Control algorithm</td>
<td>stop</td>
<td>stop</td>
<td>stop</td>
<td></td>
</tr>
</tbody>
</table>
Dual CPU

Upon Failure of Main CPU

Continues provisional display functions.

Manual operation with the Increase/Decrease keys.

Measures PV by using the A/D converter built into the subsidiary CPU. This enables approximate PV values to be shown on the display.

Failure of Display CPU

Continues provisional display functions.

Manual operation with the Increase/Decrease keys.

Failure of Control Circuit

Display turns off.

Manual operation in Hard manual mode.
**Hard Manual**

- **YS1500, YS1700, and YS1360:**
  - Device to enable the user to manipulate MV in an emergency
  - MV manipulation capability even if both CPUs and the gate array fail simultaneously

1. **Computer link connector (PROGRAMMER):**
   Communication cable connector used when downloading, uploading, and viewing the parameter and user program set using the YSS1000 Setting Software for YS1000 Series

2. **Connector for YS110 standby manual station (MANUAL STA)**

3. **Internal-unit release lever**

4. **Hard manual operation wheel (HARD MANUAL):**
   Used to set the output level.

5. **MV balance lamp (BAL [green]):**
   Lights up when the control output agrees with the hard manual output level.

6. **Hard manual selector switch (ON/OFF):**
   Used to switch over the output (MV) to the level set by the hard manual operation wheel.

7. **Internal-unit fixing screw**
Standby Manual Station

With the Model YS110 standby manual station, an internal unit can be replaced while maintaining the control output level.

YS1500, YS1700, YS1360

<table>
<thead>
<tr>
<th>Output Mode</th>
<th>Input Indicator</th>
<th>Operation Signal Indicator</th>
<th>Output Signal to Operation Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OFF</td>
<td>Indicates manipulated output of controller or auto / manual station</td>
<td>Operation signal from controller or auto / manual station</td>
</tr>
<tr>
<td>2</td>
<td>SET</td>
<td>Indicates manipulated output set by YS110</td>
<td>Operation signal from controller or auto / manual station</td>
</tr>
<tr>
<td>3</td>
<td>CONT</td>
<td>Indicates manipulated output set by YS110</td>
<td>Operation signal from YS110</td>
</tr>
</tbody>
</table>
## Specifications of YS1500 and YS1700

<table>
<thead>
<tr>
<th>Item</th>
<th>YS1500 Basic Type</th>
<th>YS1700 Basic Type</th>
<th>YS1700 Basic Type (with Expandable I/O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front panel display</td>
<td>Backlight, full-dot, semi-reflective color LCD (bar graph, digital, and meter displays)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuning</td>
<td>Via front panel display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog inputs</td>
<td>1–5 V: 4 points</td>
<td>1–5 V: 5 points</td>
<td>1–5 V: 8 points</td>
</tr>
<tr>
<td>Analog outputs</td>
<td>1–5 V: 2 points (*)</td>
<td>1–5 V: 3 points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4–20 mA: 1 point</td>
<td>4–20 mA: 1 point</td>
<td></td>
</tr>
<tr>
<td>Contact inputs/outputs</td>
<td>6 points (to be chosen for use as a DI or DO individually)</td>
<td>14 points (6 points out of 14 are to be chosen for use as a DI or DO individually)</td>
<td></td>
</tr>
<tr>
<td>Fail contact output</td>
<td>1 point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control functions</td>
<td>• Single-loop control</td>
<td>• Single-loop control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cascade control</td>
<td>• Cascade control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Auto-selector control</td>
<td>• Auto-selector control</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Programmable mode</td>
<td></td>
</tr>
<tr>
<td>Self-tuning function (STC)</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjustable setpoint filter (SVF)</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculations</td>
<td>• Measured value input calculations</td>
<td>Over 100 type of calculation module</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Setpoint input calculations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• External input calculations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program capacity</td>
<td>—</td>
<td>Text programming: Up to 1000 steps</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Function block programming: Up to 400 modules</td>
<td></td>
</tr>
<tr>
<td>Control period</td>
<td>100 ms</td>
<td>50, 100, or 200 ms</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Ethernet (Modbus/TCP)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>RS-485 (Modbus/RTU, PC-Link, Peer-to-Peer communication)</td>
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<tr>
<td></td>
<td>DCS-LCS communication (with µXL or CENTUM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>100 V system model: 24 to 120 V DC, polarity free; or 100 to 120 V AC, 50/60 Hz (±3 Hz)</td>
<td>135 to 190 V DC, polarity free; or 220 to 240 V AC, 50/60 Hz (±3 Hz)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>220 V system model: 24 to 120 V DC, polarity free; or 100 to 120 V AC, 50/60 Hz (±3 Hz)</td>
<td></td>
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<tr>
<td>Dimensions</td>
<td>Faceplate: 72 x 144 mm</td>
<td></td>
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<tr>
<td></td>
<td>Depth: 250 mm (main body of basic type)</td>
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<tr>
<td></td>
<td>Weight: 2.6 kg (main body of basic type)</td>
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</tr>
</tbody>
</table>

*YS1700: One point can be changed to 4-20 mA by a parameter setting.*
# YS1500

## Control Functions

![Control Mode Diagram](image.png)

<table>
<thead>
<tr>
<th>Control Mode</th>
<th>Single-Loop</th>
<th>Cascade</th>
<th>Autoselector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loop 1</td>
<td>Loop 2</td>
<td>Loop 1</td>
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<tr>
<td>Standard PID control</td>
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<td>✓</td>
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<tr>
<td>Proportional (PD) control</td>
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<td>—</td>
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<tr>
<td>Sample-and-hold PI control</td>
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<td>✓</td>
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<tr>
<td>Adjustable setpoint filter (SVF)</td>
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<tr>
<td>Self-tuning function (STC)</td>
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<tr>
<td>Feedforward control</td>
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<tr>
<td>Output tracking</td>
<td>✓</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Preset output</td>
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<td>✓</td>
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<tr>
<td>Output limiter</td>
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<tr>
<td>PH, PL, HH, LL, DV and VL alarm</td>
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</tbody>
</table>

*1: Functions on primary loop when closed loop, secondary loop when open loop.
*2: Functions on unselected loop.
Block Diagram of Single-loop Mode

- **DI function selection**
  - DI1
  - DI2
  - DI3
  - DI4
  - DI5
  - DI6
  - DI7
  - DI8
  - DI9
  - DI10

- **DO function selection**
  - DO1
  - DO2
  - DO3
  - DO4
  - DO5
  - DO6
  - DO7
  - DO8
  - DO9
  - DO10

- **Input filter**
  - CLG1
  - CLC1
  - PLG1
  - PLC1

- **10-segment line conversion**
- **Gain and bias**
  - FGN (FIN+FBI)+FBO

- **Ratio and bias**
  - CGN1 (CINT+CB1)+CB01

- **Deviation alarm**

- **Self-tuning STC**

- **Control elements**
  - CNT1, ALG1

- **Preset MV**
  - PMV1

- **Output limiters**
  - MH1, ML1

- **Process variable alarms**
  - PH1, PL1, HH1, LL1, VL1

- **Gain and bias**
  - FGN (FIN+FBI)+FBO

- **MV display**

- **Parameter**
  - PFKEY=STC

- **PF key operation**

- **Switching by pressing “C”**
  - DInF=TR-CAS

- **Switching by pressing “A”**
  - DInF=TR-AUT

- **Switching by pressing “M”**
  - DInF=TR-MAN

- **Backlight OFF**
  - DInF=LCD-OFF

- **Output tracking (Note 1)**
  - DInF=E-TRK

- **Preset MV switching (Note 1)**
  - DInF=E-PMV

- **Output preset MV and MAN (Note 1)**
  - DInF=E-MPMV

- **C/A external switching (Note 1)**
  - DInF=E-MAN

- **Extended I/O terminals**

- **Output tracking input**
  - X3

- **Measurement input**
  - X1, X2, X4

- **Parameter**
  - PFKEY=STC

- **Gain and bias**
  - FGN (FIN+FBI)+FBO

- **SV display**

- **Parameter**
  - PFKEY=STC

- **C/A external switching (Note 1)**
  - DInF=E-MAN

- **Backlight OFF**
  - DInF=LCD-OFF

- **Output tracking input**
  - X3

- **Measurement input**
  - X1

- **Cascade setting input**
  - X2

- **Input filter**
  - CLG1
  - CG1

- **Square root extraction and low cutoff adjustable**
  - CLC1

- **Error alarm**
  - DL1

- **Input filter**
  - TLG

- **Gain and bias**
  - FGN (FIN+FBI)+FBO

- **SV key**

- **Control elements**
  - CNT1, ALG1

- **Deviation alarm**

- **Self-tuning STC**

- **Output tracking**

- **Process variable alarms**
  - PH1, PL1, HH1, LL1, VL1

- **Gain and bias**
  - FGN (FIN+FBI)+FBO
**Block Diagram of Single-loop Mode**

- **TRK1**
- **DI7** *(DI7F = Function not set)*
- **DI8** *(DI8F = Function not set)*
- **DI9** *(DI9F = Function not set)*
- **DI10** *(DI10F = Function not set)*
- **DO7** *(DO7F = Function not set)*
- **DO8** *(DO8F = Function not set)*
- **DO9** *(DO9F = Function not set)*
- **DO10** *(DO10F = Function not set)*

- **Square root extraction and low cutoff adjustable**
  - **CLC1**
  - **PLC1**

- **Input filter**
  - **FLG**
  - **PLG1**

- **Deviation alarm**
  - **DL1**

- **Control elements**
  - **CNT1, ALG1**
  - **Preset MV** *(PMV1)*

- **Output limiters**
  - **MH1, ML1**

- **Input filter**
  - **CLG1**

- **10-segment line conversion**
  - **101 to 111**

- **Process variable alarms**
  - **PH1, PL1, HH1, LL1, VL1**

- **Ratio and bias**
  - **CGN1 (CIN1+CBI1) + CBO1**

- **Gain and bias**
  - **FGN (FIN+FBI) + FBO**

- **DI function selection**
  - **DI1** *(Parameter DI1F: Function not set)*

- **Cascade setting input**
  - **X2**

- **Measurement input**
  - **X1, X4**

- **SV key**
  - **PV display**
  - **SV display**

- **PF key operation**
  - **CMOD1=CAS**

- **DIn=OPEN (AUT)**
  - **DIn=CLOSE (CAS)**

- **C/A external switching**
  - **(Note 1) DInF=E-AUT**

- **Self-tuning**
  - **STC**
  - **STC start (Note 1)**

- **DInF=STC**
  - **PFKEY=STC**

- **Parameter**
  - **Y1**
  - **MV output 1** *(4–20 mA)*

- **Y2**
  - **MV output 2** *(1–5 V)* *(Parameter Y2S = MV1)*

- **Y4**
  - **PV output** *(1–5 V)* *(Parameter Y4S = PV1)* *(Note 1)*

- **Y3**
  - **SV output** *(1–5 V)* *(Parameter Y3S = SV1)* *(Note 1)*

- **DO5**
  - **C, A/M status output** *(Parameter DO5F = CASAUT)*

- **DO4**
  - **C/A, M status output** *(Parameter DO4F = CAS)*

- **DO3**
  - **PV velocity/ deviation alarm output** *(Parameter DO3F = DL1VL1)*

- **DO2**
  - **PV low-limit alarm output** *(Parameter DO2F = PL1)*

- **DO1**
  - **PV high-limit alarm output** *(Parameter DO1F = PH1)* *(Note 1)*

- **Y3, Y4** *(n=1, 7, 8, 9, 10)

- **C, A/M external switching**
  - **(Note 1) DInF=E-MAN**

- **Backlight OFF** *(Note 1)*

**Note 1:** One of them can be selected. Moreover, changing DI/DD function assignment enables multiple contacts to be selected.

