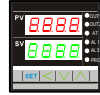


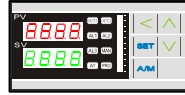
User's Manual

Linking Digital Controller

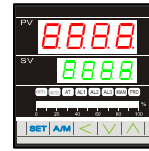
LT400/600/700/800/900



LT400



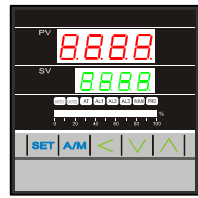
LT600



LT700



LT800



LT900

1 Notice

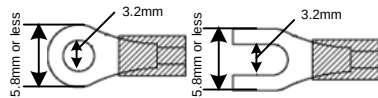
Please confirm the specification of controllers is to totally with your requirement before using it, also read this user's manual in detail.

⚠ Danger

1. Danger! Electric Shock!
DON'T touch AC power wiring terminal when controller has been powered!
Keep the power off until all of the wiring are completed!

⚠ Warning

1. Please confirm the AC power wiring to controller is correct, otherwise it would be caused aggravated damage on controller. (LT400 connecting with Pin 1 and 6, LT600/700/800/900 with Pin 1 and 2).
2. Be sure to use the rated power supply (AC85~265V or DC24V), otherwise it would be caused aggravated damage on controller.
3. Please confirm wires are connected with correct terminal (Input, Output).
4. Use M3 screw-compatible crimp-on terminals with an insulation sleeve, as shown below



Torque : 0.4 N.m (4kgf.cm)

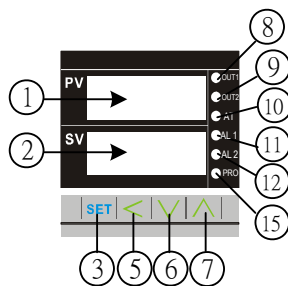
5. Avoid to install controller in following spaces :
I. A place where the ambient temperature may reach beyond the range from 0 to 50°C
II. A place where the ambient humidity may reach beyond the range from 50 to 85% RH.
III. A place where the the controller likely to come into contact with water ,oil , chemicals ,steam and vapor.
IV. A place where the controller is subject to interface with static electricity ,magnetism and noise.
6. For thermocouple(TC) input ,use shield compensating lead wire.
7. For RTD input ,use shield wires which have low resistance and no resistance difference between the 3 wires.

2 External Dimension and Panel Cutout < Unit : mm >

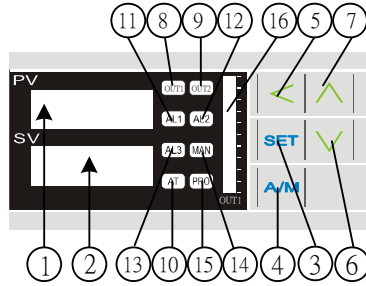
LT400			
LT600			
LT700			
LT800			
LT900			

