SAMWON TECH

NOVA100 SERIES DIGITAL CONTROLLER ST190/180/170/160/140 Instruction Manual

Thank you for purchasing Samwontech production. Please use after read instruction manual for safety. Free to contact to our sales Div. for Production Inquiry and After Service.
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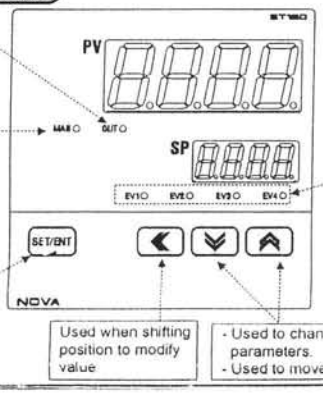
Safety Guide

The following safety symbols are used in this manual.

⚠ CAUTION 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.

⚠ CAUTION
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 100-240V AC, 50/60Hz, 10VAmax 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 for grounding to Gas pipe, water pipe, lightening rod etc.
8. No magnetic disturbances are caused.

Control Keys and Display



Type & Suffix Code

Model	Suffix Code	Description	Remark
ST140 / 160/ 170 / 180 / 190	- □ □	Digital Controller	
Control Output	S	SSR	
	A	AOUT(SCR)	
	R	RELAY	
Power	0	100 ~ 240V AC	
	1	24V DC	
Options	/RET	Retransmission Output	*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 ST140,160,180
*note3 : It can't install with AOUT

Specification

- PV/SP Data Dispaly : each 4 digits
- Sampling Time : 250ms
- Indication Acuracy : ±0.2% of FS
- Running Mode : AUTO / MAN
- Control Loops and Mode : Single-Loop Control
- Number of Setpoint(SP) : 1SP(1 Zone PID)
- Retransmission Output : 4 ~ 20mA DC (PV, SP, MV) or Loop power supply
- Communication Protocols : PC-Link, MODBUS(ASCII, RTU), SYNC Master, Slave
- Power Supply and Consumption : 100 ~ 240V AC, 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 ~ 20mA DC)

Alarm
- Alarm Capacity : STD 1 Point, 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 : ST140, 160, 180 - 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 Input Sensor

*display range : -5% ~ +105%

No.	TYPE	Temp.Range(℃)	Temp.Range(℉)	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	PtA	-199.9~850.0	-300~1560	RTD	PTA
15	PtB	-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

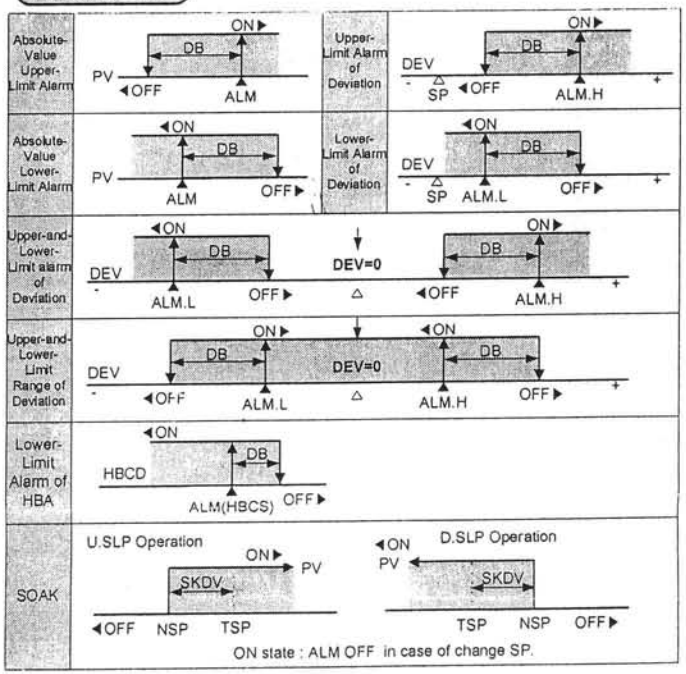
Type of Alarm

No.	Type	Output Direct For	Output Direct Rev	Standby Off	Standby On	Display Data
1	Absolute-Value Upper-Limit Alarm	O		O		AH.F
2	Absolute-Value Lower-Limit Alarm	O		O		AL.F
3	Upper-Limit Alarm of Deviation	O		O		DH.F
4	Lower-Limit Alarm of Deviation	O		O		DL.F
5	Upper-Limit Alarm of Deviation		O	O		DH.R
6	Lower-Limit Alarm of Deviation		O	O		DL.R
7	Upper-and-Lower-Limit alarm of Deviation	O		O		DO.F
8	Upper-and-Lower-Limit Range of Deviation	O		O		DI.F
9	Absolute-Value Upper-Limit Alarm		O	O		AH.R
10	Absolute-Value Lower-Limit Alarm		O	O		AL.R
21	Soak	O				SOAK