*1: YS1700 basic type (with extended I/O) only

Extended I/O terminals

---

**Output tracking (Note 1)**
- **DInF=E-TRK**

**Output preset MV and MAN (Note 1)**
- **DInF=E-PMV**

**Switching by pressing “C” (Note 1)**
- **DInF=TR-CAS**

**Switching by pressing “A” (Note 1)**
- **DInF=TR-AUT**

**Switching by pressing “M” (Note 1)**
- **DInF=TR-MAN**

**DInF,DIn** *(n=1, 7, 8, 9, 10)
- **LCD backlight**

**Backlight OFF (Note 1)**
- **DInF=LCD-OFF**

---

**Mar. 30, 2007-00**
Internal cascade O/C switching (Note 1)  
DInF=E-O/C

Output preset MV and MAN (Note 1)  
DInF=E-MPMV

Switching by pressing “C” (Note 1)  
DInF=TR-CAS
Switching by pressing “A” (Note 1)  
DInF=TR-AUT
Switching by pressing “M” (Note 1)  
DInF=TR-MAN

Output tracking (Note 1)  
DInF=E-TRK

Preset MV switching (Note 1)  
DInF=E-PMV

LCD backlight  
DInF=LCD-OFF

Note 1: One of them can be selected. Moreover, changing D/I/D function assignment enables multiple contacts to be used.

*1: YS1700 basic type (with extended I/O) only Extended I/O terminals

For YS1500-00/YS1700-00, output tracking input is made from analog input (X4).
Block Diagram of Selector Mode

For YS1500-00C/YS1700-00C, output tracking input is made from analog input 4(X4).

Note 1: One of them can be selected. Moreover, changing DI/DO function assignment enables multiple contacts to be used.

(*1): Extended I/O terminals of only YS1700 basic type (with extended I/O)

(DI07F = Function not set)
(DI08F = Function not set)
(DI09F = Function not set)
(DI10F = Function not set)

*1: Extended I/O terminals of only YS1700 basic type (with extended I/O)
Block Diagram of Selector Mode

**Notes:**
- One of them can be selected.
- Moreover, changing DI/DO function assignment enables multiple contacts to be used.

**Extended I/O terminals of only YS1700 basic type (with extended I/O)**

**Legend:**
- **DI** = Digital Input
- **DO** = Digital Output
- **MV** = Multi-Variable
- **PV** = Process Variable
- **SV** = Set Value
- **Y** = Relay Output
- **X** = Measurement Input
- **C** = Relay Contact
- **SV key** = Set Value Key
- **PV key** = Process Variable Key
- **DIn** = DI Input
- **DInF** = DI Function
- **DO** = Digital Output
- **DOF** = DO Function
- **Y** = Relay Output
- **YF** = Y Function
- **X** = Measurement Input
- **XN** = X Normally Closed
- **XO** = X Normally Open
- **CNT** = Count
- **STC** = Setpoint Tracking Control
- **PLG** = Process Link
- **TLG** = Terminal Link
- **CGN** = Circuit Group
- **SV** = Set Value
- **PV** = Process Variable
- **L** = Lower Limit
- **R** = Upper Limit
- **Y** = Relay Output
- **YF** = Y Function
- **C** = Relay Contact
- **SV** = Set Value
- **PV** = Process Variable
- **L** = Lower Limit
- **R** = Upper Limit

**Parameters:**
- **PFKEY** = STC
- **PF** = Function
- **P** = Parameter
- **E** = Extend

**Functions:**
- **Selector selection (Note 1)**
  - DInF = STC
  - Switching by pressing "C" (Note 1)
  - Switching by pressing "A" (Note 1)
  - Switching by pressing "M" (Note 1)

- **Tracking switching (Note 1)**
  - DInF = TRK
  - Output preset MV and MAN (Note 1)
  - DInF = PMV

- **Preset MV switching (Note 1)**
  - DInF = PMV

- **Backlight OFF (Note 1)**
  - DInF = LCD-OFF

- **Selector's secondary SV (Note 1)**
  - L/R switching (Note 1)

**Additional Notes:**
- *1: Extended I/O terminals of only YS1700 basic type (with extended I/O)
Self-tuning Function (STC)

■ Objectives
  • To improve the ability to adjust for changes in process characteristics, and up sets
  • To simplify, automate, and make consistent the tuning procedures

■ Features
  • The PID parameters are determined based on the process characteristics that are estimated from responses to changes in SV and changes in MV.
  • Long-term waveform monitoring is not needed because optimal PID parameters are calculated from the response waveform at a time.
  • Process characteristic estimates can be displayed, enabling fluctuations in characteristics to be monitored.
  • No cyclic identification signals are applied, preventing disturbances from affecting the process.
  • Tuning can be performed on demand by the operator whenever necessary.
  • Optimization to suppress disturbances as well as follow up the setpoint can be performed simultaneously.
  • Users do not need to understand control theory.
  • Self-tuning can be switched on and off.
  • PID setting range limits can be set to avoid risks to process operation.
Adjustable Setpoint Filter (SVF)

- **Objectives of SVF**
  To optimize the ability to follow up the setpoint while maintaining the controller tuned optimally to adapt to changes in the measured value caused by disturbances.

- **Block Diagram**

- **Example of Improved Ability to Follow Up Setpoint**

  ![Diagram](image-url)
YS1700

Control Functions

Programmable mode

Single-loop mode

Cascade mode

Selector mode

Preset Function Mode

<table>
<thead>
<tr>
<th>Programmable Mode</th>
<th>Preset Function Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BSC 1</strong></td>
<td><strong>BSC 2</strong></td>
</tr>
<tr>
<td>Standard PID control</td>
<td>✓</td>
</tr>
<tr>
<td>Proportional (PD) control</td>
<td>✓</td>
</tr>
<tr>
<td>Sample-and-hold PI control</td>
<td>✓</td>
</tr>
<tr>
<td>Batch PID control</td>
<td>✓</td>
</tr>
<tr>
<td>Feedforward control</td>
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</tr>
<tr>
<td>Output tracking</td>
<td>✓</td>
</tr>
<tr>
<td>Preset output</td>
<td>✓</td>
</tr>
<tr>
<td>Output limiter</td>
<td>✓</td>
</tr>
<tr>
<td>Adjustable setpoint filter (SVF)</td>
<td>✓</td>
</tr>
<tr>
<td>Self-tuning function (STC)</td>
<td>✓</td>
</tr>
<tr>
<td>PH, PL, HH, LL, DV and VL alarm</td>
<td>✓</td>
</tr>
</tbody>
</table>

*1: Functions on primary loop when closed loop, secondary loop when open loop.
*2: Functions on unselected loop.
*3: Either BSC1 or BSC2.

- Computation and control functions are built into the controller as a computational function library.
- One type of BSC, CSC or SSC in used for one controller at a time. However, both BSC1 and BSC2 can be used at the same time.
- Operation is the same as the YS150 in the preset function mode.
- Control period in the programmable mode is to be selected from 50 ms, 100 ms and 200 ms.
- Independent control of two loops is possible in the programmable mode.
Basic Control Module (BSC)

- Manipulated output variable
- Setpoint value or by communication
- Cascade setting value
- Deviation variable alarm flag
- Alarm setpoint for deviation variable
- Input compensation
  - Variable gain
  - Adjustable setpoint filter α (SFAn)
  - Adjustable setpoint filter β (SFBn)
  - Proportional band (PBn)
  - Integral time (TIn)
  - Derivative time (TDn)
  - Manual reset (MRn)
- Feedforward input value (output compensation)
- Output tracking input value
- Output tracking flag
- Preset output
- Preset output flag
- C/A ↔ A mode change flag
- Cascade setting value
- PV displayed on a bar-graph
- SV displayed on a bar-graph
- SV analog/computer flag
- Process variable
  - PV displayed on a bar-graph
  - SV displayed on a bar-graph
  - Process variable
- PV high limit alarm flag
- PV low limit alarm flag
- PV high-high limit alarm flag
- PV low-low limit alarm flag
- PV velocity alarm flag
- High limit alarm setpoint for PV
- Low limit alarm setpoint for PV
- High-high limit alarm setpoint for PV
- Low-low limit alarm setpoint for PV
- Velocity alarm setpoint for PV
- Velocity alarm time setpoint for PV
- High limit setpoint of MV
- Low limit setpoint of MV
- MV displayed on a bar-graph
- Control parameters registers: Data can be set in and read from the user program.
- Control flag registers: Data can be set in and read from the user program. (Data format is either (0) or (1).)
- Control data registers: Data can be set in and read from the user program.
- Already set extended register data is used at execution of the BSCn function block.
- Store to extended registers after execution of the BSCn function block.
<table>
<thead>
<tr>
<th>Command</th>
<th>Command</th>
<th>Max. Serial No.</th>
<th>New*</th>
<th>Text Programming</th>
<th>Function Block Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Code</td>
<td>Symbol</td>
</tr>
<tr>
<td>Load</td>
<td>LD (reg)</td>
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<tr>
<td>Store</td>
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<td>End</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

* New: Functions that were not available in the YS170 and are newly provided with the YS1700.

