

General Specifications

Model YS150 Single-Loop Multifunction Controller

YS 100 SERIES

GS 01B07C01-01E

GENERAL

The YS150 Single Loop Multifunction Controller is an intelligent controller with user-selectable single-loop, cascade and autoselector modes, in a compact IEC-size case.

STANDARD SPECIFICATIONS

Control Functions

There are three controller modes available : single loop, cascade, and autoselector control. You can select between these modes.

Controller Mode

Single Loop Mode

A single control module with advanced control functions' external cascade setpoint, ratio control, feedforward and tracking.

Cascade Mode

Two control modules connected in cascade. A single YS150 controller can implement a cascade loop. External cascade setpoint, ratio control and feedforward are provided.

Selector Mode

Two control modules connected in parallel. A single YS150 controller can implement an autoselector loop. External cascade setpoint and ratio control for each loop are provided.

Control Type and Parameter Specification

Each control type is incorporated in a control module.

Standard PID Control

- Proportional band : 2.0 to 999.9%
- Integral time : 1 to 9999sec
- Derivative time : 0 to 9999sec
- Including PID with reset bias
 - Reset bias : 0.0 to 106.3%
- Including non-linear control
 - non-linear gap : 0.0 to 100.0%
 - non-linear gain : 0.000 to 1.000

Proportional (PD) Control

- Proportional band : 2.0 to 999.9%
- Derivative time : 0 to 9999sec
- Balance-rate time : 1 to 9999sec



- Manual reset : -6.3 to 106.3%
- These act on basic control module .
- Including non-linear control

Advanced Control Functions

Feedforward Control (single-loop or cascade mode)

Feedforward computation is added to control output while in CAS or AUT mode.

Output Tracking (TRK) (single-loop mode)

Output is tracked based on an external trigger signal when the controller is in CAS or AUT mode.

Preset MV (PMV) output

Output is set to predetermined value when in CAS or AUT mode based on external contact signal . PMV provided for Single-loop , Cascade and Selector modules.

Adjustable Setpoint Filter (SVF)

Used for improved response to setpoint changes.

Self Tuning Functions (STC)

This function automatically adjusts PID parameters according to changes in process characteristics. STC may be started/stopped using the PF key on the front panel display or an external contact signal ; tuning limits are also set from the front display panel.

STC selection in combination with control modules

- Basic control module : STC acts on the first loop.
- Cascade control module :
 - Based on internal cascade switch (OPEN/CLOSE).
 - Acts on primary when CLOSE, on secondary when OPEN.
- Selector control module :
 - STC acts on selected loop.

STC selection in combination with control types

Standard PID, nonlinear PID, PID with reset bias.

Alarm Functions

Alarm Action : High limit, Low limit, Deviation alarms (for PV1 and PV2)

Input High Limit Alarm Setting : -6.3 to 106.3% (or Engineering Units)

Input Low Limit Alarm Setting : -6.3 to 106.3% (or Engineering Units)

Deviation Limit Alarm Setting : 0.0 to 106.3% (or Engineering Units)

Alarm hysteresis : 2% of span

Velocity Alarm

- Velocity setpoint : 0.0 to 106.3% (or Engineering Units)
- Velocity time setpoint : 1 to 9999 sec

Alarm Indication : Yellow lamp (ALM) on front panel is lit, displayed on loop panel and alarm panel in detail.

Alarming contacts output, open or close : Selectable

On power failure, contact outputs open.

Output Contact : In Single Loop mode, one each for high limit, low limit, deviation.
In cascade mode and selector mode, output alarm for high limit, low limit or deviation for each of two internal controllers.

Signal Conditioning Computations

Input Signal Conditioning Computations

- Square Root with Low Signal Cut off
 - Computes square root for process variable (PV) and cascade setpoint input. For signals below the "cut off" point (selectable between 0.0 and 100.0%), output=input.
- Ten segment characterizer function
 - Line-segment characterizer for each PV input. Set range of inputs and outputs between 0.0 and 100.0% (10% intervals)

First order lag filter

Computes input filter for PV, cascade, feedforward and tracking inputs. Range of time constant is 0.0 to 800.0 sec.

External Cascade Setpoint Scaling Computation

$$CSV = CGN(CIN + CBI) + CBO$$

- CSV : cascade setpoint computation output
- CIN : cascade input
- CGN : gain (set in range : -8.000 to 8.000)
- CBI : input bias (set in range : -106.3 to 106.3%)
- CBO : output bias (set in range : -800.0 to 800.0%)

Feedforward Signal Computation

Applies only for CAS or AUT mode operation, single loop or cascade mode.

$$FF = FGN(FIN + FBI) + FBO$$

- FF : feedforward signal computation output
- FIN : feedforward input
- FGN : FF gain (set in range : -8.000 to 8.000)
- FBI : FF input bias (set in range : -106.3 to 106.3%)
- FBO : FF output bias (set in range : -800.0 to 800.0%)

Output Signal Conditioning Computations

Output limiter acts on MV for each control module.

