

# General Specifications

## WX4 Series Computing Units (mV Input/Fixed Software Type)



Moving Average Unit, Dead Time Unit, Velocity Unit, First Order Lug Unit, First Order Lead Unit, Velocity Limiter, Peak Holder, Bottom Holder, Analog Memory, Program Setter

GS 77J09X04-01E

### General

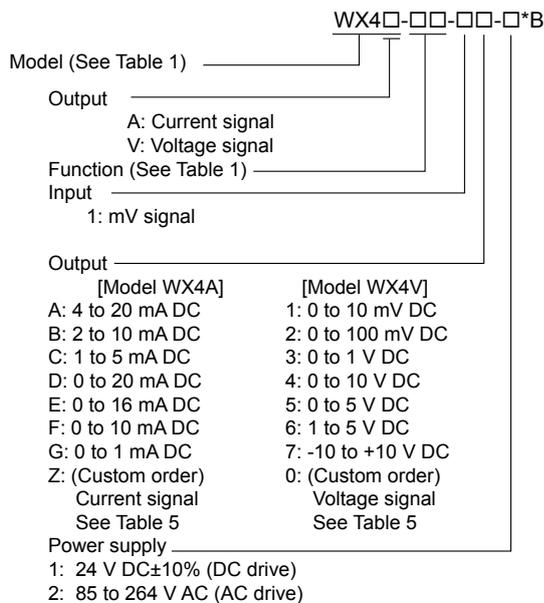
The JUXTA WX4 Series, Computing unit (mV Input/Fixed Software Type) receives a voltage input signal, applies various computing functions to it, and outputs isolated DC current or DC voltage signals to controllers or recorders.

### List of Computing Units

Table 1. List of WX4 Series

Descriptions	Models □: V or A
Moving Average Unit	WX4□-MA
Dead Time Unit	WX4□-DT
Velocity Unit	WX4□-VC
First Order Lug Unit	WX4□-LG
First Order Lead Unit	WX4□-LE
Velocity Limiter	WX4□-VL
Peak Holder (with contact input for holding)	WX4□-PH
Bottom Holder (with contact input for holding)	WX4□-BH
Analog Memory (with contact input for holding)	WX4□-AM
Program Setter (with contact input for holding)	WX4□-PS

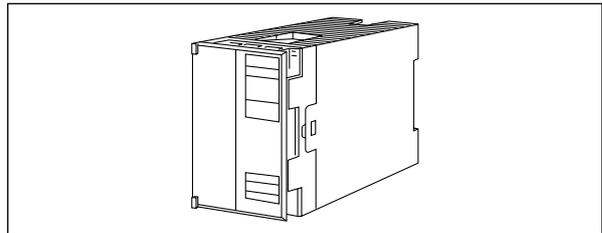
### Model and Suffix Codes



### Ordering Information

Specify the Model, Suffix codes and the Input range when ordering. (Refer to "Functions" for other items which need to be specified when ordering.)

Model and suffix codes: e.g. WX4A-MA-1A-2\*B  
 Input range: e.g. 0 to 100V DC



### Input Specifications

Input signal: Refer to Table 2

Table 2. Input Signals

Input signals	Model and Suffix codes
1 point of mV signal	WX4□-MA, WX4□-DT, WX4□-VC, WX4□-LG, WX4□-LE, WX4□-VL
1 point of mV signal, 1 point of contact input	WX4□-PH, WX4□-BH, WX4□-AM
1 point of contact input	WX4□-PS

Measuring range: Refer to Table 3

Table 3. Measuring Range

Input signal	Measuring range
mV signal	Each measuring range and span is as follows: -100 to +1250 mV: span 250 mV or more -50 to +250 mV: span 50 mV or more -10 to +50 mV: span 10 mV or more -2 to +10 mV: span 3 mV of more

Input resistance: 1 MΩ (3 kΩ or more during power off)

Allowable applied voltage: -0.5 to +4.0 V DC

Contact signal: For the models with contact inputs only

Close: 200 Ω or less

Open: 100 kΩ or more

Contact detection: 9 V, 0.2 mA DC

## ■ Output Specifications

Output signal: DC current signal or DC voltage signal  
 Allowable load resistance: Refer to Table 4