3 Parts Description

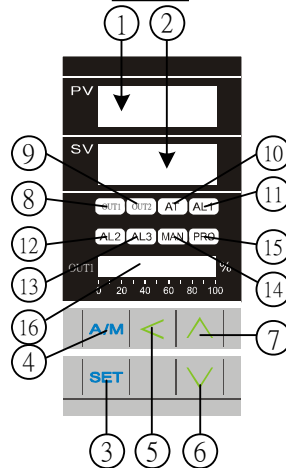
LT400



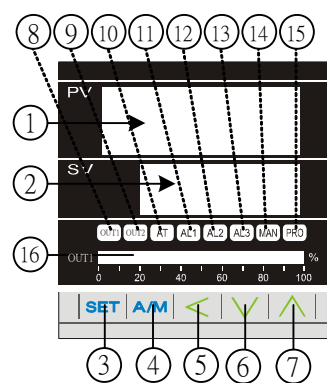
LT600



LT800



LT700/LT900

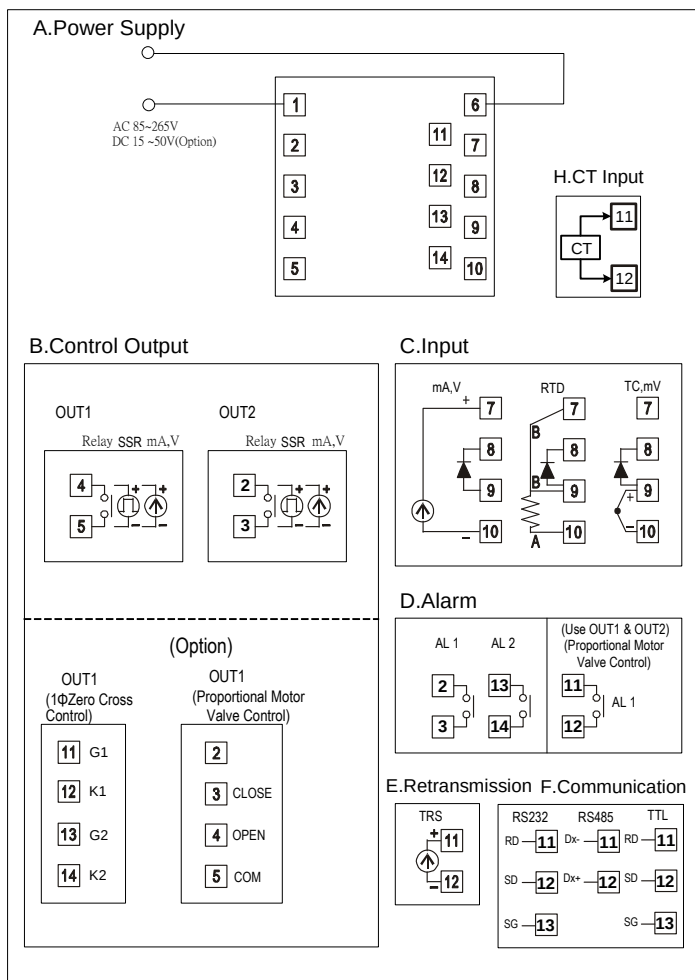


SYMBOL	NAME	FUNCTION
PV ①	Measured value (PV) display	Displays PV or various parameter symbols (Red)
SV ②	Setting value (SV) display	Displays SV or various parameter set values (Green)
SET ③	Set key	Used for parameter calling up and set value registration
A/M ④	Auto/Manual key	Switches between Auto(PID) output mode and Manual output
< ⑤	Shift key	Shift digits when settings are changed
V ⑥	Down key (*Program Hold)	Decrease numbers (*Only for programmable controller)
^ ⑦	Up key (*Program Run)	Increase numbers (*Only for programmable controller)