Not available in function block programming. These functions are equal to "wirings" when developing programs.
<table>
<thead>
<tr>
<th>Category</th>
<th>Command</th>
<th>Max. Serial No.</th>
<th>New*</th>
<th>Text Programming</th>
<th>Function Block Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Code</td>
<td>Symbol</td>
</tr>
<tr>
<td>10-segment linearizer function</td>
<td>2</td>
<td></td>
<td></td>
<td>FXn</td>
<td>FXn</td>
</tr>
<tr>
<td>Inverse conversion of 10-</td>
<td></td>
<td></td>
<td></td>
<td>IFXn</td>
<td>IFXn</td>
</tr>
<tr>
<td>segment linearizer function</td>
<td></td>
<td></td>
<td></td>
<td>Gxn</td>
<td>Gxn</td>
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<tr>
<td>Inverse conversion of</td>
<td></td>
<td></td>
<td></td>
<td>IGXn</td>
<td>IGXn</td>
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<tr>
<td>arbitrary segment</td>
<td></td>
<td></td>
<td></td>
<td>LAGm</td>
<td>LAGm</td>
</tr>
<tr>
<td>linearizer function</td>
<td></td>
<td></td>
<td></td>
<td>LAGMm</td>
<td>LAGMm</td>
</tr>
<tr>
<td>First order lag (second)</td>
<td></td>
<td></td>
<td></td>
<td>LEDm</td>
<td>LEDm</td>
</tr>
<tr>
<td>First order lag (minute)</td>
<td></td>
<td></td>
<td></td>
<td>LEDMm</td>
<td>LEDMm</td>
</tr>
<tr>
<td>Derivative (second)</td>
<td></td>
<td></td>
<td></td>
<td>DEDm</td>
<td>DEDm</td>
</tr>
<tr>
<td>Derivative (minute)</td>
<td></td>
<td></td>
<td></td>
<td>DEDMm</td>
<td>DEDMm</td>
</tr>
<tr>
<td>Dead time (second)</td>
<td></td>
<td></td>
<td></td>
<td>VELm</td>
<td>VELm</td>
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<tr>
<td>Dead time (minute)</td>
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<td></td>
<td></td>
<td>VELMm</td>
<td>VELMm</td>
</tr>
<tr>
<td>Velocity computation (second)</td>
<td></td>
<td></td>
<td></td>
<td>MAVm</td>
<td>MAVm</td>
</tr>
<tr>
<td>Velocity computation (minute)</td>
<td></td>
<td></td>
<td></td>
<td>MAVMm</td>
<td>MAVMm</td>
</tr>
<tr>
<td>Velocity limiter</td>
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<td></td>
<td></td>
<td>VLMm</td>
<td>VLMm</td>
</tr>
<tr>
<td>Moving average computation</td>
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<td></td>
<td></td>
<td>MAVm</td>
<td>MAVm</td>
</tr>
<tr>
<td>(second)</td>
<td></td>
<td></td>
<td></td>
<td>MAVMm</td>
<td>MAVMm</td>
</tr>
<tr>
<td>0 to 1 change detection</td>
<td></td>
<td></td>
<td></td>
<td>CCDm</td>
<td>CCDm</td>
</tr>
<tr>
<td>0 to 1 change detection</td>
<td></td>
<td></td>
<td></td>
<td>UEDGm</td>
<td>UEDGm</td>
</tr>
<tr>
<td>1 to 0 change detection</td>
<td></td>
<td></td>
<td></td>
<td>DEDGm</td>
<td>DEDGm</td>
</tr>
<tr>
<td>Change detection</td>
<td></td>
<td></td>
<td></td>
<td>EDGEm</td>
<td>EDGEm</td>
</tr>
<tr>
<td>Timer (second)</td>
<td></td>
<td></td>
<td></td>
<td>TIMm</td>
<td>TIMm</td>
</tr>
<tr>
<td>Timer (minute)</td>
<td></td>
<td></td>
<td></td>
<td>TIMMm</td>
<td>TIMMm</td>
</tr>
<tr>
<td>Time out (second)</td>
<td></td>
<td></td>
<td></td>
<td>TUPm</td>
<td>TUPm</td>
</tr>
<tr>
<td>Time out (minute)</td>
<td></td>
<td></td>
<td></td>
<td>TUPMm</td>
<td>TUPMm</td>
</tr>
<tr>
<td>Program setter (second)</td>
<td></td>
<td></td>
<td></td>
<td>PGMm</td>
<td>PGMm_A</td>
</tr>
<tr>
<td>Program setter (minute)</td>
<td></td>
<td></td>
<td></td>
<td>PGMmm</td>
<td>PGMmm_A</td>
</tr>
<tr>
<td>Pulse input counter</td>
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<td></td>
<td>PICm</td>
<td>PICm</td>
</tr>
<tr>
<td>Totalizer pulse output</td>
<td></td>
<td></td>
<td></td>
<td>CPOm</td>
<td>CPOm</td>
</tr>
<tr>
<td>High limit alarm</td>
<td></td>
<td></td>
<td></td>
<td>HALm</td>
<td>HALm</td>
</tr>
<tr>
<td>Low limit alarm</td>
<td></td>
<td></td>
<td></td>
<td>LALm</td>
<td>LALm</td>
</tr>
<tr>
<td>Square root extraction</td>
<td></td>
<td></td>
<td></td>
<td>SQA m</td>
<td>SQA m</td>
</tr>
<tr>
<td>(Low cutoff point or less:</td>
<td></td>
<td></td>
<td></td>
<td>SQBm</td>
<td>SQBm</td>
</tr>
<tr>
<td>Linear)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square root extraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Low cutoff point or less:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS flip-flop</td>
<td></td>
<td></td>
<td></td>
<td>RSSFm</td>
<td>RSSFm</td>
</tr>
<tr>
<td>Hold timer (second)</td>
<td></td>
<td></td>
<td></td>
<td>HTIMm</td>
<td>HTIMm</td>
</tr>
<tr>
<td>Hold timer (minute)</td>
<td></td>
<td></td>
<td></td>
<td>HTIMMm</td>
<td>HTIMMm</td>
</tr>
<tr>
<td>Previous input variable</td>
<td></td>
<td></td>
<td></td>
<td>DELAYm</td>
<td>DELAYm</td>
</tr>
<tr>
<td>Hold</td>
<td></td>
<td></td>
<td></td>
<td>HOLDm</td>
<td>HOLDm</td>
</tr>
</tbody>
</table>

* New: Functions that were not available in the YS170 and are newly provided with the YS1700.

*1: The number of times of use was up to four in the YS170, and is increased to eight in the YS1700.
<table>
<thead>
<tr>
<th>Category</th>
<th>Command</th>
<th>Text Programming</th>
<th>Function Block Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Code</td>
<td>Symbol</td>
</tr>
<tr>
<td>Logical Operations</td>
<td>Logical Operations</td>
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<tr>
<td></td>
<td>AND</td>
<td>AND</td>
<td>AND</td>
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<tr>
<td></td>
<td>OR</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>NOT</td>
<td>NOT</td>
<td>NOT</td>
</tr>
<tr>
<td></td>
<td>Exclusive OR</td>
<td>EOR</td>
<td>EOR</td>
</tr>
<tr>
<td></td>
<td>Multi-input AND</td>
<td>MAND</td>
<td>MAND</td>
</tr>
<tr>
<td></td>
<td>Multi-input OR</td>
<td>MOR</td>
<td>MOR</td>
</tr>
<tr>
<td></td>
<td>Multi-input exclusive OR</td>
<td>MEOR</td>
<td>MEOR</td>
</tr>
<tr>
<td>Conditional Judgment</td>
<td>Conditional Judgment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comparison</td>
<td>CMP</td>
<td>CMP</td>
</tr>
<tr>
<td></td>
<td>Signal switching</td>
<td>SW</td>
<td>SW</td>
</tr>
<tr>
<td></td>
<td>Greater than or equal</td>
<td>GE</td>
<td>GE</td>
</tr>
<tr>
<td></td>
<td>Greater than</td>
<td>GT</td>
<td>GT</td>
</tr>
<tr>
<td></td>
<td>Less than or equal</td>
<td>LE</td>
<td>LE</td>
</tr>
<tr>
<td></td>
<td>Less than</td>
<td>LT</td>
<td>LT</td>
</tr>
<tr>
<td></td>
<td>In range</td>
<td>INRNG</td>
<td>INRNG</td>
</tr>
<tr>
<td></td>
<td>Out of range</td>
<td>OUTRNG</td>
<td>OUTRNG</td>
</tr>
<tr>
<td></td>
<td>Jump</td>
<td>GO @&lt;label name&gt;</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Conditional jump</td>
<td>GIF @&lt;label name&gt;</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Jump to the sub-program</td>
<td>GOSUB@&lt;subprogram name&gt;</td>
<td>SUB@n (*1)</td>
</tr>
<tr>
<td></td>
<td>Conditional jump to the sub-program</td>
<td>GIFSUB@&lt;subprogram name&gt;</td>
<td>IFSUB@n (*1)</td>
</tr>
<tr>
<td></td>
<td>Condition comparison jump to the sub-program</td>
<td>Not available</td>
<td>GTSUB@n (*1)</td>
</tr>
<tr>
<td></td>
<td>Jump to the sub-program (for nesting)</td>
<td>Not available</td>
<td>SSUB@n (*2)</td>
</tr>
<tr>
<td></td>
<td>Conditional jump to the sub-program (for nesting)</td>
<td>Not available</td>
<td>IFSUB@n (*2)</td>
</tr>
<tr>
<td></td>
<td>Condition comparison jump to the sub-program (for nesting)</td>
<td>Not available</td>
<td>GSSUB@n (*2)</td>
</tr>
<tr>
<td></td>
<td>Sub-program startup</td>
<td>SUB@&lt;subprogram name&gt;</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>Sub-program termination</td>
<td>RTN</td>
<td>Not available</td>
</tr>
<tr>
<td>Register Move</td>
<td>S register change</td>
<td>CHG</td>
<td>Not available</td>
</tr>
<tr>
<td></td>
<td>S register rotation</td>
<td>ROT</td>
<td>Not available</td>
</tr>
<tr>
<td>Control Functions</td>
<td>Basic control</td>
<td>BSC1, BSC2</td>
<td>BSC1, BSC2</td>
</tr>
<tr>
<td></td>
<td>Cascade control</td>
<td>CSC</td>
<td>CSC</td>
</tr>
<tr>
<td></td>
<td>Selector control</td>
<td>SSC</td>
<td>SSC</td>
</tr>
<tr>
<td>Others</td>
<td>Storage register terminal</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Storage register terminal with enable switch</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

* New: Functions that were not available in the YS170 and are newly provided with the YS1700.
**1: n = 1 to 201; **2: n = 201 to 256
YS1000 Series

YSS1000 Setting Software

PC utility software for parameter setting and user program development

- Parameter settings for the following models:
  YS1700, YS1500, YS1310, YS1350, and YS1360
- User program development for the following model:
  YS1700

Three ways of connection:
- USB, RS-485, or Ethernet

Two types of programming language:
- User-friendly Function Block Programming
- Well-established Text Programming

Three ways of connection:
- USB, RS-485, or Ethernet

Two types of programming language:
- User-friendly Function Block Programming
- Well-established Text Programming

Function Block Programming
- Simple programming (simply connecting modules to each other)
- Easy debugging (online monitor)

Text Programming
- User-friendly Function Block Programming
- Well-established Text Programming

- Uvard compatibility for running YS170 user programs
- Conversion tool available for importing from RCMs for SPCs

Data conversion functions is under development.

