General Specifications

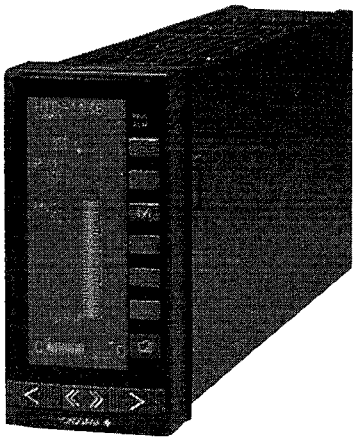
Model YS136
Auto / Manual Station
(For MV Setting)

YS100 SERIES

GS 01B07D04-01E

GENERAL

The YS136 Auto / Manual Station provides the output signals to final control element by mnual operation.
The followings are available in YS136 :
The operation mode switches (Cascade : C / Manual : M)
The operation mode switch function by status input
The operation mode status output



STANDARD SPECIFICATIONS

Basic Functions

Display / Setting Functions

PV input display : PV bar graph or trend display, and digital display
MV display : MV bar graph and digital display
MV output setting : Operation of manipulated output setting keys on front panel. (2-step speed using increased-speed key for manipulated output)
Operation mode switching : Cascade (C) / Manual (M) switch with lamp
C → M switching : Balanceless, Bumpless
M → C switching : Ramp follow-up
Follow rate ; 40 sec. / scale
Cascade (C) ; Set variable output signals follow cascade input signal
Manual (M) ; Output the variable set by manipulated output setting keys on front panel.
Parameter setting : Set on Tuning panel and Engineering panel.

Alarm Functions

Applicable for process variable (PV) input
Alarm Action : High limit, Low limit alarms
High Limit Alarm Setting : −6.3 to 106.3% (in engineering units)
Low Limit Alarm Setting : −6.3 to 106.3% (in engineering units)
Alarm Hysteresis : 2.0 %
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 : One each for High limit & Low limit.

I / O Signal Conditioning Computations

Input Signal Conditioning Computations :
Square root with low signal cut off
Computes square root for process variable (PV) input. Cut off signals below the "cut off" point (selectable between 0.0 and 100.0%)
Output Signal Conditioning Computations :
The output limitter(High limit / Low limit) affects on MV. (Only in C mode)
Output limitter Setting : −6.3 to 106.3%

Operation Mode Status Output

C / M status output : 1 point
In Cascade mode (C) : Close contact
In Manual mode (M) : Open contact

Operation Mode Switching by Status Input

Switching from C to M mode
When switched to M mode, mode lamp only C on and EXT-MAN status indication in Loop panel
Action by status input OFF or ON selectable

Input / Output Computational Period

100msec

Trend Recorder Specification

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

Front Panel Specification

The YS136 display panels are changed by use of keys on the front display panel.

C / M switch key : 1 for each
Change panel key : 1
MV setting key : 2
MV increased-speed key (Switching panel group) : 1
Display lamp : 2 Fail lamp red,
Alarm lamp yellow

Panel Specification

●Bar Graph

Scale graduations : Maximum 10 (1, 2, 4, 5, 10 available)
0% and 100% valve of scale (in engineering units) :
4 digits plus decimal point and sign
PV bar graph resolution : 0.5 % (200 elements / 100%)
MV bar graph resolution : 1.25 % (80 elements / 100%)
Displaying PV over flow : More than 100.1 %
Displaying PV under flow : Less than 0 %

●Tag No. and Other Values Displayed

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

Display Panel Specification

Front display panels are classified in three groups : Operation, Tuning, and Engineering panels.

●Operation Panels

LOOP 1, TREND 1, and ALARM.

●Tuning Panels

SETTING, PARAMETER, and I/O DATA.

●Engineering Panels

CONFIG 1, CONFIG 2, CONFIG 3, SC MAINT, PASS-WORD and FX TABLE.

Panel Operation Specification

Panels are operated by using keys on the front.
MV operation key rate : Slow 40 sec. / full scale
Fast 4 sec. / 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 terminals)
Communication speed : 78.125 kbps
Connection method : Daisy-chain connection
Communication distance : Maximum 1000m
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.)

