TTM-339

程序控制器

TTM-339 程序控制器

特色

- 0.2 取样时间0.2秒
- 0.3 精度±0.3%（不同输入种类有所差异）
- 4 具4组EVENT功能
- 5 五位数LCD显示
- 99 待机温度可达0~99℃
- 1485 15 Patterns × 99-Steps, 可达1485段

特色说明

- 15 Patterns × 99-Steps，各Patterns可相互连结，多达1485段
- 多种输入（热电偶、电压、电流...等）
- LCD液晶显示萤幕
- 可备份和初始化设定值
- 轻巧的结构，主机深度65mm，突出面板仅2mm，便于安装
- Loader communication function
- 隐藏参数功能
- 可经由手操器设定，减少繁复的设定程序
- 通讯功能
  (RS485: TOHO exclusive protocol / MODBUS)

■标准规格表

输入 (由内码切换设置)	热电偶	K, J, T, E, R, S, B, N, U, L, WRe5-26, PR40-20, PL Ⅱ			
	RTD	Pt100, JPt100 (External resistance10Ω or less per cable, three cables must have the same resistance)			
	电流/电压	4 to 20mADC (Input resistance 250Ω), 0 to 1VDC, 0 to 5VDC, 1 to 5VDC, 0 to 10V DC, 0 to 10mVDC (Input resistance 1MΩ or more)			
指示 (LCD指示)	PV (显示值)	LCD indication (with LED back light, emission colors are Red, Green and Orange), 5 digits, character height 20mm			
	SV (设定值)	LCD indication (with LED back light, emission color is Red), 5digits, character height 8mm			
	状态显示	LCD indication (with LED back light, emission color is Red), 1digit, indication height 8mm			
	模式说明部分	LCD indication (with LED back light, emission color is Green), 2 digits, character height 6mm			
	步骤说明部分	LCD indication (with LED back light, emission color is Green), 2 digits, character height 6mm			
	其他功能指示	LCD indication Red (RUN, OUT, EV1, EV2, EV3, EV4, TS1, TS2, TS3, TS4, TIME, AUTO, MANU, AT, END) Green (PTN, STP)			
控制模式	PID (auto-tuning)	Proportional band (P1, P2, P3)	0.1 to 200.0% of set limiter span (Low/Medium/High temperature)		
		Integration time (I1, I2, I3)	0 to 3600 sec (0: OFF) (Low/Medium/High temperature)		
		Differentiation time (D1, D2, D3)	0 to 3600 sec (0: OFF) (Low/Medium/High temperature)		
		Proportion cycle (T1, T2)	0.1 to 120.0 秒		
	Dead band (DB)	Temperature input	−999.9 ～ 999.9 or− 999~999 (℃)		
		Analog input	−9999 ～ 9999 (digit) (The decimal point position is the specified position.)		
	ON/OFF控制	Sensitivity (C1,C2)	Temperature input	0.0 to 999.9, 0 to 999 (℃)	
			Analog input	0 to 9999 (digit) (The decimal point position is the specified position.)	
		OFF point position selection setting	SV unit setting High/ Medium/Low		
		OFF point position	Temperature input	-999.9 to 999.9, -999 to 999 (℃)	
			Analog input	−9999 to 9999 (digit) (The decimal point position is the specified position.)	
	设定正动作/逆动作	Reverse motion (heating)			
		Normal motion (cooling)			
控制输出	Relay接点(OUT 1 only)	250VAC 3A (Resistance load), 1a contact, minimum load 5V, 100mA			
	SSR驱动电压 (OUT 1, OUT 2 selectable)	0 to 12VDC (Load resistance 600Ω or more), output voltage accuracy ±1V (23℃±10℃), leak current 21μA or less (when output is turned OFF)			
	电流 (OUT 2 only)	4 to 20mADC (Load resistance 600Ω or less), output accuracy FS±3% (23℃±10℃), leak current 21μA or less (when output is turned OFF)			
补助输出	开断集中器(6 points)	26.4VDC 100mA (MAX)			
		Output name TS1 to 4, TIME, EV4			