STEP | PROGRAM | COMMENT
--- | --- | ---
1 | LD DI 1 | :
2 | NOT | :
3 | CIF 0 | :
4 | LD K 16 | :
5 | ST FL1 | :
6 | LD P 1 | :
7 | ST T 1 | :
8 | LD DO 4 | :
9 | NOT | :
10 | CIF 24 | :

2.5 times larger in-controller program capacity:
400 steps → 1000 steps

In-controller program capacity: 400 modules

- Calculations of values in engineering units: Floating point format
- New calculation modules: Exponential, logarithmic, temperature compensation, pressure compensation, and more
- Parts of program can be saved in subprogram units for reuse
Window Configuration of YSS1000

Title bar (application name and open filename in brackets)

Toolbar

Menu items

YSS1000 window

Basic window of configuration software for YSS1000

Perform all operations on the basic window

Various setting windows:
• Window for parameter setting
• Window for event setting
• Window for data sheet creation
• Window for program development

Folder structure view

Register view.

When a document window for register setting opens, registers are shown in the lower-left pane.
YSS1000 Function Overview

## Settings That Can Be Made Using YSS1000

YSS1000 is computer software for setting and developing the parameters and user programs for YS1000 Series controllers, on a computer. Linking YSS1000 to a YS1000 Series controller or setter enables tuning and subprogram monitoring to be done online.

<table>
<thead>
<tr>
<th>Settings in YS1000</th>
<th>Description</th>
<th>YS1700 in Program Mode</th>
<th>YS1700 and YS1500 in Function Selection Mode</th>
<th>YS1310 YS1350 YS1360</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameter setting</strong></td>
<td>Data sheet</td>
<td>File information, I/O comments, and parameter comments can be set.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Parameter data</td>
<td>The PID parameters, tables, scales, constants, and other parameter values can be set.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Event display settings</strong></td>
<td>Event display settings</td>
<td>Messages to be displayed in a dialog box that will appear when a predefined event occurs, can be set.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>User program development</strong></td>
<td>Function block programming</td>
<td>User programs can be developed by simply connecting modules to each other.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Text programming</td>
<td>User programs are coded as conventional text descriptions in Reverse Polish Notation. Text programs of up to 1000 steps can be coded.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Download Upload Compare</td>
<td>Parameter settings and developed programs can be uploaded to, and downloaded from, YS1000 Series controllers. (Downloads to the YS1000, however, can only be performed when the operation mode is STOP.)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Tuning</strong></td>
<td>Tuning</td>
<td>The PID parameters can be finely tuned while monitoring the PV, SV, and MV trend graphs, and the operation mode can be changed.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Register monitor</td>
<td>Registers used in the user program can be monitored.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Function block monitor</td>
<td>Function block diagrams configured by control modules in user programs can be monitored.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Module monitor</td>
<td>Input and output values of modules can be monitored.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simulated event display</td>
<td>The set event messages can be made to appear for testing on the YS1000 controller.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>File</strong></td>
<td>Save Open Compare</td>
<td>Parameter settings and user programs set in YSS1000 or, downloaded from YS1000 Series controllers, can be saved to a computer disk.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Print</strong></td>
<td>Print</td>
<td>Parameter settings and user programs can be printed.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Inspection support utilities (under development)

Data conversion functions (under development)

- **YS100 data conversion:**
  Used to import data from YS100 Series instruments to the YS1000 Series. Parameter settings and user programs can be read out from YS100 Series instruments and converted into data in the format for the YS1000 Series. User files created using the Model YSS10 or YSS20 programming package can also be converted into data for the YS1000 Series. The converted data can be edited, saved to a file, printed, and uploaded to YS1000 Series controllers as data for the YS1000 Series.

- **SLPC data conversion:**
  Used to import data from SLPC programmable indicating controllers to YS1700 controllers. Parameter settings and user programs can be read out from user ROMs for SLPCs and converted into data in the format for YS1700s. The converted data can be edited, saved to a file, printed, and uploaded to YS1000 Series controllers as data for the YS1000 Series.
  To read data in user ROMs for SLPCs, an optional ROM reader is required.
## Model and Suffix Codes

### YS1000 Series Model and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Option Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>YS1700</td>
<td></td>
<td>/A01</td>
<td>mV input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A02</td>
<td>Thermocouple input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A03</td>
<td>RTD input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A04</td>
<td>Potentiometer input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A05</td>
<td>Isolator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A06</td>
<td>Two-wire transmitter input (isolated)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A07</td>
<td>Two-wire transmitter input (non-isolated)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A08</td>
<td>Frequency input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/DF</td>
<td>Direct input with Fahrenheit temperature range function (*10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A31</td>
<td>RS-485 communication (PC-link, Modbus, YS protocol, peer-to-peer) (*5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A32</td>
<td>DCS-LCS communication (*6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/A34</td>
<td>Ethernet communication (Modbus/TCP) (*7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/FM</td>
<td>FM nonincendive approved (FM Class I, div 2) (*8) (Note2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/NHM</td>
<td>Without hard manual device (always provided with standard models) (*9) (Note2)</td>
</tr>
</tbody>
</table>

*1: Applicable to YS1700 only. This option comes with an I/O expansion terminal block (Model YS011) and a 3-meter I/O expansion cable (Model YS011).

*2: Fits into and can be connected to a YS80 housing (Model SHUP). (Model SHUP-410 EK- and HOMAC-compatible housing and Model SHUP-100 EBS and I Series-compatible housing need to be ordered separately.)

*3: A Line-compatible housing (Model 100) needs to be ordered separately.

*4: The direct sensor input option can only be specified with suffix code -02x, -04x, or -05x. Only one input type can be specified.

*5: Cannot be specified with suffix code -03x. Options A31 and A32 cannot be specified at the same time. Please specify the communication options /A31 (RS-485 communication) to directly communicate with the CENTUM CS3000.

*6: Not applicable to Model YS1310. Options A31 and A32 cannot be specified at the same time. Please specify the communication options /A32 (DCS-LCS communication) to communicate with the CENTUM CS1000/CS3000 through the SCIU.

*7: Option A32 can only be specified with suffix code -00x or -01x.

*8: Can only be specified with suffix code -00x or -01x.

*9: Option NHM can only be specified for Models YS1700, YS1500, and YS1360. Unless specified, a hard manual device is featured.

*10: This option can be combined only with option code /A02 or /A03. If option code /DF is specified, Fahrenheit temperature range can be available for direct input range in addition to Centigrade temperature range. In case of specifying Fahrenheit temperature range for direct input, option code /DF is required. When the direct input temperature range may be changed to Fahrenheit temperature range after shipment, also specify option code /DF.
Special specifications: CE Mark- or FM nonincendive-compliance is not available for products with any option that is handled as a “special specification.”

Note: The shaded types in the above tables are still under development (the order entry is not yet available.)
Note1: The suffix codes Type 3, 4, and 5 are currently under development. The release is scheduled for August 2007, and the first delivery will be in September 2007.
Note2: An application has been made for the FM non-incendive approval. The certification and sales release is scheduled for June 2007, and the first delivery will be in July 2007.

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>YSS1000</td>
<td>-0</td>
<td>Always 0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Always 0 (with CD media and proprietary cable)</td>
</tr>
</tbody>
</table>

Accessories (sold separately)

<table>
<thead>
<tr>
<th>Product name</th>
<th>Model</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHUP standard housing</td>
<td>SHUP-000</td>
<td>Available for YS1xx0-03x (Replace for YS80 Series)</td>
</tr>
<tr>
<td>SHUP long housing</td>
<td>SHUP-100</td>
<td>Available for YS1xx0-03x (Replace for I Series or EBS Series)</td>
</tr>
<tr>
<td>SHUP EK/HOMAC housing</td>
<td>SHUP-420</td>
<td>Available for YS1xx0-03x (Replace for EK/HOMAC Series)</td>
</tr>
<tr>
<td>100 Line pneumatic instrument replace housing</td>
<td>YS006</td>
<td>Available for YS1xx0-05x (Replace for 100 Line pneumatic instrument)</td>
</tr>
<tr>
<td>120 Ω terminating resistor (*)</td>
<td>YS020</td>
<td>For RS-485 communication</td>
</tr>
<tr>
<td>250 Ω shunt resistor (*)</td>
<td>YS021</td>
<td>For a built-in 24 V transmitter power supply</td>
</tr>
</tbody>
</table>

*: The YS1000’s main unit has a built-in terminating resistor, which can be selected for use by setting the relevant parameter. If a terminating resistor is used in another device at the termination of the same communication system, an external terminating resistor needs to be provided to match the terminating resistance of the YS1000’s built-in terminating resistor.
Housings for Replacement of Earlier Series

Compatible with the existing cases and housings of earlier series

YS1000 Series Standard Case

1: A compatible case is used to replace the existing case of an earlier series.

2: A compatible housing is used to replace the entire, existing housing of an earlier series.

Compatibility with the YS1000 Series is also considered in the terminal size (M4), terminal arrangement, and number of terminals.

YS100 (*1)
YS80 (*2)
EK (*2)
Pneumatic 100 Line (*2)
1, EBS (*2)
Difference in Form Depending on Suffix Code

YS1xx0-00x Basic Type

YS1000 standard case
Expandable I/O cannot be connected later.

YS1xx0-01x Basic Type with Expandable I/O

Model with expandable I/O attached to a YS1000 standard case.

YS1xx0-02x Compatible Type for YS100

YS100-compatible case
An Ethernet port or expandable I/O is not available.

YS1xx0-03x Compatible Type for YS00 Internal Unit

Supplied in a case compatible with YS00 Series' internal units and used to fit into the housing.

Fitting to the following housings (sold separately):
- SHUP-000 YS00 Series replacement housing
- SHUP-100 special housing for YEDS Series replacement
- SHUP-430 special housing EK/HCMAC replacement

YS1xx0-04x Compatible Type for YS00

YS100-compatible case
An Ethernet port or expandable I/O is not available.

YS1xx0-05x Compatible Type for 100 Line

Supplied in a case compatible with YS100 Series' internal units and used to fit into a housing of the YS00 Series.

