

General Specifications

UT35A-L Digital Indicating Controller (Limit Control Type)



GS 05P04D41-01EN

[Style: S6]

Overview

The UT35A-L is a Limit Control Type Digital Indicating Controller that can be configured either as a high limit or as a low limit controller by a user. The UT35A-L complies with FM approval.

The UT35A-L features universal input, three alarm outputs, retransmission output, a timer to count the total time the setpoint is exceeded, and a register to retain the maximum temperature reached. The UT35A-L controller employs an easy-to-read, 14-segment large color LCD display, along with navigation keys, thus greatly increasing the monitoring and operating capabilities. The short depth of the controller helps save instrument panel space. The UT35A-L also supports RS-485 and Ethernet communication.



Features

- A 14-segment, active (PV display color changing function) color LCD display is employed. Two five-digit, high-resolution displays are possible. Alphabet letters can be displayed in an easy-to-read manner. The guide display shows parameter names.
- Easy to operate
Navigation keys (SET/ENTER and Up/Down/Left/Right arrow keys) are employed to facilitate making settings.
- 65 mm depth
The small depth enables the mounting in a thin and small instrumented panel.
- Quick setting function
Setting only the minimum necessary parameters for operation is possible.

Functional Specifications

Limit Control Function

Setpoint : 1

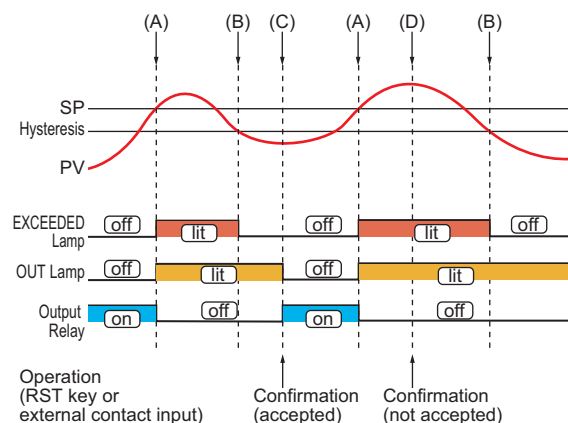
Control type : high limit or low limit

Limit action : latching

High Limit Control

When PV exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then.

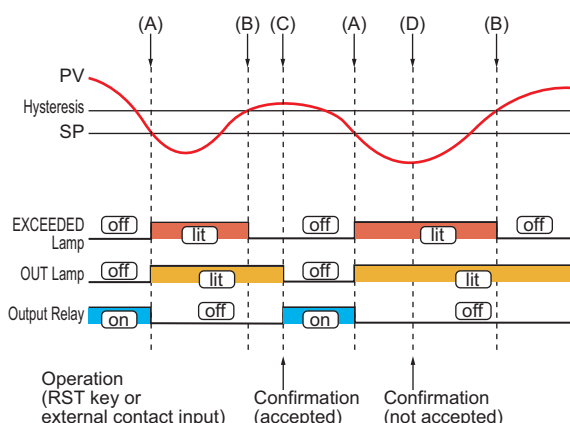
"EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RST" key (or by an external contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever "OUT" lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



Low Limit Control

When PV exceeds a setpoint (SP), "EXCEEDED" lamp lights, and "OUT" lamp turns ON (point A). The limit control output relay is de-energized then.

"EXCEEDED" lamp turns off when PV goes into normal condition, while "OUT" lamp stays on as it is (point B). "OUT" lamp turns off when a confirming operation is done by an operator (point C). The way to confirm is pushing the "RST" key (or by an external contact, according to the setting of setup parameter CNF). The confirming operation is not accepted during PV exceeds SP (point D). State of output relay is de-energized whenever "OUT" lamp is on. (NC terminal: CLOSE, NO terminal: OPEN)



Control Computation Function

Alarm Functions

- Types of Alarm

Measured value alarm	PV (measured value) high/low limit alarm
Deviation alarm	Deviation high/low limit alarm
Rate-of-change alarm	Deviation high and low limits alarm Deviation within high and low limits alarm PV rate-of-change alarm
Other alarms	Self-diagnosis alarm FAIL

- Alarm Functions

Alarm output action	Alarm stand-by action Alarm latch (forced reset) function Alarm hysteresis Alarm ON/OFF delay timer
Number of alarm settings	3
Number of alarm output points	3

Contact I/O Function

This function allows for allocating the input error condition, operation condition, alarm condition or other conditions to the contact input and contact output.