Control Computational Period

100msec

Operation Mode status output

C/(A-M) status output : 1 point

(C-A)/M status output : 1 point

- C : Cascade mode
- A : Auto mode
- M : Manual mode

In cascade mode,

Cascade OPEN / CLOSE status : 1 point

In selector mode,

SV of secondary loop, LOCAL / REMOTE : 1 point

Mode Switching by Contact Status Input

One of the following operation mode switchings can be selected.

Open / close of status input signal : selectable.

Action mode	Controller mode		
	single	cascade	selector
CAS↔AUTO or CAS,AUTO↔MAN External switching	○	-	-
Internal Cascade Connection OPEN/CLOSE	-	○	-
SV of secondary loop REMOTE/LOCAL	-	-	○
Preset MV output ON / OFF	○	○	○
Output tracking ON / OFF	○	-	-
Self-Tuning Function ON/OFF external switching	○	○	○

(note) In this table, [-] is not applicable.

Trend Recorder Specification

The recorder gathers PV data for both loops and displays this on the trend recording panels.

Trend recording span (scan rate in parenthesis)

- : 1.5min (1sec), 7.5min (5sec),
- 15min (10sec), 45min (30sec),
- 1.5hr (1min), 7.5hr (5min),
- 15hr (10min), 45hr (30min)

Trend data points : 90

Operation / Monitoring Specification

The data displayed on YS150 display panels are changed by use of keys on the front display panel.

- C, A, M switching key : one each
- Inc, Dec key : one each (increase / decrease)
- Change panel key : 1
- PF key : 1

This key can be used to set STC function ON/OFF.

- MV setting key : 2
- MV full speed key : 1

(Also used as SHIFT Key to change panel group)

- Display lamp : 2
- FAIL lamp red
- ALM lamp yellow

Panel Specification

Bar Graph

- Scale graduations : Maximum 10 (1, 2, 4, 5, 10 available)

0% and 100% value of scale (in engineering units):

4 digits plus decimal point and sign

- PV bar graph resolution : 0.5% (200 elements / 100%)
- SV resolution : 0.5%
- MV bar graph resolution : 1.25% (80 elements / 100%)

Tag No. and Other Values Displayed

- Tag No. Display : Alphanumeric .
Maximum 8 digit .
- Digital PV, SV display : 4 digit in engineering unit plus decimal point and sign
- Digital MV display : 4 digit % plus decimal point and sign

Display Panel Specification

Front display panels are classified in three groups :

Operation, Tuning, and Engineering panels. Switch groups by pressing SHIFT and Page keys together.

Operation Panels

Seven operation panels are provided : LOOP 1, LOOP 2, TREND 1, TREND 2, ALARM, DUAL 1 and DUAL 2. Display selection is made by pressing the Page key.

Tuning Panels

Seven tuning panels are provided : TUNING MENU, PID 1, PID 2, STC 1, STC 2, PARAMETER, and I/O DATA.

Engineering Panels

Seven engineering panels are provided : ENG. MENU, CONFIG 1, CONFIG 2, CONFIG 3, SC MAINT, PASSWORD and FX TABLE.

Panel Operational Specification

Panels are operated by front keys .

- SV operation key rate : 40sec / full scale
- MV operation key rate : Slow 40sec / full scale
Fast 4sec / full scale

Communication Function

YS-net communication

YS net can be used for personal computer communication.

Communication specifications

- Communication interface : Specification unique to YS-net (2-terminal)
- Communication speed : 78.125 kbps
- Connection type : Daisy-chain connection
- Communication distance : Maximum 1000 m
- Communication cable : Twisted-pair cable

Function of personal computer communication

This function is used to communicate with a personal computer. Data can be exchanged with application software on Windows with the DDE server function without a program.

Maximum number of instruments to be connected :

- 16 (can be extended up to 63 by extra engineering)
(combination of YS131, YS135, YS136, YS150 and YS170 is possible.)

YS-net communication specifications on the personal computer side:

- Personal computer : compatible with IBM PC/AT
- YS-net communication board (for ISA slot)
- YSS50 YS-net parameter definition file
- A set of communication software (DDE server)
- OS of Microsoft Windows version 3.1 or later
- Also, application software with the DDE server function is necessary.
- (For example, Microsoft Excel or other SCADA software)

* Windows is a trademark of Microsoft Corporation.
Microsoft is a registered trademark of Microsoft Corporation.

Communication items : Various parameters, such as the measured value, set value, manipulated output, PID set value, and operation mode, can be sent or received. Selectable data setting permission by communication.

DDC, SPC mode : DDC or SPC is selectable.
 In the DDC mode, manipulated output can be directly operated from the computer.
 In the SPC mode, set values can be set from the computer.

Back-up for communication failure :
 The operation mode (AUT / MAN) upon failure of the supervisory computer can be set.

Communication period : 1 sec

RS-485 Communications

Communication Specifications

Communication interface : RS-485 (5 terminals)
 Transmission Control : Start - stop synchronization, no protocol, half - duplex
 Communication speed : 1200 , 2400 , 4800 , 9600 bps
 Connection Type : Multi Drop Type
 Maximum number of instruments to be connected:

16 (combination of YS131, YS135, YS136, YS150, YS170 is possible.)

Communication distance : Max. length is 1200m

Max. text length : 220 Byte

Time to wait between characters : 0.1 sec

Communication Items

Selectable to send / receive PV, SV, MV and other parameters. Selectable data setting permission by communication.