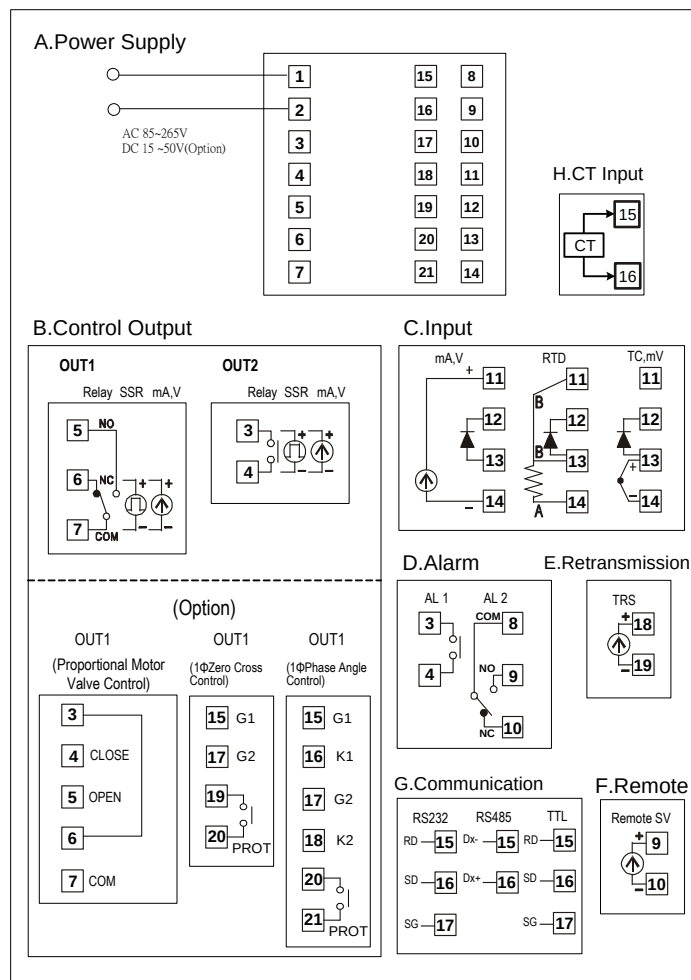
SYMBOL	NAME	FUNCTION
OUT1 ⑧	OUT1 lamp	Lights when OUT1 is on (Green)
OUT2 ⑨	OUT2 lamp	Lights when OUT2 is on (Green)
AT ⑩	Autotuning lamp	Lights when Autotuning is activated (Orange)
AL1 ⑪	Alarm 1 lamp	Lights when Alarm 1 is activated (Red)
AL2 ⑫	Alarm 2 lamp	Lights when Alarm 2 is activated (Red)
AL3 ⑬	Alarm 3 lamp	Lights when Alarm 3 is activated (Red)
MAN ⑭	Manual output lamp	Lights when manual output is activated (Red)
PRO ⑮	*Program Running lamp	*Flashes when program running (Only for programmable controller)
OUT1% ⑯	Output% Bar-Graph display	Output% is displayed on 10-dot LEDs

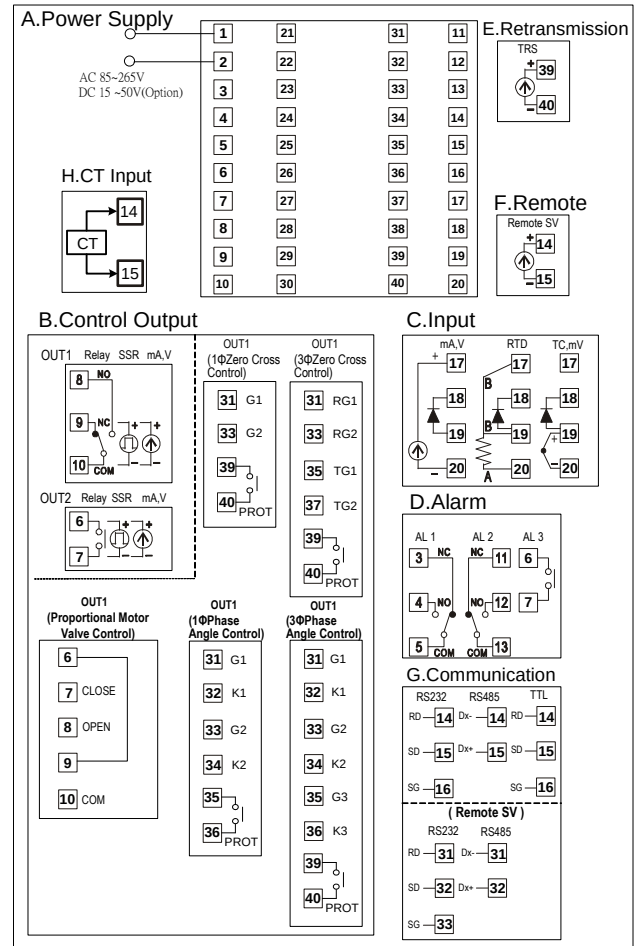
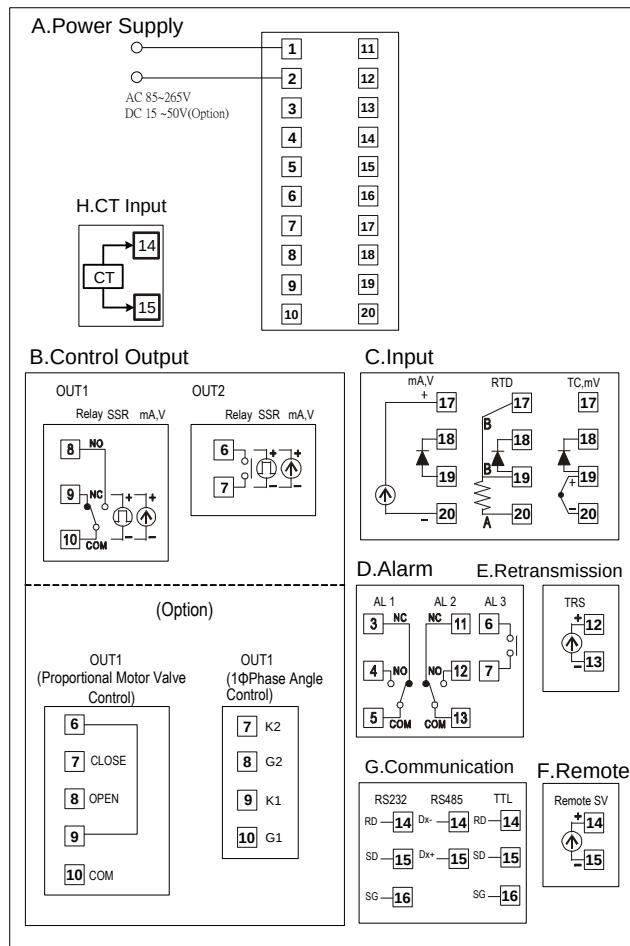
4 Terminal Arrangement