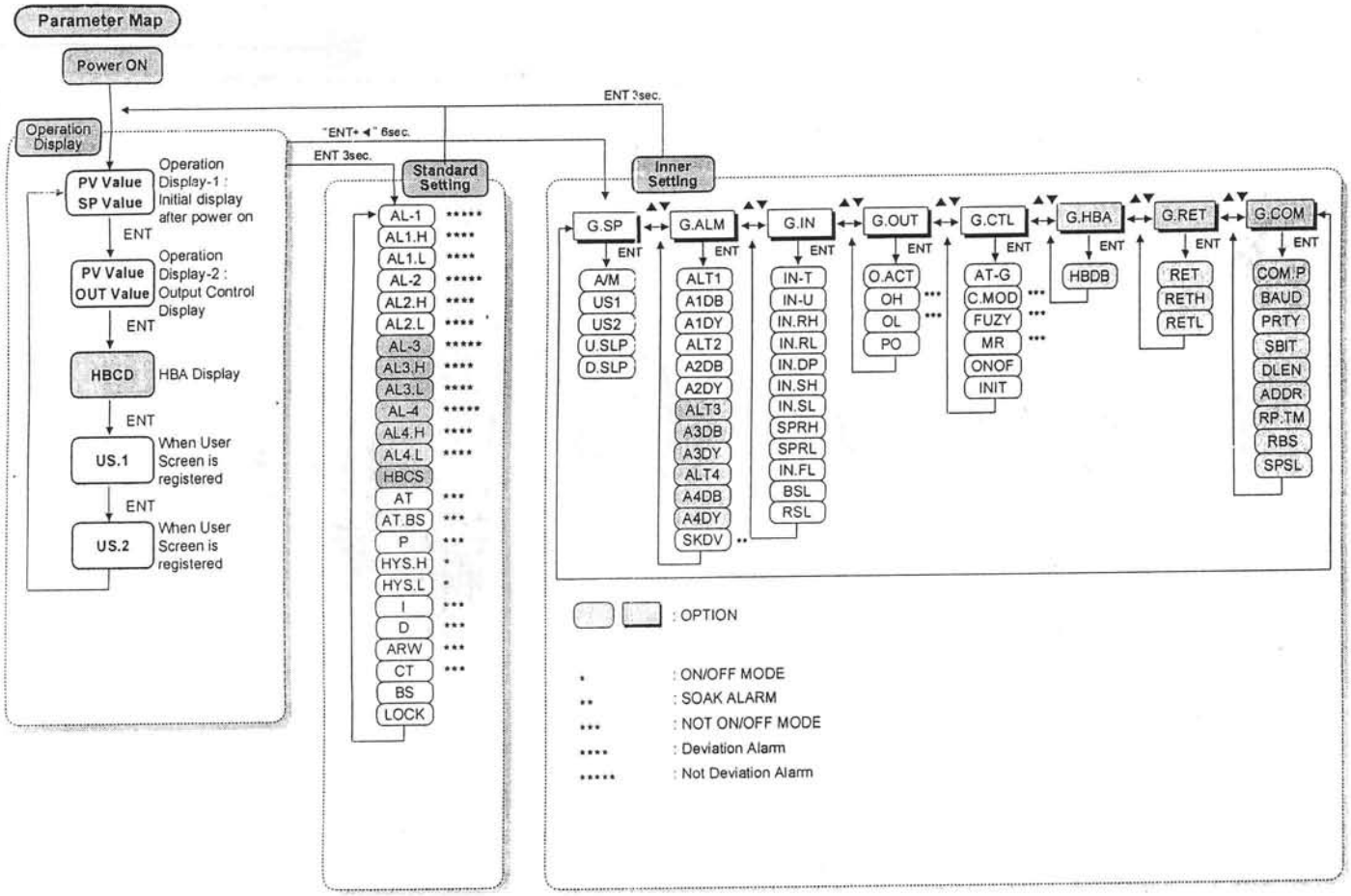
No.	Type	Output Direct For	Output Direct Rev	Standby Off	Standby On	Display Data
11	Absolute-Value Upper-Limit Alarm	O			O	AH.FS
12	Absolute-Value Lower-Limit Alarm	O			O	AL.FS
13	Upper-Limit Alarm of Deviation	O			O	DH.FS
14	Lower-Limit Alarm of Deviation	O			O	DL.FS
15	Upper-Limit Alarm of Deviation		O		O	DH.RS
16	Lower-Limit Alarm of Deviation		O		O	DL.RS
17	Upper-and-Lower-Limit alarm of Deviation	O			O	DO.FS
18	Upper-and-Lower-Limit Range of Deviation	O			O	DI.FS
19	Absolute-Value Upper-Limit Alarm		O		O	AH.RS
20	Absolute-Value Lower-Limit Alarm		O		O	AL.RS
22	Lower-Limit Alarm of HBA *	O				HBA

