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Safety Guide

The following safety symbols are used in this manual.

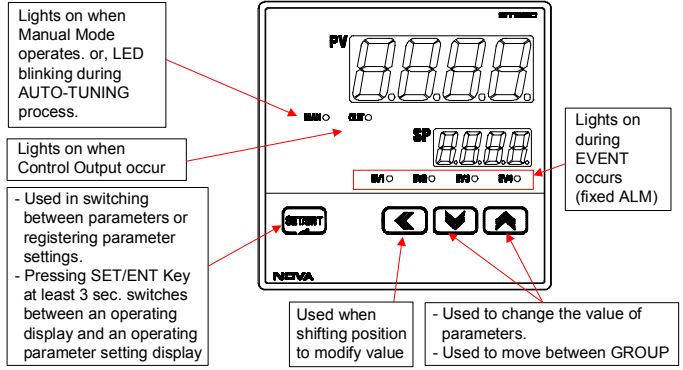


If this symbol is marked on the product, the operator must investigate the explanation given in this manual to protect injury or death to personnel or damage to instrument.



1. Be sure to operate the controller installed on a panel to prevent electric shock.
2. Keep the input circuit wiring as far as possible away from power and ground circuit.
3. Do not mount front panel facing downward.
4. To prevent electric shock, be sure to turn off and the source circuit breaker before wiring.
5. The power consumptions are 100-240VAC, 50/60Hz, 10VAmx and operate without power switching in advance.
6. No work in wet hands(it caused electric shock)
7. Refer the way of grounding connection, however, keep away from grounding to Gas pipe, water pipe, lightning rod etc.
8. No magnetic disturbances are caused.