	Relay接点(4 points)	250VAC 1A (Resistance load) 1a contact			
		Output name EV1 to 3, END			
	设定范围 (Upper and Lower limit)	Temperature input	−1999.9 to 2999.9, −1999 to 2999 (℃)		
			However, thermocouples R, S, B, WRe5-26 and PR40-20 are −1999 to 9999 (℃)		
		Analog input	−19999 to 29999 (digit)		
	灵敏度	Temperature input	0.0 to 999.9, 0 to 999 (℃)		
		Analog input	0 to 9999 (digit)		
	极性设置	Normal open, Normal close			
取样时间		0.2 秒			
精确值	热电偶	K, J, T, E, R , B, N, S	Either ±(0.3% +1 digit) of process value or ±2℃ , whichever is bigger (23℃±10℃). However, ±3℃ between −100 to 0℃ , ±4℃ between −200 to −100℃ There is no accuracy specified below 400℃ for B-Thermocouple.		
		U, L	Either ±(0.3% +1 digit) of process value or ±4℃, whichever is bigger. However, ±6℃ for less than 0℃.		
		WRe5-26	Either ±(0.6% +1 digit) of process value or ±4℃, whichever is bigger.		
		PR40-20	±9.4℃±1 digit. There is no accuracy specified below 800℃		
		PL Ⅱ	Either ±(0.3% +1 digit) of process value or ±2℃, whichever is bigger.		
	RTD	Pt100, JPt100	Either ±(0.3% +1 digit) of process value or ±0.9℃, whichever is bigger (23℃±10℃).		
	电流/电压	0 to 1VDC, 0to 5VDC, 1 to 5VDC, 0 to10VDC, 4 to20mADC	±0.3% of FS±1 digit (23℃±10℃)		
		0 to 10mVDC	±0.5% of FS±1 digit (23℃±10℃)		
断电记忆		EEPROM			
电源		100 to 240VAC 50/60Hz (Permissible voltage range is 85 to 110%)			
重量		300g or less			
消费电源		10VA or less			
配件		Instruction manual, metal attachment			
工作环境温度/湿度 (补偿范围)		23℃±10℃ , 45 to 75%RH			
工作环境温度/湿度范围		0 to 50℃ , 20 to 90% RH (No condensation)			
储存环境温度/湿度		−20 to 70℃ (No freezing and condensation), 5 to 95% RH (No condensation)			
功能	标准功能	Pattern numbers	1 to 15		
		Step numbers	1 to 99 (Maximum value changes depending on selected pattern numbers)		
		Wait function setting (1 to 4 common)	Wait zone setting	Temperature input	0.0 to 999.9, 0 to 999 (℃)
				Analog input	0 to 9999 (digit)
			Wait time setting	0 to 99 hrs 59 min	
		End signal ON time	0 to 99 hrs 59 min		
		Time signal function setting (1 to 4 common)	ON delay timer	0 to 99 hrs 59 min	
			OFF delay timer	0 to 99 hrs 59 min	
		PID setting	Memory points 3points (Low/Medium/High temperature)		
		PID range setting	Low temperature (PID No1): [Minimum value of setting temperature range (SLL)] to [Intermediate point 1 (PM1)]		
			Medium temperature (PID No2): [Intermediate point1 (PM1)] to [Intermediate point2 (PM2)]		
			High temperature (PID No3): [Intermediate point2 (PM2)] to [Maximum value of setting temperature range (SLH)]		
		Intermediate point setting	Intermediate point1 setting= [Minimum value of setting temperat ure range] to [Maximum value of setting temperature range-5.0℃]		
			Intermediate point2 setting=[Setting value of intermediate point1] to [Maximum value of setting temperature range]		
		PV start/SV start selection	PV start/SV start switchable		
			Start temperature setting when SV start	Temperature input	SLL to SLH (℃)
				Analog input	SLL to SLH (digit)