LT400



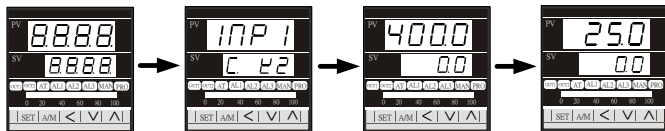
LT700





5 Operations

1. Power ON: Controller will display as following



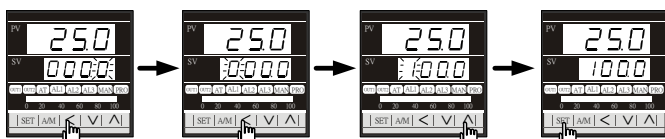
Light all LEDs and all 7 segment displays

Display input type

Display range (0.0 ~ 400.0)

Ready for use

2. Change the Set Value(SV): Change SV from 0.0 to 100.0



Press $\leftarrow$ Key
The SV number started to flash. The flashing digit indicates which digit can be set.

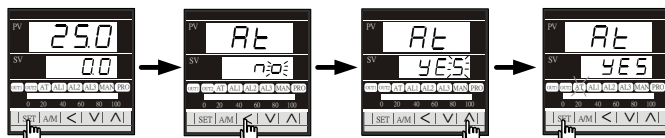
Press $\leftarrow$ Key
To select the hundreds digit. To change the number to 1.

Press Δ Key
To change the number to 1.

Press SET Key
To store the new set value.

3. Autotuning (AT):

Use AT function to automatically calculate and set the optimize PID value for your system.



Press SET Key
To display parameter AT.

Press $\leftarrow$ Key
To change AT setting.

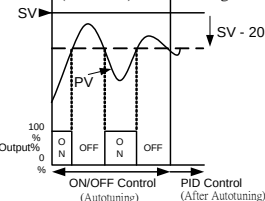
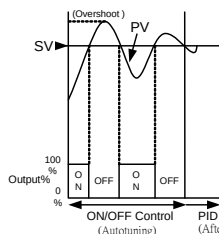
Press Δ Key
Change AT to "YES"

Press SET Key
Start Autotuning process (AT lamp will be lighted on)

Autotuning
ATVL=0

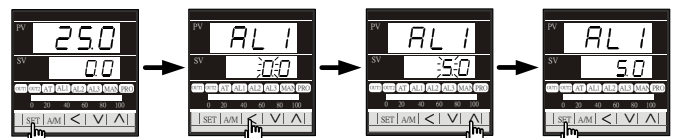
Autotuning
ATVL=20

*Set ATVL to prevent overshoot occurred during autotuning process.
To set ATVL, press SET key for 5 seconds to enter Level 2 (PID Level) and then change the value.