Control Keys and Display

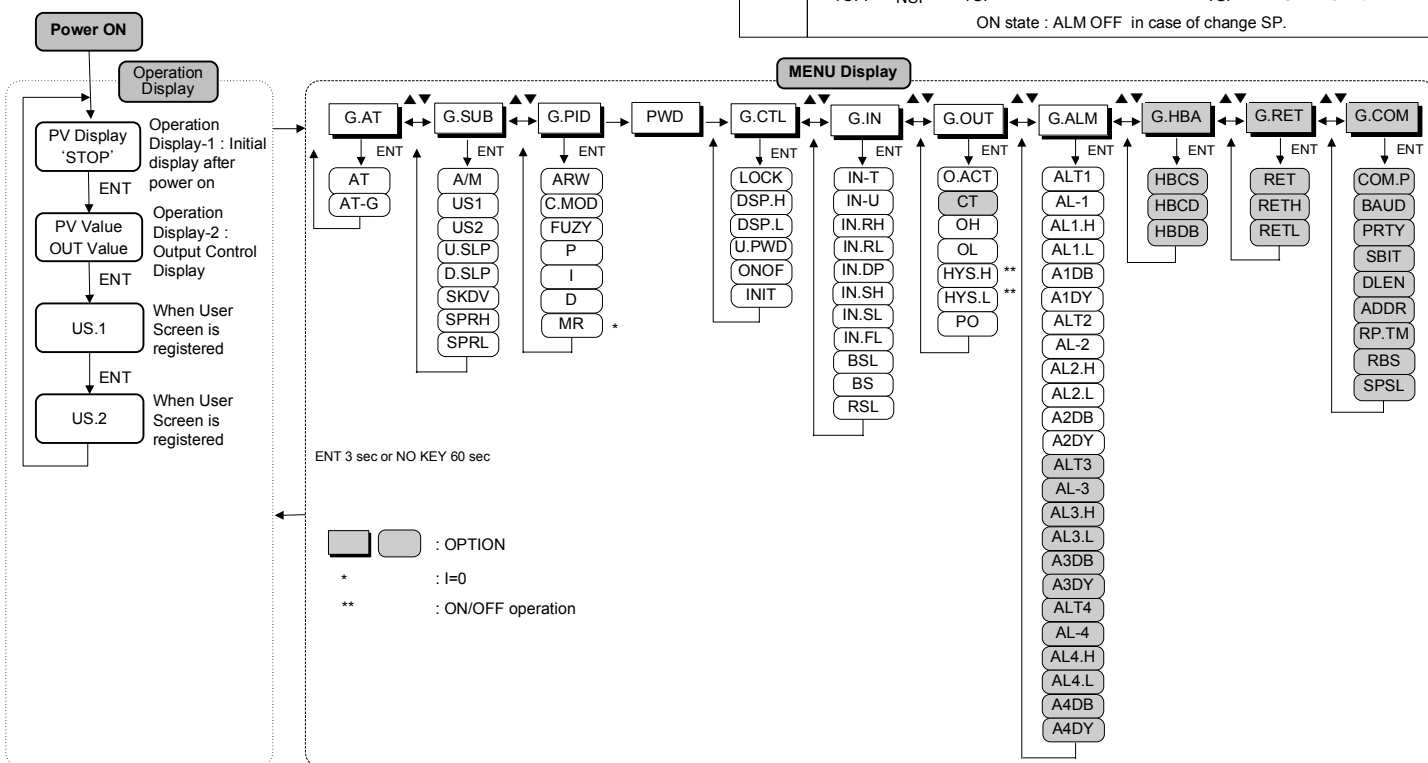


Type of Input Sensor

*display range : -5% ~ +105%

No.	TYPE	Temp.Range(°C)	Temp.Range(°F)	Group	DISP
1	K1	-200 ~ 1370	-300 ~ 2500	T/C	TC.K1
2	K2	-199.9 ~ 999.9	0 ~ 2300		TC.K2
3	J	-199.9 ~ 999.9	-300 ~ 2300		TC.J
4	E	-199.9 ~ 999.9	-300 ~ 1800		TC.E
5	T	-199.9 ~ 400.0	-300 ~ 750		TC.T
6	R	0 ~ 1700	32 ~ 3100		TC.R
7	B	0 ~ 1800	32 ~ 3300		TC.B
8	S	0 ~ 1700	32 ~ 3100		TC.S
9	L	-199.9 ~ 900.0	-300 ~ 1600		TC.L
10	N	-200 ~ 1300	-300 ~ 2400		TC.N
11	U	-199.9 ~ 400.0	-300 ~ 750		TC.U
12	W	0 ~ 2300	32 ~ 4200		TC.W
13	Platinel II	0 ~ 1390	32 ~ 2500		TC.PL
14	PIA	-199.9 ~ 850.0	-300 ~ 1560	RTD	PTA
15	PB	-199.9 ~ 500.0	-199.9 ~ 999.9		PTB
16	PTC	-150.0 ~ 150.0	-199.9 ~ 300.0		PTC
17	JPTA	-199.9 ~ 500.0	-199.9 ~ 999.9		JPTA
18	JPTB	-150.0 ~ 150.0	-199.9 ~ 300.0	JPTB	
19	0.4 ~ 2.0V	0.400 ~ 2.000V		DCV	2V
20	1 ~ 5V	1 ~ 5V			5V
21	0 ~ 10V	0 ~ 10V			10V
22	-10 ~ 20mV	-10 ~ 20mV		mV	20M
23	0 ~ 100mV	0 ~ 100mV			100M

Parameter Map



* Operation in Power ON : Start in Operation MODE before Power OFF
· AUTO Operation MODE : Start Control from PO

Type & Suffix Code

Model	Suffix Code	Description	Remark
ST340 / 360 / 370 / 380 / 390	- □ □	Digital Controller	
Control Output	S	SSR	
	A	AOUT(SCR)	
	R	RELAY	
Power	0	100 ~ 240VAC	
	1	24VDC	
Options	/RET	Retransmission	*note1
	/RS	RS422 / 485	*note1
	/HBA	Heater Break Alarm	*note1, *note3
	/ALM3	RELAY Output 1 Point	*note2
	/ALM4	RELAY Output 1 Point	*note1, *note2

*note1:RET, RS, HBA, ALM4 to be purchased separately *note2:it can't use at ST340,360,380
*note3 : It can't install with AOUT