* In case of HBA Option

Alarm Operation



Parameter Map



PARAMETER Table

Standard Setting

Symbol	Parameter	Setting Range	Unit	Initial	Remark
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
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
AL-3	Set value of ALT3	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Option
AL3.H	Upper-Limit 3et value of ALT1	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
AL-4	Set value of ALT4	EU(-100.0 ~ 100.0%)	EU	EU(100.0%)	Option
AL4.H	Upper-Limit 4et value of ALT1	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
HBCS	Heater Break Current Set	OFF, 1 ~ 50A	ABS	OFF	Option
AT	Auto Tuning	OFF, ON	ABS	OFF	AUTO Operation
AT.BS	AT Bias	EUS(-10.0 ~ 10.0%)	ABS	EUS(0.0%)	AUTO Operation
P	Proportional Band	0.1 ~ 999.9%	%	10.0%	Always
HYS.H	HYSTERISIS HIGH	EUS(0.0 ~ 10.0%)	EUS	EUS(0.5%)	ON/OFF Mode
HYS.L	HYSTERISIS LOW	EUS(0.0 ~ 10.0%)	EUS	EUS(0.5%)	ON/OFF Mode
I	Integral Time	OFF, 1 ~ 6000sec	sec	120sec	Always
D	Derivative Time	OFF, 1 ~ 6000sec	sec	30sec	Always
ARW	Anti-Reset Wind-Up Select	Auto(0.0) ~ 200.0%	%	100.0%	Always
CT	Cycle Time 1	1 ~ 300 sec	sec	2sec	Output= SSR,RLY
BS	Bias Value	EUS(-100.0 ~ 100.0%)	ABS	0	Always
LOCK	Key Lock	-1, 0, 1	ABS	0	Always

Inner Setting

SP GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
A/M	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

ALARM GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
ALT1	Alarm Type 1	refer to "Type of Alarm"	ABS	AH.F	Always
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
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
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	Option
ALT4	Alarm Type 4	refer to "Type of Alarm"	ABS	AH.F	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	Option
SKDV	Soak Deviation	EUS(0.0 ~ 10.0%)	EUS	EUS(0.0%)	Soak Alarm

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	℃, °F	ABS	℃	T/C, RTD
IN.RH	Max. Value of Measurement Range	refer to "Type of Input Sensor" However, INRH > INRL	EU	EU(100%)	Always
IN.RL	Min. Value of Measurement Range		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 The Decimal Point Position is relay on the value of IN.DP	ABS	100.0	mV, V
IN.SL	Min Value of Input Scale		ABS	0.0	mV, V
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
IN.FL	PV Filter	OFF, 1 ~ 120	sec	OFF	Always
BSL	BOUT SEL	OFF, UP, DOWN	ABS	UP (DCV=OFF)	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
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)
PO	Preset Out	-5.0~105.0%	%	0.0%	Always

CTL GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
AT-G	AT Gain	0.1 ~ 10.0	ABS	1.0	AUTO Operation
C.MOD	C. MODE	D.DV , D.PV	ABS	D.PV	Always
FUZY	Fuzzy	OFF, ON	ABS	OFF	Always
MR	Manual Reset	-5.0 ~ 105.0%	%	50.0%	I=0
ONOF	ON/OFF MODE	OFF, ON	ABS	OFF	Always
INIT	INIT	OFF, ON	ABS	ON	Always

HBA GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
HBDB	Heater Break Current DB	0 ~ 10A	ABS	1	Option

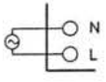
RET GROUP

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 However, RETH > RETL	EU	INRH	When select RET=PV, SP
RETL	Low-Limited Value of Retransmission		EU	INRL	