Contact input	Limit output confirmation (RESET) (DI1 fixed)
	Alarm Latch release
	PV red/white switching
	LCD backlight ON/OFF switching
Contact output	Message interrupt displays 1 through 4
	Alarms 1 through 3

Communication Function

	Function	Method	Interface	Targets	Max connection	Communication Data
Modbus/TCP	A standard industry protocol allowing communications between the controller and devices such as PCs, PLCs, and DCSs.	Server	Ethernet	PLC and others	2 connections	PV, SP, ALM, etc
		Gateway	Ethernet +RS-485	RS-485: UT55A/UT52A/ UT35A/UT32A/ UP55A/UP35A/ UM33A (*1)	31 units	
Slave		RS-485	PLC and others, UT55A/UT52A/ UT35A/UT32A/ UP55A/UP35A/ UM33A (*2)	31 units		
Slave		RS-485	PC and others, UT55A/UT52A/ UT35A/UT32A/ UP55A/UP35A/ UM33A(*2)	31 units		
Modbus (RTU/ASCII)						
PC link	The proprietary Yokogawa protocol allowing communications to PCs, PLCs and touch panels.					
Ladder	A protocol to communicate to PLCs.					

*1: UT digital indicating controller, Signal conditioner JUXTA, Power monitor POWERCERT can be connected.
*2: UT digital indicating controllers can be connected.

Physical interface

Ethernet Standard : IEEE802.3 (10BASE-T, 100BASE-TX)
Max segment length : 100m

RS-485 Max. Connecting Configuration : Cascade Max. 4 level (10BASE-T), Max. 2 level (100BASE-TX)
Standard : EIA RS-485
Communication method : Two-wire half-duplex or four-wire half-duplex, start-stop synchronization, and non-procedural
Baud rate : 600,1200,2400,4800,9600,19200 or 38400 bps
Maximum communication distance : 1200 m
Terminating resistor : 220Ω (External)

■ Hardware Specifications

Display Specifications

- PV display
5-digit, 14-segment active color LCD (white/red)
Character height: 21.5 mm
- Data display
5-digit, 11-segment color LCD (orange)

Universal Input Specifications

- Number of input points: 1
- Types of input, instrument range, and measurement accuracy (see the table below)

Types of input	Instrument range		Accuracy	
	°C	°F		
Thermocouple	K	-270.0 to 1370.0°C	-450.0 to 2500.0°F	±0.1% of instrument range ±1 digit for 0°C or more
		-270.0 to 1000.0°C	-450.0 to 2300.0°F	
	J	-200.0 to 500.0°C	-200.0 to 1000.0°F	±0.2% of instrument range ±1 digit for less than 0°C
		-200.0 to 1200.0°C	-300.0 to 2300.0°F	
	T	-270.0 to 400.0°C	-450.0 to 750.0°F	However, ±2% of instrument range ±1 digit for less than -200°C of thermocouple K ±1% of instrument range ±1 digit for less than -200°C of thermocouple T
		0.0 to 400.0°C	-200.0 to 750.0°F	
	B	0.0 to 1800.0°C	32 to 3300°F	±0.15% of instrument range ±1 digit for 400°C or more ±5% of instrument range ±1 digit for less than 400°C
	S	0.0 to 1700.0°C	32 to 3100°F	±0.15% of instrument range ±1 digit
	R	0.0 to 1700.0°C	32 to 3100°F	
	N	-200.0 to 1300.0°C	-300.0 to 2400.0°F	±0.1% of instrument range ±1 digit ±0.25% of instrument range ±1 digit for less than 0°C
	E	-270.0 to 1000.0°C	-450.0 to 1800.0°F	±0.1% of instrument range ±1 digit for 0°C or more
	L	-200.0 to 900.0°C	-300.0 to 1600.0°F	
	U	-200.0 to 400.0°C	-300.0 to 750.0°F	±0.2% of instrument range ±1 digit for less than 0°C However, ±1.5% of instrument range ±1 digit for less than -200.0°C of thermocouple E
		0.0 to 400.0°C	-200.0 to 1000.0°F	
	W (*2)	0.0 to 2300.0°C	32 to 4200°F	±0.2% of instrument range ±1 digit
	Platinel 2	0.0 to 1390.0°C	32.0 to 2500.0°F	±0.1% of instrument range ±1 digit
PR20-40	0.0 to 1900.0°C	32 to 3400°F	±0.5% of instrument range ±1 digit for 800°C or more Accuracy not guaranteed for less than 800°C	
W97 Re3-W75 Re25	0.0 to 2000.0°C	32 to 3600°F	±0.2% of instrument range ±1 digit	
Resistance-temperature detector (RTD) 3-wire	JPt100	-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit (*1)
		-150.00 to 150.00°C	-200.0 to 300.0°F	±0.1% of instrument range ±1 digit
	Pt100	-200.0 to 850.0°C	-300.0 to 1560.0°F	±0.1% of instrument range ±1 digit (*1)
		-200.0 to 500.0°C	-300.0 to 1000.0°F	±0.1% of instrument range ±1 digit
Standard signal	0.400 to 2.0000 V		±0.1% of instrument range ±1 digit	
	1.000 to 5.000 V			
DC voltage	4.00 to 20.00 mA			
	0.000 to 2.000 V			
DC current	0.00 to 10.00 V			
	-10.00 to 20.00 mV			
	0.00 to 20.00 mA			