Specification

- PV/SP Data Display : each 4 digits
- Indication Accuracy : ±0.2% of FS
- Control Loops and Mode : Single-Loop Control
- Number of Setpoint(SP) : 1SP(1 Zone PID)
- Retransmission Output : 4 ~ 20mADC (PV, SP, MV) or Loop power supply
- Communication Protocols : PC-Link, MODBUS(ASCII, RTU), SYNC Master, Slave
- Power Supply and Consumption : 100 ~ 240VAC, 50 ~ 60Hz / Max 6W below
- Sensor
 - PV Input : Universal Input(1 Point)
 - Type of Input
 - T/C : K, J, E, T, R, B, S, L, N, U, W, Platinel II
 - RTD : Pt100, JPt100
 - DCV : -10 ~ 20mV, 0 ~ 100mV, 0.4 ~ 2.0VDC, 1 ~ 5VDC, 0 ~ 10VDC (4 ~ 20mA, 0 ~ 20mA, with external 250Ω, 500Ω)
- Output
 - Control Output : 1 Point
 - Time-proportional PID : Relay, SSR(V-Pulse)
 - Continuous PID : SCR(4 ~ 20mADC)
- Alarm
 - Alarm Capacity : STD 2 Points, Max 4 Points *note4
 - Alarm Type : 21 types(High/Low Temp Limit, Deviation Limit etc) *note5
- HBA
 - CT Spec : use CTL-6-S or 800:1 CT

*note4 : ST340, 360, 380 - Max 2 Points *note5 : In case of HBA Option - 22 Types

Safety & EMC

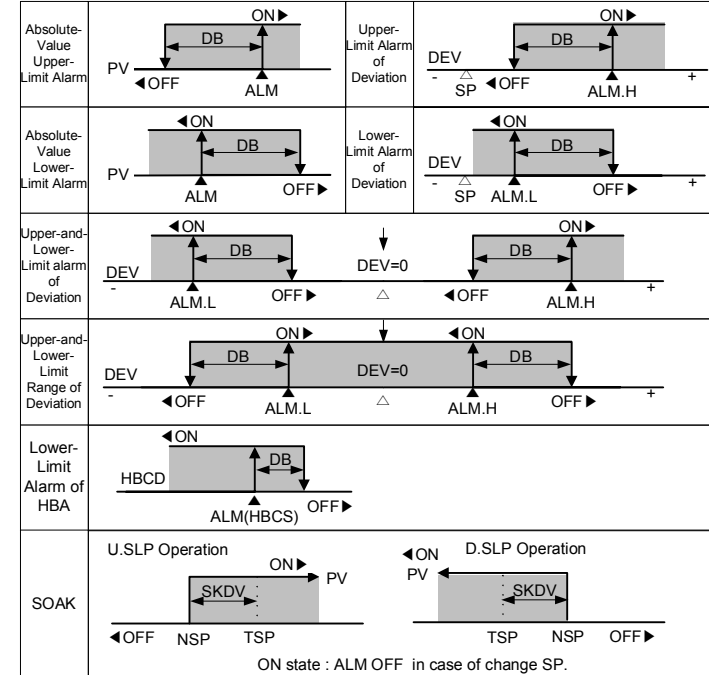
- Safety : EN61010-1, UL61010C-1, CAN/CSA-C22.2 No.10101-92, Category II
- EMC : EMI(Emission) - EN61326, ClassA
EMS(Immunity) - EN61326

Type of Alarm

No.	Type	Output Direct For Rev Off On	Standby	Display Data	No.	Type	Output Direct For Rev Off On	Standby	Display Data
1	Absolute-Value Upper-Limit Alarm	○	○	AH.F	11	Absolute-Value Upper-Limit Alarm	○	○	AH.FS
2	Absolute-Value Lower-Limit Alarm	○	○	AL.F	12	Absolute-Value Lower-Limit Alarm	○	○	AL.FS
3	Upper-Limit Alarm of Deviation	○	○	DH.F	13	Upper-Limit Alarm of Deviation	○	○	DH.FS
4	Lower-Limit Alarm of Deviation	○	○	DL.F	14	Lower-Limit Alarm of Deviation	○	○	DL.FS
5	Upper-Limit Alarm of Deviation	○	○	DH.R	15	Upper-Limit Alarm of Deviation	○	○	DH.RS
6	Lower-Limit Alarm of Deviation	○	○	DL.R	16	Lower-Limit Alarm of Deviation	○	○	DL.RS
7	Upper-and-Lower-Limit alarm of Deviation	○	○	DO.F	17	Upper-and-Lower-Limit alarm of Deviation	○	○	DO.FS
8	Upper-and-Lower-Limit Range of Deviation	○	○	DI.F	18	Upper-and-Lower-Limit Range of Deviation	○	○	DI.FS
9	Absolute-Value Upper-Limit Alarm	○	○	AH.R	19	Absolute-Value Upper-Limit Alarm	○	○	AH.RS
10	Absolute-Value Lower-Limit Alarm	○	○	AL.R	20	Absolute-Value Lower-Limit Alarm	○	○	AL.RS
21	Soak	○	○	Soak	22	Lower-Limit Alarm of HBA *	○	○	HBA