4. Change the Alarm value:

Change AL1 value to "5.0" (AL1 active, if PV exceeds SV over 5.0)



Press SET Key
To display parameter AL1

Press $\leftarrow$ Key
To change AL1 value

Press Δ Key
Increase AL1 value

Press SET Key
Store the new value of AL1

* There are total 16 alarm mode types, referenced as below:

* To change Alarm mode, press $\text{SET} + \leftarrow$ key 5 seconds to enter Level 3 (Input Level) and then change the value of ALD1/ALD2/ALD3.

5. Alarm mode type (Referenced for ALD1/ALD2/ALD3)

($\blacktriangle$:SV $\triangle$:Alarm set value)

01	Deviation high alarm with hold action*	04	Band alarm	07	Segment End alarm (Only for Programmable controller)
11	Deviation high alarm	05	Process high alarm with hold action*	17	Program Run alarm (Only for Programmable controller)
02	Deviation low alarm with hold action*	15	Process high alarm	08	System failed alarm* (ON)
12	Deviation low alarm	06	Process low alarm with hold action*	18	System failed alarm* (OFF)
03	Deviation high/low alarm with hold action*	16	Process low alarm	09	Heater Break Alarm (HBA)
13	Deviation high/low alarm			00	No alarm

*Hold action:

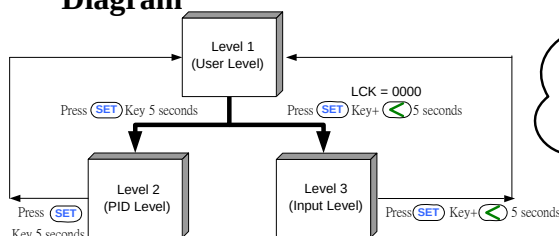
When Hold action is ON, the alarm action is suppressed at start-up until the measured value(PV) enters the non-alarm range.

*System failed:

It means that the controller display error message with one of the following: "UUU1" or "NNN1" or "CJCE"

6 Parameter List

Levels Diagram



* The controller returns to Level 1 if there is no key operation within 60 seconds.

* In any Level ,press **A/M** key twice will return to Level 1.

Level 2 (PID Level)

Parameter	Description
Default Value	

Level 1 (User Level)

Parameter	Set Value	Parameter	Set Value	Parameter	Set Value
Process Value	P''	Derivative time 1	d 1	Range :	0~900 seconds
Set Value	5.2	(For output 1)	6.0	PI control if set to 0	
Output Limit	OUTL	Dead-band time	db 1	Don't care	
	1000		0		
Autotuning	At	Auto tuning offset value	At'' 1	Range :	0~USPL
	455/100		0		
Alarm 1 set value	AL 1	Output 1 cycle time	CYt 1	Range :	0~150 seconds
	00		10	Relay output :	10
Heater current display (HBA set value)	c 00	Hysteresis for output 1 ON/OFF control	HYS 1	Voltage pulse output :	1 , mA output: 0
	00		1	Range :	0~1000
Alarm 2 set value	AL 2	Proportional band 2 (For output 2)	P 2	The same with P1	
	00		3.0		
Alarm 3 set value	AL 3	Integral time 2 (For output 2)	i 2	The same with I1	
	00		240		
		Derivative time 2 (For output 2)	d 2	The same with D1	
			6.0		
		Output 2 Cycle time	CYt 2	The same with CYT1	
			10		
		Hysteresis for output 2 ON/OFF control	HYS 2	The same with HYS1	
			1		
		Control gap 1 (For output 1)	GAP 1	Set point of output 1 (Heating side) =SV - GAP1	
			0		
		Control gap 2 (For output 2)	GAP 2	Set point of output 2 (Cooling side) =SV + GAP2	
			0		
		Function lock	L C L		
			0000		