The accuracy is that in the standard operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz.

- *1: ±0.3°C and ±1 digit in the range between 0 and 100°C
±0.5°C ±1 digit in the range between -100 and 200°C
- *2: W-5% Re/W-26% Re (Hoskins Mfg.Co.), ASTM E988
- Applicable standards: JIS, IEC and DIN (ITS-90) for thermocouples and resistance-temperature detectors (RTD)
- Input sampling period: Synchronized to control period
- Burnout detection
Upscale and downscale of function, and OFF can be specified for the standard signal of thermocouple and resistance-temperature detector (RTD).
For integrated signal input, 0.1 V or 0.4 mA or less is judged as a burnout.
- Input bias current: 0.05 µA (for thermocouple and resistance-temperature detector (RTD))
- Resistance-temperature detector (RTD) measured current: About 0.16 mA
- Input resistance
1 MΩ or more for thermocouple/mV input
About 1 MΩ for voltage input
About 250 Ω for current input (with built-in shunt resistance)
- Allowable signal source resistance
250 Ω or less for thermocouple/mV input
Effect of signal source resistance: 0.1 µV/Ω or less
2 kΩ or less for DC voltage input
Effect of signal source resistance: about 0.01%/100 Ω
- Allowable wiring resistance
Up to 150 Ω per line for resistance-temperature detector (RTD) input (conductor resistance between the three lines shall be equal)
Effect of wiring resistance: ±0.1°C/10 Ω
- Allowable input voltage/current
±10 V DC for thermocouple/mV/mA or resistance-temperature detector (RTD) input
±20 V DC for V input
±40 mA DC for mA input
- Noise reduction ratio
40 dB or more (at 50/60 Hz) in normal mode
120 dB or more (at 50/60 Hz) in common mode
- Reference junction compensation error
±1.0°C (15 to 35°C)
±1.5°C (-10 to 5°C and 35 to 50°C)

Relay Contact Output Specifications

- Types of contact and number of points
Limit control relay output: one 1 c-contact point
Alarm output: 3 1a-contact points (Common is separated)
- Contact rating
1c-contact: 3 A at 250 V AC or 3 A at 30 V DC (resistance load)
1a-contact: 1 A at 240 V AC or 1 A at 30 V DC (resistance load)
- *: This cannot be used for a small load of 10 mA or less.
- Application: alarm output, FAIL output, etc.
- Time resolution for limit control output: 10 ms or 0.1% of output value, whichever is larger

Step Response Time Specifications

1 s

(Response time at 63% of transmission output when a change is made stepwise in the range between 10 and 90% of input span)

