



NOVA 300 SERIES DIGITAL CONTROLLER ST390/380/370/360/340/320 Instruction Manual

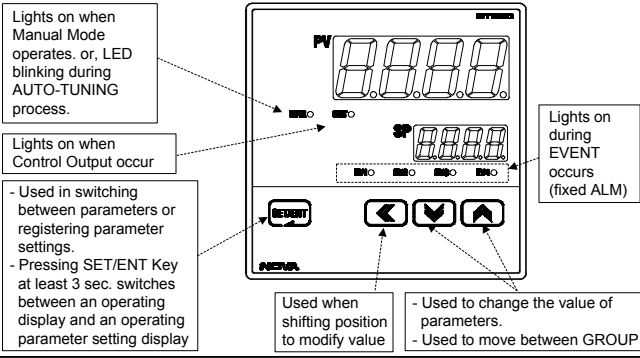
Thank you for purchasing Samwon technology production. Please use after read instruction manual for safety. Free to contact to our sales Div. for Production Inquiry and After Service.
Tel : +82-32-326-9120 FAX : +82-32-326-9119
http://www.samwontech.com E-mail : webmaster@samwontech.com

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

Control Keys and Display



Type of Input Sensor

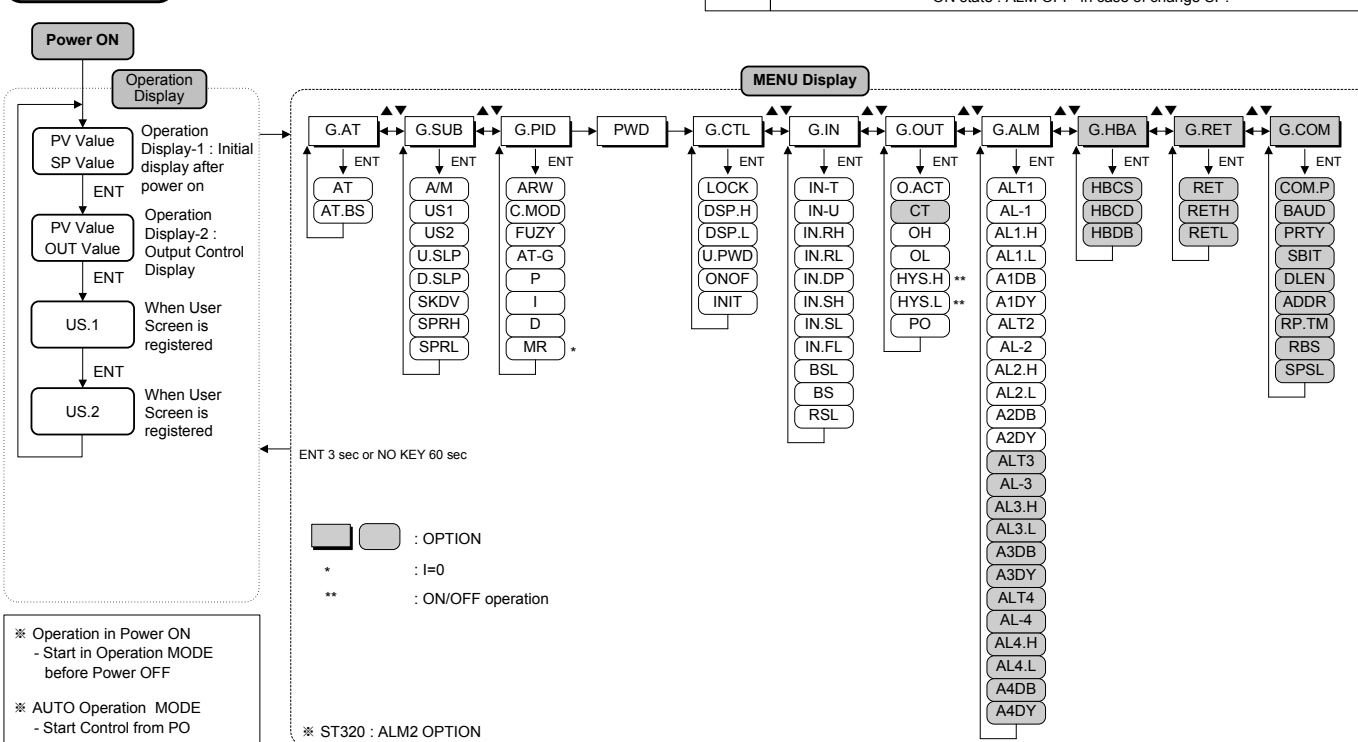
*display range : -5% ~ +105%

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	PIB	-199.9 ~ 500.0	-199.9 ~ 999.9		PTB
16	PIC	-150.0 ~ 150.0	-199.9 ~ 300.0		PTC
17	JPIA	-199.9 ~ 500.0	-199.9 ~ 999.9	JPTA	
18	JPIB	-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

Base Suffix Code

Model	Base Suffix Code	Description
ST320 / 340 / 360 / 370 / 380 / 390	- □ □	Digital Controller
Control Output	S	SSR
	A	AOUT(SCR)
	R	RELAY
Power	0	100 ~ 240V AC
	1	24V DC(preparing)

Parameter Map



Option Suffix Code

Option Suffix Code	Description	Available Model	Remark