**Table 4. Output signals**

Output range	Output range
4 to 20 mA DC: 750 Ω or less	0 to 10 mV DC: 250 kΩ or more
2 to 10 mA DC: 1500 Ω or less	0 to 100 mV DC: 250 kΩ or more
1 to 5 mA DC: 3000 Ω or less	0 to 1 V DC: 2 kΩ or more
0 to 20 mA DC: 750 Ω or less	0 to 10 V DC: 10 kΩ or more
0 to 16 mA DC: 900 Ω or less	0 to 5 V DC: 2 kΩ or more
0 to 10 mA DC: 1500 Ω or less	1 to 5 V DC: 2 kΩ or more
0 to 1 mA DC: 15 kΩ or less	-10 to +10 V DC: 10 kΩ or more

## ■ Standard Performance

Accuracy rating: ±0.2% of span  
 Note that the accuracy is not guaranteed for output levels less than 0.5% of the span of 0 to X mA output range type.  
 The ranges corresponding to input span of less than 10 mV:

$$\text{Accuracy} = 0.2 \times \frac{10 \text{ (mV)}}{\text{Input span (mV)}} \text{ (\%)}$$

Response speed: 500 ms, 63% response (10 to 90%)  
 Computation cycle: 100 ms  
 Insulation resistance: MΩ or more at 500 V DC between input and output, output and power supply, and input and power supply.  
 Withstand voltage:  
 DC drive; 1500 V AC/min. between (input and output) and power supply.  
 500 V AC/min. between output and power supply.  
 AC drive ; 1500 V AC/min. between input and output, input and power supply, input and ground, output and power supply, output and ground, and power supply and ground.

## ■ Environmental Conditions

Operating temperature range: 0 to 50°C  
 Operating humidity range: 5 to 90% RH (no condensation)  
 Power supply voltage: 85 to 264 V AC, 47 to 63 Hz or 24 V DC±10%  
 Effect of power supply voltage fluctuations: ±0.1% of span or less for fluctuation within the operating range of power supply voltage specification  
 Effect of ambient temperature change: ±0.2% of span or less for a temperature change of 10°C.  
 Current consumption: 24 V DC 56 mA (WX4V), 78 mA (WX4A)  
 Power consumption: 100 V AC 7.0 V A (WX4V), 8.5 V A (WX4A)

## ■ Mounting and Dimensions

Material: ABS resin (Case body)  
 Mounting method: Rack, Wall or DIN rail mounting

Connection: M4 screw terminal  
 External dimensions: 72 x 48 x 127mm (H x W x D)  
 Weight: DC drive; Approx.130 g,  
 AC drive; Approx.280 g

## ■ Standard Accessories

Tag number label: 1  
 Mounting block: 2  
 Mounting screw: M4 screw x 4

## ■ Custom Order Specifications

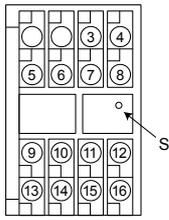
Output signal: Refer to Table 5

**Table 5. Acceptable range for custom order**

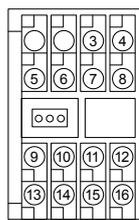
	Current signal	Voltage signal
Output range	0 to 24 mA DC	-10 to +10 V DC
Span	1 to 24 mA DC	10 m V to 20 V DC
Zero elevation	0 to 200%	-100 to +200%

Dual output: If dual output is necessary, specify /D0 at the end of the model code.  
 Note that the second output is fixed within the range of 1 to 5 V DC. Each first and second signal is output through an independent buffer amplifier. Relative error is within ±0.2%.

## Terminal Assignments



WX4□-MA, -DT, -VC, -LG, -LE, -VL	
3	Check terminal (+)
4	Check terminal (-)
5	Do not use this terminal
6	Do not use this terminal
7	Input (+)
8	Input (-)
9	Output 2 (+)
10	Output 2 (-)
11	Output 1 (+)
12	Output 1 (-)
13	Do not use this terminal
14	Power supply (L+)
15	Power supply (N-)
16	Ground (G)



WX4□-PS	
3	Start/Reset (+)
4	Start/Reset (-)
5	Do not use this terminal
6	Do not use this terminal
7	Do not use this terminal
8	Do not use this terminal
9	Output 2 (+)
10	Output 2 (-)
11	Output 1 (+)
12	Output 1 (-)
13	Do not use this terminal
14	Power supply (L+)
15	Power supply (N-)
16	Ground (G)