Retransmission Output Specifications

- Number of points: 1 point
- Output function: current output
4 to 20 mA DC or 0 to 20 mA DC/load resistance 600 Ω or less
- Current output accuracy: ±0.1% of span (however, ±5% of span for 1 mA or less)
The accuracy is that in the basic operating conditions: 23 ±2°C, 55 ±10%RH, and power frequency at 50/60 Hz

Contact Input Specifications

- Number of points: 2 points
- Input type: no-voltage contact input or transistor contact input
- Input contact capacity: 12 V DC, 10 mA or more
Be sure to use a contact with a minimum ON current of 1 mA or more
- ON/OFF detection
No-voltage contact input:
Contact resistance 1 kΩ or less in ON state
Contact resistance 50 kΩ or more in OFF state
Transistor contact input:
2 V or less in ON state
Leak current 100 μA or less in OFF state
- Status detection minimum hold time: 250 ms
- Application: Confirmation operation, etc.

Safety and EMC Standards

- Safety:
Compliant with IEC/EN61010-1 (CE), approved by CAN/CSA C22.2 No. 61010-1 (CSA), UL61010-1. Certified for FM-3810 and FM-3545.
Installation category: CAT. II
Pollution degree: 2
Measurement category: I (CAT. I)
Rated measurement input voltage: Max. 10 V DC
Rated transient overvoltage: 1500 V (*)
*: This is a reference safety standard value for measurement category I of IEC/EN/CSA/UL61010-1. This value is not necessarily a guarantee of instrument performance.
- EMC standards:
Compliant with
CE marking
EN 61326-1 Class A, Table 2 (For use in industrial locations),
EN 61326-2-3
EN 55011 Class A, Group 1
EN 61000-3-2 Class A
EN 61000-3-3
C-tick mark
EN 55011 Class A, Group 1
The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
- RoHS regulation: Compliant

Power Supply Specifications and Isolation

- Power supply
Rated voltage: 100 to 240 V AC (+10%/-15%), 50/60 Hz
24 V AC/DC (+10%/-15%) (When the /DC option is specified)
- Power consumption: 18 VA (For the /DC option.
DC: 9 VA, AC: 14 VA)
- Storage: Nonvolatile memory
- Allowable power interruption time: 20 ms (at 100 V AC)
- Withstanding voltage

2300 V AC for 1 minute between primary and secondary terminals
1500 V AC for 1 minute between primary terminals
500 V AC for 1 minute between secondary terminals
(Primary terminals = Power (*) and relay output terminals, Secondary terminals = Analog I/O signal terminals, contact input terminals, communication terminals, and functional grounding terminals.)

*: Power terminals for 24 V AC/DC models are the secondary terminals.

- Insulation resistance
Between power supply terminals and a grounding terminal: 20 MΩ or more at 500 V DC
- Isolation specifications

PV (universal) input terminals	Internal circuits	Power supply
Retransmission (analog) output terminals		
Control relay (c-contact) output terminals		
Alarm-1 relay (a-contact) output terminals		
Alarm-2 relay (a-contact) output terminals		
Alarm-3 relay (a-contact) output terminals		
Contact input terminals		
RS485 communication terminals		
Ethernet communication terminal		

The circuits divided by lines are insulated mutually.

Environmental Conditions

Normal operating conditions

- Ambient temperature: -10 to 50°C (-10 to 40°C for side-by-side mounting of controllers)
- Ambient humidity: 20 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less
- Continuous vibration (at 5 to 9 Hz) Half amplitude of 1.5 mm or less
(at 9 to 150 Hz) 4.9 m/s² or less, 1 oct/min for 90 minutes each in the three axis directions
- Rapid vibration: 14.7 m/s², 15 s or less
- Impact: 98 m/s² or less, 11 msec.
- Installation altitude: 2,000 m or less above sea level
- Warm-up time: 30 minutes or more after the power is turned on
- Start-up time within 10 s