* In case of HBA Option

Alarm Operation



PARAMETER Table

AT GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
AT	Auto Tuning	OFF, ON	ABS	OFF	AUTO Operation
AT-G	AT Gain	0.1 ~ 10.0	ABS	1.0	AUTO Operation

◎ AT GROUP is skipped in ON/OFF MODE operation.

SUB GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
AM	AUTO, MAN	AUTO, MAN	ABS	AUTO	Always
US1	User Screen	OFF, D-Register Number(1~1299)	ABS	OFF	Always
US2	User Screen	OFF, D-Register Number(1~1299)	ABS	OFF	Always
U.SLP	Up Slop	OFF(0), EUS(0.0%+1digit ~ 100.0%)/min	EUS	OFF(0)	Always
D.SLP	Down Slop	OFF(0), EUS(0.0%+1digit ~ 100.0%)/min	EUS	OFF(0)	Always
SKDV	Soak Deviation	EUS(0.0 ~ 100.0%)	EUS	EUS(0.0%)	Always
SPRH	Set Point Range High	EU(0.0 ~ 100.0%)	EU	EU(100.0%)	Always
SPRL	Set Point Range Low	EU(0.0 ~ 100.0%)	EU	EU(0.0%)	Always

P.I.D GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
ARW	Anti-Reset Wind-Up Select	Auto(0.0) ~ 200.0%	%	100.0%	Always
C.MOD	Control Mode	D.DV, D.PV	ABS	D.DV	Always
FUZY	Fuzzy	OFF, ON	ABS	ON	Always
P	Proportional Band	0.1 ~ 999.9%	%	10.0%	Always
I	Integral Time	OFF, 1 ~ 6000 sec	sec	120 sec	Always
D	Derivative Time	OFF, 1 ~ 6000 sec	sec	30 sec	Always
MR	Manual Reset	-5.0 ~ 105.0%	%	50.0%	I=0

◎ P.I.D GROUP is skipped in ON/OFF MODE operation.

CTL GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
LOCK	Key Lock	OFF, ON(No Editing)	ABS	OFF	Always
DSP.H	Display High Limit	EU(-5.0 ~ 105.0%) However, DSP.L < DSP.H	EU	EU(105.0%)	Always
DSP.L	Display Low Limit	EU(-5.0 ~ 105.0%) However, DSP.L < DSP.H	EU	EU(-5.0%)	Always
U.PWD	User Password	0 ~ 9999	ABS	0	Always
ONOF	ON/OFF MODE	OFF, ON	ABS	OFF	Always
INIT	Parameter Initialization	OFF, ON	ABS	OFF	Always

IN GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
IN-T	Input Type	refer to "Type of Input Sensor"	ABS	TC.K1	Always
IN-U	Display Range	°C, °F	ABS	°C	T/C, RTD
IN.RH	Max. Value of Measurement Range	Within DEF.Range refer to "Type of Input Sensor"	EU	EU(100%)	Always
IN.RL	Min. Value of Measurement Range	refer to "Type of Input Sensor"	EU	EU(0.0%)	Always
IN.DP	Decimal Point Position	0 ~ 3	ABS	1	mV, V
IN.SH	Max Value of Input Scale	Within -1999 ~ 9999 however, INSH > INSL	ABS	100.0	mV, V
IN.SL	Min Value of Input Scale	The Decimal Point Position is rely on the value of IN.DP	ABS	0.0	mV, V
IN.FL	PV Filter	OFF, 1 ~ 120	sec	OFF	Always
BSL	BOU SEL	OFF, UP, DOWN	ABS	UP (DCV=OFF)	Always
BS	Bias Value	EUS(-100.0 ~ 100.0%)	ABS	0	Always
RSL	RJC SEL	TC, TC.RJ, RJC	ABS	TC.RJ	T/C