/RET	Retransmission	ALL	*note1
/RS	RS 485	ALL	*note1
/HBA	Heater Break Alarm	Except ST320	*note1, *note3
/ALM2	RELAY Output 1 Point	Only ST320	*note2, *note4
/ALM3	RELAY Output 1 Point	ST390 / ST370	
/ALM4	RELAY Output 1 Point	ST390 / ST370	*note1

*note1 : RET, RS, HBA, ALM4 to be purchased separately
 *note2 : RET, ALM2 to be purchased separately
 *note3 : It can't install with AOUT
 *note4 : It's standard function except ST320

Ex) Order Suffix Code : ST340 - S0 / RS

Base + Option

Specification

- PV/SP Data Display : each 4 digits
- Indication Accuracy : ±0.2% of FS (Inquire separately for PTC and JPTB)
- 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 *note5
 - Alarm Type : 21 types(High/Low Temp Limit, Deviation Limit etc) *note6
- HBA
 - CT Spec : use CTL-6-S or 800:1 CT

*note5 : ST320 - STD 1 Point / ST320, 340, 360, 380 - Max 2 Points
 *note6 : In case of HBA Option - 22 Types

Safety & EMC

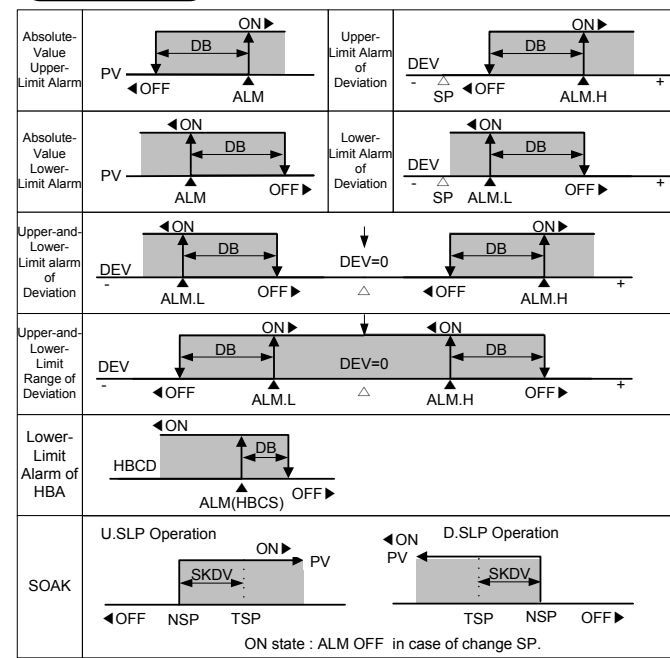
- Safety : EN61010-1, UL61010C-1, CAN/CSA C22.2 No.10101-92, Category II
- EMC : EMI(Emission) - EN61326, ClassA
 EMS(Immunity) - EN61326

