General Specifications

GS 77J09X02-01E

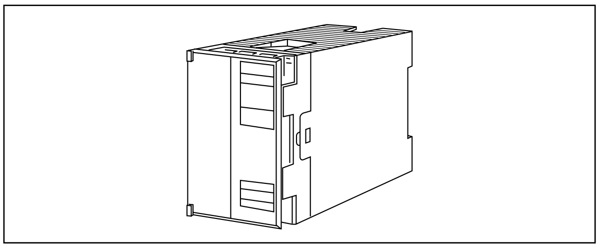
WX2 Series
Computing Units (Variable/Fixed Software Type)

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, Programmable Unit

JUXTA

■ General

The JUXTA WX2 Series, Computing unit (Variable/ 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 WX2 Series

Descriptions	Models □: V or A
Moving Average Unit (Fixed software type)	WX2□-MA
Dead Time Unit (Fixed software type)	WX2□-DT
Velocity Unit (Fixed software type)	WX2□-VC
First Order Lug Unit (Fixed software type)	WX2□-LG
First Order Lead Unit (Fixed software type)	WX2□-LE
Velocity Limiter (Fixed software type)	WX2□-VL
Peak Holder (Variable software type, with contact input for holding)	WX2□-PH
Bottom Holder (Variable software type, with contact input for holding)	WX2□-BH
Analog Memory (Variable software type, with contact input for holding)	WX2□-AM
Program Setter (Variable software type)	WX2□-PS
Programmable Unit (Variable software type, with contact input)	WX2□-FP

■ Model and Suffix Codes

WX2□-□□-□□-□*B

Model (See Table 1)
Output
 A: Current signal
 V: Voltage signal
Function (See Table 1)
Input
 1: Voltage signal
 0: Custom order (See Table 5)

Output

[Model WX2A]	[Model WX2V]
A: 4 to 20 mA DC	1: 0 to 10 mV DC
B: 2 to 10 mA DC	2: 0 to 100 mV DC
C: 1 to 5 mA DC	3: 0 to 1 V DC
D: 0 to 20 mA DC	4: 0 to 10 V DC
E: 0 to 16 mA DC	5: 0 to 5 V DC
F: 0 to 10 mA DC	6: 1 to 5 V DC
G: 0 to 1 mA DC	7: -10 to +10 V DC
Z: (Custom order) Current signal See Table 6	0: (Custom order) Voltage signal See Table 6

Power supply
1: 24 V DC±10% (DC drive)
2: 85 to 264 V AC (AC drive)

■ 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. WX2A-MA-1A-2*B
Input range: e.g. 1 to 5 V DC

■ Input Specificatons

Input signal: Refer to Table 2

Table 2. Input Signals

Input signals	Model and Suffix codes
1 point of DC voltage signal	WX2□-MA, WX2□-DT, WX2□-VC, WX2□-LG, WX2□-LE, WX2□-VL
1 point of DC voltage signal, 1 point of contact input	WX2□-PH, WX2□-BH, WX2□-AM, WX2□-FP
1 point of contact input	WX2□-PS

Measuring range: Refer to Table 3

Table 3. Measuring Range

Input signal	Measuring range
DC voltage signal	Specify within 0 to 10 V DC when voltage is applied (Span: 2 V or more)

Input resistance: 1 MΩ (100 kΩ or more during power off)
Allowable applied voltage: -15 to +15 VDC
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

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2nd Edition August 01, 2007(YK)

■ 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.
Response speed: 500ms, 63% response (10 to 90%)
Computation cycle: 0.1 ms
Insulation resistance: 100 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 60 mA (WX2V), 82 mA (WX2A)
Power consumption: 100 V AC 7.0 V A (WX2V), 8.5 V A (WX2A)

■ 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 127 mm (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

Input signal: DC current signal - Refer to Table 5
Input resistance x (Input curent) shall be within the measuring span of voltage input signal.