DDC, SPC mode

Selectable to DDC / SPC mode.

DDC mode : MV Operated directly by supervisory computer.

SPC mode : SV set by supervisory computer.

Back-up for Communication Failure

For failure of supervisor computer, selectable backup mode (AUT mode , MAN mode).

Communications with DCS

Receivers for communications

CENTUM- XL, CENTUM : LCS card in control station
 µXL, YEWPACK II : LCS card in control unit
 Distance of communication : Maximum length is 100m
 Use SCCD communication cable .

Communication Items

Data Communication period : 480msec

Computer modes (DDC , SPC modes)

Computer modes DDC and SPC selectable from DCS .

Back-up for Communication Failure

Back up mode if DCS fails is selectable (AUT mode , MAN mode).

Power-Fail / Restart Functions

Select from following three recovery modes ;

TIM1 mode : Up to approx. 2 sec. , HOT start .
 Longer than approx. 2 sec. , COLD start .
 TIM2 mode : Up to approx. 2 sec. , HOT start .
 Longer than approx. 2 sec. , Initial start .

AUT mode : Always HOT start .

For long power failure, always initial start .

Life of parameter backup : over 48 hours , average is 7 days
 (Backed up by charge on super capacitor)

If a power failure continues longer than the life of the parameter backup, the system restarts from Initial start .

Action for each start mode

	HOT start	COLD start	Initial start
Operation mode	same as before power fail	MAN	MAN
Manipulated Value (MV)	same as before power fail	-6.3%	-6.3%
Set point (SV)	same as before power fail	same as before power fail	Data stored in nonvolatile memory
PID Parameter	same as before power fail	same as before power fail	
Dynamic computation as first order lag	Continue	Initialize	Initialize

Self-Diagnostic Features

Failure of computation · control circuit :

FAIL lamp lit.
 Fail contact output is open.
 (open for power fail)

Failure of input signals , Open outputs (MV)

: ALM lamp lit
 Display the origin for alarm

Back up for failure of YS150

Upon failure, the display changes to the loop1 panel. The controller can be operated in hard manual mode. Before switching to hard manual, user can to balance the output .

I/O Signals Specifications

Analog Input Specification

Analog input : 1 to 5VDC , 4 points
 Option for single direct input
 (mV, TC, RTD, 2-wire transmitter, potentiometer or frequency input).

Input resistance: More than 1MΩ

Analog Outputs

Analog output : 4 to 20mA, 1 point. Load resistance is 0 to 750Ω.
 1 to 5VDC, 2 points. Load resistance is greater than 2kΩ .

Status Input/Output

Status input : 1 point

Input status	ON	OFF
Non-voltage contact *1*2	CLOSED less than 200Ω	OPEN more than 100kΩ
Voltage contact *1*2	LOW input voltage -0.5 to 1VDC	HIGH input voltage +4.5 to 30VDC

*1 Supply rating : more than 5VDC, 20mA
 *2 Minimum pulse width : 120msec

Status output signals : 5 points
 Transistor contact rating 30V DC 200mA
 (resistance load)
 Fail output signal : 1 point
 Transistor contact rating 30V DC 200mA
 (resistance load)

Signal Isolation

Analog input/output signals are not isolated from the computation circuit, and use a negative common ground. For the direct input, except for 2-wire transmitter (input not isolated) , the input signals are isolated from computation circuit and power supply circuit.
 Status input/output signals are isolated from computation circuit , and isolated from each other. Isolation is also provided between the computation circuit and power supply circuit.

Distributor Power Supply for Transmitter

Power Supply for Transmitter : 24VDC 30mA
 (No short circuit protection)

It is not isolated from the computational circuits .

When it is shorted the computation will stop.

Provide external resistance(250Ω) for 1 to 5V.

Safety Requirements Conformity Standards

The YS150 conforms to the safety requirements as shown below except when with the option /D□□.

IEC1010-1 : 1990

EN61010-1 : 1992

EMC Conformity Standards

The instruments with the option /CE have the EMC conformity as shown below.

For EMI (Emission) - EN55011 : Class A Group 1

For EMS (Immunity) - EN50082 - 2 : 1995

Note that this instrument continues to operate with its measurement accuracy with ±20% of range during the test.

Hazardous Area Classification

The YS150 with the option /CSA is CSA approved as shown below.

CSA standard : CSA C22.2 No. 213

(Non-incendive Electrical Equipment for use in Hazardous Locations)

Location : Class I, Division 2,
 Groups A, B, C & D

Temperature Code : T4

Design Performance

Accuracy rating for 1 to 5V input : ±0.2% of span

Accuracy rating for 4 to 20mA output :
 Output current ±1.0% of span

Accuracy rating for 1 to 5V output :
 Voltage output ±0.3% of span

Effect of ambient temperature change on accuracy rating :
 |Accuracy| / 2 (per 10°C between 0°C to 50°C)

Effect of power supply voltage variation on accuracy rating :
 |Accuracy| / 2 (within rated power supply voltage)

Maximum current flow : 600mA (DC drive of 100V version)
 100mA (DC drive of 220V version)

Maximum power consumption :
 26VA (AC drive of 100V version)
 29VA (AC drive of 220V version)