Type of Alarm

No.	Type	Output Direct		Standby	Display Data	No.	Type	Output Direct		Standby	Display Data
		For	Rev					Off	On		
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	Soak	○	○	○	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.BS	Auto Tuning Bias	EUS(-10.0 ~ 10.0%)	EUS	EUS(0.0%)	Always

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

SUB 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
SKDV	Soak Deviation	EUS(0.0 ~ 10.0%)	EUS	EUS(0.0%)	When select ALM=SOAK
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.PV	Always
FUZY	Fuzzy	OFF, ON	ABS	ON	Always
AT-G	AT Gain	0.1 ~ 10.0	ABS	1.0	AUTO Operation
P	Proportional Band	0.0 ~ 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	℃, °F	ABS	℃	T/C, RTD
IN.RH	Max. Value of Measurement Range	refer to "Type of Input Sensor"	EU	EU(100.0%)	Always
IN.RL	Min. Value of Measurement Range	However, INRH > INRL	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	BOUT 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 Output	-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	Option
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	Option

◎ ALM3,4=ST320, 340, 360, 380 : can't use.

HBA GROUP

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

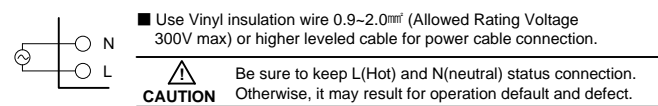
TRANS GROUP

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	

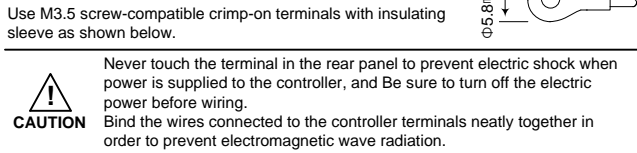
COMM GROUP

Symbol	Parameter	Setting Range	Unit	Initial	Remark
--------	-----------	---------------	------	---------	--------