COMM GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
COM.P	Communication Protocol	PCC0, PCC1, MODBUS ASCII MODBUS RTU, SYNC-Master, SYNC-Slave	ABS	PCC0	Option
BAUD	Baud Rate	600,1200,2400,4800,9600,19.2K	ABS	9600	Option
PRTY	Parity	None, Even, Odd	ABS	None	Option
SBIT	Stop Bit	1, 2	ABS	1	Option
DLEN	Data Length	7,8(SKIP in MODBUS)	ABS	8	Option
ADDR	Address	1 ~ 99(Max 31 can connect)	ABS	1	Option
RP.TM	Response Time	0 ~ 10(x10ms)	ABS	0	Option
RBS	Remote Bias	EUS(-100.0 ~ 100.0%)	EUS	EUS(0.0%)	SYNC-Slave
SPSL	SP SELECT	LSP, RSP	ABS	LSP	Option

Power Cable Connection

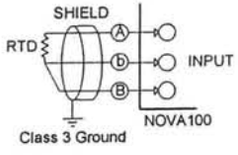


■ Use Vinyl insulation wire 0.9~2.0㎟ (Allowed Rating Voltage 300V max) or higher leveled cable for power cable connection.

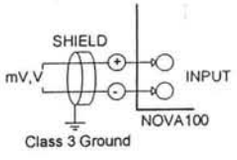
⚠ CAUTION Be sure to keep L(Hot) and N(neutral) status connection. Otherwise, it may result for operation default and defect.

ANALOG INPUT Connection

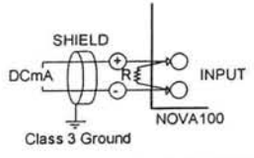
1. RTD INPUT



2. DC VOLTAGE INPUT



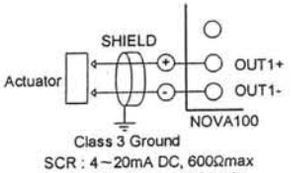
3. DC CURRENT INPUT



ANALOG OUTPUT Connection

⚠ CAUTION To prevent electric shock, be sure to turn off the NOVA100 Controller and the source circuit breaker before wiring.

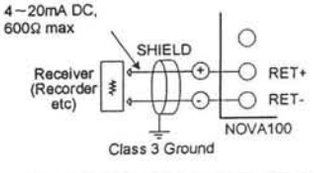
1. SSR / SCR



SCR : 4~20mA DC, 600Ωmax
SSR : 12V DC min, 600Ω min

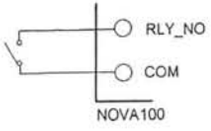
⚠ CAUTION To prevent electric shock, be sure to turn off the NOVA100 controller and the source circuit breaker before connection/disconnection of the actuator as well as wiring.

2. RET



⚠ CAUTION To prevent electric shock, be sure to turn off the NOVA100 controller and the source circuit breaker before connection/disconnection of the receiver as well as wiring.

RELAY Connection



⚠ CAUTION To protect electric shock, be sure to turn off the NOVA100 controller and the source circuit breaker before wiring.

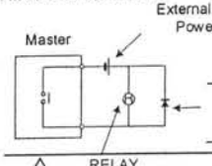
Use an Auxiliary RELAY

■ 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
- ▶ Shinyoug Communications Co.,Ltd. : CR-CFS, CR-U etc

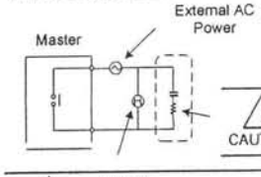
1. In case of DC RELAY



⚠ CAUTION DIODE (Need to connect direct to RELAY COIL Terminal (SOCKET))

⚠ CAUTION RELAY (Rating Specification of RELAY COIL should be used lower than the Contact Rating of Controller)

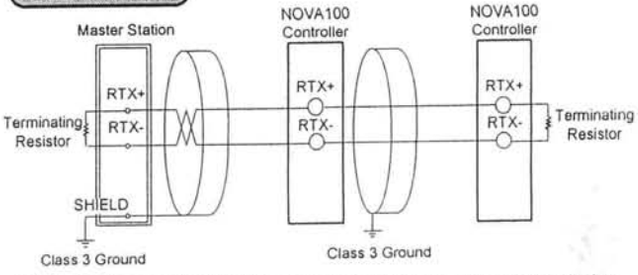
2. In case of AC RELAY



⚠ CAUTION CR FILTER (Need to connect direct to RELAY COIL Terminal (SOCKET))

⚠ CAUTION RELAY (Rating Specification of RELAY COIL should be used lower than the Contact Rating of Controller)

통신(RS485) 배선



■ Up to 31 slave controllers(NOVA100 series instruments equipped with communication option) can be multidrop-connected.