Table 5. Acceptable Range for Input Signals

Input signal	Input resistance	Input signal	Input resistance
10 to 50 mA DC	100 Ω	0 to 20 mA DC	250 Ω
4 to 20 mA DC	250 Ω	0 to 16 mA DC	250 Ω
2 to 10 mA DC	500 Ω	0 to 10 mA DC	500 Ω
1 to 5 mA DC	1 kΩ	0 to 1 mA DC	5 kΩ

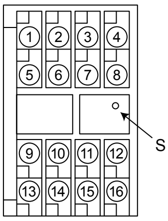
Output signal: Refer to Table 6

Table 6. Acceptable range for custom order

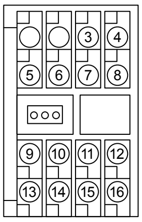
	Current signal	Voltage signal
Output range	0 to 24 mA DC	-10 to +10 V DC
Span	1 to 24 mA DC	10 mV to 20 V DC
Zero elevation	0 to 200%	-100 to +200%

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



WX1□-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)



WX1□-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)

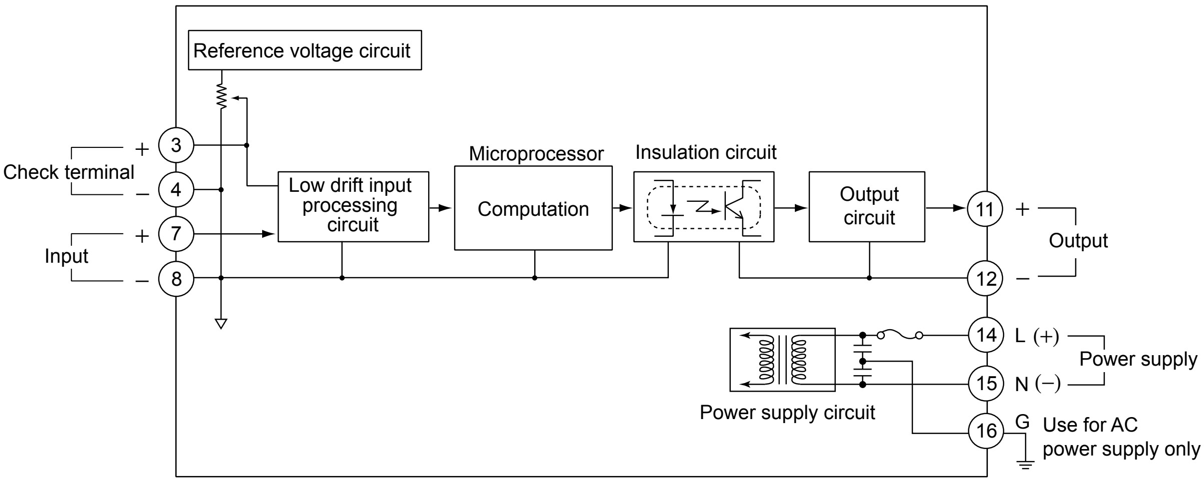
WX1□-PH, -BH, -AM, -FP	
3	Hold (+)
4	Hold (-)
5	Do not use this terminal
6	Do not use this terminal
7	Input (+)
8	Input (-)
9	Output 2 (+)
10	Output 2 (-)
11	Output 1 (+)
12	Output 1 (-)
13	Do not use this terminal
14	Power supply (L+)
15	Power supply (N-)
16	Ground (G)

S: WX2□-MA; Moving average time setting volume
WX2□-DT; Dead time setting volume
WX2□-VC; Velocity computation time setting volume
WX2□-LG, -LE; Time constant setting volume
WX2□-VL; Velocity limit value setting volume

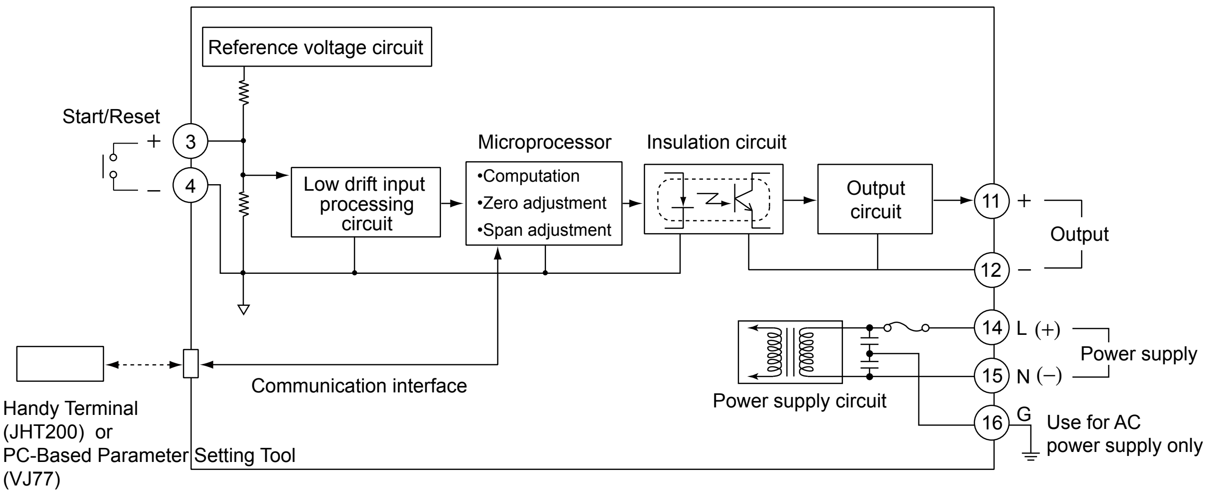
Terminals 9–10 are used for Output 2 only when the dual output is specified.