Fitting to the following housings (sold separately):
- YS006 special housing for 100 Line pneumatic controllers
Note on Using the YS100-compatible Case

When Using YS100-compatible Case:

- A signal converter can be built in (for direct connection to a sensor).
- The YS110 standby manual station can be plugged in.
## Functional Restriction Depending on Suffix Code

<table>
<thead>
<tr>
<th>Suffix Code</th>
<th>Terminal Arrangement (Note 1)</th>
<th>Expandable I/O</th>
<th>Built-in Converters</th>
<th>Use with Replacement Housing</th>
<th>Ethernet</th>
<th>RS-485 (Note 4)</th>
<th>DCS-LCS Communication (Note 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-00x</td>
<td>YS1000</td>
<td></td>
<td></td>
<td>![Checkmark]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-01x</td>
<td>YS1000 with expandable I/O</td>
<td>![Checkmark]</td>
<td></td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td></td>
</tr>
<tr>
<td>-02x</td>
<td>YS100-compatible</td>
<td></td>
<td></td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td>![Checkmark]</td>
<td></td>
</tr>
<tr>
<td>-03x</td>
<td>Connector (needs housing)</td>
<td></td>
<td></td>
<td>![Checkmark]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-04x</td>
<td>YS100-compatible</td>
<td>![Checkmark]</td>
<td></td>
<td>![Checkmark]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-05x</td>
<td>Connector (needs housing)</td>
<td>![Checkmark]</td>
<td></td>
<td>![Checkmark]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** Models YS1xx0-03x and -05x are supplied in a case compatible with internal units, so they need housing for signal wiring.

**Note 2:** Use one of the following housing according to your purpose:

<table>
<thead>
<tr>
<th>Instrument to Be Replaced</th>
<th>Housing to Be Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>YS80 Series</td>
<td>SHUP-000</td>
</tr>
<tr>
<td>I Series or EBS Series</td>
<td>SHUP-100</td>
</tr>
<tr>
<td>EK or HOMAC Series</td>
<td>SHUP-420</td>
</tr>
</tbody>
</table>

**Note 3:** Use the housing below where necessary:

<table>
<thead>
<tr>
<th>Instrument to Be Replaced</th>
<th>Housing to Be Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Line pneumatic instrument</td>
<td>YS006</td>
</tr>
</tbody>
</table>

**Note 4:** RS-485 and DCS-LCS communication cannot be used together.

**Note 5:** Applicable to YS1700-01x only.
Terminal
YS1500 and YS1700 Basic Type:
Terminal Arrangements in Single-loop/Cascade/Selector Modes

Analog Outputs
- Manipulated output variable 1
  - Y1: Current output (4-20 mA DC)
- Manipulated output variable 2
  - Y2: Voltage output (1-5 V DC)
- Setpoint output
  - Y3: Voltage output (1-5 V DC)

For manipulated output variable 2 and setpoint output, the output type can be changed using the analog output-2 selection Y2S and analog output-3 selection Y3S, engineering parameters.

Analog Inputs
- Single loop mode
  - Measurement input
  - Cascade mode
  - Measurement input 1
  - Cascade mode
  - Measurement input 2
  - Cascade setting input
  - Cascade setting input 1
  - Cascade setting input 2
- Selector mode
  - Measurement input 1
  - Cascade setting input
  - Cascade setting input 1
  - Cascade setting input 2

Digital Inputs and Outputs
- For use as digital input 6
- For use as digital output 1
- For use as digital input 5
- For use as digital output 2

If the terminals concerned are used as digital output, an external power supply is always required.

Digital Inputs and Outputs
- For use as digital input 1
- For use as digital output 1

(Direct Input Signal Output)
- For optional code /A01)
- Voltage input (1-5 V DC)

FAIL Output
- ON in normal condition
- FAIL output always requires external power supply.
Connection of Transmitter Supply Power

<table>
<thead>
<tr>
<th>Measurement input 1</th>
<th>24 V DC</th>
<th>supply voltage</th>
</tr>
</thead>
</table>

The figure at the left shows an example of the wiring for measurement input 1. Measurement input 2 can also be connected in the same way.

RS-485 Communication

DCS-LCS Communication

<table>
<thead>
<tr>
<th>Optional code /A31</th>
<th>Optional code /A32</th>
</tr>
</thead>
<tbody>
<tr>
<td>SG</td>
<td>LCS(+)</td>
</tr>
<tr>
<td>SD(-)</td>
<td>LCS(-)</td>
</tr>
<tr>
<td>RD(-)</td>
<td></td>
</tr>
<tr>
<td>RDB(+)</td>
<td></td>
</tr>
</tbody>
</table>

Direct Input Terminals

<table>
<thead>
<tr>
<th>mV input (optional code /A04)</th>
<th>Thermocouple input (optional code /A02)</th>
<th>RTD input (optional code /A03)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

Power Supply

- Supply voltage (AC): 100 to 120 V AC (±10%), 50/60 Hz (±3 Hz) (100 V system) (AC)
- Supply voltage (DC): 24 to 120 V DC (±10%) (100 V system) (DC)

DC power supply can be connected without polarity.

Digital input hardware specifications:
- When voltage is present: On
- When voltage is not present: Off
- ON: 0 to 1 V DC
- OFF: 4.5 to 30 V DC
- Input contact rating: 5 V DC, 20 mA or more
- Match the wiring resistances of terminals 19 and 20 with each other.
- Two-wire transmitter input
- Match the wiring resistances of terminals 19 and 20 with each other.
- Two-wire transmitter input
- Case of it to 20 mA signal not requiring supply power
YS1700 Basic Type: Terminal Arrangements in Programmable Mode

**Analog Outputs**

- **Analog output 1**
  - Y1
  - Current output (4-20 mA DC)
- **Analog output 2**
  - Y2
  - Voltage output (1-5 V DC)
- **Analog output 3**
  - Y3
  - Voltage output or current output (4-20 mA)

**Analog Inputs**

- **Analog input 1**
  - X1
  - Voltage input (1-5 V DC)
- **Analog input 2**
  - X2
  - Voltage input (1-5 V DC)
- **Analog input 3**
  - X3
  - Voltage input (1-5 V DC)
- **Analog input 4**
  - X4
  - Voltage input (1-5 V DC)
- **Analog input 5**
  - X5
  - Voltage input (1-5 V DC)

**Ethernet Communication**

- 10BASE-T/100BASE-TX UTP connector
- Active LED (left side)
- Color: Contents
- Off: Stopped
- Orange: Semi-duplex
- Green: Full duplex
- Link LED (right side)
- Color: Contents
- Off: Stopped
- Orange: 10 Mbps
- Green: 100 Mbps

**Digital Inputs and Outputs**

- For use as digital input 1
  - DI1
  - Voltage
  - Input
  - +
  - -
  - Fault Output
  - ON: −0.5 to 1 V DC
  - OFF: +4.5 to 30 V DC

- For use as digital input 2
  - DI2
  - Voltage
  - Input
  - +
  - -
  - Green
  - 250 mA or less (resistive load)
  - 200 Ω or less

- For use as digital input 3
  - DI3
  - Voltage
  - Input
  - +
  - -
  - Red
  - 200 mA or less (resistive load)
  - 100 kΩ or more

- For use as digital input 4
  - DI4
  - Voltage
  - Input
  - +
  - -
  - Yellow
  - 200 mA or less (resistive load)
  - 100 kΩ or more

- For use as digital input 5
  - DI5
  - Voltage
  - Input
  - +
  - -
  - Blue
  - 200 mA or less (resistive load)
  - 100 kΩ or more

- For use as digital input 6
  - DI6
  - Voltage
  - Input
  - +
  - -
  - Purple
  - 200 mA or less (resistive load)
  - 100 kΩ or more

**Direct Input Signal Output**

- For use as digital input 6
  - DO1
  - Voltage
  - Input
  - +
  - -
  - Turquoise
  - 200 mA or less (resistive load)
  - 100 kΩ or more

**FAIL Output**

- ON in normal condition

**Connection of Transmitter Supply Power**

- Analog input 1
  - Voltage input (1-5 V DC)

The figure at the left shows an example of the wiring for analog input 1. Analog inputs 2 – 5 can also be connected in the same way.

Analog output 3 can be changed using analog output 3 current/voltage switch. Y3TP engineering parameter. Initial value: 1 – 5 V DC.

If the terminals concerned are used as digital output, an external power supply is always required.

If direct input (optional specifications) is provided, analog input 5 becomes direct input signal output.

**Power Supply**

Supply voltage: 100 to 120 V AC (±10%), 50/60 Hz (±3 Hz) (100 V system)

Power feed type, voltage, contact: 135 to 190 V DC (±10%) (220 V system)

DC power supply can be connected without polarity.

The digital input and output functions can be set using the YSS1000 Setting Software (sold separately).
### Analog Outputs

- **Analog Output 1**: 10BASE-T/100BASE-TX, Y1, RJ45 connector, Voltage: +22 V, Current output: 1 input.
- **Analog Output 2**: X2, Semi-duplex, Voltage: +3 V, Current output: 4 input.
- **Analog Output 3**: X3, 10 Mbps, Voltage: +5 V, Current output: Y3, or current/voltage switching (1-5 V DC).
- **Analog Output 4**: X4, I/O terminals, Y3TP engineering parameter.

### Analog Inputs

- **Analog Input 1**: Voltage: +1 V, -2 V (1-5 V DC).
- **Analog Input 2**: Voltage: +3 V, -4 V (1-5 V DC).
- **Analog Input 3**: Voltage: +5 V, -6 V (1-5 V DC).
- **Analog Input 4**: Voltage: +7 V, -8 V (1-5 V DC).

### Digital Inputs and Outputs

#### Digital Inputs
- **DI1**: Direct Input Terminals
- **DI2**: Digital Input 1
- **DI3**: Digital Input 2
- **DI4**: Digital Input 3
- **DI5**: Digital Input 4

#### Digital Outputs
- **DO1**: Digital Output 1
- **DO2**: Digital Output 2
- **DO3**: Digital Output 3
- **DO4**: Digital Output 4
- **DO5**: Digital Output 5

### Power Supply

- **Supply Voltage (AC)**: 100 to 120 V AC (±10%), 50/60 Hz (±3 Hz) (100 V system), 220 V AC (±10%), 50/60 Hz (±3 Hz) (220 V system)
- **Supply Voltage (DC)**: 24 to 120 V DC (±10%) (100 V system), 150 to 190 V DC (±10%) (220 V system)

### Direct Input Terminals (Optional specifications)

- **mV Input (optional code /A01)**
- **Thermocouple Input (optional code /A02)**
- **RTD Input (optional code /A03)**

- **Potentiometer Input (optional code /A04)**
- **Two-Wire Transmitter Input (optional code /A05, /A06)**

- **Frequency Input (optional code /A09)**

### Power Feed Type

- **Power Feed Type, Two-Wired**: Signal, Frequency Input, Power Supply
- **Power Feed Type, Three-Wired**: Signal, Frequency Input, Power Supply

---

*Note: The diagram includes additional electrical connections and labels for various ports and terminals.*
YS1700 Basic Type with Expandable I/O: Terminal Arrangements of Expanded I/O

The digital input functions are not set when shipped from the factory. The functions can be set using the DI7F to DI10F engineering parameters.

When voltage is present
ON: −0.5 to 1 V DC
OFF: +4.5 to 30 V DC

For no voltage
ON: resistance of 200 Ω or less
OFF: resistance of 100 kΩ or more
Input contact rating: 5 V DC, 20 mA or more

The digital output functions are not set when shipped from the factory. The functions can be set using the DO7F to DO10F engineering parameters.