Current flow and power consumption for rated voltage :
 430mA Typ. at 24VDC
 19VA Typ. at 100VAC
 23VA Typ. at 220VAC

Isolation Resistance

Between I/O Terminals and Ground : 100MΩ/500VDC

Between Power supply and Ground : 100MΩ/500VDC

Withstanding Voltage

Between I/O Terminals and Ground : 500V AC for 1minute

Between Power supply and Ground : 100V AC version
1000V AC for 1 minute
220V AC version

Common mode noise rejection : 83dB(50Hz)

Series mode noise rejection : 46dB(50Hz)

Normal Operating Condition

Ambient Temperature: 0 to 50°C (32 to 122°F)

Ambient Humidity : 5 to 90%RH (non-condensing)

Rated Power Supply Voltage : For both DC and AC

Isolation Resistance

100V version ;

DC drive ; 24 - 120VDC \pm (±10%), no polarity

AC drive ;100 - 120VAC \sim (±10%), 50/60Hz (±3Hz)

220V version ;

DC drive ;135 - 190VDC \pm (±10%), no polarity

AC drive ;220 - 240VAC \sim (±10%), 50/60Hz (±3Hz)

Under this rated voltage the instruments conform to the safety requirements in IEC1010-1 and EN61010-1. Under this condition the safety barrier BARD is allowed to be connected to the inputs.

On the other hand, the instruments themselves have the ability to operate under the condition as shown below which is the same as the former description of the power supply voltage.

Usable Power Supply Voltage : For both DC and AC

100V version ;

DC drive ; 20 - 130VDC, no polarity

AC drive ; 80 - 138VAC, 47 - 63Hz

220V version ;

DC drive ;120 - 340VDC, no polarity

AC drive ;138 - 264VAC, 47 - 63Hz

Dimensions, Mounting, Wiring

Mounting type : Direct panel mount

Panel mounting : Direct panel mounting kit (side by side)

Panel cut out : $137^{+2} \times 68^{+0.7}$ (mm) [5.4×2.7 (inch)]

Connecting type :

External connections : Use ISO M4 screws

Power supply, ground connections : Use ISO M4 screws

Housing dimensions : 144×72×320mm

[5.7×2.8×12.6 (inch)]

(H×W×Depth behind panel)

Weight : 2.6kg

MODEL & SUFFIX CODES

Model	Suffix code	Option	Description
YS150			Single Loop Multifunction Controller
		-0	Standard
		1	Always 1
Power Supply		1 2	100V version 220V version
Options		/ □	Option (Refer to the following table)

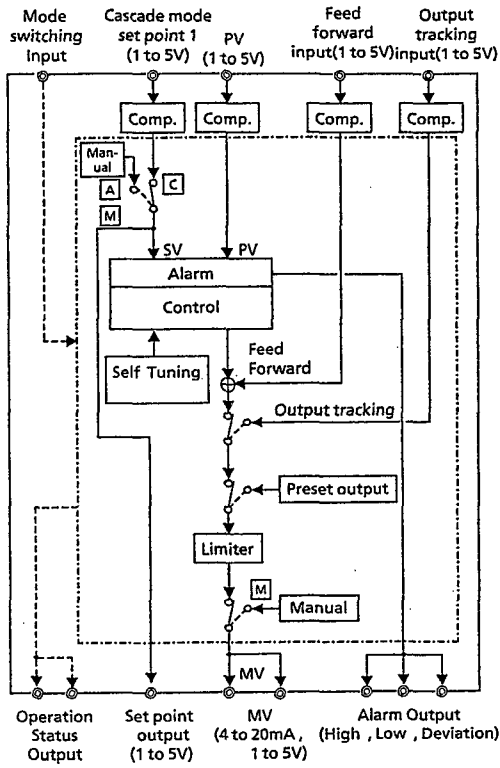
OPTION CODES

	Option Codes	Combination with /CE	Combination with /CSA	Description
	/ CE / CSA	- No	No -	CE Mark Approved CSA Non-incendive Approved
Input Options	/ A01	No	Yes	It is possible to select one from the followings; mV Input (EM1) Thermocouple Input (ETS / YS) (Type K, T, J, E, B, R, S) Resistance Temperature Detector Input (ERS) (Pt100, JPt100) Potentiometer (ES1) Input Isolator (EH1) 2 - wire Transmitter Input (EA1) 2 - wire Transmitter Input (EA9) (no isolation from the field) Frequency Input (EP3)
	/ A02	No	Yes	
	/ A03	No	Yes	
	/ A04	No	Yes	
	/ A05	No	Yes	
	/ A06	No	Yes	
	/ A07	No	Yes	
	/ A08	No	Yes	
Input Options for /CE	/ A12	Yes	No	It is possible to select one from the followings; Thermocouple Input (ETS / YS) (Type K, T, J, E, B, R, S) Resistance Temperature Detector Input (ERS) (Pt100, JPt100) 2 - wire Transmitter Input (EA1) 2 - wire Transmitter Input (EA9) (no isolation from the field)
	/ A13	Yes	No	
	/ A16	Yes	No	
	/ A17	Yes	No	
Communication	/ A31	Yes	Yes	It is possible to select one from the followings; RS - 485 DCS-LCS YS-net
	/ A32	Yes	Yes	
	/ A33	Yes	Yes	
Construction	/ D11	No	No	It is possible to select one from the followings; Replace for YEW SERIES 80 Internal Unit (Separate ordered for housing or use SHUP that already mounted) Closely Mounting for YEW SERIES 80 Housing Replace for 100 Line Internal Unit (Order YS006, YS100 Housing for 100 Line, separately.)
	/ D12	No	No	
	/ D13	No	No	