OUT GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
O.ACT	Reverse and Forward	REV, FWD	ABS	REV	Always
CT	Cycle Time	1 ~ 300 sec	sec	2 sec	Output=SSR, RLY
OH	High-Limit value of Output	OL + 1Digit ~ 105.0% (However, OH>OL)	%	100.0%	Always(ON/OFF Mode: SKIP)
OL	Low-Limit value of Output	-5.0% ~ OH - 1Digit (However, OH>OL)	%	0.0%	Always(ON/OFF Mode: SKIP)
HYS.H	HYSTERISYS HIGH	EUS(0.0 ~ 10.0%)	EUS	EUS(0.5%)	ON/OFF Mode
HYS.L	HYSTERISYS LOW	EUS(0.0 ~ 10.0%)	EUS	EUS(0.5%)	ON/OFF Mode
PO	Preset Out	-5.0 ~ 105.0%	%	0.0%	Always

ALARM GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
ALT1	Alarm Type 1	refer to "Type of Alarm"	ABS	AH.F	Always
AL-1	Set value of ALT1	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Not Deviation Alarm
AL1.H	Upper-Limit Set value of ALT1	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Deviation Operation
AL1.L	Low-Limit Set value of ALT1	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Deviation Operation
A1DB	Alarm 1 Hys	EUS(0.0 ~ 100.0%)	EUS	EUS(0.5%)	Always
A1DY	Alarm 1 Operation Delay Time	0.00~99.59(MM.SS) ALT1-HH:MM in case of Soak	TIME	0.00	Always
ALT2	Alarm Type 2	refer to "Type of Alarm"	ABS	AH.F	Always
AL-2	Set value of ALT2	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Not Deviation Alarm
AL2.H	Upper-Limit Set value of ALT2	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Deviation Operation
AL2.L	Low-Limit Set value of ALT2	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Deviation Operation
A2DB	Alarm 2 Hys	EUS(0.0 ~ 100.0%)	EUS	EUS(0.5%)	Always
A2DY	Alarm 2 Operation Delay Time	0.00~99.59(MM.SS) ALT2-HH:MM in case of Soak	TIME	0.00	Always
ALT3	Alarm Type 3	refer to "Type of Alarm"	ABS	AH.F	Option
AL-3	Set value of ALT3	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Option
AL3.H	Upper-Limit Set value of ALT3	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Option
AL3.L	Low-Limit Set value of ALT3	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Option
A3DB	Alarm 3 Hys	EUS(0.0 ~ 100.0%)	EUS	EUS(0.5%)	Option
A3DY	Alarm 3 Operation Delay Time	0.00~99.59(MM.SS) ALT3-HH:MM in case of Soak	TIME	0.00	Always
ALT4	Alarm Type 4	refer to "Type of Alarm"	ABS	AH.F	Option
AL-4	Set value of ALT4	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Option
AL4.H	Upper-Limit Set value of ALT4	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Option
AL4.L	Low-Limit Set value of ALT4	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	Option
A4DB	Alarm 4 Hys	EUS(0.0 ~ 100.0%)	EUS	EUS(0.5%)	Option
A4DY	Alarm 4 Operation Delay Time	0.00~99.59(MM.SS) ALT4-HH:MM in case of Soak	TIME	0.00	Always

◎ ALM3,4=ST340, 360, 380 : can't use. ◎ Type of Alarm 21:Soak, 22:HBA

HBA GROUP

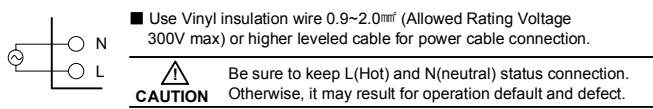
Symbol	Parameter	Setting Range	Unit	Initial	Remark
HBCS	Heater Break Current Set	OFF, 1 ~ 50A	ABS	OFF	Option
HBCD	Heater Break Current Display	DISPLAY ONLY	ABS	INRH	Option
HBDB	Heater Break Current DB	0 ~ 10A	ABS	1	Option