Rating 30 V DC
200 mA or less (resistive load)

If the terminals concerned are used as digital output, an external power supply is always required.
YS1310 Indicator with Alarm

(1) LCD display unit (color LCD): 120 x 320 dots *1
(2) FAIL lamp (LED: red)
(3) ALM lamp (LED: yellow)
(4) Software key
(5) Page key
(6) SHIFT key
(7) Tag label (recommended placement position)

Features:

- Indicating alarm monitor for two inputs for simultaneous monitoring of both loops.
- Trend graph display for measured values.
- High-high, high, low, and low-low alarms can be detected for each of the two inputs.
- Logical ANDs or ORs of arbitrary alarms can be set. From among these, a total of six alarms can be assigned to alarm output contacts.
YS1350 Manual Setter for SV Setting

(1) LCD display unit (color LCD): 120 x 320 dots *1
(2) FAIL lamp (LED: red)
(3) ALM lamp (LED: yellow)
(4) C mode key (LED: green), M mode key (LED: yellow)
(5) SV increase key
(6) SV decrease key
(7) Page key
(8) SHIFT key
(9) Tag label (recommended placement position)

---

Features:

- A manual loader used to output a remote setpoint signal to a controller.
- Trend graph display for measured values.
- High- and low-limit alarms can be displayed, and contact outputs are available.
YS1360 Manual Setter for MV Setting

Features:

- A manual loader used to output a control signal to an actuator of a final control device.
- Trend graph display for measured values.
- High- and low-limit alarms can be displayed, and contact outputs are available.
Centralized monitoring and operations via operation windows such as tuning windows and control group windows on human interface stations (HISs), are enabled.

Communication functions can be configured using a standard builder program for the DCS.

The DCS function blocks to correspond to individual YS1700s and YS1500s are defined as SLPCs. Each YS1350 is defined as an SMST-111, and each YS1360 as an SMST-121.

The YS1310 cannot communicate with a DCS.

Up to 120 YS1000 controllers and manual setters in total can be connected to each EFCS in CENTUM-XL, and up to 24 YS1000 controllers and manual setters in total can be connected to each MFCU in µXL.

Please specify the communication options /A31 (RS-485 communication) to directly communicate with the CENTUM CS3000.

Please specify the communication options /A32 (DCS-LCS communication) to communicate with the CENTUM CS1000/CS3000 through the SCIU.

• Ideal means to back up a DCS where reliability is critical, such as in chemical plants.
Peer-to-Peer Communication

A maximum of 16 YS1000 controllers and setters can be connected per RS485 link. For 4 instruments from among these, each can transmit 4 analog data and 16 status data. Any instrument on a RS485 inter-communication link can read all data on the same link (16 analog data and 64 status data).

- Maximum number of instruments: 32
- Maximum communication speed: 38.4K bps
- Maximum number of instruments that can transmit data: 4
- Transmitted data: 4 analog and 16 status data per sender (YS1700 instrument)
- Receiver instruments: 32
- Communication period: 200 ms on average (asynchronous to control calculation periods)
Open Network Connectivity

Open network connectivity

Ideal for Small-scale Instrumentation

SCADA/OPC Server

FA-M3

PC-link
RS-485

Ethernet (Modbus/TCP)

Connectible to PC-link
→ Easy connection to FA-M3 via a UT-link module

PLC
Modbus
RS-485

Connectible to Modbus and Ethernet (Modbus/TCP)
→ Easy connection to PLCs, SCADA, OPC Server
Application Note

Temperature and Pressure Compensation for Ideal Gas

Floating-point format calculations have enabled physical quantities (in engineering units) to be used in calculations.

- When using calculation modules in the earlier YS Series:
  Scaling needs to be performed by the user to normalize physical quantities into the standard internal data form (0 to 100%) so that those quantities can be processed.

- When using a temperature and pressure compensation module in a YS1700:
  - Thanks to floating-point format calculations, no scaling is needed.
  - Online monitor enables the interim calculation results between calculation modules to be checked.
    - Note: Online monitor can only be used for user programs coded in function block programming, and thus cannot be used for those coded in text programming.

Calculations in YS1700

1. Assign scaling of temperature and pressure input values.
2. Configure a calculation block for temperature and pressure compensation of flow rates of ideal gas.
3. Assign BSC to perform a PID calculation.
Boiler Drum Level Control

- **Problem in Boiler Drum Level Control with YS170 and SLPC:**
  - In the YS170 and SLPC, single-element control needs to be configured within the user program.
  - The YS1700, however, offers the primary direct mode so that the user program can switch on and off single-element control by changing a parameter.

- **Three-element Control:**
  - Disturbances in drum level are caused by fluctuations in main steam flow.
  - Figure 1 shows a typical drum level controller, which measures the drum level (1), main steam flow (2), and feedwater flow (3) and manipulates the feedwater control valve to regulate the drum level. This is three-element control.
  - This three-element controller is a so-called cascade controller in which a drum level control unit is cascaded into a feedwater flow control unit.

- **Single-element Control:**
  - During startup of a boiler, both the feedwater and main steam flow rates remain below the measurable ranges, and this makes the three-element control with a level controller and flow controller unstable.
  - In such cases, it is effective to use single-element control in which the feedwater controller is bypassed and the drum level controller directly controls the feedwater control valve.
Boiler Feedwater Treatment

**Chemical Injection (or Chemical Dosing)**

- For safe and efficient operation, the quality of feedwater, steam, and condensate in boiler plants must be controlled and maintained in the most favorable conditions.
  - Example: For reclamation drain from makeup water desalination systems and condensate desalination systems, as well as acidic or alkaline wastewater from desalinated water production plants, a treatment appropriate for the properties of the respective wastewater quality must be employed in addition to neutralization.
- A flocculant is injected for makeup water treatment, and anti-corrosion agents such as a deoxidant and pH adjuster are also injected.
- In areas where water supply is limited, industrial wastewater and domestic wastewater need to be treated and reused.

**Water Quality Control Requires Water Quality to Be Measured with Various Sensors and Many Analog Inputs to Be Connected.**

Objects of Measurement:

- Dissolved oxygen concentration
- Dissolved oxygen saturation
- Untreated water flow rate
- Untreated water temperature
- Chemical injection rate
- pH
- Untreated water turbidity
- Electrical conductivity of untreated water

**New: Eight Analog Inputs**
Compressor Anti-surge Control

**Compressor Control**
- Compressor start and stop
  The inlet valve and blow-off valve are controlled efficiently.
- During steady-state operation
  The inlet valve is controlled to regulate the blow-off flow rate of the compressed air. (Flow control)

**Compressor Anti-surge Control**
- Selector control (YS’s proprietary algorithm)
  The controlled object can be automatically switched over between two different factors, namely, flow rate and pressure.
- Fast 50 ms control period (programmable mode)
  Enables follow-up of sudden process changes, and ensures smooth switching.
- User programming
  Control including a start-up sequence can be tailored for various compressors.

