# **Autonics**

# Two-Degree-of-Freedom PID **Temperature Controllers**



#### **Ordering Information**

O Size

2: Alarm 1 / 2

R: Relay

S: SSR drive

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website .

#### T N O - O 4 O O - O S - O G Control output 2 S: DIN W 48 $\times$ H 48 mm R: Relay H: DIN W 48 imes H 96 mm S: SSR drive L: DIN W 96 $\times$ H 96 mm C: Current or SSR drive Control method No mark: Fixed control O Communication P: Program control N: None R: RS485 Alarm outputs Option input/output 4: Alarm 1 / 2 / 3 / 4 Digital input Transmission No. **CT** input output 6: Alarm 1 / 2 / 3 / 4 / 5 / 6 **006** 0 Control output 1 008 009 014 3 0 C: Current or SSR drive 026 **031** 0 2 1 035

#### **Product Components**

Product

• Bracket

Instruction manual

1

# **TN Series** CATALOG

#### For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

The specifications, dimensions, etc are subject to change without notice for product improvement Some models may be discontinued without notice.

#### **Features**

- · 2-DOF PID algorithm optimized for various control environments
- + 50 ms high-speed sampling and  $\pm$ 0.2% display accuracy
- · Program control and fixed control models available
- Up to 10 patterns X 20 steps program setting (program control model)
- Timer function for preset operation (fixed control model)
- · Simultaneous heating/cooling and automatic/manual control function
- Control functions: Group PID, Zone PID, Anti Reset Windup (ARW)
- · Control status monitoring of up to 10 events
- RS485 communication output model available
- Communication protocols: Modbus RTU/ASCII, PLC ladderless, Sync-Master
- Communication speed: up to 115,200bps • Heater burnout alarm function (CT input)
- · Parameter setting via PC
- Comprehensive Device Management Software (DAQMaster) provided
- Communication converter connection with front loader port (TNH, TNL only)
- · Shortcut key setting with front user key button [U]
- · Easy maintenance with detachable terminal blocks



Specif	ications				
Power sup	ply	100 - 240 VAC~, 50/60 Hz ±10%			
Power con	sumption	≤ 8 VA			
Display type		11 segment, LCD type (operating value display part: 7 segment)			
Sampling	period	50 / 100 / 250 ms (parameter)			
Input spec	ification	Refer to 'Input Type and Using Range'			
Option	СТ	•0.0-50.0 A (primary current measurement range) •CT ratio: 1/1,000 •Measurement accuracy: ±5% F.S. ±1digit			
input	Digital	• Contact - ON: $\leq 2$ kΩ, OFF: $\geq 90$ kΩ • Non contact - residual voltage $\leq 1.0$ V, leakage current $\leq 0.1$ mA • Outflow current: $\approx 0.5$ mA per input			
	Relay	250 VAC~ 3A 1a			
Control	SSR	$12 \text{ VDC} = \pm 2 \text{ V}, \leq 20 \text{ mA}$			
output	Current	DC 0 - 20 mA or DC 4 - 20 mA (parameter), Load resistance: $\leq$ 500 $\Omega$			
	Alarm	250 VAC~ 3 A 1a			
Option output	Transmission	DC 4 - 20 mA (load resistance: $\leq$ 500 $\Omega$ , output accuracy: $\pm$ 0.3% F.S.)			
	Communication	R\$485			
	Туре	ON/OFF, P, PI, PD, PID			
	Multi SV				
Control	Group PID	≤ 8 group			
cype	Zone PID	4 zones			
	ARW (Anti Reset Windup)	50 to 200 %			
Program	Program	≤ 10 patterns			
control	Step	$\leq$ 200 steps (1 pattern: $\leq$ 20 steps)			
	Setting type	Thermocourble PTD: 1 to 100 /0.1 to 100 0\ %C /%C			
Hysteresis		• Analog: 1 to 100 digit			
Proportion	nal band (P)	0.1 to 999.9 °C (0.1 to 999.9%)			
Integrat til	me (I)	0 to 9,999 sec			
Derivative	ume (D)	0.10 9,999 Sec			
Control cy	cle (T)	Selectable current or SSR drive output: 1.0 to 120.0 sec			
Manuatre	set	Potween the charging part and the cace:			
Dielectric	strength	3,000 VAC ~ 50/60 Hz for 1 min			
Vibration		<ul> <li>Y, Z direction for 2 hours</li> <li>OUT1/2: &gt; 5 000 000 operations</li> </ul>			
Relay life cycle	Mechanical	AL1/2/3/4/5/6: ≥ 20,000,000 operations     OUT1/2: > 200 000 operations			
	Electrical	• AL1/2/3/4/5/6: ≥ 100,000 operations			
Insulation	resistance	$\geq$ 100 M $\Omega$ (500 VDC== megger)			
Insulation type		Double insulation or reinforced insulation (mark: , dielectric strength between the measuring input part and the power part: 3 kV)			
Noise immunity		$\pm 2$ kV square shaped noise by noise simulator (pulse width: 1 $\mu s)$ R-phase, S-phase			
Memory retention		pprox 10 years (non-volatile semiconductor memory type)			
Ambient temperature		-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)			
Ambient humidity		35 to 85%RH			
Protection structure		IP65 (Front panel, IEC standards)			
Loader port		TNS: top side     TNH, TNL: front side			
Accessory		Bracket			
Unit weight (packaged)					
Approval		Sec. 20 20			