Simultaneous use with peer-to-peer communication :
available

YS-net communication specifications on the computer side :
Personal computer : compatible with IBM PC / AT
YS-net communication board (for ISA slot)
YSS50 YS-net parameter definition file
Communication softwares (DDE server)
OS of Microsoft Windows version 3.1 or later.
Also, application software with a 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 kinds of parameters such as the measured value, manipulated output, and operation mode can be sent or received. Selectable data setting permission by communication.

Back-up for communication failure :
The operation mode is set to MAN at supervisory computer failure.

Communication cycle: 1 sec

RS-485 Communication

●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 read/write PV, MV and other parameters.
Selectable data permission by communication.

●Back-up for Communication Failure

When the supervisory computer failure, operation mode switches to M mode.

DCS-LCS Communication

●Communicate for

CENTUM-XL, CENTUM :

In Control Station Connects to LCS card

μXL, YEWPACK MARK II :

In Control Unit Connects to LCS card

Distance : Max. 100 m, Using SCCD Comm. cable

●Communication Items

Selectable to read/write PV (monitoring only), MV, operation mode and other parameters.

Selectable data permission by communication.

Data communication period : 480 msec.

●Back-up for Communication Failure

When the supervisory DCS failure, operation mode switches to M mode.

(C mode lamp on, BUM display in loop panel)

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 over for back up time, parameters previously stored in EEPROM are used. Use the SAVE Key to write to EEPROM.

Action by start type

	HOT Start	COLD Start	Initial Start
Operation Mode	Same as before Power-Fail	MAN	MAN
Manipulated Output (MV)	Same as before Power-Fail	- 6.3 %	- 6.3 %
Parameter	Same as before Power-Fail	Same as before Power-Fail	Same as stored in EEPROM

Self-Diagnostic Features

Failure of computation / control circuit :

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

Failure of input signals :

ALM lamp lit, Display the origin for alarm

Display for failure of YS136

Upon failure, the display changes to the Fail panel.

Manual operation by hard-manual is available.

Balance operation of MV when switching to hard-manual.

I/O Signals Specifications

Analog Input Signal

Analog input : 1 to 5V DC, 2 points (PV input, cascade input).
Option for PV input direct input (mV, TC, RTD, 2-wire transmitter, potentiometer or frequency input).

Input resistance: More than 1MΩ

Analog Output Signal

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

Status I/O Signal

Status input signal : 1 point (Mode switch input)

Input Status / Input Signal	ON	OFF
Contact Input (Note 1)	Contact close Resistance up to 200Ω	Contact open Resistance up to 100kΩ
Voltage Input	LOW Input voltage −0.5~1VDC	HIGH Input voltage +4.5~30VDC

(Note1) Signal : More than 5VDC, 20mA
Min. Pulse : 120ms

Status output signal : 3 points
(C / M Status output, High & Low limit alarms output)
Transistor contact 30V DC 200mA (resistance load)

Fail output signal : 1 point
Transistor contact 30V DC 200mA (resistance load)

Signal Isolation

The analog input/output circuit is not isolated from the computation circuit, and use a negative common ground. Status output signals are isolated from computation circuit, and isolated from each other. Isolation is also provided between the computation circuit and power supply circuit.
For the direct input, isolation is provided between the computation circuit, the input 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 YS136 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 YS136 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
Teperature Code : T4

Design Performance

Accuracy rating forl to 5V input : ±0.2% 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)
Max. current flow : 600mA (DC drive of 100V version)
100mA (DC drive of 220V version)
Max. power consumption :
26VA / 100VAC (AC drive of 100V version)
29VA / 220VAC (AC drive of 220V version)
Current flow and power consumption for recommended voltage : 430mA Typ. at 24VDC
19VA Typ. at 100VAC
23VA Typ. at 220VAC
Isolation Resistance
Between I/O Terminals and Ground:
More than 100MΩ / 500VDC
Between Power supply and Ground :
More than 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
20V AC version : 1500V AC for 1 minute
Common mode noise rejection : 83dB(50Hz)
Series mode noise rejection : 46dB(50Hz)

Normal Operating Condition

Ambient Temperature: 0 to 50℃
Ambient Humidity : 5 to 90%RH (non-condensing)
Rated Power Supply Voltage : For both DC and AC
100V version;
DC drive ; 24 - 120VDC ⎓ (±10%), no polarity
AC drive ;100 - 120VAC ~ (±10%), 50/60Hz (±3Hz)
220V version;
DC drive ;135 - 190VDC ⎓ (±10%), no polarity
AC drive ;220 - 240VAC ~ (±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 input.