■标准规格表

功能	程序规范	输出操作/结束信号输出选择和配置		
		外部驱动信号选择	Internal operation, external operation	
		Temperature range setting for power failure recovery	Temperature input	0.0 to 2999.9, 0 to 2999(℃)
			Analog input	0 to 2999 (digit)
	定时器规格	单位设定	1 min	
		时间设定	0 to 99 hrs 59 min	
		精度	±(0.5% +0.5 sec) of setting time	
	操纵变量	Manipulated variable function selection (MLF)	None, Manipulated variable limiter, manipulated variable current limiter	
		操纵变量上下限	上限 (MLH1 to MLH4)	MLL1 to 100.0(%), MLL2 to 100.0(%)
				MLL3 to 100.0(%), MLL4 to 100.0(%)
			下限 (MLL1 to MLL4)	0.0 to MLL1(%), 0.0 to MLL2(%)
				0.0 to MLL3(%), 0.0 to MLL4(%)
		Manipulated variable change limiter rise	Percentage of rise for manipulated variable	0.0 to 549.0%)(0.0% : function OFF)
			Rise time of manipulated variable	0 to 3600 (sec) (0: function is none)
	设定上下限 (SLL), (SLH)	上限 (SLH)	温度输入	(SLL+5.0) to SV setting range upper limit, (SLL+5) to SV setting range upper limit(℃)
			类比输入	(SLL+50) to SV setting range upper limit (digit)
		下限(SLL)	温度输入	SV setting range lower limit to (SLH-5.0), SV setting range lower limit to (SLH-5)(℃)
			类比输入	SV setting range lower limit to (SLH-50) (digit)
	缩放设置 (Analog input only)	上限(FSH1)	FSL1 to 29999 (digit)	
		下限(FSL1)	−19999 to FSH1 (digit)	
	控制类型 (CNT)	PID 控制 , ON/OFF 控制		
	PV倍数补正(PVG)	0.500 to 2.000 (倍)		
	PV补正 (PVS)	温度输入	−999.9 to 999.9, −999 to 999(℃)	
		类比输入	−9999 to 9999 (digit)	
	输入滤波 (PDF1)	0.0 to 99.9 (秒)		
	Special PV filter setting (PDFS)	0.0 to 99.9 (秒)		
	Anti reset windup	0.0 to 110.0(%) (Function OFF by 110.0% setting)		
	手调复归(PBB)	0.0 to 100.0(%) (−100.0 to 100.0(%) if there is auxiliary control)		
	主要控制回路异常	PV 变异设定	温度输入	0.0 to 999.9, 0 to 999(℃)
			类比输入	0 to 9999 (digit) (The decimal point position is the specified position.)
		时间设定	0 to 3600 (sec)	
	小数点切换(DP)	温度输入	1℃ , 0.1℃	
		类比输入	1/digit, 0.1/digit,0.01/digit, 0.001/digit, 0.0001/digit	
	资料锁定(LOC)	Normal screen, pattern No. setting mode, alarm temperature sett ing mode, PID setting mode, common parameter setting mode (SET1 to 12), setting temperature (all steps at one time), wait function setting (all steps at one time), time signal 1ot 4 function setting (all steps at one time), manipulated variable limiter function setting (all steps at one time), setting time (all steps at one time), end signal ON time		

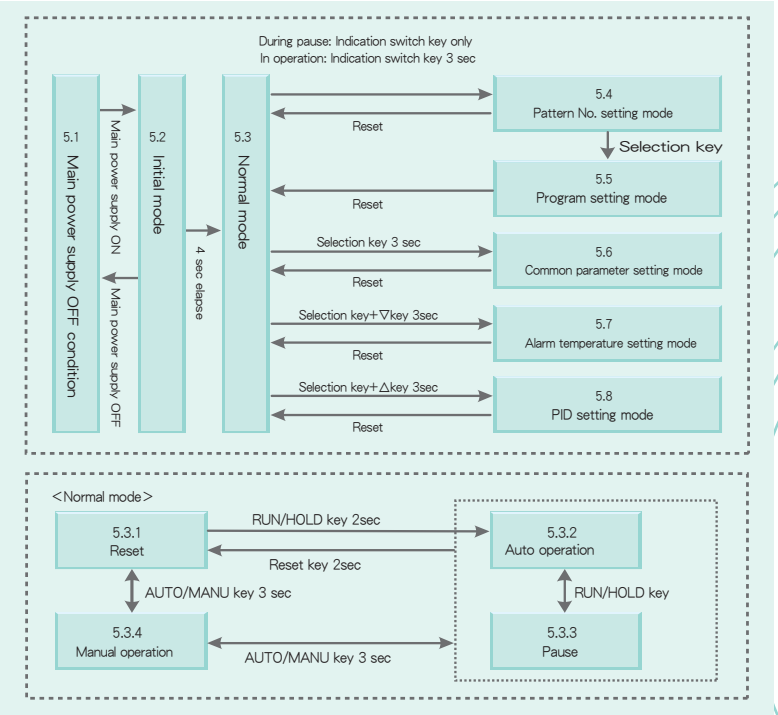
■选用规格表

DI 输入	输入点数	7 点
	输入规格	无电压连接
	功能	Run/Reset, Hold, Step advance, pattern selection
	最小输入时间	200 mS
	ON 电流	Maximum 6 mADC
	OFF 电压	Maximum 6 VDC