# **Communication Interface**

RS485		
Comm. protocol	Modbus RTU/ASCII, Sync-Master, PLC ladderless	
Connection type	RS-485, RS-422A	
Application standard	EIA RS485 compliance with	
Maximum connection	32 units (address: 01 to 99)	
Synchronous method	Asynchronous	
Comm. Method	Two-wire half duplex	
Comm. effective range	≤ 800 m	
Comm. speed	≤ 115,200 bps	
Response time	5 to 99 ms (default: 20 ms)	
Start bit	1 bit (fixed)	
Data bit	8 bit (fixed)	
Parity bit	None (default), Odd, Even	
Stop bit	1 bit, 2 bit (default)	
EEPROM life cycle ≈ 1,000,000 operations (Erase / Write)		

• 1 character of ModBus RTU is fixed at 11 bit.

# Input Type and Using Range

The setting range of some parameters is limited when using the decimal point display.

Input type         Display         Using range (°C)         Using range (°F)           Normal Stress $point$ Display         Using range (°C)         Using range (°F)           Normal Stress $1$ $l \in RH$ -200 to 1,350         -328 to 2,463 $J$ (IC) $1$ $l \in RH$ -199.9 to 999.9         -199.9 to 999.9 $J$ (IC) $1$ $l \in ERH$ -200 to 800         -328 to 1,472 $E$ (CR) $1$ $E \in RH$ -200 to 800         -199.9 to 999.9           T (CC) $1$ $E \in ERH$ -200 to 400         -199.9 to 752.0           B (PR) $1$ $b PR$ 0 to 1,800         32 to 3,122           R (PR) $1$ $R PR$ 0 to 1,750         32 to 3,182           N (NN) $1$ $R PR$ 0 to 1,750         32 to 3,182           N (NN) $1$ $C \in E E$ $0$ to 2,300         32 to 4,172 $L$ (IC) $1$ $C \in E E$ $0$ to 2,300         32 to 4,172 $L$ (IC) $1$ $C \in E E$ $0$ to 2,300         32 to 4,172 $L$ (IC) $1$			Decimal					
$ \begin{split} & K(CA) & \begin{array}{ccccccccccccccccccccccccccccccccccc$	Input type		point	Display	Using range (°C) Using range (°F)			
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		K (CA)	1	к с Я.Н	-200 to 1,350	-328 to 2,463		
$ \begin{tabular}{ c c c c c c c } \hline 1 & JI \ LH & -200 & to \ 800 & -199.8 & to \ 1,472 \\ \hline 0.1 & JI \ LL & -199.9 & to \ 800.0 & -199.9 & to \ 999.9 \\ \hline E \ (CR) & 1 & E \ E \ RH & -200 & to \ 800 & -328 & to \ 1,472 \\ \hline 0.1 & E \ CR \ & -199.9 & to \ 800 & -328 & to \ 752 \\ \hline 0.1 & E \ CR \ & -199.9 & to \ 800 & -328 & to \ 752 \\ \hline 0.1 & E \ CL \ & -199.9 & to \ 400 & -328 & to \ 752 \\ \hline 0.1 & E \ CL \ & -199.9 & to \ 400 & -328 & to \ 752 \\ \hline 0.1 & E \ CL \ & -199.9 & to \ 400 & -328 & to \ 752 \\ \hline R \ (PR) & 1 & B \ PR & 0 & to \ 1,750 & 32 & to \ 3,182 \\ \hline S \ (PR) & 1 & S \ PR & 0 & to \ 1,750 & 32 & to \ 3,182 \\ \hline S \ (PR) & 1 & S \ PR & 0 & to \ 1,750 & 32 & to \ 3,182 \\ \hline S \ (PR) & 1 & S \ PR & 0 & to \ 1,300 & -328 & to \ 2,372 \\ \hline C \ (TT)^{01} & 1 & C \ E \ E & 0 & to \ 2,300 & 32 & to \ 4,172 \\ \hline G \ (TT)^{02} & 1 & C \ E \ E & 0 & to \ 2,300 & 32 & to \ 4,172 \\ \hline G \ (TT)^{02} & 1 & C \ E \ E & 0 & to \ 2,300 & 32 & to \ 4,172 \\ \hline L \ (IC) & 1 & L \ I \ L \ I \ L \ I \ L \ I \ L \ I \ L \ I \ L \ I \ I$		R (CA)	0.1	K E A.L	-199.9 to 999.9	-199.9 to 999.9		