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
YS136			Auto / Manual Station (For MV Setting)
For use	-0		General
	0		Always 0
Power Supply	1		100V version
	2		220V version
Options		/□	Options (Refer to the following table)

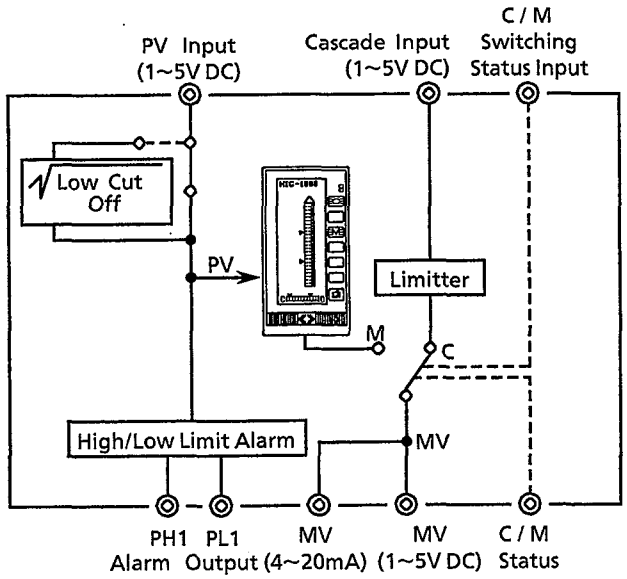
OPTION CODES

	Option Codes	Combi-nation with /CE	Combi-nation with /CSA	Description
	/ CE	-	No	CE Mark Approved
	/ CSA	No	-	CSA Non-incendive Approved
Input Options				It is possible to select one from the followings;
	/ A01	No	Yes	mV Input (EM1)
	/ A02	No	Yes	Thermocouple Input (ET5 / YS) (Type K, T, J, E, B, R, S)
	/ A03	No	Yes	Resistance Temperature Detector Input (ER5) (Pt100, JPt100)
	/ A04	No	Yes	Potentiometer (ES1)
	/ A05	No	Yes	Input Isolator (EH1)
	/ A06	No	Yes	2 - wire Transmitter Input (EA1)
	/ A07	No	Yes	2 - wire Transmitter Input (EA9) (no isolation from the field)
	/ A08	No	Yes	Frequency Input (EP3)
Input Options for /CE				It is possible to select one from the followings;
	/ A12	Yes	No	Thermocouple Input (ET5 / YS) (Type K, T, J, E, B, R, S)
	/ A13	Yes	No	Resistance Temperature Detector Input (ER5) (Pt100, JPt100)
	/ A16	Yes	No	2 - wire Transmitter Input (EA1)
	/ A17	Yes	No	2 - wire Transmitter Input (EA9) (no isolation from the field)
Commu-nication				It is possible to select one from the followings;
	/ A31	Yes	Yes	RS - 485
	/ A32	Yes	Yes	DCS-LCS
	/ A33	Yes	Yes	YS-net
Con-struction				It is possible to select one from the followings;
	/ D11	No	No	Replace for YEWSERIES 80 Internal Unit (Separate ordered for housing or use SHUP that already mounted)
	/ D12	No	No	Closely Mounting for YEWSERIES 80 Housing
	/ D13	No	No	Replace for 100 Line Internal Unit (Order YS006, YS100 Housing for 100 Line, seperately)

ORDERING INSTRUCTIONS

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

BLOCK DIAGRAM



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 K, T, J, E, B, R, S 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℃ 10 to 500℃ (JPt100)	Total resistance 100 to 2000Ω Span 80 to 2000Ω
	Zero Elevation	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 ±20μVof input conversion	Within larger of ±0. 2% of span or ±0. 2℃	Within±0. 2% of span
Reference Junction Compensation Error		–	Within±1℃ (note 2)	–	–

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

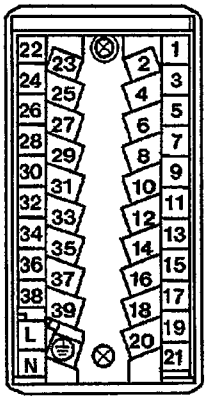
(note 2) For Type B , there is no reference junction compensation .
For other types, when the measured teperature is less than 0℃, multiply above error by K .