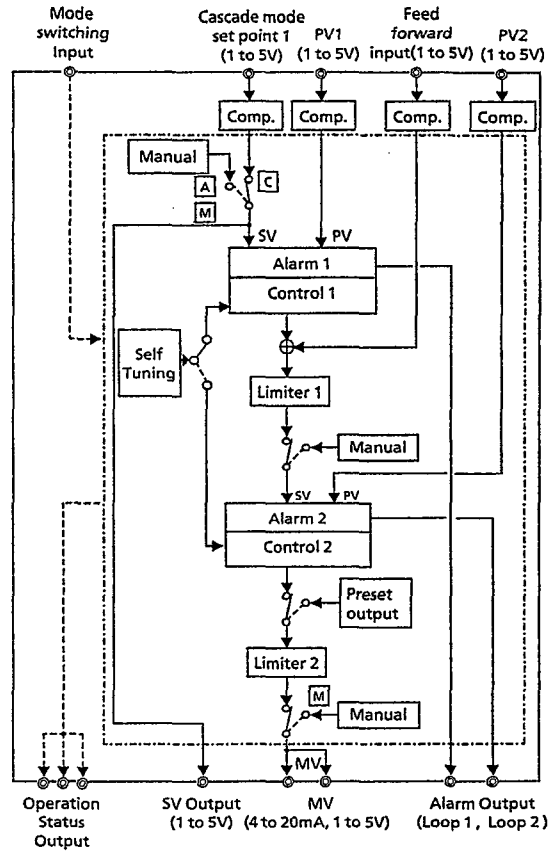
ORDERING INSTRUCTIONS

When ordering, specify the model & suffix code and option code if necessary.

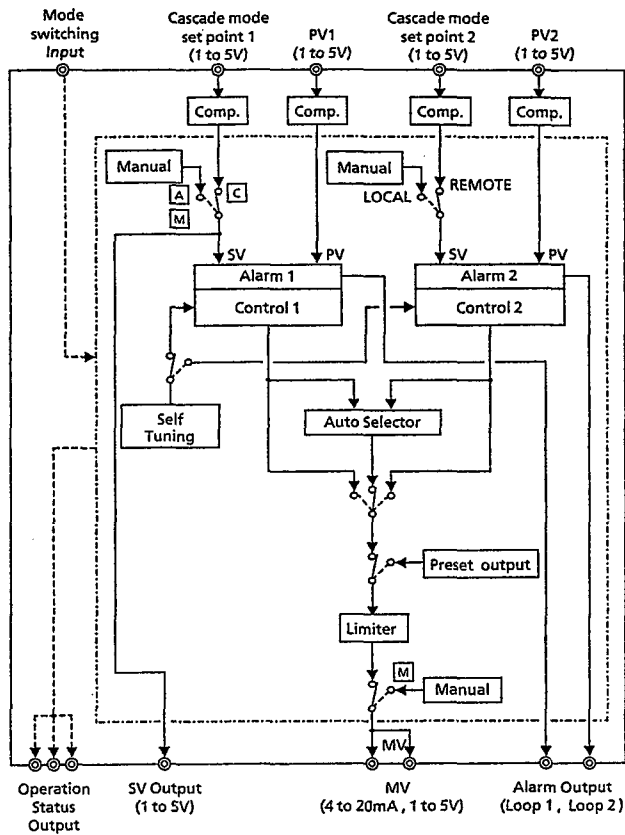
BLOCK DIAGRAM



Single-Loop mode



Cascade mode



Autoselector mode

INPUT OPTIONS

Name		mV input	Thermocouple input	Resistance temperature detector input	Potentiometer
Option Code		/A01	/A02, /A12	/A03, /A13	/A04
Input Signal		DC voltage - 50 to +150mV	JIS, ANSI Thermocouple Type B, R, S, K, E, J, T IEC, ANSI Type N	RTS JIS' 89Pt100 (DIN Pt100) or JIS' 89 JPt100 3-wire Current : 1mA	potentiometer 3-wire
Measuring Limit	Span	10 to 100mV DC	10 to 63mV (Thermoelectric conversion)	10 to 650°C 10 to 500°C (JPt100)	Total resistance 100 to 2000Ω Span 80 to 2000Ω
	Zero El- evation	The smaller one of 3 times of span or ±50mV	The smaller one of 3 times of span or ±25mV	Max. 5 times of span	Within 50% of total resistance
Measuring Range		Set on Engineering panel			
Input Resistance		1MΩ (3kΩ when power off)	-	-	-
Input External Register		Less than 500Ω	Less than 10Ω / wire (note 1)	Less than 10Ω / wire	
Allowable Input Current, Voltage		- 0.5 to 4V DC		-	-
Input Linearization		None	provided	provided	None
1 to 5V Output Accuracy Rating		Within ±0.2% of span	Within larger of ±0.2% of span or ±20μV of input conversion	Within larger of ±0.2% of span or ±0.2°C	Within ±0.2% of span
Reference Junction Compensation Error		-	Within ±1°C (note 2)	-	-

(note 1) The smaller one of 10Ω or measuring temperature span × 0.4Ω per wire.