■ Block Diagrams

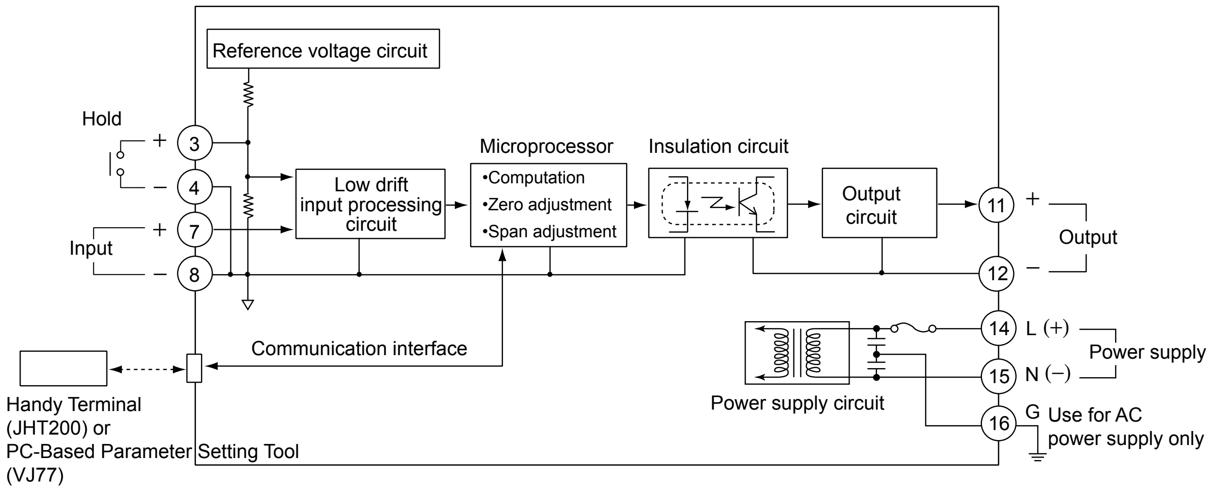
- **WX2□ -MA, -DT, -VC, -LG, -LE, -VL**



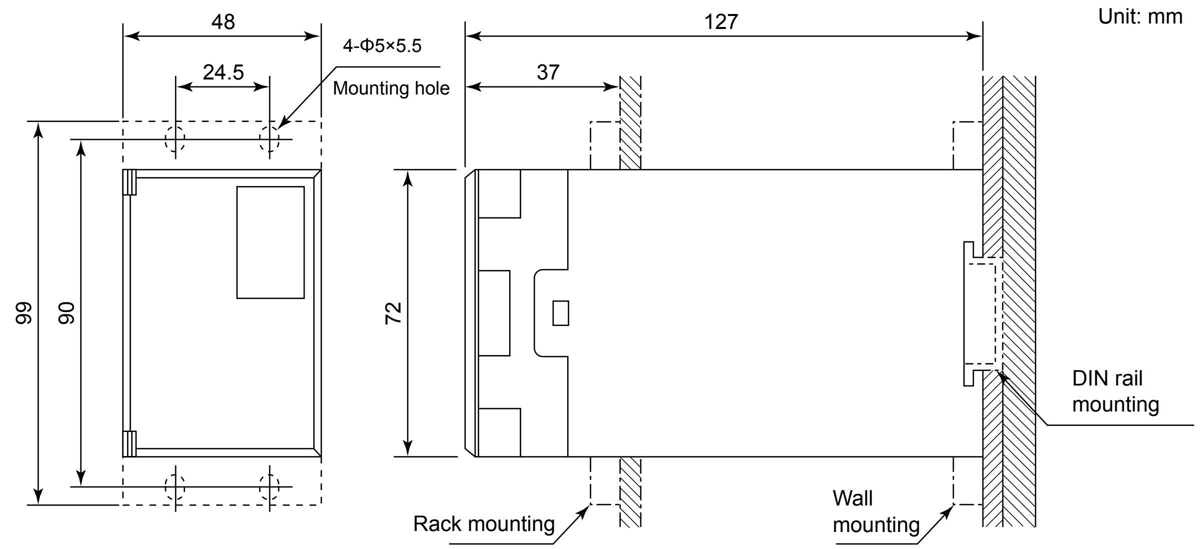
- **WX2□ -PS**



● **WX2□ -PH, -BH, -AM, -FP**



■ External Dimensions



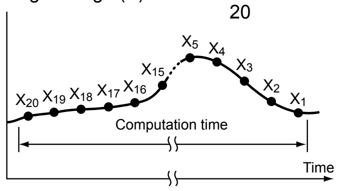
■ Functions

• WX2□-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>

$$\text{Moving average (Y)} = \frac{X1+X2+...X20}{20}$$



Setting range of moving average time:
0 to 1000 sec. (0 to 1 V) 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.

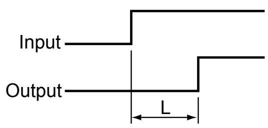
• WX2□-DT Dead Time Unit

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.

• WX2□-VC Velocity Unit

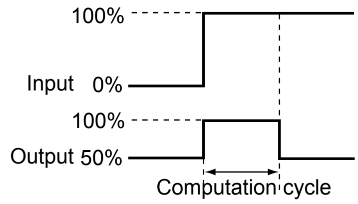
This computing unit calculates the input velocity by subtracting the input of the last velocity computation (X_L) from the present input (X). The unit then adds a 50% bias to one-half of the obtained velocity and outputs the result (Y).

The output obtained is as follows:
When there is no change in input: 50%
When the input has increased: 50% or more (100% when $X-X_L= 100\%$)
When the input has decreased: 50% or less (0% when $X-X_L= -100\%$)

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

X: Present Input
X_L: 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.

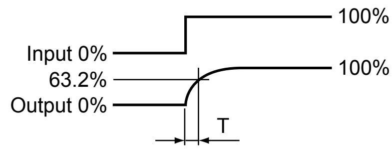
• WX2□-LG First Order Lag Unit

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

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

X: Input, T_S: 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.

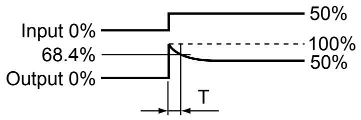
• WX2□-LE First Order Lead Unit

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_S: Time constant, Y: Output