$ \begin{tabular}{ c c c c c c } \hline $1(0)$ & $0.1$ & $JI$ $L$ $L$ $-199.9$ to $800.0$ $-199.9$ to $99.9$ \\ \hline $E$ (CR)$ & $1$ & $E$ $C$ $R$ $H$ $-200$ to $800$ $-199.9$ to $99.9$ \\ \hline $T$ (CC)$ & $1$ & $E$ $C$ $L$ $-199.9$ to $800.0$ $-199.9$ to $752.0$ \\ \hline $0.1$ & $E$ $C$ $L$ $-199.9$ to $400.0$ $-199.9$ to $752.0$ \\ \hline $B$ (PR)$ $1$ & $b$ $P$ $R$ $0$ to $1,800$ $-32$ to $3,272$ \\ \hline $S$ (PR)$ $1$ $R$ $P$ $R$ $0$ to $1,750$ $32$ to $3,182$ \\ \hline $S$ (PR)$ $1$ $R$ $P$ $R$ $0$ to $1,750$ $32$ to $3,182$ \\ \hline $S$ (PR)$ $1$ $C$ $E$ $L$ $0$ to $2,300$ $-32$ to $4,172$ \\ \hline $S$ (PR)$ $1$ $C$ $E$ $L$ $0$ to $2,300$ $-32$ to $4,172$ \\ \hline $G$ (TT)^{021}$ $1$ $C$ $E$ $L$ $0$ to $2,300$ $-32$ to $4,172$ \\ \hline $C$ (TT)^{021}$ $1$ $C$ $E$ $L$ $0$ to $2,300$ $-32$ to $4,172$ \\ \hline $L$ (IC)$ $1$ $L$ $L$ $L$ $L$ $-199.9$ to $90.0$ $-199.9$ to $99.9$ \\ \hline $L$ (RUS)$ $1$ $L$ $L$ $L$ $L$ $L$ $10$ to $2,300$ $-328$ to $1,652$ \\ \hline $U$ (CC)$ $1$ $L$ $L$ $L$ $L$ $-199.9$ to $90.0$ $-199.9$ to $99.9$ \\ \hline $L$ (RUS)$ $1$ $L$ $L$ $L$ $L$ $-200$ to $800$ $-328$ to $1,652$ \\ \hline $0.1$ $L$ $L$ $L$ $L$ $-199.9$ to $800$ $-328$ to $1,552$ \\ \hline $U$ (CC)$ $1$ $L$ $L$ $L$ $L$ $-199.9$ to $800$ $-328$ to $1,552$ \\ \hline $U$ (CC)$ $1$ $L$ $L$ $L$ $L$ $-199.9$ to $400$ $0$ $-199.9$ to $752.0$ \\ \hline $Platinel II$ $1$ $PL$ $I$ $0$ $-199.9$ to $400$ $0$ $-199.9$ to $32.0$ \\ \hline $Cu100$ $\Omega$ $0$ $0$ $1$ $L$ $L$ $L$ $-199.9$ to $200$ $-199.9$ to $32.0$ \\ \hline $Cu100$ $\Omega$ $0$ $0$ $1$ $L$ $L$ $L$ $-199.9$ to $600$ $-199.9$ to $32.0$ \\ \hline $Cu100$ $\Omega$ $0$ $0$ $1$ $L$ $L$ $L$ $-199.9$ to $600$ $-199.9$ to $392.0$ \\ \hline $Cu100$ $\Omega$ $0$ $0$ $1$ $L$ $L$ $L$ $-199.9$ to $600$ $-199.9$ to $392.0$ \\ \hline $DPti0$ $\Omega$ $0$ $0$ $1$ $D$ $D$ $100$ $D$ $100$ $D$ $199.9$ to $99.9$ \\ \hline $Dris0$ $\Omega$ $0$ $1$ $D$ $D$ $100$ $D$ $D$ $100$ $D$ $100$ $D$ $100$ $D$ $D$ $D$ $D$ $D$ $D$ $D$ $100$ $D$ $D$ $D$ $D$ $D$		1/10)	1	JI E.H	-200 to 800	-328 to 1,472		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		J (IC)	0.1	JI E.L	-199.9 to 800.0	-199.9 to 999.9		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		F (CP)	1	E C R.H	-200 to 800	-328 to 1,472		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			0.1	E C R.L	-199.9 to 800.0	-199.9 to 999.9		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		T (CC)	1	Е С С.Н	-200 to 400	-328 to 752		