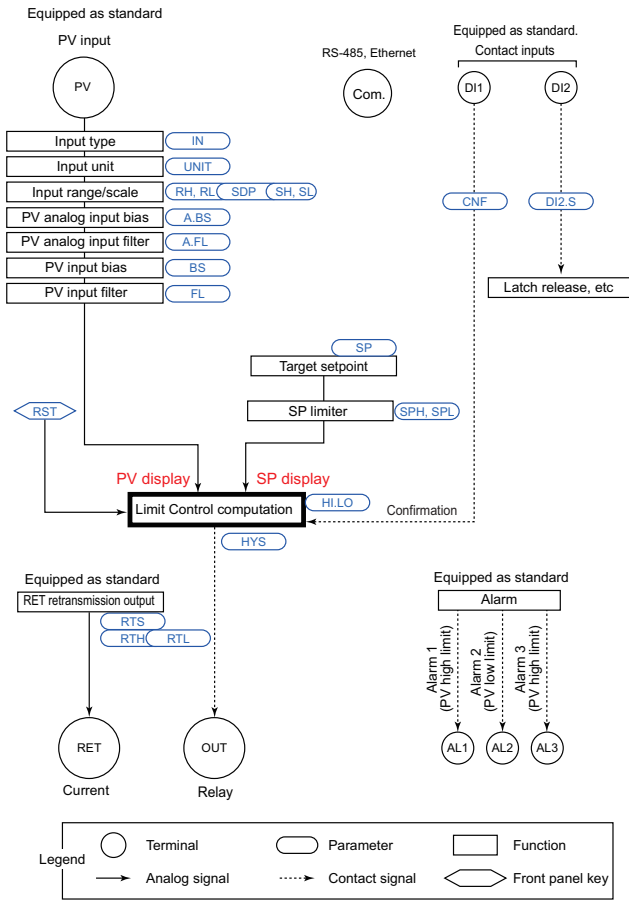
Transportation and Storage Conditions

- Temperature: -25 to 70°C
- Temperature change rate: 20°C per hour or less
- Humidity: 5 to 95%RH (no condensation)

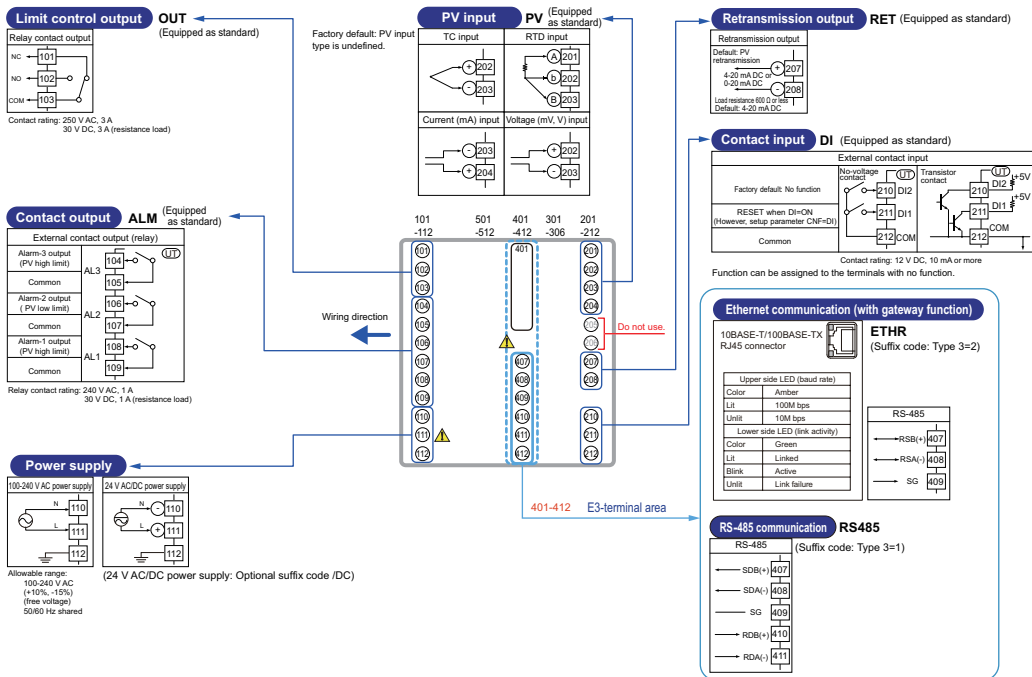
Effects of Operating Conditions

- Effect of ambient temperature
For voltage or TC input:
±1 μV/°C or ±0.01% of F.S. (instrument range)/°C, whichever is greater
For RTD input:
±0.05°C/°C (ambient temperature) or less
For current input:
±0.01% of F.S. (instrument range)/°C
For analog output:
±0.02% of F.S./°C or less
- Effect of power supply fluctuation:
For analog input: ±0.05% of F.S. (instrument range) or less
For analog output: ±0.05% of F.S. or less
(Each within rated voltage range)