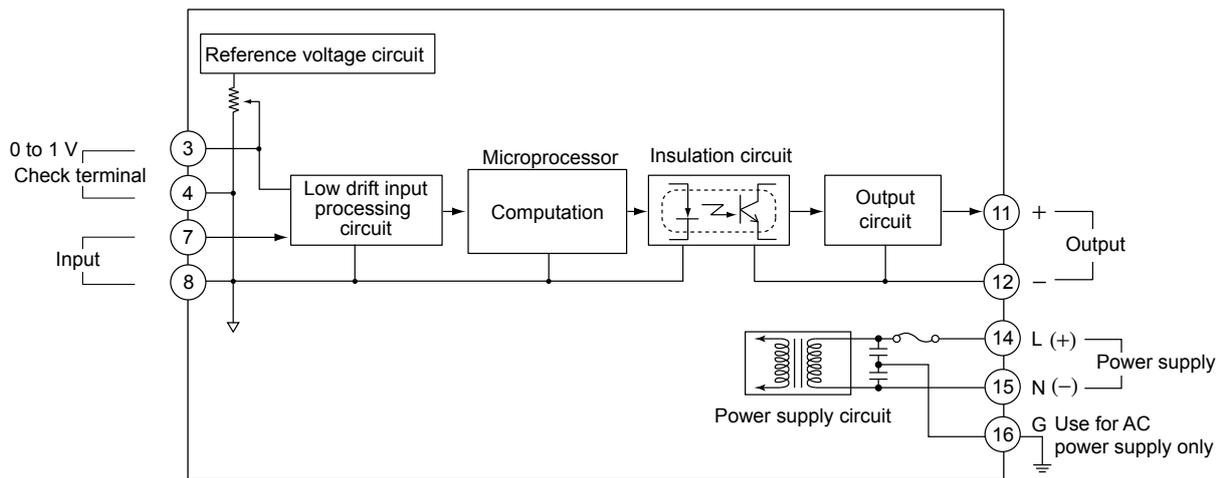
WX4□-PH, -BH, -AM, -FP	
3	Hold (+)
4	Hold (-)
5	Do not use this terminal
6	Do not use this terminal
7	Input (+)
8	Input (-)
9	Output 2 (+)
10	Output 2 (-)
11	Output 1 (+)
12	Output 1 (-)
13	Do not use this terminal
14	Power supply (L+)
15	Power supply (N-)
16	Ground (G)

S: WX4□-MA; Moving average time setting volume  
 WX4□-DT; Dead time setting volume  
 WX4□-VC; Velocity computation time setting volume  
 WX4□-LG, -LE; Time constant setting volume  
 WX4□-VL; Velocity limit value setting volume

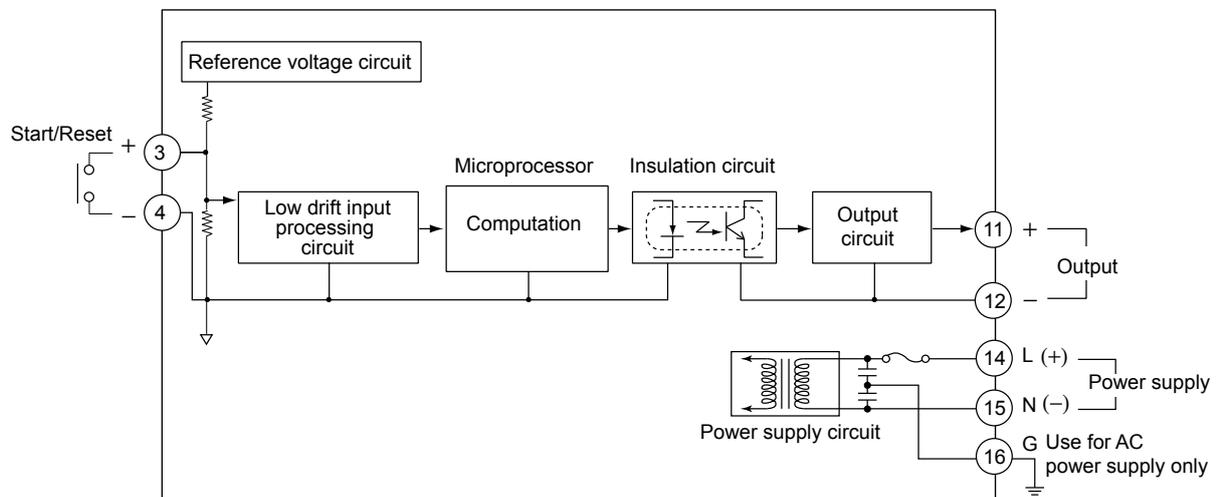
Terminals (9)–(10) are used for Output 2 only when the dual output is specified.