$ \begin{array}{c ccccc} \mbox{Hermitian} B (PR) & 1 & b PR & 0 \ to 1,800 & 32 \ to 3,272 \\ \mbox{R}(PR) & 1 & P PR & 0 \ to 1,750 & 32 \ to 3,182 \\ \mbox{S}(PR) & 1 & 5 PR & 0 \ to 1,750 & 32 \ to 3,182 \\ \hline N(NN) & 1 & N NN & -200 \ to 1,300 & -328 \ to 2,372 \\ \hline C(TT)^{01} & 1 & C \ L L \\ \hline G(TT)^{02} & 1 & C \ L L \\ \hline G(TT)^{02} & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ L L \\ \hline & 1 & C \ C \ D \\ \hline & 1 & C \ C \ C \\ \hline & 1 & C \ C \ C \\ \hline & 1 & C \ C \ C \\ \hline & 1 & C \ C \ C \\ \hline & 1 & C \ C \ C \\ \hline & 1 & C \ C \\ \hline & $		1 (CC)	0.1	E C C.L	-199.9 to 400.0	-199.9 to 752.0		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		B (PR)	1	ь рр	0 to 1,800	32 to 3,272		
$ \begin{array}{c} \mbox{Thermod}\\ \mbox{Field}\\ \mbox{Couple} \end{array} \begin{array}{c} \mbox{S} (PR) & 1 & 5 \mbox{$PR$} & 0 \mbox{to} 1,750 & 32 \mbox{to} 3,182 \\ \mbox{N} (NN) & 1 & N \mbox{$N$} NN & -200 \mbox{to} 1,300 & -328 \mbox{to} 2,372 \\ \mbox{C} (TT)^{01} & 1 & \mbox{$L$} E & 0 \mbox{to} 2,300 & 32 \mbox{to} 4,172 \\ \mbox{$G$} (TT)^{02} & 1 & \mbox{$G$} E & 0 \mbox{to} 2,300 & 32 \mbox{to} 4,172 \\ \mbox{$L$} (RU) & 1 & \mbox{$L$} E & 0 \mbox{to} 2,300 & 32 \mbox{to} 4,172 \\ \mbox{$L$} (RUS) & \mbox{$0$} 1 & \mbox{$L$} E & 0 \mbox{to} 2,300 & -328 \mbox{to} 4,172 \\ \mbox{$L$} (RUS) & \mbox{$1$} 1 & \mbox{$L$} E & -199.9 \mbox{to} 9000 & -328 \mbox{to} 4,172 \\ \mbox{$L$} (RUS) & \mbox{$0$} 1 & \mbox{$L$} RH & -200 \mbox{to} 800 & -328 \mbox{to} 1,99.9 \mbox{to} 999.9 \\ \mbox{$U$} (CC) & \mbox{$1$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 8000 & -199.9 \mbox{to} 999.9 \\ \mbox{$V$} (CC) & \mbox{$1$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 8000 & -199.9 \mbox{to} 999.9 \\ \mbox{$V$} (CC) & \mbox{$1$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 8000 & -199.9 \mbox{to} 752.0 \\ \mbox{$0$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 4000 & -199.9 \mbox{to} 752.0 \\ \mbox{$V$} 1 & \mbox{$C$} 0 \mbox{$0$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 4000 & -199.9 \mbox{to} 392.0 \\ \mbox{$C$} Cu100 \mbox{$\Omega$} 0 \mbox{$0$} 1 & \mbox{$U$} E L & -199.9 \mbox{to} 2000 & -199.9 \mbox{to} 392.0 \\ \mbox{$C$} Cu100 \mbox{$\Omega$} 0 \mbox{$0$} 1 & \mbox{$J$} P LH & -200 \mbox{to} 650 & -328 \mbox{to} 1,202 \\ \mbox{$0$} 0 \mbox{$1$} 1 & \mbox{$J$} P LH & -200 \mbox{to} 650 & -199.9 \mbox{to} 399.9 \\ \mbox{$D$} P ti00 \mbox{$\Omega$} 0 \mbox{$1$} 1 & \mbox{$J$} P LH & -200 \mbox{to} 650 & -199.9 \mbox{to} 999.9 \\ \mbox{$D$} P ti00 \mbox{$\Omega$} 1 & \mbox{$M$} I & \mbox{$2$} 0 \mbox{to} 199.9 \mbox{to} 999.9 \\ \mbox{$Nickel120 \mbox{$\Omega$} 1 & \mbox{$N$} I \mbox{to} 200 & -112 \mbox{to} 392 \\ \mbox{to} 5V & - & \mbox{$RV$} 3 & \mbox{to} 10V \\ \mbox{to} 100 \mbox{$V$} 0 \mbox{to} 5V \\ \mbox{to} 5V & - & \mbox{$RV$} 3 & \mbox{to} 100 \mbox{$V$} \\ \mbox{to} 100 \mbox{to} 0 \mbox{to} 0 to$	Thormo	R (PR)	1	R PR	0 to 1,750	32 to 3,182		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	couplo	S (PR)	1	S PR	0 to 1,750	32 to 3,182		