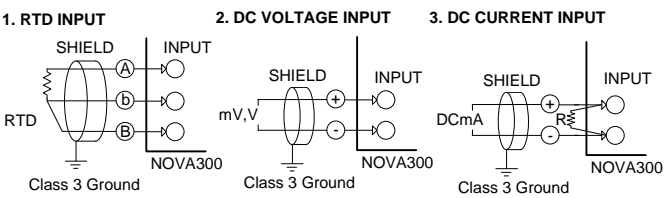
Power Cable Connection



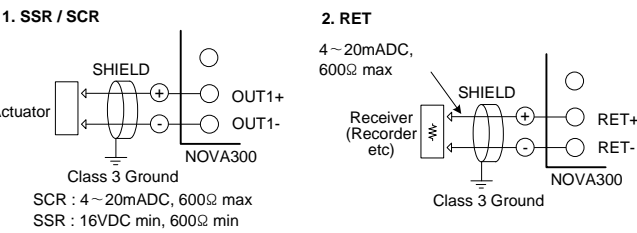
Terminal Specification



ANALOG INPUT Connection

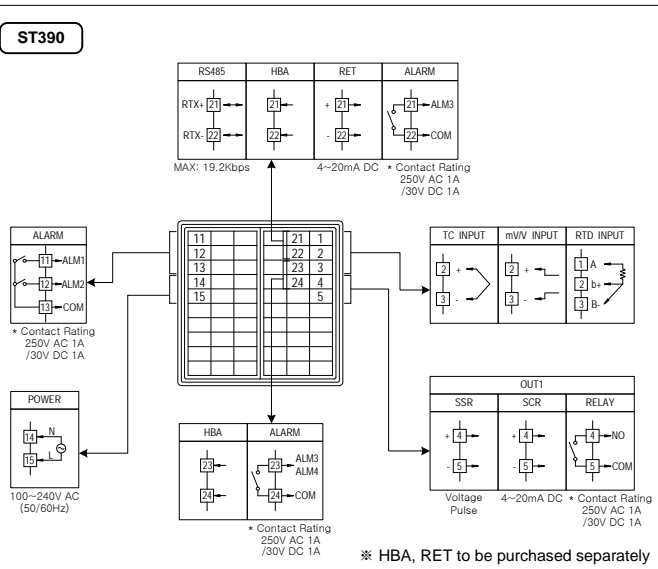


ANALOG OUTPUT Connection

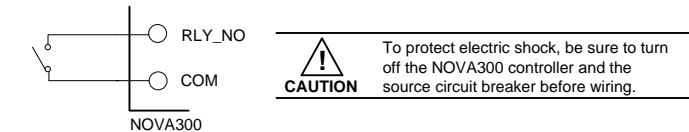


CAUTION To prevent electric shock, be sure to turn off the NOVA300 controller and the source circuit breaker before connection/disconnection of the actuator, receiver as well as wiring.

Terminal Arrangement and External wiring

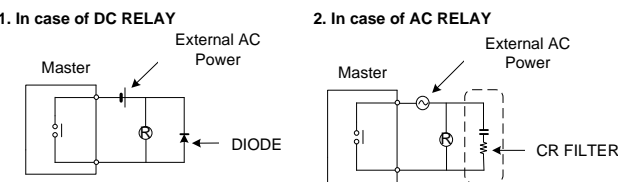


RELAY Connection



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
 - ▶ Jiwoi Electric Co.,Ltd. : SKV, SKVB etc
 - ▶ Shinyoug Communications Co.,Ltd. : CR-CFS, CR-U etc



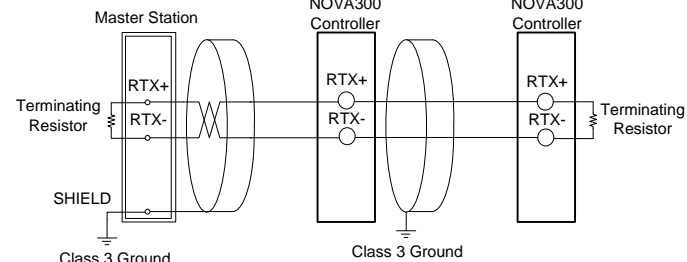
CAUTION

- DIODE, CR FILTER Need to connect direct to RELAY COIL Terminal (SOCKET)
- RELAY Rating Specification of RELAY COIL should be used lower than the Contact Rating of Controller

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

Communication Wiring (RS485)