LCK	Levels entering available			Parameters which can be changed
	Level 1 (User Level)	Level 2 (PID Level)	Level 3 (Input Level)	
0000				All parameters (Factory set value)
1111			-----	All parameters
0100			-----	All parameters except Level 3
0110			-----	Parameters in Level 1
0001			-----	SV" and "LCK"
0101			-----	Only "LCK"

7 Error Displays

IN IE	INIE : Input 1 Error
CJCE	CJCE :Cold Junction Compensation Failed
UUU 1	UUU1 : PV is above USPL
NNN 1	NNN1 : PV is below LSPL
ADCF	ADCF :A/D Convert Failed
RAMF	RAMF :RAM Failed

Level 3 (Input Level)

Parameter	Initial Value	Range	Unit
INP1	2		
Set			
ANLI	0		
Set			
ANHI	5000		
Set			
dP	0000		
Set			
LSPL	0.0		
Set			
USPL	400.0		
Set			
RI L2	0		
Set			
RI H2	5000		
Set			
RI d1	11		
Set			
RI t1	99.59		
Set			
RI d2	0		
Set			
RI t2	99.59		
Set			
RI d3	0		
Set			
RI t3	99.59		
Set			
HYSR	0.0		
Set			
CLD1	230		
Set			
CHO1	3600		
Set			
CLD2	230		
Set			
CHO2	3600		
Set			
CLD3	0		
Set			
CHO3	5000		
Set			
rULCY	5		
Set			
CRt	0.0		
Set			
SEtR	0000		
Set			
PSL	rtu		
Set			
bLS	a-81		
Set			
Idn	1		
Set			
BRd	384		
Set			
SVDS	0.0		
Set			
PVDS	0.0		
Set			
UNt	C		
Set			
PVFE	200		
Set			
CRSC	0.0		
Set			
OUd	HEAt		
Set			
OPRd	P		
Set			
H=	60Hz		
Set			

Return to "INP1"

8 Specifications

Standard Spec.

Model	LT400	LT600	LT700	LT800	LT900
Dimension	48X48mm	96X48mm	72X72mm	48X96mm	96X96mm
Supply voltage	AC 85~265V , DC24V (Optional)				
Frequency	50/60 HZ				
Power Consumption	approx 3VA	approx 4VA	approx 3VA	approx 4VA	approx 4VA
Memory	Non-volatile memory E ² PROM				
Input	Measurement input. Sample time : 250ms,0.2% of FS				
	TC	K , J , R , S , B , E , N , T , W , PL2 , U , L			
	RTD	PT100 , JPT100 , JPT50			
	mA dc	4~20mA , 0~20mA			
	Voltage dc	0~1V , 0~5V , 0~10V , 1~5V , 2~10V , -10~10mV , 0~10mV , 0~20mV , 0~50mV , 10~50mV			
	DP Position	0000 , 000.0 , 00.00 , 0.000 (available for mA or Voltage dc input)			
Output 1	Main control output				
	Relay	SPST type	SPDT type	SPDT type	SPDT type
		3A , 220V , electrical life : 100,000 times or more(under the rated load).			
	Voltage Pulse	For SSR drive. ON:24V , OFF:0V , maximum load current:20mA.			
	mA dc	4~20mA , 0~20mA .Maximum load resistance:560 Ω			
	Voltage dc	0~5V , 0~10V ,1~5V ,2~10V. Maximum load current:20mA.			
Alarm 1	SPST type	SPDT type	SPST type	SPDT type	SPDT type
	A , 220V , electrical life : 100,000 times or more(under the rated load).				
Control algorithms	PID , P , PI , PD , ON/OFF(P=0) , FUZZY				
PID range	P:0~200% , I:0~3600 Secs , D:0~900 Secs				
Isolation	Output terminal (control output , alarm ,transmission) and Input terminal are isolated separately.				
Isolated resistance	10M Ω or more between input terminals and case(ground) at DC 500V ,10M Ω or more between output terminals and case(ground) at DC 500V				
Dielectric strength	1000V AC for 1 minute between input terminals and case(ground) , 1500V AC for 1 minute between output terminals and case(ground)				
Operating temperature	0~50℃				
Humidity range	20~90% RH				
Weight	LT400 approx 150g ,LT600/700/800 approx 225g , LT900 approx 300g.				
Display Height	PV:7mm SV:7mm	PV:7mm SV:7mm	PV:14mm SV:10mm	PV:7mm SV:7mm	PV:14mm SV:10mm

Optional Spec.