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	-couple	N (NN)	1	N NN	-200 to 1,300	-328 to 2,372		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		C (TT) 01)	1	C EE	0 to 2,300	32 to 4,172		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		G (TT) 02)	1	G EE	0 to 2,300	32 to 4,172		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		1 (10)	1	LI E.H	-200 to 900	-328 to 1,652		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		L (IC)	0.1	LI E.L	-199.9 to 900.0	-199.9 to 999.9		
L (KO3)         0.1         L RL         -199.9 to 800.0         -199.9 to 999.9           U (CC)         1         U U C H         -200 to 400         -328 to 752.0           Platinel II         1         U U C L         -199.9 to 400.0         -199.9 to 752.0           Platinel II         1         U L L         -199.9 to 400.0         -199.9 to 752.0           Platinel II         1         P L I         0 to 1.390         32 to 2,534           Cu50 Ω         0.1         C U S         -199.9 to 200.0         -199.9 to 392.0           Cu100 Ω         0.1         C U I U         -199.9 to 200.0         -199.9 to 392.0           JPt100 Ω         0.1         U J P L.H         -200 to 650         -328 to 1,202           DPt50 Ω         0.1         U P L.L         -199.9 to 650.0         -199.9 to 999.9           DPt100 Ω         1         U P L.L         -199.9 to 650.0         -199.9 to 999.9           DPt100 Ω         1         U P L.L         -199.9 to 650.0         -199.9 to 999.9           Nickel120 Ω         1         NI I Z         -80 to 200         -112 to 392           0 to 10V         -         R V I         0 to 10V         0 to 5V           0 to 5V         -         R V			1	L R.H	-200 to 800	-328 to 1,472		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		L (RUS)	0.1	L R.L	-199.9 to 800.0	-199.9 to 999.9		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		11(00)	1	ШΕ С.Н	-200 to 400	-328 to 752		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		0 (CC)	0.1	U C C.L	-199.9 to 400.0	-199.9 to 752.0		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Platinel II	1	PLII	0 to 1,390	32 to 2,534		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Cu50 Ω	0.1	CU S	-199.9 to 200.0	-199.9 to 392.0		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		Cu100 Ω	0.1	C U 10	-199.9 to 200.0	-199.9 to 392.0		
Analog         0.1         J P LL         -199.9 to 650.0         -199.9 to 999.9           DPt5 Ω         0.1         J P L 5         -199.9 to 600.0         -199.9 to 999.9           DPt10 Ω         1         J P L H         -200 to 650.0         -199.9 to 999.9           DPt10 Ω         0.1         J P L L         -199.9 to 650.0         -199.9 to 999.9           Nickel120 Ω         1         J P L L         -199.9 to 650.0         -199.9 to 999.9           Nickel120 Ω         1         N I I Z         -80 to 200         -112 