## Block Diagrams

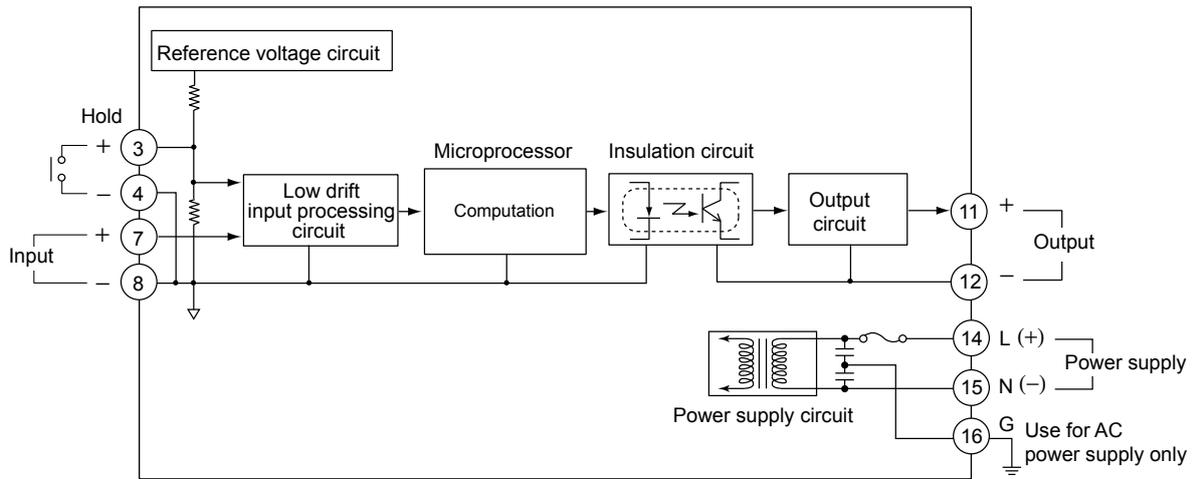
### WX4□ -MA, -DT, -VC, -LG, -LE, -VL



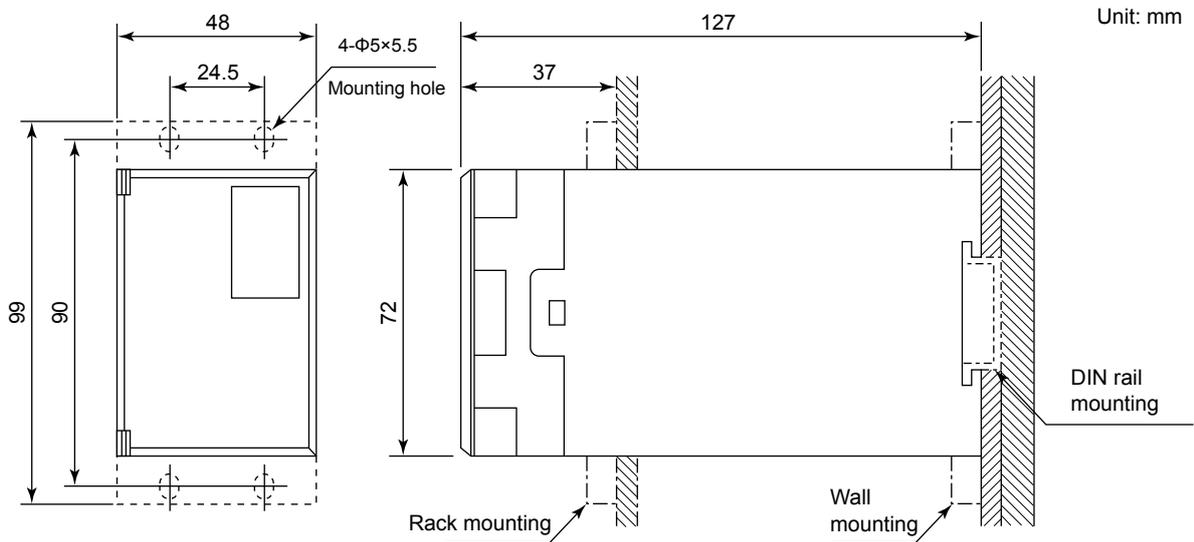
### WX4□ -PS



● WX4□ -PH, -BH, -AM



■ External Dimensions

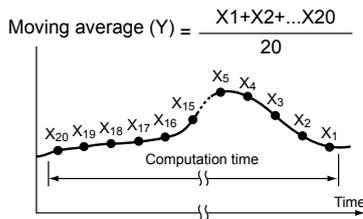


**■ Functions**

**• WX4□-MA Moving Average Unit**

This computing unit outputs the average of 20 input data (X) sampled at intervals of one-twentieth of the moving-average time (L). At the next sampling, the unit discards the oldest data and outputs the average of the 20 data, repeating the same operation. The output between samplings is smoothed out by interpolation.

**<Example>**



- Setting range of moving-average time:  
0 to 1000 sec. (0 to 1V) with 4 significant digits.  
minimum unit is 1 sec.
- Moving-average time can be set by the volume of front panel and monitored by check terminal.
- Accuracy of moving average and time constant setting: (±5.0% of set value) ± 5.0 sec.

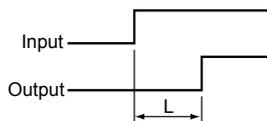
**• WX4□-DT Dead Time Unit**

This computing unit stores the input values (X) sampled at intervals of one-twentieth of the dead time (L) into 20 buffers and outputs data (Y) by orderly shifting them after the dead time has elapsed. The output between samplings is smoothed by interpolation.

$$Y = \frac{e^{-Ls}}{1+Ts} X$$

X: Input, L: Dead time  
Y: Output, T: Time constant

**<Example: 0% → 100% step input>**



- Setting range of dead time:  
0 to 1000 sec. (0 to 1 V) with 4 significant digits.  
minimum unit is 1 sec.
- Dead time can be set by the volume of front panel and monitored by check terminal.