TRANS GROUP

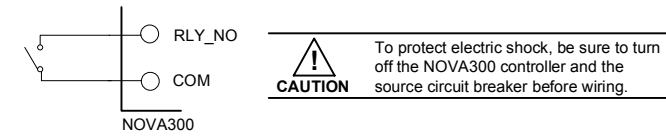
Symbol	Parameter	Setting Range	Unit	Initial	Remark
RET	Select RET	LPS, PV, SP, MV	ABS	PV	Option
RETH	High-Limited Value of Retransmission	T/C, RTD : INRH ~ INRL mV, V : INSH ~ INSL	EU	INRH	When select RET=PV, SP
RETL	Low-Limited Value of Retransmission	However, RETH > RETL	EU	INRL	

COMM GROUP

Power Cable Connection



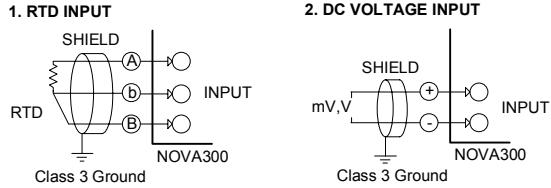
RELAY Connection



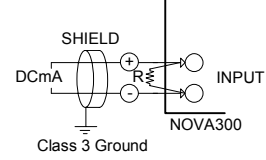
Use an Auxiliary RELAY

- When using an auxiliary relay or inductance load (L) such as solenoid, be sure to insert a CR filter(for AC) or diode (for DC) in parallel as a surge-suppressor circuit to reject sparks, preventing malfunction or damage.
- Recommended CR FILTER
- ▶ Seong Hoo Electronics : BSE104R120 25V (0.1μ+120Ω)
 - ▶ HANA PARTS CO. : HN2EAC
 - ▶ Songmi Electric Co.,Ltd. : CR UNIT 953, 955 etc
 - ▶ Jiwol Electric Co.,Ltd. : SKV, SKVB etc
 - ▶ Shinyoung Communications Co.,Ltd. : CR-CFS, CR-U etc

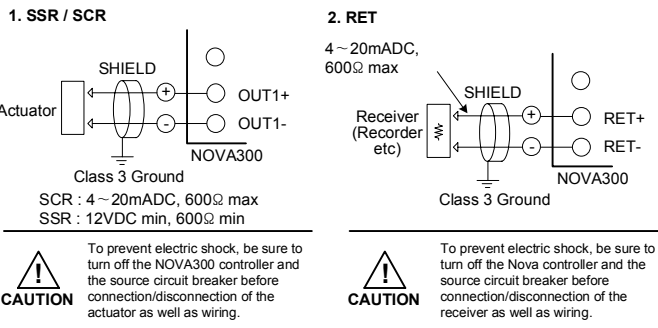
ANALOG INPUT Connection



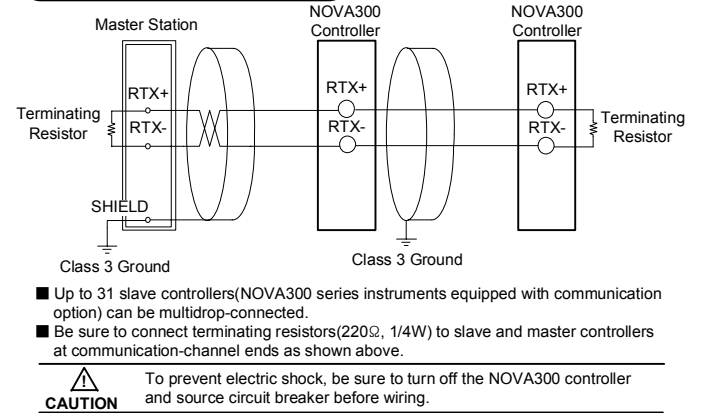
3. DC CURRENT INPUT



ANALOG OUTPUT Connection



Communication Wiring (RS485)