<Example: 0% → 50% step input>

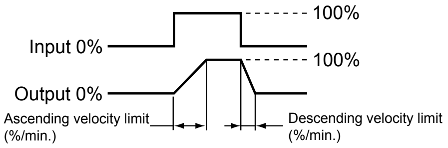


Setting range of time constant: 1.0 to 100.0 sec. (0.010 to 1.000 V); minimum unit is 0.1 sec.
Time constant can be set by the volume of front panel and monitored by check terminal.
Accuracy of time constant setting: (±5.0% of set value) ±1.0 sec.

• WX2□-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) ± 5.0%/min.

• WX2□-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.

• WX2□-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.

• WX2□-AM Analog Memory

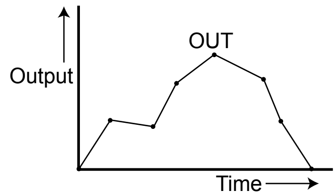
This computing unit holds the output signal (Y) at that time when receiving a voltage signal input from various converters and opening the hold-command input (contact input). If the contact input is closed, it outputs the value corresponding to the input value.

• WX2□-PS Program Setter

This computing unit starts the program when opening the start/reset input (contact input), and outputs the isolated current or voltage signal (Y) internally generated. When closing the 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 sec. ≤ (t_0 to t_{10}) ≤ 7984 sec.
-10.0% ≤ (Y_0 to Y_{10}) ≤ 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_0 to t_{10}
Output breakpoints: Y_0 to Y_{10}
Setting resolution: Time; 8 sec., Outputs; 0.1%

<Example>



Ordering information

•Time table: Write and specify all data of t_0 to t_{10} and Y_0 to Y_{10} 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	

• WX2□-FP Programmable Unit

Receiving a voltage signal input from various converters, this computing unit performs various computations and outputs the isolated current or voltage signal.