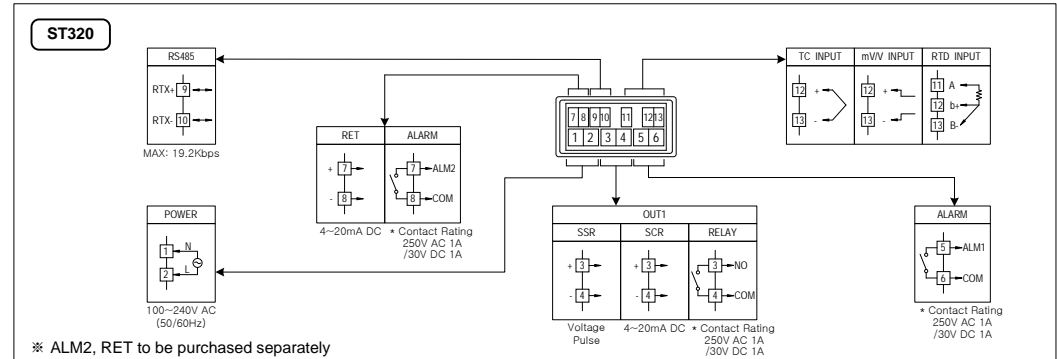
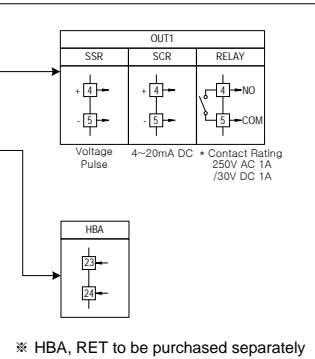
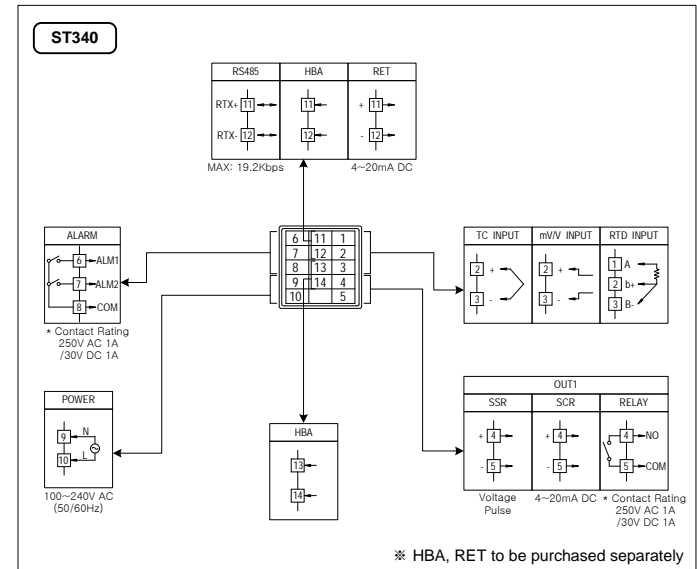
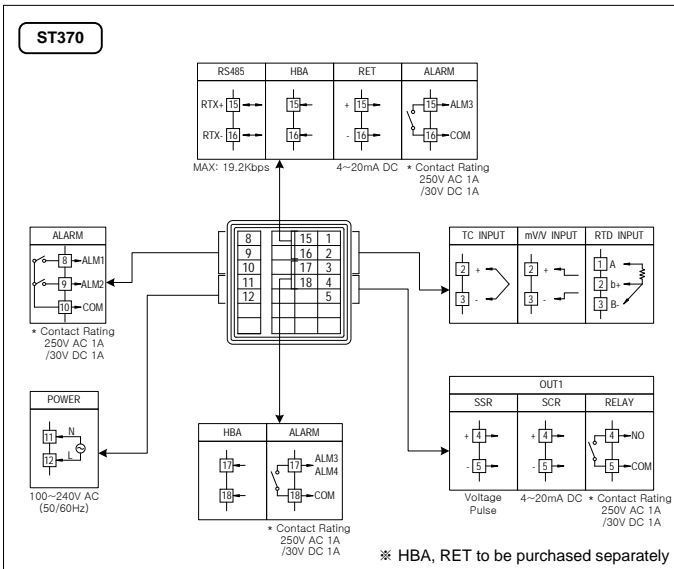


■ Up to 31 slave controllers(NOVA300 series instruments equipped with communication option) can be multidrop-connected.
 ■ Be sure to connect terminating resistors(220Ω, 1/4W) to slave and master controllers at communication-channel ends as shown above.
CAUTION To prevent electric shock, be sure to turn off the NOVA300 controller and source circuit breaker before wiring.