■ Block Diagram



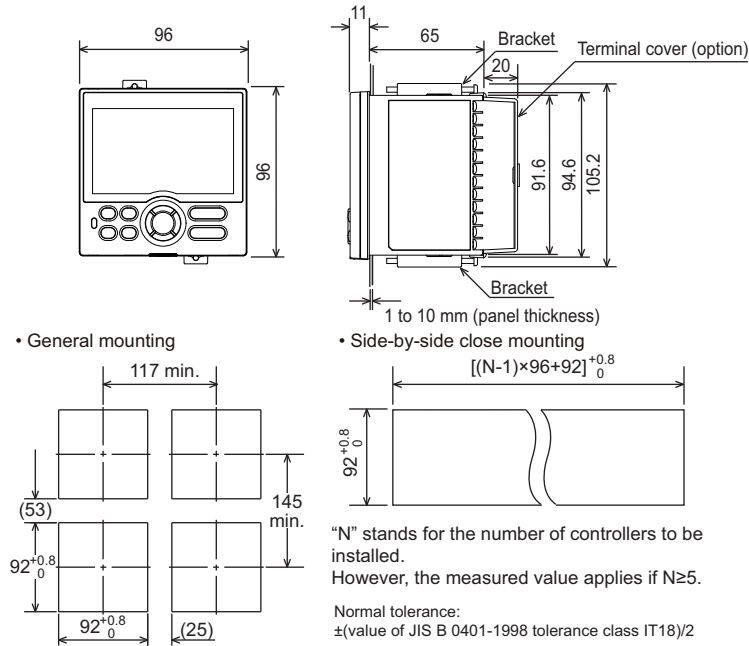
■ Terminal Arrangement



External Dimensions and Panel Cutout Dimensions

UT35A-L

Unit: mm



Construction, Mounting, and Wiring

- Degree of protection provided by Enclosure: IP66 (for front panel) (Not available for side-by-side close mounting.)
- Material: Polycarbonate resin (Flame retardancy: UL94 V-0)
- Case color: Light gray or Light charcoal gray
- Weight: 0.5 kg or less
- External dimensions (mm): 96 (width) x 96 (height) x 65 (depth from the panel surface)
- Mounting: Direct panel mounting; mounting bracket, one each for upper and lower mounting
- Panel cutout dimensions (mm): 92^{+0.8/0} (width) x 92^{+0.8/0} (height)
- Mounting position: Up to 30 degrees above the horizontal. No downward tilting allowed.
- Wiring: M3 screw terminal with square washer (signal wiring and power)

Model and Suffix Code

Model	Suffix code	Optional suffix code	Description
UT35A			Digital Indicating Controller (provided with retransmission output, 2 DIs, and 3 DOs) (Power supply: 100-240 V AC)
Type 1: Basic control	-L		Limit control type
Type 2: Functions	0		Always "0"
Type 3: Open networks	0 1 2		None RS-485 communication (Max.38.4 kbps, 2-wire/4-wire) Ethernet communication (with serial gateway function)
Display language	-1		English
Case color	0 1		White (Light gray) Black (Light charcoal gray)
Fixed code		-00	Always "-00"
Optional suffix codes		/DC	Power supply 24 V AC/DC

Items to be specified when ordering

Model and suffix codes, whether User's Manual and QIC required.

Standard accessories

Brackets (mounting hardware), Unit label, Operation Guide

Accessory

Name	Model	Description
Terminal cover	UTAP001	
User's Manual (CD-ROM)	UTAP003	

Special Order Items

Model code	Suffix code	Description
LL50A	-00	Parameter Setting Software