- Accuracy of dead time and time constant setting: (±5.0% of set value) ± 5.0 sec.

**• WX4□-VC Velocity Unit**

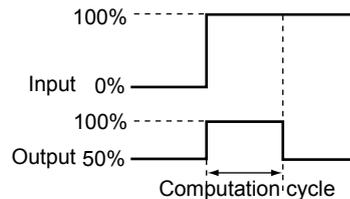
This computing unit calculates the input velocity by subtracting the input of the last velocity computation (X<sub>L</sub>) from the present input (X). The unit then adds a 50% bias to one-half of the obtained velocity and outputs the result (Y).

The output obtained will be as follows:  
When there is no change in input: 50%  
When the input has increased: 50% or more (100% when X-X<sub>L</sub>= 100%)  
When the input has decreased: 50% or less (0% when X-X<sub>L</sub>= -100%)

$$Y = \frac{X - X_L}{2} + 50\%$$

X: Present Input  
X<sub>L</sub>: Input of the last velocity computation  
Y: Output

**<Example>**



- Setting range of velocity computation time:  
0 to 1000 sec. (0 to 1 V) with 4 significant digits.  
minimum unit is 1 sec.
- Velocity computation time can be set by the volume of front panel and monitored by check terminal.
- Accuracy of velocity computation and time constant setting: (±5.0% of set value) ± 5.0 sec.

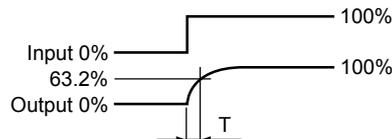
**• WX4□-LG First Order Lag Unit**

This computing unit provides a first order lag computation on input (X) with a time constant (T) and outputs the result (Y).

$$Y = \frac{1}{1+Ts} X$$

X: Input, T<sub>s</sub>: Time constant, Y: Output

**<Example: 0% → 100% step input>**



- Setting range of time constant: 1.0 to 100.0 sec. (0.010 to 1.000 V); minimum unit is 0.1 sec.
- Time constant can be set by the volume of front panel and monitored by check terminal.
- Accuracy of time constant setting: (±5.0% of set value) ± 1.0 sec.