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

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 – minimum transmitter operating voltage) / 0. 02 A (Ω)	Less than RL= (20 – minimum transmitter operating voltage) / 0. 02 A (Ω)
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.
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 µsec OFF time : 60 µsec (for input frequency 0 to 6 kHz) ON time : 30 µsec OFF time : 30 µsec (for input frequency 6 to 10 kHz)
Input signal level	Contact input : Relay contact , transistor contact Detection level Open : more than 100 kΩ 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 Vpp (for input frequency 0 to 6 kHz) at least 5 Vpp (for input frequency 6 to 10 kHz)
Internal load resistance	Selected from 200 Ω, 500 Ω, 1 kΩ (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 ±0. 2% of span

TERMINAL DESIGNATION



Terminal Designation Table

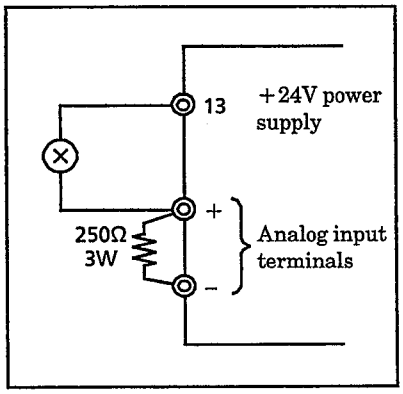
Terminal No.	Signal Contact
1	+ > PV input (1 to 5 VDC)
2	–
3	+ > Cascade input
4	–
5	+
6	–
7	+
8	– (note 2)
9	+ > Direct input signal output (1 to5 VDC)
10	–
11	+ > Fail output
12	–
13	Power supply for transmitter +(24VDC (note 2)
14	Communication (SG)
15	Communication (SA)
16	Communication (SB)
17	Communication (RA) or LCS+ or YS-net DA
18	Communication (RB) or LCS– or YS-net DB
19	+ Direct input (note 3)
20	–
21	
22	+ > MV output 1 (4 to 20mA)
23	–
24	+ > MV output 2 (1 to 5 VDC)
25	–
26	+
27	–
28	+ > High limit alarm output
29	–
30	+ > Low limit alarm output
31	–
32	+
33	–
34	+ > C / M Status output
35	–
36	+
37	–
38	+ > Operation mode Switch input
39	–
L	+ > Power supply
N	–
⏚	Ground (GND)

Wiring For Direct Input

		Terminals		
		19	21	20
mV ,Thermocouple input		+		–
Resistance temperature detector RTD (note 1)		A B B		
Potentiometer input (note 2)		100 %		0 %
Fre-quency 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 19 must be the same as 20 .
(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