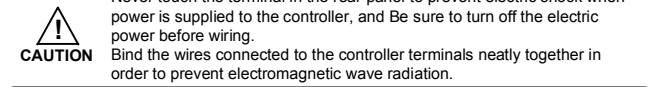


Power Cable Specification

Vinyl insulated wire 0.9~2.0mm² (Allowed Rating Voltage 300V max)

Terminal Specification

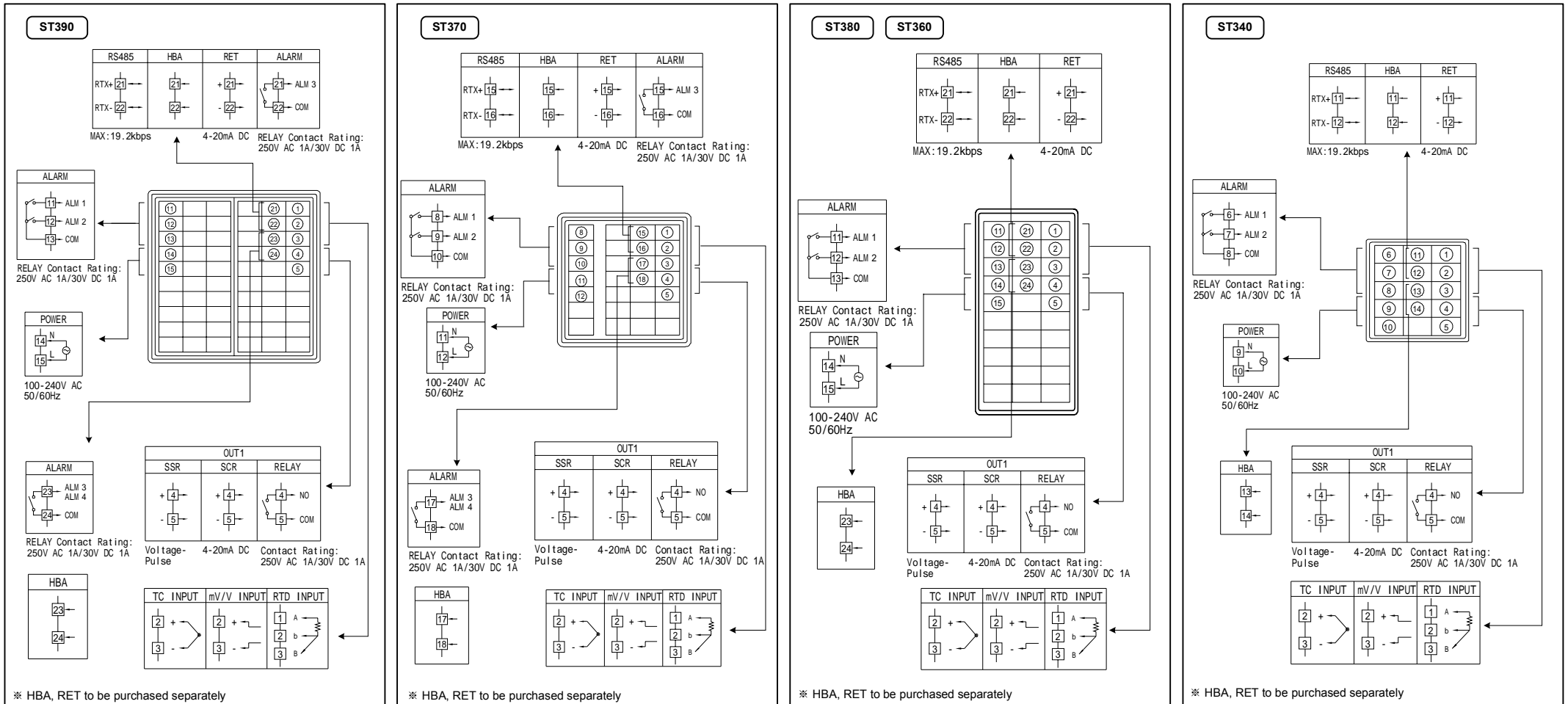
Use M3.5 screw-compatible crimp-on terminals with insulating sleeve as shown below.