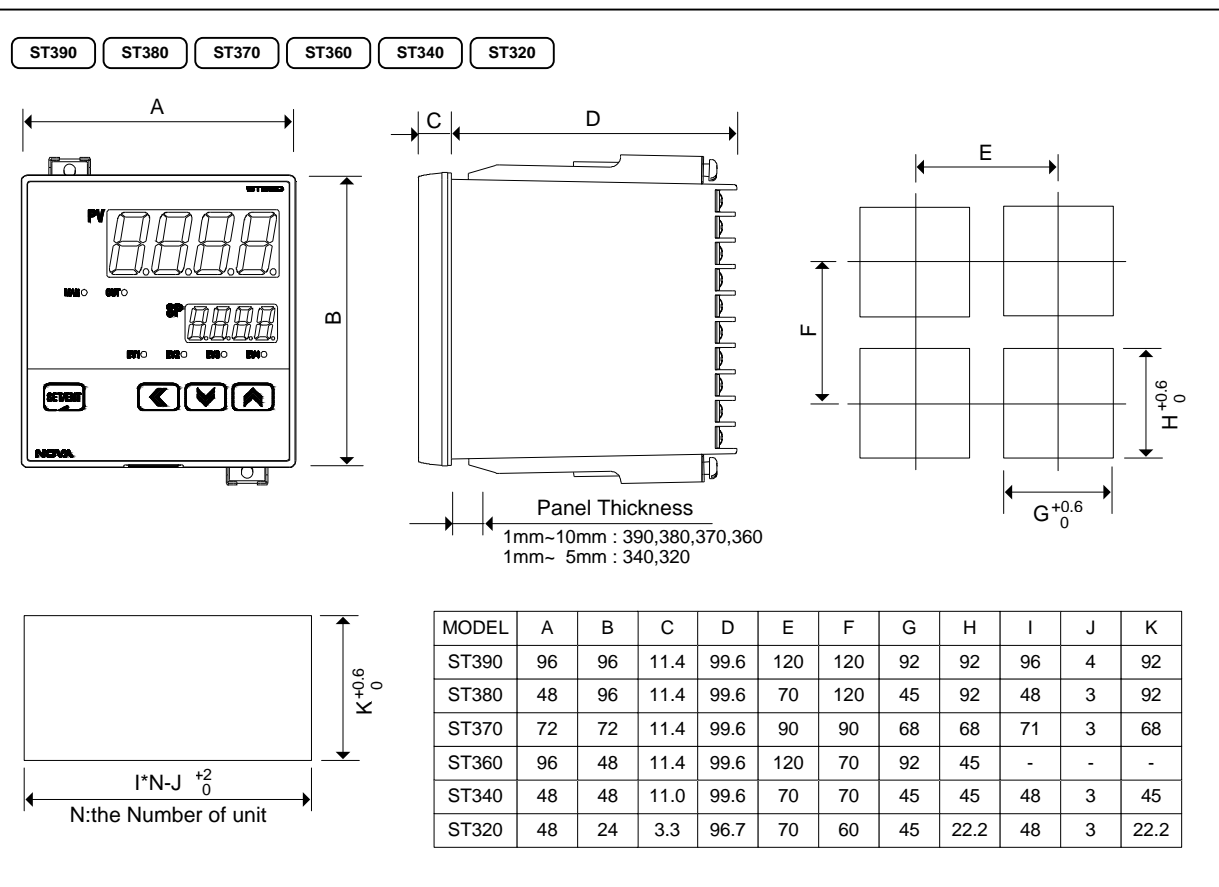
D-Registers

Parameter	D-egister	Parameter	D-egister	Parameter	D-egister
NPV	0001	AL-2	0407	IN.RL	0604
NSP	0002	AL-3	0408	IN.DP	0605
MVOUT	0006	AL-4	0409	BIAS	0606
ALSTS	0014	AL1.H	0411	IN.SL	0607
A/M	0105	AL2.H	0412	IN.SH	0608
AT	0121	AL3.H	0413	IN.FL	0609
AT-G	0122	AL4.H	0414	BSL	0610
US1	0135	AL1.L	0416	O.ACT	0611
US2	0136	AL2.L	0417	CT	0612
SP	0201	AL3.L	0418	OH	0613
LOCK	0203	AL4.L	0419	OL	0614
DSP.H	0204	A1DB	0421	HYS.H	0615
DSP.L	0205	A2DB	0422	HYS.L	0616
U.PWD	0206	A3DB	0423	PO	0617
ONOF	0207	A4DB	0424	RSL	0618
INIT	0208	A1DY	0426	RET	0651
SPRH	0211	A2DY	0427	RETH	0652
SPRL	0212	A3DY	0428	RETL	0653
U.SLP	0216	A4DY	0429	COM.P	0661
D.SLP	0217	ARW	0501	BAUD	0662
SKDV	0218	FUZZY	0502	PRTY	0663
HBCS	0301	P	0503	SBIT	0664
HBCD	0302	I	0504	DLEN	0665
Hbdb	0303	D	0505	ADDR	0666
ALT1	0401	MR	0506	RP.TM	0667
ALT2	0402	C.MOD	0507	RBS	0668
ALT3	0403	IN-T	0601	SPSL	0669
ALT4	0404	IN-U	0602		
AL-1	0406	IN.RH	0603		

* Thick Line : READ ONLY



Dimension and Panel Cutout



How to install Mount