Model	LT400	LT600	LT700	LT800	LT900
Programmable RAMP/SOAK	2 Patterns with 8 segments each . The 2 patterns can be linked together as 16 segments use.				
Output 2	For heating and cooling control use. Relay , SSR , 4~20mA , 0~20mA , 0~5V , 0~10V , 1~5V , 2~10V				
Alarm 2	SPST type	SPDT type	SPDT type	SPDT type	SPDT type
	3A , 220V , electrical life : 100,000 times or more(under the rated load).				
Alarm 3	Not available	Available	Available	Available	Available
		SPST type	SPST type	SPST type	SPST type
	3A , 220V , electrical life : 100,000 times or more(under the rated load).				
Heater Break Alarm (HBA)	Display range of heater current : 0.0~99.9A , Accuracy : 1%FS				
	Included CT : SC-80-T(5.8mm dia , 0.0~80.0A) or SC-100-T(12mm dia , 0.0~99.9A)				
	Alarm relay : AL1				
Transmission	Available for PV or SV transmission				
	4~20mA , 0~20mA , 0~1V , 0~5V , 0~10V , 1~5V , 2~10V				
Remote SV Input	4~20mA , 0~20mA , 0~1V , 0~5V , 0~10V , 1~5V , 2~10V				
Communication	Protocol : MODBUS RTU , MODBUS ASCII , TAIE				
	RS232 , RS485 , TTL				
	Baud rate: 2400 , 4800 , 9600 , 19200 , 38400 bps				
	Data bits : 8 , Stop bit : 1 or 2bit , Odd or Even parity.				
WaterProof/DustProof	IP65				

9 Order Information

Model & Suffix codes

Model	Output1	Output2	Alarm	TRS	Remote SV	Communi- cation	Input Type	Power	Water/Dust Proof
LT400	1	0	1	0	0	0	02	A	N
LT400 48x48mm	0 None	0 None	0 None	0 None	0 None	0 None	See Input	A AC 85~265V	N None
LT600 96x48mm	1 Relay	1 Relay	1 1 Set	1 4~20mA	1 4~20mA	1 RS232	Codes	D DC 24V	W IP65
LT700 72x72mm	2 Voltage Pulse (SSR Drive)	2 Voltage Pulse (SSR Drive)	2 2 Sets	2 0~20mA	2 0~20mA	2 RS485			
LT800 48x96mm	3 4~20mA	3 4~20mA	3 3 Sets	A 0~5V	A 0~5V	3 TTL			
LT900 96x96mm	4 0~20mA	4 0~20mA		B 0~10V	B 0~10V	A RS232_MODBUS			
(STANDARD)				C 1~5V	C 1~5V	B RS485_MODBUS			
P LT400 48x48mm	A 0~5V	A 0~5V		D 2~10V	D 2~10V				
P LT600 96x48mm	B 0~10V	B 0~10V	A HBA *						
P LT700 72x72mm	C 1~5V	C 1~5V	B HBA + AL2						
P LT800 48x96mm	D 2~10V	D 2~10V	C HBA + AL2+AL3						
P LT900 96x96mm									
(RAMP/SOAK Programmable)									
	5 1 φ SCR ZERO CROSS CONTROL								
	6 3 φ SCR ZERO CROSS CONTROL								
	7 Motor valve control								
	8 1 φ SCR PHASE ANGLE CONTROL								
	9 3 φ SCR PHASE ANGLE CONTROL								

* HBA:Heater Break Alarm(HBA must use AL1 as alarm relay)