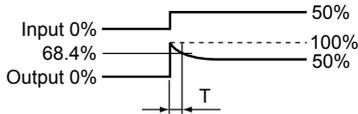
**• WX4□-LE First Order Lead Unit**

This computing unit provides a first order lead computation on input (X) with a time constant (T) and outputs the result (Y).

$$Y = \left(1 + \frac{T_s}{1 + T_s}\right) X$$

X: Input, T<sub>s</sub>: Time constant, Y: Output

**<Example: 0% → 50% step input>**



Setting range of time constant: 1.0 to 100.0 sec. (0.010 to 1.000 V); minimum unit is 0.1 sec.

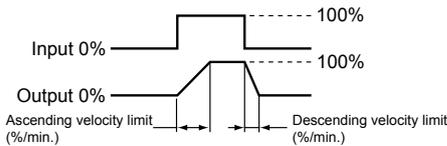
Time constant can be set by the volume of front panel and monitored by check terminal.

Accuracy of time constant setting: (±5% of set value) ±1 sec.

**• WX4□-VL Velocity Limiter**

This computing unit limits the input (X) velocity at the ascending velocity limit for a positive change at the descending velocity limit for a negative change, and outputs the limited value (Y). When the input velocity (slope) is not more than the limit, the unit outputs the input as it is.

**<Example: 0% → 100% → 0% step input>**



Setting range of velocity limit: 0.1 to 600.0%/min.; minimum unit is 0.1 %/min. Setting the limit at 700.0%/min. or above does not limit the input, the unit simply outputs the input as is (Open limit function).

Velocity limit value can be set by the volume of front panel and monitored by check terminal. "0 to 1000%/min." corresponds to "0.010 to 1.000 V".

Setting accuracy of velocity limit: (±5.0% of set value) ± 5%/min.

**• WX4□-PH Peak Holder**

This computing unit outputs the current signal or voltage signal (Y) corresponding to the peak value when receiving a voltage signal input from various converters and opening the hold-command input (contact input). If the contact input is closed, it outputs the value corresponding to the input value.

**• WX4□-BH Bottom Holder**

This computing unit outputs the current signal or voltage signal (Y) corresponding to the bottom value when receiving a voltage signal input from various converters and opening the hold-command input (contact input). If the contact input is closed, it outputs the value corresponding to the input value.

**• WX4□-AM Analog Memory**

This computing unit holds the output signal (Y) at the moment when receiving a voltage signal input from various converters and opening the hold-command input (contact input). If the contact input is closed, it outputs the value corresponding to the input value.

**• WX4□-PS Program Setter**

This computing unit starts the program when opening start/reset input (contact input), and outputs the isolated current or voltage signal (Y) internally generated. When closing start/reset input, the program is reset. The output signal changes with the time lapse corresponding to the 11 time table breakpoints.

Setting conditions of time table:

$$0.0 \text{ sec.} \leq (t_0 \text{ to } t_{10}) \leq 7984 \text{ sec.},$$

$$-10.0\% \leq (Y_0 \text{ to } Y_{10}) \leq 110.0\%$$

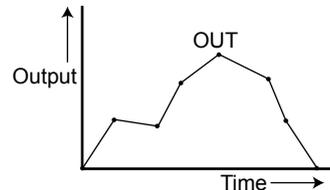
$$t_0 < t_1 < t_2 < t_3 < t_4 < t_5 < t_6 < t_7 < t_8 < t_9 < t_{10}$$

Time breakpoints: t<sub>0</sub> to t<sub>10</sub>

Output breakpoints: Y<sub>0</sub> to Y<sub>10</sub>

Setting resolution: Time; 8 sec., Outputs; 0.1%

**<Example>**



**Ordering information**

•Time table: Write and specify all data of t<sub>0</sub> to t<sub>10</sub> and Y<sub>0</sub> to Y<sub>10</sub> on the work sheet below.

**<Work Sheet>**

Model and suffix code: \_\_\_\_\_

Time (sec.)		Output (%)	
t0		Y0	
t1		Y1	
t2		Y2	
t3		Y3	
t4		Y4	
t5		Y5	
t6		Y6	
t7		Y7	
t8		Y8	
t9		Y9	
t10		Y10	