(note 2) For Type B, there is no reference junction compensation.

For other types, when the measured temperature is less than 0°C, multiply above error by K.

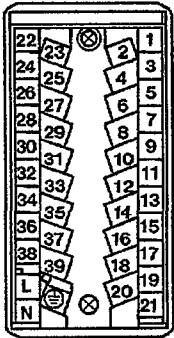
$$\text{where } K = \frac{\text{TC output per } ^\circ\text{C at } 0^\circ\text{C}}{\text{TC output per } ^\circ\text{C at measured temperature}}$$

Name	Input isolator (1 to 5V input)	2-wire transmitter input	2-wire transmitter input (Input : not isolated)
Option Code	/A05	/A06, /A16	/A07, /A17
Input Signal	1 to 5VDC	4 to 20mADC signal from 2-wire transmitter (Transmitter power supplies)	4 to 20mADC signal from 2-wire transmitter (Transmitter power supplies)
Input Resistance	1MΩ (100kΩ when power off)	250Ω	250Ω
Input External Register	-	Less than $RL = (20 - \text{minimum transmitter operating voltage}) / 0.02 \text{ A } (\Omega)$	Less than $RL = (20 - \text{minimum transmitter operating voltage}) / 0.02 \text{ A } (\Omega)$
Allowable Input Current, Voltage	±30VDC	40mADC	40mADC
Input Linearization	None	None	None
1 to 5V Output Accuracy Rating	Within ±0.2% of span	Within ±0.2% of span	Within ±0.2% of span

Name	Frequency input
Option code	/A08
Input Signal	2-wire type : ON/OFF contact , voltage pulse , current pulse (Internal distributor may be used to supply power to transmitter) 3-wire type : Voltage pulse , internal distributor may be used to supply power to transmitter
Input Frequency	0 to 10 kHz
100%Frequency	0.1 to 10 kHz
Zero elevation	May be varied between 0 to 50% of input frequency.
Measuring range	Can be changed on engineering panel
Low level input cut off point	Set in range : 0.01 Hz (and more than 1% of max. frequency) to 100%
Minimum input pulse width	ON time : 60 μ sec OFF time : 60 μ sec (for input frequency 0 to 6 kHz) ON time : 30 μ sec OFF time : 30 μ sec (for input frequency 6 to 10 kHz)
Input signal level	Contact input : Relay contact , transistor contact Detection level Open : more than 100 k Ω Close : less than 200 Ω Contact rating : at least 15 VDC , 15 mA Voltage / Current input : Low level : -1 to +8 V, High level : +3 to +24 V Voltage swing : at least 3 V _{pp} (for input frequency 0 to 6 kHz) at least 5 V _{pp} (for input frequency 6 to 10 kHz)
Internal load resistance	Selected from 200 Ω , 500 Ω , 1 k Ω (for current pulse input)
Input filter	10 msec filter enable/disable (contact or voltage)
Internal distributor	12VDC 30 mA or 24 VDC 30 mA can be selected .
1 to 5V output Accuracy rating	Within $\pm 0.2\%$ of span

TERMINAL DESIGNATION

Terminal Designation Table



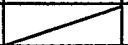
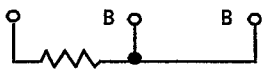