■ Be sure to connect terminating resistors(220Ω, 1/4W) to slave and master controllers at communication-channel ends as shown above.

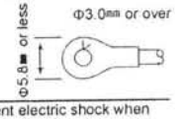
⚠ CAUTION To prevent electric shock, be sure to turn off the NOVA100 controller and source circuit breaker before wiring.

Power Cable Specification

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

Terminal Specification

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

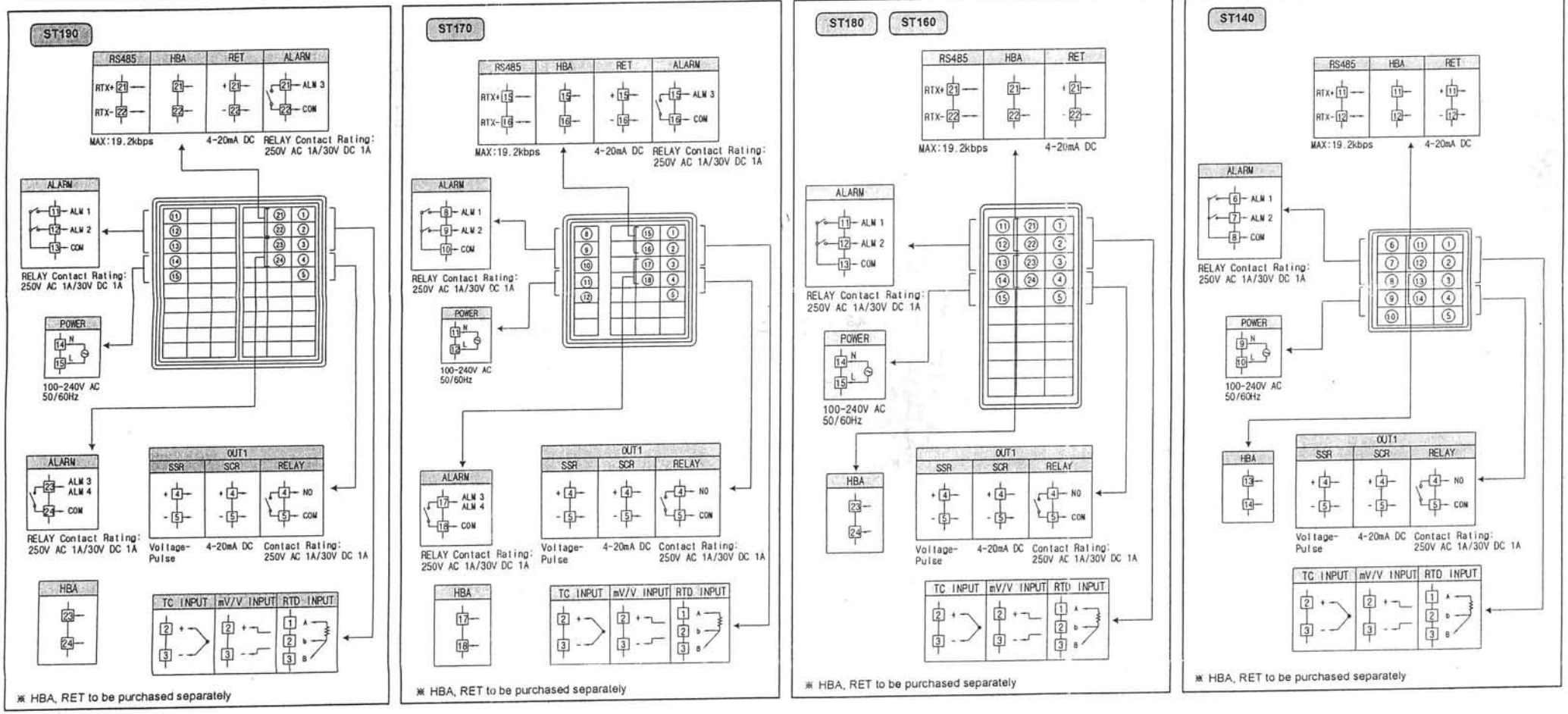


⚠ CAUTION Never touch the terminal in the rear panel to prevent electric shock when power is supplied to the controller, and Be sure to turn off the electric power before wiring.
Bind the wires connected to the controller terminals neatly together in order to prevent electromagnetic wave radiation.