to 392.9           0 to 10 V         -         R V I         0 to 10 V         -           0 to 5 V         -         R V Z         0 to 5 V         -           1 to 5 V         -         R V Z         0 to 100 mV         -           0 to 100 mV         -         R H Z         0 to 100 mV         -		ID+100 O	1	JPE.H	-200 to 650	-328 to 1,202		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	DTD	JPIIOU 12	0.1	JPE.L	-199.9 to 650.0	-199.9 to 999.9		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	RID	DPt50 Ω	0.1	d P E S	-199.9 to 600.0	-199.9 to 999.9		
Deficiency         0.1         dPEL         -199.9         to         650.0         -199.9         to         999.9           Nickel120 Ω         1         NI         I2         -80         to         200         -112         392           Vickel120 Ω         1         NI         I2         -80         to         200         -112         to         392           0 to         10 V         -         R V         0 to         10 V         0         0         0         10         V           Analog         1 to 5 V         -         R V 3         1 to 5 V         -         R V 3         0 to         100 mV           0 to         0 to         0 mV         -         R M 4         0 to         0 to         20 mA			1	d₽£.H	-200 to 650	-328 to 1,202		
Nickel120 Ω         1         NI         I2         -80         to         200         -112         to         392           0 to 10 V         -         RV         1         0 to         10 V         -         392           0 to 5 V         -         RV2         0 to         5 V         -		DFILOU 12	0.1	d P E.L	-199.9 to 650.0	-199.9 to 999.9		
0 to 10 V         -         R / I         0 to 10 V           0 to 5 V         -         R / 2         0 to 5 V           1 to 5 V         -         R / 3         1 to 5 V           0 to 100 mV         -         R / 3         1 to 5 V           0 to 100 mV         -         R / 4         0 to 100 mV		Nickel120 Ω	1	NI 12	-80 to 200	-112 to 392		
Analog         0 to 5 V         -         R // 2         0 to 5 V           1 to 5 V         -         R // 3         1 to 5 V           0 to 100 mV         -         R // / 1         0 to 100 mV           0 to 20 mA         -         R // / 1         0 to 20 mA		0 to 10 V	-	AV I	0 to	10 V		
Analog         1 to 5 V         -         R V 3         1 to 5 V           0 to 100 mV         -         R M V         0 to 100 mV         0 to 20 mA           0 to 20 mA         -         R M R I         0 to 20 mA		0 to 5 V	-	AK 5	0 to 5 V			
O to 100 mV         -         Rmv I         O to 100 mV           0 to 20 mA         -         RmR I         0 to 20 mA	Analog	1 to 5 V	-	A¥ 3	1 to 5 V			
0 to 20 mA - 8M8 / 0 to 20 mA	Analog	0 to 100 mV	-	AMV I	0 to	100 mV		
		0 to 20 mA	-	AMA I	0 to	20 mA		
4 to 20 mA - RMR2 4 to 20 mA		4 to 20 mA	-	8482	4 to	20 mA		