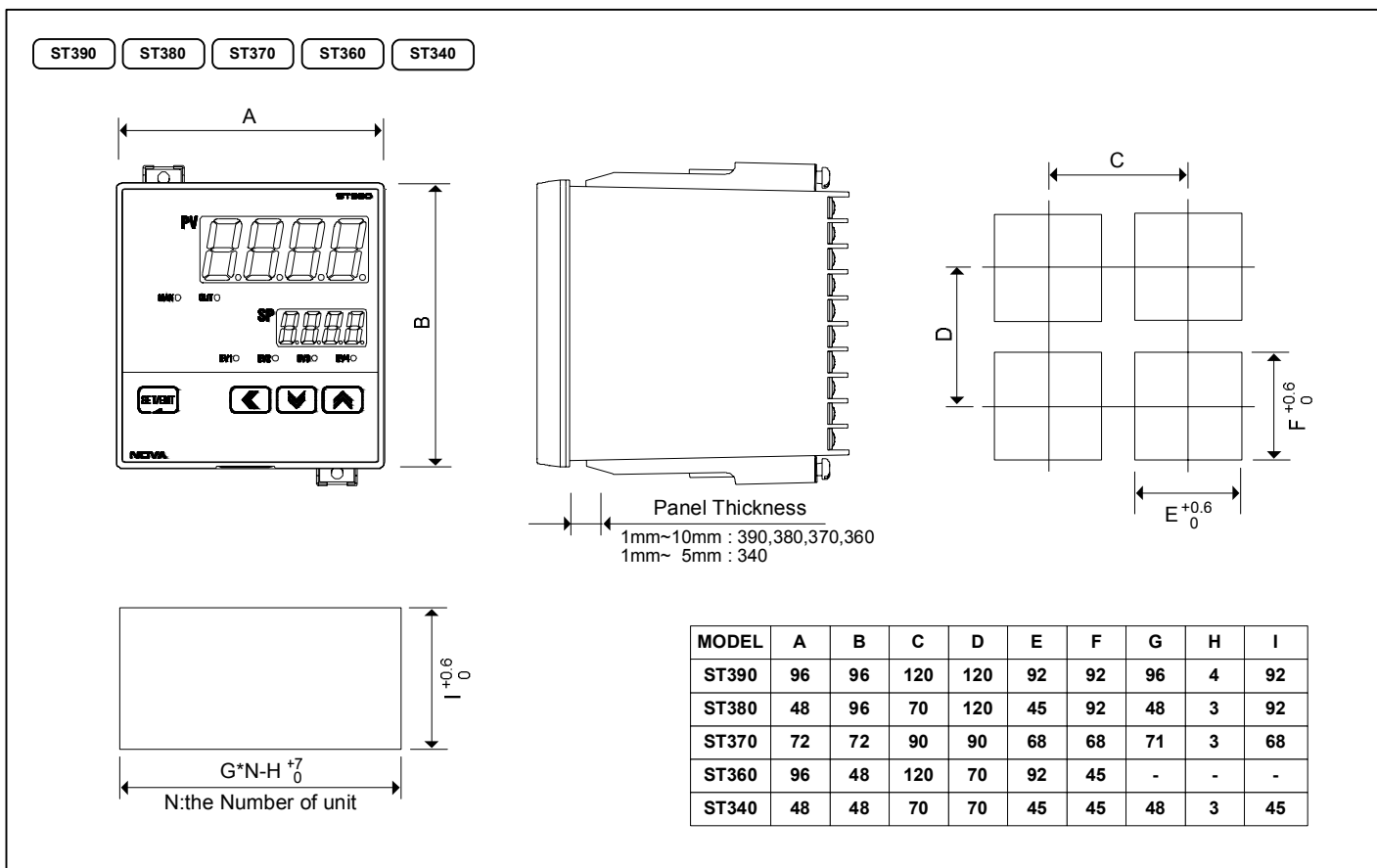
Display Error and Correction

Display ERROR	ERROR Contents	Correction
E.SYS	EEPROM, DATA Loss	Ask repair
E.RJC	RJC SENSOR Failure	Ask repair
Flash Decimal point of SP	Communication Failure	Comm Cable CHECK
S.OPN	SENSOR Open	SENSOR CHECK
E.AT	AT Time Out (27h over)	PROCESS CHECK

Terminal Arrangement and External wiring



Dimension and Panel Cutout



How to install Mount