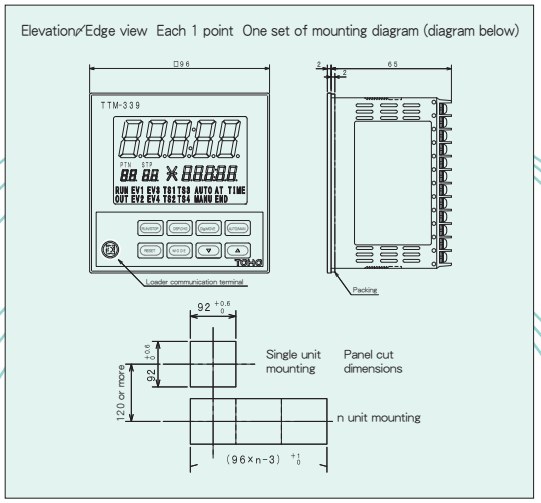
CT 输入	测定点数	1 point
	测量范围	0.0 to 50.0A
	电流范围设定	0.0 to 30.0A
	Setting resolution	0.1A
	精度	±5% of full span (1.0A or less is outside accuracy)
	电流限制设定	Memory points 20 points

		Communication	Loader communication
通讯	通讯标准	RS-485 (1:10) Normal communication, Communication between the main unit and the sub-units. (The main unit-sub unit communication under development)	TTL(1:1)
	通讯终端	RS-485 exclusive terminal	Loader communication exclusive te rminal
	Protocol	TOHO protocol, MODBUS protocol (RTU mode), MODBUS protocol (ASCII mode)	TOHO protocol
	Direction of information	Half duplex	Half duplex
	同步系统	Asynchronous	Asynchronous
	传输代码	ASCII	ASCII
	介面	RS-485 (two lines)	TTL level
	通讯速率	2400/4800/9600/19200/38400 bps	2400/4800/9600/19200/38400 bps
	通讯距离	500 m	
	通讯延迟时间	0 to 250 mS	0 to 250 mS
	通讯开关设定	Write protect, write enable	
	特色	Start bit: 1 bit fixed	Start bit: 1 bit fixed
		Stop bit: 1/2 bit	Stop bit: 1/2 bit
		Data length: 7/8 bit	Data length: 7/8 bit
		MODBUS: ASCII···7 bit fixed	
		MODBUS: RTU···8 bit fixed	
		Parity: None/Odd number/Even number	Parity: None/Odd number/Even number
		BCC check: No/Yes	BCC check: No/Yes
		Address: TOHO 1 to 99 (stations) MODBUS 1 to 247 (stations)	Address: 1 to 99 stations

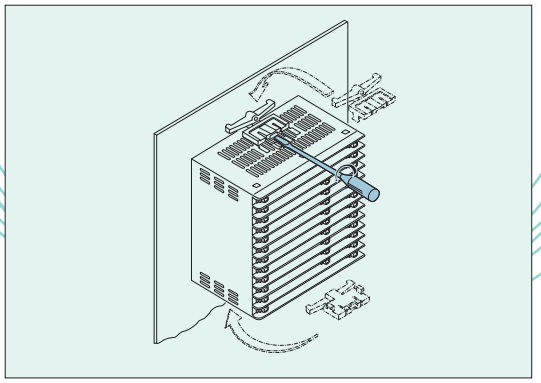
■流程图



■尺寸图



■面板安装



■输入范围

输入种类			测量 /设定范围	Indication resolution
热电偶	K	℃	-200.0to+1372.0	1℃ /0.1℃
	J	℃	-200.0to+1200.0	
	T	℃	-200.0to+400.0	
	E	℃	-200.0to+1000.0	
	R	℃	-50 to+1768	1℃
	S	℃	-50 to+1768	
	B	℃	0 to1800	
	N	℃	-200.0to+1300.0	1℃/0.1℃
	U	℃	-200.0to+400.0	
	L	℃	-200.0to+900.0	
	PR40-20	℃	0 to1880	1℃
	WRe5-26	℃	0 to2300	
	PL II	℃	0.0 to1390.0	1℃/0.1℃
RTD	Pt100	℃	-200.0to+850.0	
	JPt100	℃	-200.0to+510.0	
电压	0 to 1VDC		-19999 to +29999 Indication width is 20000 or less	A decimal point position can be changed at random.
	0 to 5VDC			
	1 to 5VDC			
	0 to 10VDC			
	0 to 10mVDC			
电流	4 to 20mADC			