![Compressor Anti-surge Control Diagram](image)
## Comparisons

<table>
<thead>
<tr>
<th>Item</th>
<th>YS1700</th>
<th>YS170</th>
<th>SLPC*E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front display</td>
<td>Color full-dot LCD</td>
<td>Full-dot LCD</td>
<td>Meter</td>
</tr>
<tr>
<td>Analog display</td>
<td>Available (bar and meter displays)</td>
<td>Available (bar display)</td>
<td>Available (meter display)</td>
</tr>
<tr>
<td>Digital display</td>
<td>Available</td>
<td>Available</td>
<td>Not available</td>
</tr>
<tr>
<td>Trend display</td>
<td>Available</td>
<td>Available</td>
<td>Not available</td>
</tr>
<tr>
<td>Alarm display</td>
<td>LCD and LED</td>
<td>LCD and LED</td>
<td>LED</td>
</tr>
<tr>
<td>Dimensions</td>
<td>72 x 144 x 250 mm (DIN)</td>
<td>72 x 144 x 320 mm (DIN)</td>
<td>87 x 182 x 480 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.6 Kg (Basic type)</td>
<td>2.6 Kg</td>
<td>5.4 Kg</td>
</tr>
<tr>
<td>User operations</td>
<td>Via front panel</td>
<td>Via front panel</td>
<td>SV and MV; Via front panel Parameters: Via side panel</td>
</tr>
<tr>
<td>Inputs</td>
<td>Analog 5 + 3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Digital (total of DIs + DOs) + 4 DOs</td>
<td>6 (total of DIs + DOs)</td>
<td>6 (total of DIs + DOs)</td>
</tr>
<tr>
<td>Sensor direct</td>
<td>1 (optional: mV, TC, RTD, potentiometer, isolator, two-wire transmitter, or pulse; not available for the basic type)</td>
<td>1 (optional: mV, TC, RTD, potentiometer, isolator, two-wire transmitter, or pulse)</td>
<td>Not available</td>
</tr>
<tr>
<td>Outputs</td>
<td>Current 1 or 2</td>
<td>1 or 2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Voltage 1 + 1 or 2 + 1</td>
<td>1 or 2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Contacts 6 (total of DIs + DOs) + 4 DOs</td>
<td>6 (total of DIs + DOs)</td>
<td>6 (total of DIs + DOs)</td>
</tr>
<tr>
<td></td>
<td>Fail contact 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Transmitter power supply</td>
<td>2 (standard), 1 or 1 isolated (optional) + 1 non-isolated (standard); 24 V DC, 60 mA with overcurrent protector</td>
<td>2 (standard), 1 or 1 isolated (optional) + 1 non-isolated (standard); 24 V DC, 60 mA</td>
<td>Not available</td>
</tr>
<tr>
<td>Control loop</td>
<td>Single loop</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>Cascade</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>Selector</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td></td>
<td>Dual loop</td>
<td>Available</td>
<td>Not available</td>
</tr>
<tr>
<td>PID calculation</td>
<td>PID, P, sample PI, and batch PID</td>
<td>PID, P, sample PI, and batch PID</td>
<td>PID, sample PI, and batch PID</td>
</tr>
<tr>
<td>Control period</td>
<td>50, 100, or 200 ms</td>
<td>50, 100, or 200 ms</td>
<td>100 or 200 ms</td>
</tr>
<tr>
<td>STC</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Programming tool</td>
<td>PC (USB connection)</td>
<td>PC</td>
<td>SPRG programmer</td>
</tr>
<tr>
<td>Programming method</td>
<td>Text programming or function block programming</td>
<td>Text programming</td>
<td>Text programming</td>
</tr>
<tr>
<td>Programming capacity</td>
<td>Text programming: 1000 steps (main + sub) Function block programming: 400 modules</td>
<td>400 steps (main and sub-programs)</td>
<td>Main: 99 steps Sub: 99 steps</td>
</tr>
<tr>
<td>Hard manual device</td>
<td>Available</td>
<td>Available</td>
<td>Not available</td>
</tr>
<tr>
<td>DCS communication</td>
<td>Direct connection (CS 3000) or via SCIU (CS 1000/CS 3000)</td>
<td>Direct connection (CS 3000) or via SCIU (CS 1000/CS 3000)</td>
<td>Via SCIU (CS 1000/CS 3000)</td>
</tr>
<tr>
<td>RS-485</td>
<td>Modbus, PC-Link, or YS100</td>
<td>YS100</td>
<td>Via SCIU</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Modbus/TCP</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td>Item</td>
<td>YS1700-010/A31/A34</td>
<td>US1000-11/A10</td>
<td>UT750-51</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td><strong>Front-face display unit</strong></td>
<td>Full-dot color LCD</td>
<td>PV/SV/MV LED bar display</td>
<td>LED + full-dot mono-chrome LCD</td>
</tr>
<tr>
<td><strong>Analog display</strong></td>
<td>Available (bar and meter displays)</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>Digital display</strong></td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>Trend display</strong></td>
<td>Available</td>
<td>Not available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>Alarm display</strong></td>
<td>Available (LCD + LED)</td>
<td>Available (LED)</td>
<td>Available (LED)</td>
</tr>
<tr>
<td><strong>External dimensions</strong></td>
<td>72 × 144 × 250 mm (DIN) or (YS100 or YS80 housing)</td>
<td>72×144×180mm(DIN)</td>
<td>96×96×100</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.6 kg (basic type)</td>
<td>0.8kg</td>
<td>1kg</td>
</tr>
<tr>
<td><strong>Operation panel</strong></td>
<td>Front panel</td>
<td>Front panel</td>
<td>Front panel</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog</strong></td>
<td>8</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Digital</strong></td>
<td>6 (total of DIs + DOs)</td>
<td>7 DIs</td>
<td>7 DIs + 16 DIs (two optional units added)</td>
</tr>
<tr>
<td><strong>Direct input</strong></td>
<td>1: Optional (mV, TC, RTD, potentiometer, isolator, 2-wire transmitter, or pulse) (Not available for the basic type)</td>
<td>(Two out of analog inputs are universal inputs.)</td>
<td>(Two out of analog inputs are universal inputs.)</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>1 or 2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>3 or 2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Contact</strong></td>
<td>6 (total of DIs + DOs)</td>
<td>7 DOs</td>
<td>7 DOs + 16 DOs (two optional units added)</td>
</tr>
<tr>
<td><strong>Transmitter Power Supply</strong></td>
<td>24 V DC, 60 mA (Two transmitters can be connected.) With overcurrent protector</td>
<td>24 V DC, 30 mA 2 points With overcurrent protector</td>
<td>15 V DC (shared by transmitter output) 2 points With overcurrent protector</td>
</tr>
<tr>
<td><strong>CONTROL LOOP</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single loop</strong></td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>Cascade</strong></td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>Selector</strong></td>
<td>Available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Dual loop</strong></td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td><strong>PID Operation</strong></td>
<td>PID, P, SAMPLE PI, BATCH PID</td>
<td>PID</td>
<td>PID</td>
</tr>
<tr>
<td><strong>Control Period</strong></td>
<td>50, 100, 200msec</td>
<td>50, 100, 200, 500ms</td>
<td>50, 100, 200, 500ms</td>
</tr>
<tr>
<td><strong>STC</strong></td>
<td>Available</td>
<td>AT, SUPER</td>
<td>AT, SUPER, SUPER2</td>
</tr>
<tr>
<td><strong>Programming Tools</strong></td>
<td>PC</td>
<td>PC</td>
<td>PC</td>
</tr>
<tr>
<td><strong>Programming Method</strong></td>
<td>Text programming or function block programming</td>
<td>Function block programming</td>
<td>Function block programming</td>
</tr>
<tr>
<td><strong>Programmable Capacity</strong></td>
<td>Text programming: 1000 steps (main + sub) Function block programming: 400 modules</td>
<td>60 modules</td>
<td>100 modules</td>
</tr>
<tr>
<td><strong>Hard Manual</strong></td>
<td>Available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>DCS Communication</strong></td>
<td>Direct communication (CS3000) or via SCIU (CS3000/CS1000)</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>RS-485 Communication</strong></td>
<td>Available (Modbus, PC-link, YS1000)</td>
<td>Available (Modbus, PC-link)</td>
<td>Available (Modbus, PC-link, Ladder)</td>
</tr>
<tr>
<td><strong>Ethernet Communication</strong></td>
<td>Available (Modbus, TCP)</td>
<td>Not available</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Screw Terminals</strong></td>
<td>M4</td>
<td>M3.5</td>
<td>M3.5</td>
</tr>
<tr>
<td><strong>Safety Standards</strong></td>
<td>IEC (CE marking certified)</td>
<td>IEC (CE marking certified), CSA</td>
<td>IEC (CE marking certified), UL</td>
</tr>
<tr>
<td><strong>Dust- and drip-proof</strong></td>
<td>IP54</td>
<td>IP65</td>
<td>IP55</td>
</tr>
<tr>
<td><strong>Explosionproof</strong></td>
<td>FM</td>
<td>FM, CSA</td>
<td>-</td>
</tr>
</tbody>
</table>
## Q & A

<table>
<thead>
<tr>
<th>No.</th>
<th>Category</th>
<th>Questions</th>
<th>Answers or Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD</td>
<td>Can the LCD brightness be adjusted?</td>
<td>Yes.</td>
</tr>
<tr>
<td>2</td>
<td>LCD</td>
<td>Does the LCD have a screen saver function?</td>
<td>Yes, it has. ECO (eco) mode is equivalent to it.</td>
</tr>
<tr>
<td>3</td>
<td>LCD</td>
<td>How does the LCD display appear in bright rooms such as areas near windows?</td>
<td>The LCD is of semi-reflective type; it offers excellent visibility even in bright rooms with sunlight streaming in early in the morning or at dusk. (Caution: Do not use YS1000 in locations where the LCD is in direct sunlight. Otherwise, the LCD life may be shortened.)</td>
</tr>
<tr>
<td>4</td>
<td>LCD</td>
<td>Is the LCD replaced on a display unit basis? Can the LCD be replaced while control continues?</td>
<td>The LCD is replaced on a display unit basis, by well-training service person. The power supply must be turned off.</td>
</tr>
<tr>
<td>5</td>
<td>LCD</td>
<td>Can the LCD backlight be replaced?</td>
<td>Because the backlight now has a long life, the same as that of the LCD, replacement of the backlight only is not available.</td>
</tr>
<tr>
<td>6</td>
<td>Meter display</td>
<td>Is reverse swing (low scale limit &gt; high scale limit) possible on the PV scale of a METER Display, etc.?</td>
<td>Yes.</td>
</tr>
<tr>
<td>7</td>
<td>Meter display</td>
<td>What are the differences in scales of an LCD-based METER Display in comparison with YS80?</td>
<td>An LCD-based METER Display displays the main and intermediate scale marks, but does not show subscale marks. An accurate value can be checked on a digital display.</td>
</tr>
<tr>
<td>8</td>
<td>Meter display</td>
<td>Are functions similar to those of LCD-based METER Display available on competitors' models?</td>
<td>The display form is specific to Yokogawa Electric.</td>
</tr>
<tr>
<td>9</td>
<td>Meter display</td>
<td>Is reverse swing (100% at the left of the display and 0% at the right) possible for analog output (needle) on a METER Display, etc.?</td>
<td>Not possible as standard. It may be handled by special order. Please contact to your nearest YOKOGAWA sales office.</td>
</tr>
<tr>
<td>10</td>
<td>Meter display</td>
<td>Is PV’s log scale display possible?</td>
<td>No.</td>
</tr>
<tr>
<td>11</td>
<td>Meter display</td>
<td>Can the color of the pointer on a METER Display be changed (specified)?</td>
<td>It can be changed to green, blue, or pink.</td>
</tr>
<tr>
<td>12</td>
<td>Expandable I/O</td>
<td>Are there limitations on the models that can be combined with expandable I/O?</td>
<td>Only YS1700-01x can be combined with expandable I/O. Models other than YS1700 or various compatible models cannot be combined with expandable I/O.</td>
</tr>
<tr>
<td>13</td>
<td>Expandable I/O</td>
<td>Can the length of the expandable I/O cable be specified?</td>
<td>It is possible by special order. Its length can be selected from among 1 m, 5 m, and 10 m. Please contact to your nearest YOKOGAWA sales office.</td>
</tr>
<tr>
<td>14</td>
<td>Communication</td>
<td>Are Ethernet and RS-485 communications optional specifications? Can they be used in combination?</td>
<td>Ethernet and RS-485 communications are optional specifications. They can also be used in combination. (Ethernet is available only in the basic type.)</td>
</tr>
<tr>
<td>15</td>
<td>Communication</td>
<td>Can parameters and user programs be uploaded (read out to PC) during operations?</td>
<td>Yes.</td>
</tr>
<tr>
<td>16</td>
<td>Compatible housing</td>
<td>For replacement of the earlier models such as EK series (also I, EBS, etc), can their housings be used as is?</td>
<td>The existing housings cannot be used. A compatible housing (model: SHUP) for each series should be used and the instruments need to be replaced on a housing basis.</td>
</tr>
<tr>
<td>17</td>
<td>Compatible housing</td>
<td>For incorporation into the earlier model's compatible housing, is only the internal unit inserted and used?</td>
<td>The earlier model’s compatible types are delivered fitted into the compatible housing (SHUP). They should be inserted into a compatible housing (SHUP) and used on a case basis.</td>
</tr>
<tr>
<td>18</td>
<td>Reliability</td>
<td>Can aluminum electrolytic capacitors be parts having defined life spans?</td>
<td>Parts with a life of 10 years or more are excluded from parts having defined life spans. Aluminum electrolytic capacitors have a life of more than 10 years due to use of parts with a longer life and design taking life into account, so they are not included in the parts with defined life spans.</td>
</tr>
<tr>
<td>No.</td>
<td>Category</td>
<td>Questions</td>
<td>Answers or Steps</td>
</tr>
<tr>
<td>-----</td>
<td>----------</td>
<td>-----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>19</td>
<td>Reliability</td>
<td>Is mutual complementary by dual CPU configuration specific to Yokogawa Electric?</td>
<td>This function is unique in YOKOGAWA product. Dual CPU configuration plus Hard Manual offers high reliability.</td>
</tr>
<tr>
<td>20</td>
<td>Reliability</td>
<td>Is an alarm issued in the event of a CPU failure?</td>
<td>FAIL contact is output.</td>
</tr>
<tr>
<td>21</td>
<td>CE marking</td>
<td>What about the models (types) compatible with CE marking?</td>
<td>The basic type, basic type (with expandable I/O), and YS100 compatible type are compatible with CE marking.</td>
</tr>
<tr>
<td>22</td>
<td>Setting Software</td>
<td>Can the YSS1000 dedicated cable be purchased on its own?</td>
<td>We do not sell dedicated cable alone; it is available when purchased with software as a set. However, if the cable breaks, etc., a dedicated cable can be purchased as a special order. Please contact your nearest YOKOGAWA sales office.</td>
</tr>
<tr>
<td>23</td>
<td>Setting Software</td>
<td>Is a function for connecting with the dedicated cable on the YS1000 main unit side an optional specification?</td>
<td>The YS1000 main unit has the function of connecting with the dedicated cable as standard. For USB connection using YSS1000, YSS1000 comes with a dedicated cable. YS1000 requires no optional specifications.</td>
</tr>
<tr>
<td>24</td>
<td>Setting Software</td>
<td>YSS1000 is stated to be compatible with USB connection. Does the YS1000 main unit have USB terminals?</td>
<td>The YS1000 main unit has no USB terminal. Use the dedicated cable to connect to a PC’s USB port.</td>
</tr>
<tr>
<td>25</td>
<td>Setting Software: user program</td>
<td>Can programs written in text format be automatically converted to function block programs?</td>
<td>Automatic conversion is not available.</td>
</tr>
<tr>
<td>26</td>
<td>Setting Software: user program</td>
<td>Can sequences or logic be written using user programs on YS1700?</td>
<td>Yes.</td>
</tr>
<tr>
<td>27</td>
<td>Setting Software: user program</td>
<td>Can user programs written in text format up to now be rewritten in function block programs?</td>
<td>Yes. However, the notation system is different.</td>
</tr>
<tr>
<td>28</td>
<td>Setting Software: user program</td>
<td>Are computations (functions and commands) available in text programming and in function block programming the same?</td>
<td>Control computation, arithmetic operation, and logical operation are available in both text and function block programming types. (Caution: For commands that do not need to be used due to differences in the description method, there are cases where only one of the programming types is available. This applies to commands such as branch commands, CHG (S-register replacement), and ROT (S-register rotation).)</td>
</tr>
<tr>
<td>30</td>
<td>Setting Software: user program conversion tool</td>
<td>When will the SLPC user program conversion tool be released?</td>
<td>It is scheduled to be released in 2007.</td>
</tr>
<tr>
<td>31</td>
<td>Setting Software: user program conversion tool</td>
<td>When SLPC’s program ROM is ported to YS1700, does the ROM need to be disconnected from SLPC?</td>
<td>The program ROM must be disconnected from SLPC.</td>
</tr>
<tr>
<td>32</td>
<td>Others: special order</td>
<td>Can HumiSeal coating be provided?</td>
<td>It can be handled by special order. Please contact to your nearest YOKOGAWA sales office.</td>
</tr>
<tr>
<td>33</td>
<td>Others: replacement</td>
<td>Integrators (STLD or YFCT) perform temperature-pressure compensation. Is this temperature-pressure compensation functionally replaceable to YS1000?</td>
<td>Temperature-pressure compensation is possible if the input is analog signal. If the input is pulses, it can be handled by analog conversion using a pulse-analog converter. If pulses are counted using YS1000’s DI input, the minimum input pulse width needs to be 70 msec or more. (In this case, the pulse frequency is 7 Hz maximum.)</td>
</tr>
</tbody>
</table>
Dimensions