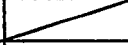
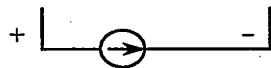
Terminal No.	Single-Loop Mode	Cascade Mode	Selector Mode
1	+ > PV	+ > PV 1	+ > PV 1
2	- > PV	- > PV 1	- > PV 1
3	+ > Cascade set point input	+ > Cascade set point input	+ > Cascade set point input 1
4	- > Cascade set point input	- > Cascade set point input	- > Cascade set point input 1
5	+ > Tracking input	+ > PV 2	+ > PV 2
6	- > Tracking input	- > PV 2	- > PV 2
7	+ > Feedforward input	+ > Feedforward input	+ > Cascade setpoint input 2
8	- > Feedforward input	- > Feedforward input	- > Cascade setpoint input 2
9	+ > Direct input signal output (note 1)	+ > Direct input signal output (note 1)	+ > Direct input signal output (note 1)
10	- > Direct input signal output (note 1)	- > Direct input signal output (note 1)	- > Direct input signal output (note 1)
11	+ > Fail output	+ > Fail output	+ > Fail output
12	- > Fail output	- > Fail output	- > Fail output
13	Power supply for transmitter (note 2)	Power supply for transmitter (note 2)	Power supply for transmitter (note 2)
14	Communication (SG)	Communication (SG)	Communication (SG)
15	Communication (SA)	Communication (SA)	Communication (SA)
16	Communication (SB)	Communication (SB)	Communication (SB)
17	Communication (RA) or LCS+ or YS-net DA	Communication (RA) or LCS+ or YS-net DA	Communication (RA) or LCS+ or YS-net DA
18	Communication (RB) or LCS- or YS-net DB	Communication (RB) or LCS- or YS-net DB	Communication (RB) or LCS- or YS-net DB
19	+ $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)	+ $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)	+ $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)
20	- $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)	- $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)	- $\left[\begin{array}{c} \\ \\ \end{array} \right]$ Direct input (note 3)
21			
22	+ > MV1 (4 to 20mA)	+ > MV1 (4 to 20mA)	+ > MV1 (4 to 20mA)
23	- > MV1 (4 to 20mA)	- > MV1 (4 to 20mA)	- > MV1 (4 to 20mA)
24	+ > MV 2 (1 to 5 VDC)	+ > MV 2 (1 to 5 VDC)	+ > MV 2 (1 to 5 VDC)
25	- > MV 2 (1 to 5 VDC)	- > MV 2 (1 to 5 VDC)	- > MV 2 (1 to 5 VDC)
26	+ > SV (1 to 5 VDC)	+ > SV (1 to 5 VDC)	+ > SV (1 to 5 VDC)
27	- > SV (1 to 5 VDC)	- > SV (1 to 5 VDC)	- > SV (1 to 5 VDC)
28	+ > High limit alarm output	+ > First loop Alarm output	+ > First loop Alarm output
29	- > High limit alarm output	- > First loop Alarm output	- > First loop Alarm output
30	+ > Low limit alarm output	+ > Second loop Alarm output	+ > Second loop Alarm output
31	- > Low limit alarm output	- > Second loop Alarm output	- > Second loop Alarm output
32	+ > Deviation alarm output	+ > OPEN/CLOSE status output	+ > LOCAL/REMOTE status output
33	- > Deviation alarm output	- > OPEN/CLOSE status output	- > LOCAL/REMOTE status output
34	+ > C/AM status output	+ > C/AM status output	+ > C/AM status output
35	- > C/AM status output	- > C/AM status output	- > C/AM status output
36	+ > CA/M status output	+ > CA/M status output	+ > CA/M status output
37	- > CA/M status output	- > CA/M status output	- > CA/M status output
38	+ > Action mode switching input	+ > Action mode switching input	+ > Action mode switching input
39	- > Action mode switching input	- > Action mode switching input	- > Action mode switching input
L	+ > Power supply	+ > Power supply	+ > Power supply
N	- > Power supply	- > Power supply	- > Power supply
\oplus	Ground (GND)	Ground (GND)	Ground (GND)

(note 1) When connecting a direct input to direct input terminals (19,20,21), these terminals are the output terminals for the 1 to 5V output signal.

(note 2) For power supply for transmitter, refer to the connection diagram.

(note 3) For terminal connection, refer to other table "Wiring For Direct Input."

Wiring For Direct Input

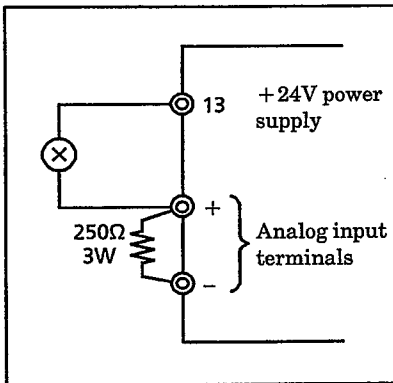
		Terminals		
		19	21	20
mV, Thermocouple input		+		-
Resistance temperature detector RTD (note 1)				
Potentiometer input (note 2)				
Frequency input	2-wire (volt contact)	+		-
	2-wire type	Signal	Power supply	
	3-wire type	+	Power supply	-
2-wire transmitter input (note 3)				

(note 1) Designations for A,B,B obey JIS Standard .

(note 2) Wiring resistance of A must use the same as B .

(note 3) For 4-20mA input that does not need the power supply transmitter , wire to 20 (+) and 21 (-) .