■接点输出

Event 功能 1 (4 points)

功能		附加功能	
0	无	0	None
1	Deviation upper and lower limit	1	Hold
2	Deviation upper limit	2	Wait
3	Deviation lower limit	3	Hold + Wait
4	Deviation range		
5	Absolute value upper and lower limit		
6	Absolute value upper limit		
7	Absolute value lower limit		
8	Absolute value range		

Event function (Loop Abnormal)

功能	
0	None
1	Exist
附加功能	
0	None
1	Hold

■终端连接图

	Power		1
			2
Not used			3
OUT1 Relay/SSR drive voltage output		-	4
		+	5
OUT2 SSR drive/4 to 20mADC output		-	6
		+	7
Not used			8
Relay contact output	EV1		9
	EV2		10
	EV3		11
	COM		12

X	A	Communication (RS-485)	
25	B		
26	Pattern1	DI input	
27	Pattern2		
28	Pattern3		
29	Pattern4		
30	RUN/RDY		
31	Operation switching		
32	Step advance		
33	COM		
34	END	Relay contact output	
Y	COM		

13	+	EV4	Open collector output
14	+	TS1	
15	+	TS2	
16	+	TS3	
17	+	TS4	
18	+	TIME	
19	-	COM	
20	CT input		
21			
22	Sensor input (See diagram below)		
23			
24			

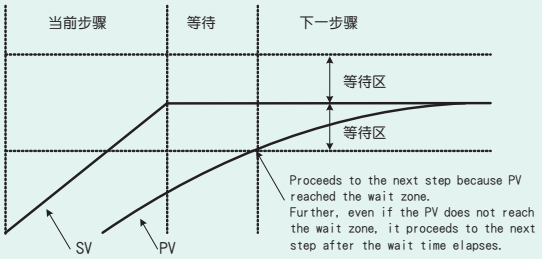
22	b	22		22	+
23	B	23	-	23	-
24	A	24	+	24	
RTD		TC/10mV		Current/Voltage	

■功能说明

●等待功能

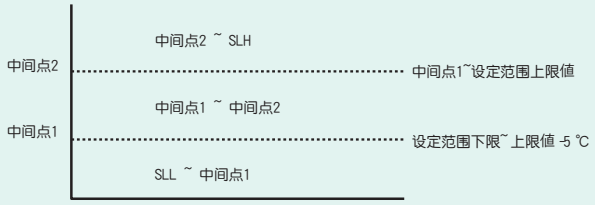
当PV值先到达SV设定值时，将不执行等待时间，直接跳往下一段执行。

当PV值未到达SV设定值时，将执行所设定的等待时间，使PV值到达SV设定值时便跳往下一段执行。



●自动演算

The auto-tuning starts at each point of Low/Medium/High temperature. The temperature, to which the auto-tuning is performed, is set in the respective start screen and the auto-tuning is started by pressing the RUN/HOLD key. AT-1 (～3)/PV is alternately indicated on the PV display digits during the auto-tuning.
The auto-tuning is stopped by pressing the RUN/HOLD key again.