Display Error and Correction

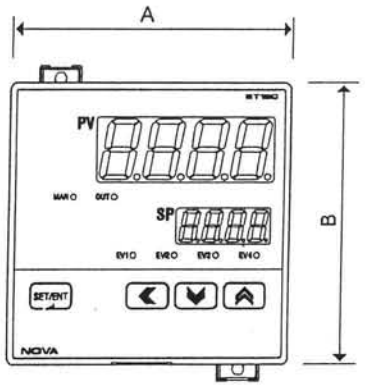
Display ERROR	ERROR Contents	Correction
E.SYS	EEPROM, DATA Loss	Ask repair
E.RJC	RJC SENSOR Failure	Ask repair
Flash Decimal point of SP	Communication Failure	Comm Cable CHECK
S.OPN	SENSOR Open	SENSOR CHECK
E.AT	AT Time Out (27h over)	PROCESS CHECK

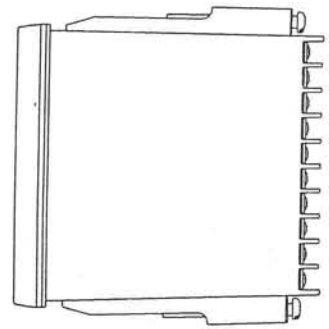
Terminal Arrangement and External wiring

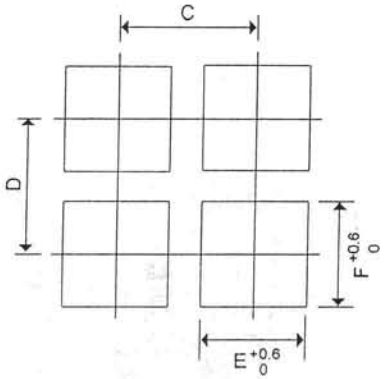


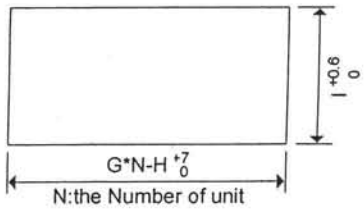
Dimension and Panel Cutout

ST190 ST180 ST170 ST160 ST140





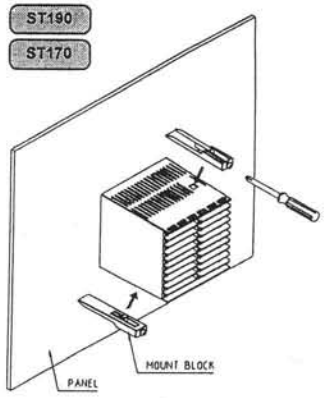




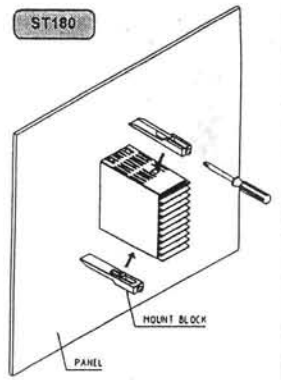
MODEL	A	B	C	D	E	F	G	H	I
ST190	96	96	120	120	92	92	96	4	92
ST180	48	96	70	120	45	92	48	3	92
ST170	72	72	90	90	68	68	71	3	68
ST160	96	48	120	70	92	45	-	-	-
ST140	48	48	70	70	45	45	48	3	45

How to Install Mount

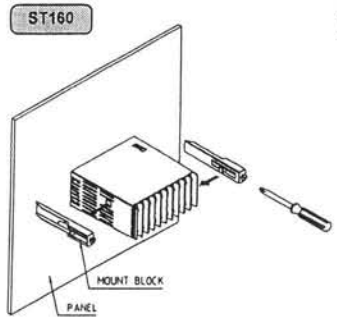
ST190 ST170



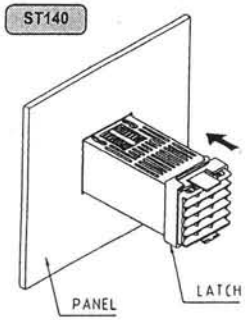
ST180



ST160



ST140



1) Cut the mounting panel. (Refer to Dimension and Panel Cutout)
2) Insert the controller into the panel cutout with the rear terminal board facing ahead.
3) Attach the right and left mount and fix it to the panel.(Use driver)