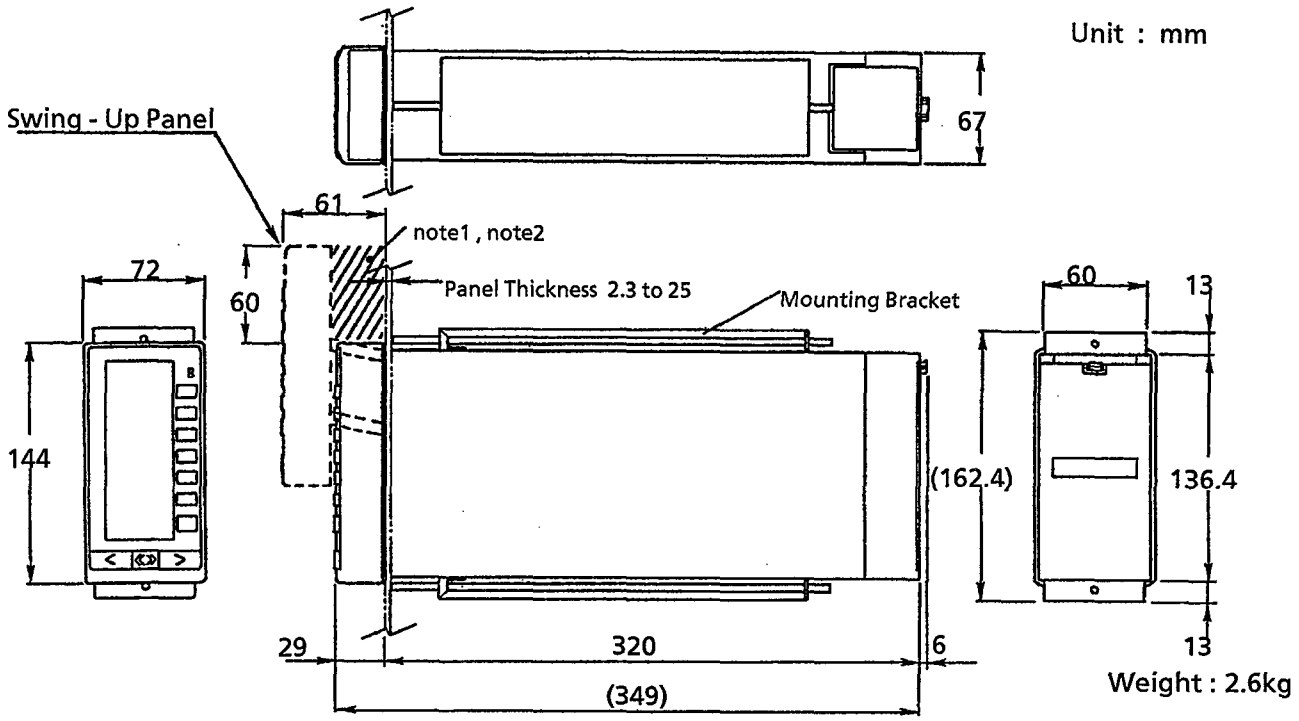
ACCESSORIES

Tag plate sheals : 4 sheets
Range sheals : 4 sheets

(note 1) Nothing must be connected to the terminal with no designation.
(note 2) When connecting a direct input to direct input terminals (19,20,21) , these terminals are the output terminals for the1 to 5V output signal.
(note 3) For terminal connection , refer to other table "Wiring For Direct Input. ".

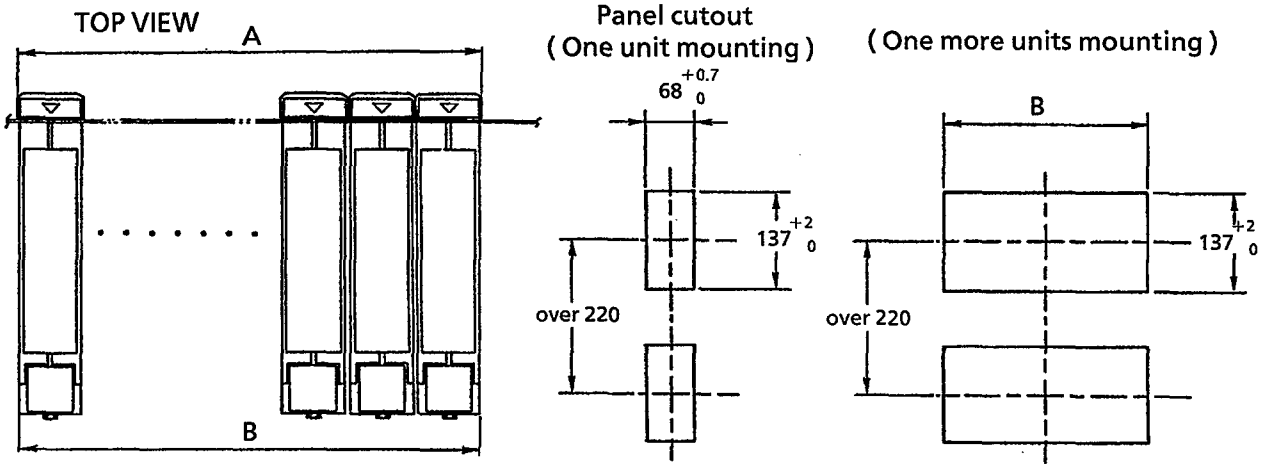
EXTERNAL DIMENSION

Unit : mm



Weight : 2.6kg

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 swinged 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

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

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