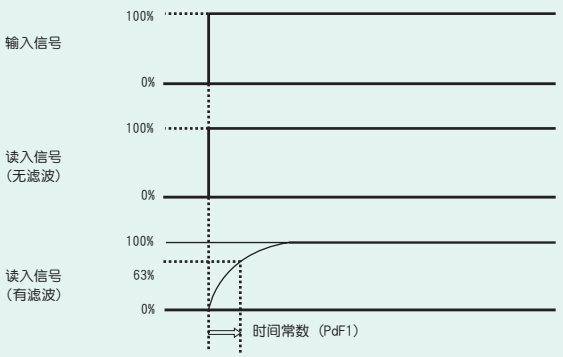
●PV/SV 启动 温度开始加热的基准

PV 动 由内码设定之SV值为起始值。
SV 动 由开机时之PV值为起始值。

●PV 数位滤波

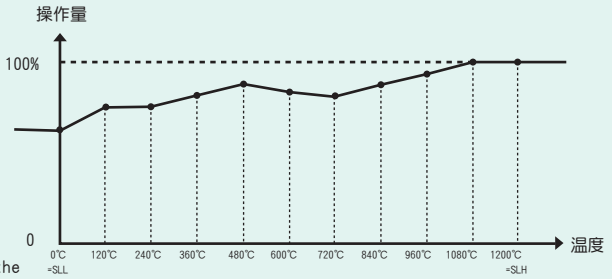
可防止瞬间输入信号交变，产生率波影响
可衰减高频杂讯，当电气杂讯干扰至输入，PV滤波可抑制杂讯。
若输入(PV值)变化不连续，则PV滤波会使其反应时间延迟。

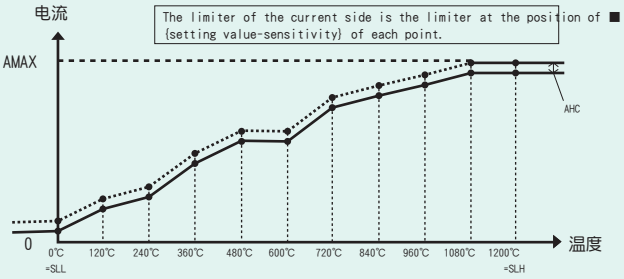
※CR filter…Primary delay filter
The use of Digital PV filter:
①Removal of high frequency noise...The noise effect is minimized when the electrical noise is added to input.
②A response can be delayed against the sudden change of the input



●操纵变量电流限制器

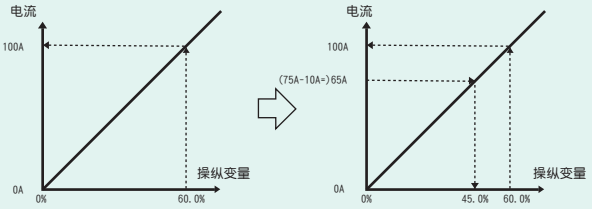
This function divides SLL to SLH into 10 segments and performs manipulated variable limit and current value limit at respective points. The limit of manipulated variable is performed by calculation in the manipulated limiter points 1 to 11. In the current limiter points 1 to 11, if the measurement current value exceeds the (setting value-current limiter sensitivity) of respective points, the manipulated variable at the current value limiter point is computed from the measured current value and the present manipulated variable, and the manipulated variable limit is performed from the computed manipulated variable. This manipulated variable changes every time the current value is measured. And, the final manipulated variable performs the limit by the smaller one of the two above





✓Calculated by the manipulated variable and the current value of SLL in case the input is below the table range
✓Calculated by the manipulated variable and the current value of SLH in case the input is over the table range

e.g.) When the various settings and PV are as follows.
PV=120℃, manipulated variable limiter point 2=75.0%, current value limiter point 2=75A, present manipulated variable=60%, AMAX=200 (equivalent to 0 to 5.0A), AHC=10A
〈When measurement current value=100A〉
The manipulated variable of the current value limiter point 2 (75A)-the current limiter sensitivity (10A) is calculated by the interaction between 0 to the present manipulated variable (60.0%)=0 to measurement current value (100A). The manipulated variable is 45.0% according to the calculation.



●Pattern/Step setting

The following fixed step numbers are set by the pattern numbers about step numbers.

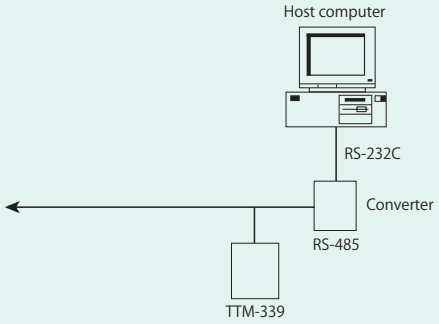
Pattern number	Step number
When 1 is selected	99 steps
When 2 is selected	49 steps
When 3 is selected	33 steps
When 4 is selected	24 steps
When 5 is selected	19 steps
When 6 is selected	16 steps
When 7 is selected	14 steps
When 8 is selected	12 steps

Pattern number	Step number
When 9 is selected	11 steps
When 10 is selected	9 steps
When 11 is selected	9 steps
When 12 is selected	8 steps
When 13 is selected	7 steps
When 14 is selected	7 steps
When 15 is selected	6 steps

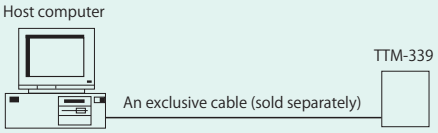
● 通讯功能 (inclusive of Loader Communication)

A connection example with the personal computer

Centralized supervision with the personal computer would be possible with the connection like the chart below.