* ■ Block means option functions with additional charge

Combination of options and models O Available X Not available

Options	RAMP/SOAK PROGRAM	Output 1					Output2	Alarm2	Alarm3	HBA	TRS	Remote SV	Communication	DC 24V Power
Model		1 φ SCR_Z	3 φ SCR_Z	Motor valve control	1 φ SCR_P	3 φ SCR_P								
LT400	O	O	X	O	X	X	O	O	X	O	O	O	O	O
LT600	O	X	X	O	O	X	O	O	O	O	O	O	O	O
LT700	O	O	X	O	O	X	O	O	O	O	O	O	O	O
LT800	O	X	X	O	O	X	O	O	O	O	O	O	O	O
LT900	O	O	O	O	O	O	O	O	O	O	O	O	O	O

* HBA function and Remote SV function can not be specified in the same model

Input type table

		TYPE	CODE	RANGE	TYPE	CODE	RANGE	TYPE	CODE	RANGE
TC	K	K1	01	0.0~200.0℃(392.0°F)	K2	02	0.0~400.0℃(752.0°F)	K3	03	0~600℃(1112°F)
		K4	04	0~800℃(1472°F)	K5	05	0~1000℃(1832°F)	K6	06	0~1200℃(2192°F)
	J	J1	07	0.0~200.0℃(392.0°F)	J2	08	0.0~400.0℃(752.0°F)	J3	09	0~600℃(1112°F)
		J4	10	0~800℃(1472°F)	J5	11	0~1000℃(1832°F)	J6	12	0~1200℃(2192°F)
	R	R1	13	0~1600℃(2912°F)	R2	14	0~1769℃(3216°F)			
	S	S1	15	0~1600℃(2912°F)	S2	16	0~1769℃(3216°F)			
	B	B1	17	0~1820℃(3308°F)						
	E	E1	18	0~800℃(1472°F)	E2	19	0~1000℃(1832°F)			
	N	N1	20	0~1200℃(2192°F)	N2	21	0~1300℃(2372°F)			
	T	T1	22	0.0~400.0℃(752.0°F)	T2	23	0.0~200.0℃(392.0°F)	T3	24	0.0~350.0℃(662.0°F)
	W	W1	25	0~2000℃(3632°F)	W2	26	0~2320℃(4208°F)			
	PLII	PL1	27	0~1300℃(2372°F)	PL2	28	0~1390℃(2534°F)			
	U	U1	29	-199.9~600.0℃(999.9°F)	U2	30	-199.9~200.0℃(392.0°F)	U3	31	0.0~400.0℃(752.0°F)
L	L1	32	0~400℃(752°F)	L2	33	0~800℃(1472°F)				
RTD	JPT 100	JP1	41	-199.9~600.0℃(999.9°F)	JP2	42	-199.9~400.0℃(752.0°F)	JP3	43	-199.9~200.0℃(392.0°F)
		JP4	44	0~200℃(392°F)	JP5	45	0~400℃(752°F)	JP6	46	0~600.0℃(1112°F)
	PT 100	DP1	47	-199.9~600.0℃(999.9°F)	DP2	48	-199.9~400.0℃(752.0°F)	DP3	49	-199.9~200.0℃(392.0°F)
		DP4	50	0~200℃(392°F)	DP5	51	0~400℃(752°F)	DP6	52	0~600℃(1112°F)
	JPT 50	JP.1	53	-199.9~600.0℃(999.9°F)	JP.2	54	-199.9~400.0℃(752.0°F)	JP.3	55	-199.9~200.0℃(392.0°F)
		JP.4	56	0~200℃(392°F)	JP.5	57	0~400℃(752°F)	JP.6	58	0~600℃(1112°F)

	TYPE	CODE	RANGE
LINEAR	AN1	61	-10~10mV
		62	-2~2V
		63	-5~5V
		64	-10~10V
	AN2	71	0~10mV
	AN3	76	0~20mV
	AN4	81	0~50mV
		82	0~20mA
		83	0~1V
		84	0~5V
		85	0~10V
		86	0~5KR
	AN5	87	0~2V
		91	10~50mV
		92	4~20mA
		93	1~5V
		94	2~10mV