Permissible line resistance per line: ≤ 5 Ω
 01) C (TT): Same as existing W5 (TT) type sensor
 02) G (TT): Same as existing W (TT) type sensor

### Display accuracy

Input type	Using temperature	Display accuracy
Thermo -couple	At room temperature (23°C ±5 °C)	<ul> <li>(PV ±0.2% or ±1 °C higher one) ±1-digit</li> <li>Thermocouple K, J, T, N, E below -100 °C and L, U, PLII, RTD Cu50 Ω, DPt50 Ω: (PV ±0.3% or ±2 °C higher one) ±1-digit</li> <li>Thermocouple C, G and R, S below 200 °C: (PV ±0.3% or ±3 °C higher one) ±1-digit</li> <li>Thermocouple B below 400 °C: There is no accuracy standards</li> </ul>
RTD	Out of room temperature range	$\begin{array}{l} (\text{PV}\pm0.5\% \text{ or }\pm2\ ^{\circ}\text{C higher one})\pm1\text{-digit}\\ \bullet\text{RTD Cu50 }\Omega, \text{DPt50 }\Omega; (\text{PV}\pm0.5\% \text{ or }\pm3\ ^{\circ}\text{C higher one})\\ \pm1\text{-digit}\\ \bullet\text{Thermocouple R, S, B, C, G:}\\ (\text{PV}\pm0.5\% \text{ or }\pm5\ ^{\circ}\text{C higher one})\pm1\text{-digit}\\ \bullet\text{Other sensors:}\leq\pm5\ ^{\circ}\text{C}(\leq-100\ ^{\circ}\text{C})\end{array}$
Analog	At room temperature (23°C ±5 °C)	±0.2% F.S. ±1-digit
Analog	Out of room temperature range	±0.5% F.S. ±1-digit

#### **Dimensions**

• Unit: mm, For the detailed drawings, follow the Autonics website.



	Body				Panel cut-out					
	A	В	С	D	E	F	G	н	I	J
TNS	49	49	6	69	1.5	44.8	$\geq 65$	$\geq 65$	45 <sup>+0.6</sup>	45 <sup>+0.6</sup>
TNH	49	97	6	69	1.5	91.5	$\geq 65$	$\geq 115$	45 <sup>+0.6</sup>	92 <sup>+0.8</sup>
TNL	97	97	6	69	1.5	91.5	$\geq 115$	$\geq 115$	92 <sup>+0.8</sup>	92 <sup>+0.8</sup>

## Bracket



#### **Unit Descriptions**

4

5

6

E

- Below is based on TNL Series.
- The shape and function of each part may be different depending on the series, and it is possible to check the additional information in the user manual.

#### 1. PV display part (White)

- RUN mode: Displays PV (Present value) and unit. Setting mode: Displays parameter name 2. SV display part (Green)
- RUN mode: Displays SV (Setting value) and unit. 1 Setting mode: Displays parameter setting value. 3. Operating value display part (Yellow) 2 • RUN mode: Displays selected value among MV (Manipulated output value), CT, TIME with unit. 3

000

- 4. Temperature control indicator • Fixed control: Relative PV value status display
- based on SV  $PV > SV (\nearrow), PV = SV (\rightarrow), PV < SV (\searrow)$  Program control: Displays temperature control status of up  $(\nearrow)$ , hold  $(\rightarrow)$ , down  $(\searrow)$ .

#### 5. Operation status indicator

0  $\square$ 

Display	Name	Description
LOCK	Lock	Turns ON during key lock status.
PROG	Program	Turns ON during program control.
WAIT	Wait	Turns ON during waiting status.
HBA1/2	Heater break alarm	Turns ON when the heater break alarm output is ON.

#### 6. Output status indicator

	Display	Name	Description
	OUT1/2	Control output	Turns ON when the control output is ON
	AT	Auto tuning	Flashes during auto tuning every 1 sec
-	MAN	Manual control	Turns ON during manual control mode
	STOP	Control output stop	Turns ON during control output stop mode
	HOLD	Program control hold	Turns ON when program control is hold status
	AL1 to 6	Alarm output	Turns ON when the alarm output is ON

#### 7. Input key

Display	Name		
[U]	User key		
[M]	Mode key		
	Setting value		
[ ], [ ], [ ], [	control kev		

#### 8. PC loader port

For connecting communication converter (SCM-USP).

# **Sold Separately**

Terminal protection cover

- Communication converter: SCM Series
- Current transformer (CT)
- Front cover

#### Sold Separately: Front cover

• Unit: mm, For the detailed drawings, follow the Autonics website.

### TNS: FSA-COVER





#### TNL: FLA-COVER



# **Autonics**