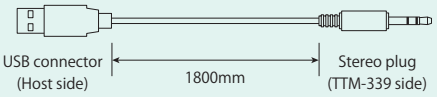


Loader communication



※Loader cable specification

[Appearance and structure]



[Standard and performance]

USB I/F standard	USB Specification 2.0 Compliant
DTE (Personal computer side) speed	Up to 38400bps
Connector specification	Personal computer side: USB
	Temperature Controller side: φ2.5mm Stereo plug

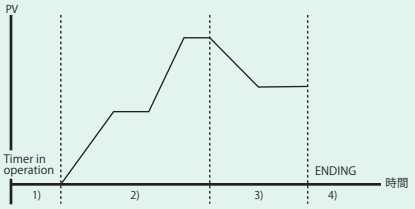
[Model]

TTM-LOADER

● Power failure function

In the event of power failure during which the unit had been in operation, the setting of the unit can be restored back to the time right before the power failure but on the following condition. However, if the PV at the time of recovery is outside the range of PV±Power Failure Recovery Temperature, operation will be in stop condition when it recovers. The alarm condition of Event function will be also restored back to the time right before the power failure.

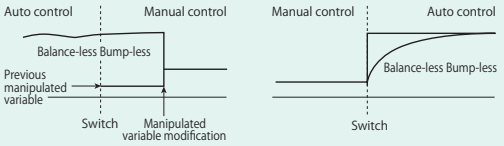
1) When step 1 is in timer operation condition (SV=SLL) → Restores up to the point when the power failure occurred
2) During the ramp of SV increase or in soak → Restores with PV start Restores with the operation-end "END" when there is no SV.
3) During the ramp of SV decrease or while in soak after decrease → PV>Restores with PV start in the decreasing step in case of the decreasing point. PV≦Restores with the operation-end "END" in case of the decreasing point
4) While in End → Restores to END
5) Restores with pause when the power failure occurred during pause while in conditions mentioned in 1) to 3)
6) When in manual operation → Restores with stop condition.



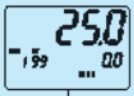
● 自动控制 (AUTO)/手动控制 (MANU)

自動控制：
控制輸出量為自動演算或隨機算後P.I.D值的控制輸出百分比。
溫度表在一般狀態下，程序將自動操作，完成控制程序。

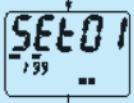
手動控制：
手動控制是直接手動更改其輸出百分比來控制輸出。
輸入感測損壞時，可以手動操作，完成控制程序。



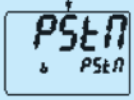
● Blind function



Press the selection key

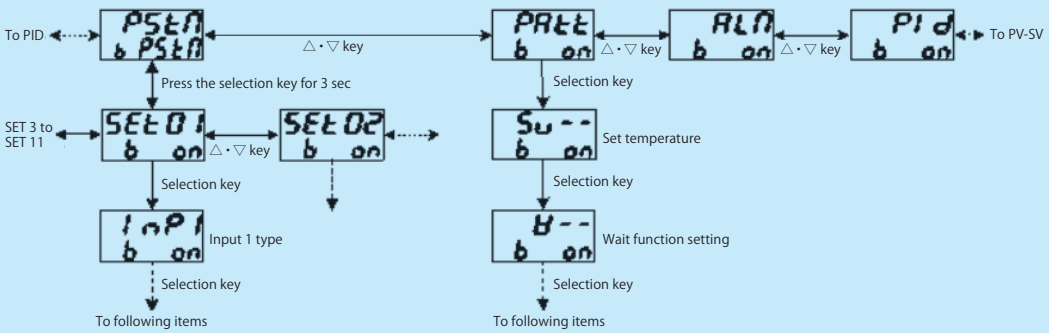


After pressing the selection key for 2 seconds, it will shift to common parameter setting, but continue to press the selection key.