Connection diagram of power supply to transmitter

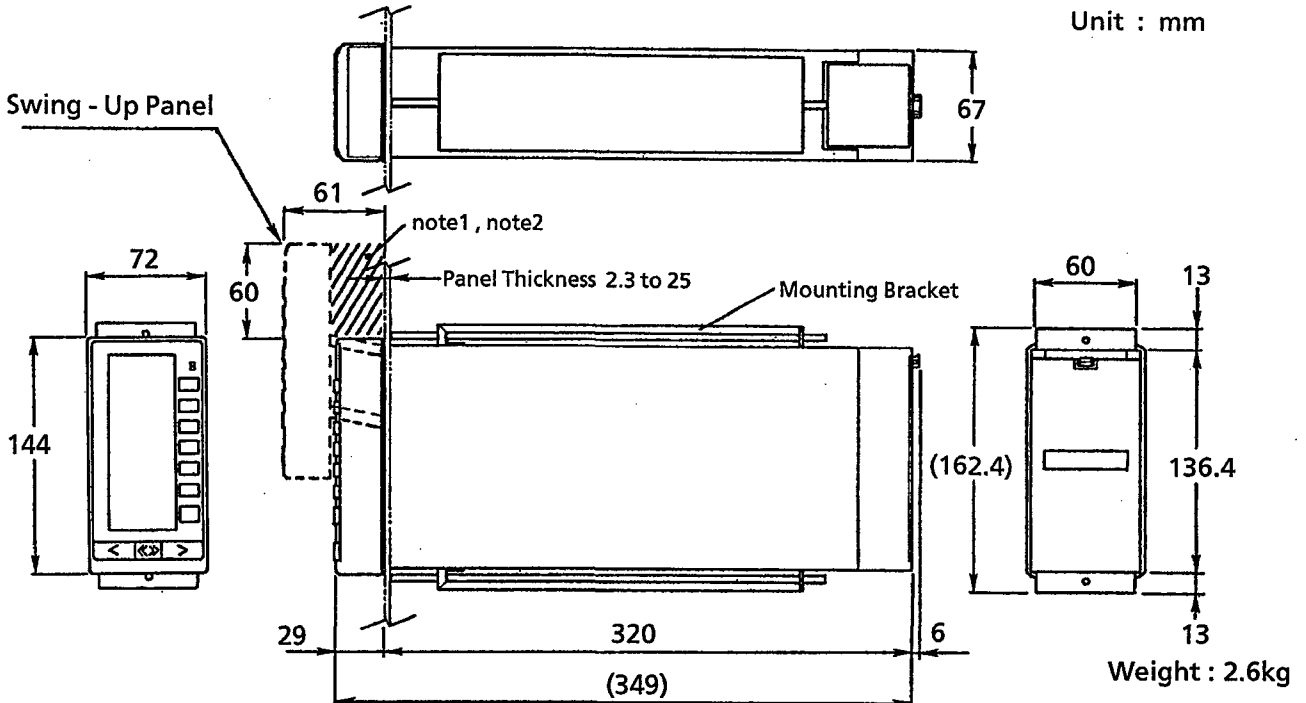


ACCESSORIES

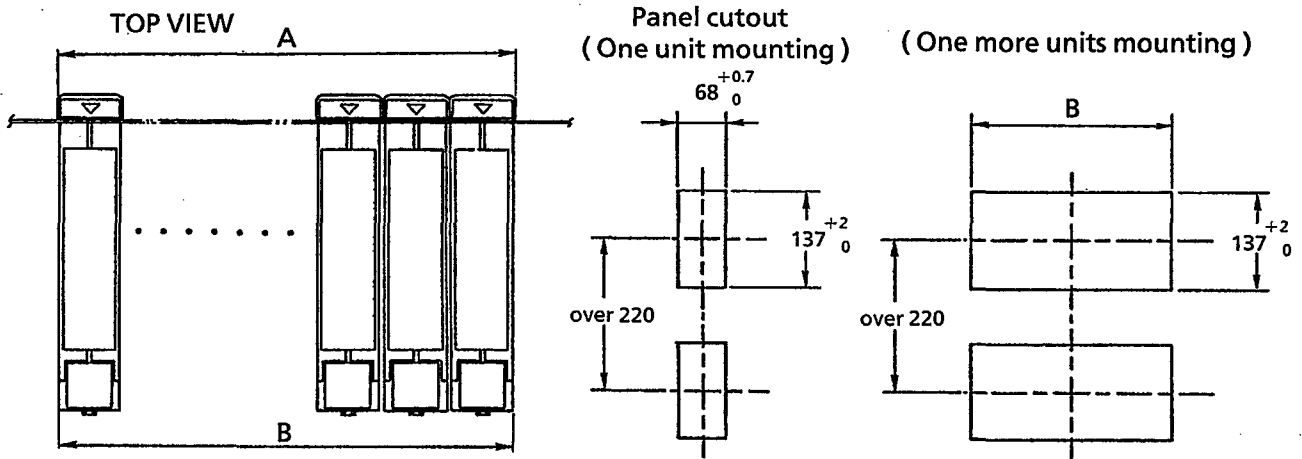
Tag plate sheals : 4 sheets

Range sheals : 4 sheets

EXTERNAL DIMENSION



Note 1 : To allow the faceplate to swing up 60mm (see above), any obstruction at the top of the panel should project no more than 29mm.
 Note 2 : To allow replacement of the fluorescent tube used for back-lighting, 130mm clearance above the swung up faceplate is required.
 Note 3 : For good ventilation, keep space of more than 100mm in the upper and lower parts of the panel.



The Normal Allowable difference = ± (Value of IT18 for JIS B 0401 - 1986) / 2

Panel cutout for mounting closely multi - unit

Unit Size \ Unit	1	2	3	4	5	6	7
A	72	144	216	288	360	432	504
B	68 ^{+0.7} ₀	140 ^{+1.0} ₀	212 ^{+1.0} ₀	284 ^{+1.0} ₀	356 ^{+1.0} ₀	428 ^{+1.0} ₀	500 ^{+1.0} ₀

Unit Size \ Unit	8	9	10	11	12	13	14
A	576	648	720	792	864	936	1008
B	572 ^{+1.0} ₀	644 ^{+1.0} ₀	716 ^{+1.0} ₀	788 ^{+1.0} ₀	860 ^{+1.0} ₀	932 ^{+1.0} ₀	1004 ^{+1.0} ₀