Dimensions of YS1000 Basic Type

Panel Cutout Dimensions

For single mounting:

For side-by-side mounting:

Panel Cutout Width for Side-by-side Mounting

<table>
<thead>
<tr>
<th>Number of instruments to be mounted</th>
<th>L(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>140</td>
</tr>
<tr>
<td>3</td>
<td>212</td>
</tr>
<tr>
<td>4</td>
<td>284</td>
</tr>
<tr>
<td>5</td>
<td>356</td>
</tr>
<tr>
<td>6</td>
<td>428</td>
</tr>
<tr>
<td>7</td>
<td>500</td>
</tr>
<tr>
<td>8</td>
<td>572</td>
</tr>
<tr>
<td>9</td>
<td>644</td>
</tr>
<tr>
<td>10</td>
<td>716</td>
</tr>
<tr>
<td>11</td>
<td>788</td>
</tr>
<tr>
<td>12</td>
<td>860</td>
</tr>
<tr>
<td>13</td>
<td>932</td>
</tr>
<tr>
<td>14</td>
<td>1004</td>
</tr>
</tbody>
</table>

Note 1: If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

Note 2: To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.

Trigonometry
Unit: mm
General tolerance = ±(value of tolerance class IT18 based on JIS B 0401-1998) / 2

TIP

Precautions When Using This Type:

- Option code A0x (direct sensor input) is not available.
- Option codes A31 (RS-485) and A32 (DCS-LCS communication) cannot be specified at the same time.
Dimensions of YS1000 Basic Type with Expandable I/O

**Suffix Codes -01x**

Note 1: If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

Note 2: When installing the expandable I/O cable, secure the wiring space of at least 60 mm for a minimum curvature radius of the cable in addition to the mounting bracket space of 72 mm from the terminal cover face of the main unit.

When swung up

Instrument panel thickness: 2.3 to 25 mm

Clamp bracket

Expandable I/O cable

(YS1700 with Expandable I/O)

Weight: Main unit 1.6kg + Expandable I/O Cable 320g

Panel Cutout Dimensions

For single mounting:

68 + 0.7 mm

137 + 2 mm

For side-by-side mounting:

\[ L + \frac{1}{2} \]

Panel Cutout Width for Side-by-side Mounting

<table>
<thead>
<tr>
<th>Number of instruments to be mounted</th>
<th>( L ) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>140</td>
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<tr>
<td>3</td>
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<tr>
<td>4</td>
<td>284</td>
</tr>
<tr>
<td>5</td>
<td>356</td>
</tr>
<tr>
<td>6</td>
<td>428</td>
</tr>
<tr>
<td>7</td>
<td>500</td>
</tr>
<tr>
<td>8</td>
<td>572</td>
</tr>
<tr>
<td>9</td>
<td>644</td>
</tr>
<tr>
<td>10</td>
<td>716</td>
</tr>
<tr>
<td>11</td>
<td>783</td>
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<td>12</td>
<td>860</td>
</tr>
<tr>
<td>13</td>
<td>932</td>
</tr>
<tr>
<td>14</td>
<td>1004</td>
</tr>
</tbody>
</table>

Trigonometry

Unit: mm

General tolerance = \( \frac{1}{2} \) (value of tolerance class IT18 based on JIS B 0401-1998)

Note 1: If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

Note 2: To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.

**TIP**

Precautions When Using This Type:

- Option code A0x (direct sensor input) is not available.
- Option codes A31 (RS-485) and A32 (DCS-LCS communication) cannot be specified at the same time.
Dimensions of Expandable I/O Block and Expandable I/O Cable

**Suffix Code -01x**

- **Expandable I/O Terminal Block (YS010)**

  ![Diagram of Expandable I/O Terminal Block](image)

  - Weight: 260g

- **Expandable I/O Cable (YS011)**

  ![Diagram of Expandable I/O Cable](image)

  - Weight: 320g
  - Ground wiring: 1.25mm², green
  - Length: 500±50mm
Dimensions of Compatible Type for YS100

Suffix Codes -02x
Unit: mm

Note 1: If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

Note 2: To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.

Note 3: General tolerance = ±(value of tolerance class IT18 based on JIS B 0401-1998) / 2

TIP
Precautions When Using This Type:

- Option code A0x (direct sensor input) is available
- Option code A34 (Ethernet) is not available.
- Option codes A31 (RS-485) and A32 (DCS-LCS communication) cannot be specified at the same time.
- Option code FM (FM nonincendive) is not available.
- CE Mark-compliance is underway.
- Not dust- or splash-proof
Dimensions of Compatible Type for YS80 Internal Unit

**TIP**
Use this type with the SHUP housing for YS80 Series

**Suffix Codes -03x**

**Note 1:** Instrument panel thickness: 2.3 to 25 mm

Unit: mm

- When swung up

**Note 1:** If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

**Note 2:** To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.

**Note 3:** General tolerance = ±(value of tolerance class IT18 based on JIS B 0401-1998) / 2

**TIP**
Precautions When Using This Type:

- Needs a separately sold housing for installation and wiring.
- Option code A34 (Ethernet) is not available.
- Option code A31 (RS-485) is not available
- Option code FM (FM nonincendive) is not available.
- Not compliant with CE Mark
- Not dust- or splash-proof

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**Instrument to Be Replaced** | **Housing to Be Used**
--- | ---
YS80 Series | SHUP-000
I Series or EBS Series | SHUP-100
EK or HOMAC Series | SHUP-420

YS80 special housings can be used to replace I, EBS, EK, and HOMAC Series.
Dimensions of Compatible Type for YS80

**TIP**
Requires the same panel cutout dimensions and has the same depth as those of the YS80 Series. The terminal arrangements are almost the same as those of the YS80 Series.

**Note 1:** Instrument panel thickness: 2.3 to 25 mm

When swung up

**Note 1:** If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.

**Note 2:** To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.

**Note 3:** General tolerance = ±(value of tolerance class IT18 based on JIS B 0401-1998) / 2

**TIP**
Precautions When Using This Type:
- Option code A0x (direct sensor input) is available.
- Option code A34 (Ethernet) is not available.
- Option codes A31 (RS-485) and A32 (DCS-LCS communication) cannot be specified at the same time.
- Option code FM (FM nonincendive) is not available.
- Not compliant with CE Mark
- Not dust- or splash-proof
- Not installed in housing (but supplied in a YS80-compliant case).
Dimensions of Compatible Type for 100 Line

Suffix Codes -05x

Unit: mm

Dimensions:
- 70 mm
- 53 mm
- 13.9 mm
- 144 mm
- 22 mm
- 5345 mm
- 70 mm

Notes:
1. If a nameplate, etc. is installed within 60 mm above the instrument, the height of the nameplate, etc. must be 30 mm or less from the panel surface.
2. To ensure good air ventilation, allow space of 100 mm or more at the top and bottom of the panel.
3. General tolerance = ±(value of tolerance class IT18 based on JIS B 0401-1998) / 2

Instrument to Be Replaced | Housing to Be Used
---|---
100 Line pneumatic instrument | YS006

TIP
Precautions When Using This Type:
- Needs a separately sold housing (Model YS006) for installation and wiring.
- Option code A0x (direct sensor input) is available.
- Option code A34 (Ethernet) is not available.
- Option codes A31 (RS-485) and A32 (DCS-LCS communication) cannot be specified at the same time.
- Option code FM (FM nonincendive) is not available.
- Not compliant with CE Mark
- Not dust- or splash-proof