The indication blinks after holding down the selection key for 10 sec on PV/SV screen. Then, when the selection key and reset key are pressed successively, the function will become Blind Mode.

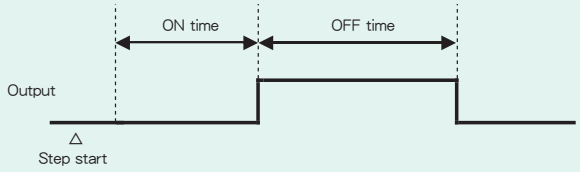
① The indication blinks after holding down the selection key for 10 sec on PV/SV screen. Then, selection key and reset key are pressed successively, the function will become Blind Mode.
② In the BLIND MODE, either "ON" or "OFF" will be displayed on under each characters (S portion). "ON" is "Display", "OFF" is "None-Display" (Blind). However, as for the PV/SV sc elapsed time screen and the manipulated variable screen, the setting shall be all at one time.
③ To change characters in BLIND MODE, press the indication switch key.
④ To end the Blind Setting Mode, either put off the power or press selection key for 10 second PV/SV screen.



● 时间信号动作

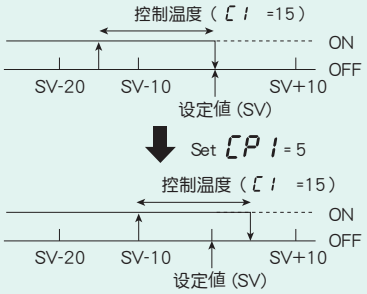
当步骤开始时，ON delay timer被终止时，信号输出 1 ～ 4 会变成ON。
OFF delay timer被终止之后，输出会变成 OFF。当时间信号输出变成ON时，相对应的TS1～TS4的灯会亮起。
The function selections 0 to 5 of TS1 to TS4 are selected at each step, the above mentioned operation is performed by setting value in case of 1 to 4, the function is none when 0 is selected, the time signal output is always turned ON in the selection step when 5 is selected.
The output is returned till the returned point when the time is returned by △/▽ key after the time course, and then the count is startedfrom that point. (It's from the halfway.)

e.g.)After 3 minutes from the time the OFF delay ends, the output is turned ON and the OFF delay is counted for 2 minutes when the elapsed time is reversed 5 minutes back by △key.



● ON/OFF 控制灵敏度动作设定

OFF点在”0”时，到达SV时即”OFF”。

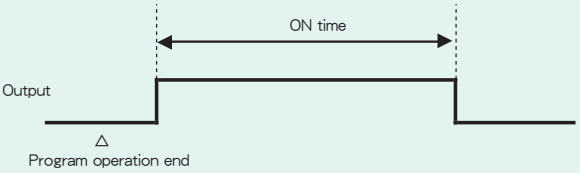


This is when off point position movement is set up with (+5).
In the actual specification, there is no description change as above, but move above equal to (+5) as a position of ON/OFF.
When moved to negative side, the OFF point moves to opposite side to description above.

● 操作过程中信号输出 /结束信号输出功能

操作过程中信号输出
信号输出操作过程中，继电器输出为”NO”。

结束信号输出
信号结束时输出可切换 ON/OFF 输出，输出信号为ON时，ON time的时间可设定范围。
最后结束灯亮。



■ 选型表

TTM-339- ① ② - ③

	Input	Thermocouple (K, J, T, E, R, S, B, N, U, L, WRe5-26, PR40-20, PLⅡ)		Multiple inputs, Switchable by key
		R.T.D. (Pt100, JPt100)		
		Current (4 to 20 mADC)		
		Voltage (0 to 1 VDC, 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC, 0 to 10 mVDC)		
①	Output1	R	Relay contact	R or P selectable
		P	SSR drive voltage	
②	Output2	P	SSR drive voltage	P or I selectable
		I	Current 4 to 20 mADC	
③	Option	A	Relay contact (EV1 to EV3) "EV3" is none when relay contact is selected for output1	
		B	Relay contact END signal output	
		C	Open collector TS1 to 4, TIME, EV4 "EV4" is none when relay contact is selected for output1	
		D	CT input	
		E	DI input	
		M	Communication (RS485)	
		T	Front face (English version)	

NEWS0007/11/2009