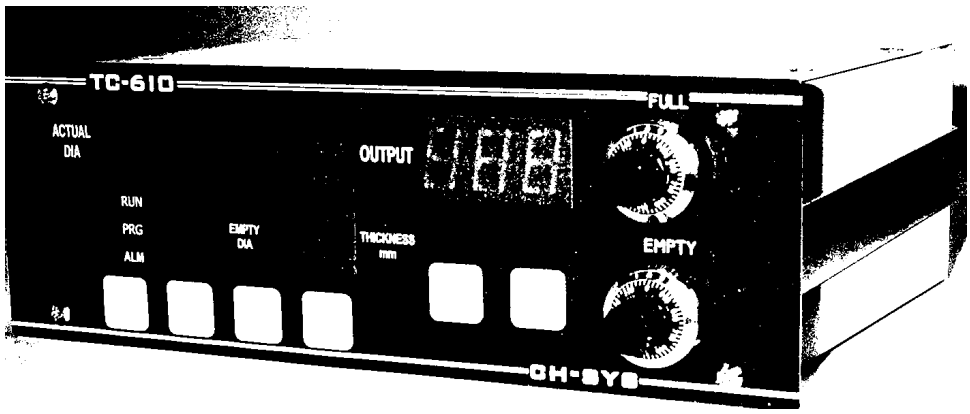
TC-610 Ultrahigh Precision Tension Controller

USER MANUAL

Concise Solution by easy-setting

of material thickness



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1. TC-610 Features

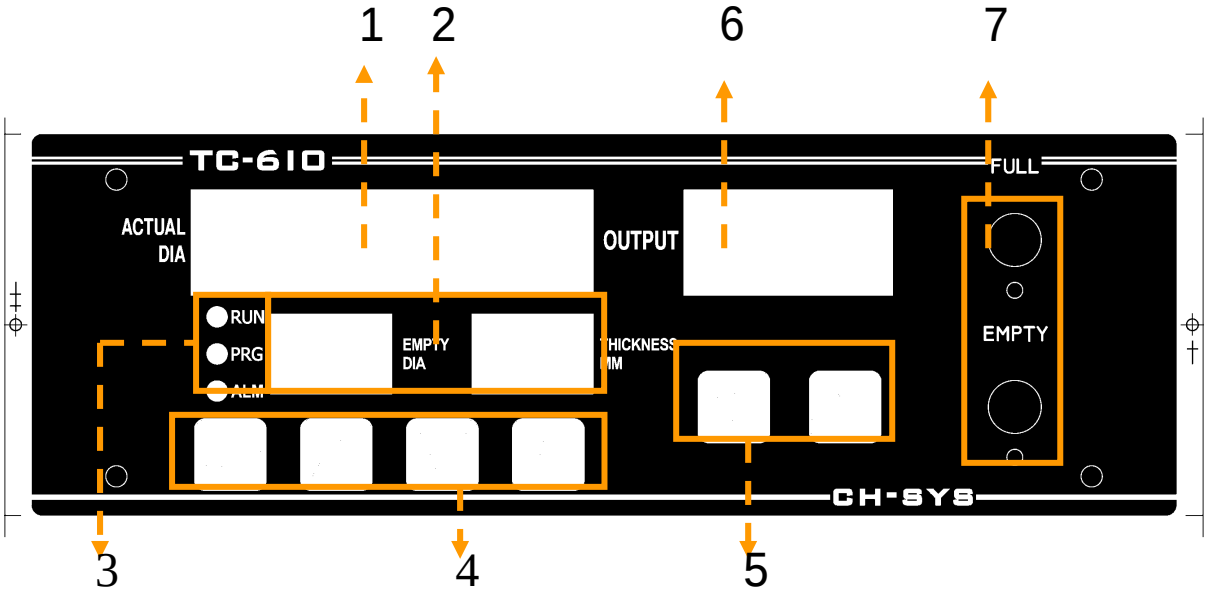
TC-610 is a powerful, easy-to-use tension controller. From the control panel, the user simply sets the tension to FULL spool and EMPTY spool, and enters either total material length or total number of circles to achieve high precision tension control.

Applications: applies to industries such as plastic, thin film, gluing, electric cord, steel plate, starching yarn, joining warp, and paper.

2. Safety precautions

- Make sure to power off before wiring or unwiring TC-610 to avoid danger or causing damage to controller.
- Terminals 3 and 4 of outputting 0-24V DC voltage is only used for resistive load, not for inductance load (DC motor).
- Terminals 11-25 are contacts for inputting and outputting signals. Do not connect them to AC power to avoid damage.
- Terminals 1 and 2 are input points for AC28V±2V. Use isolated transformer for power supply.
- Terminals 3 and 4 are for outputting 0-24V DC voltage (max. 5.5A). Put in fuse circuit before connecting to load.
- Do not remove controller casing or perform pressure tests to controller components.
- Keep records of TC-610 tension controller parameter setting after test run.

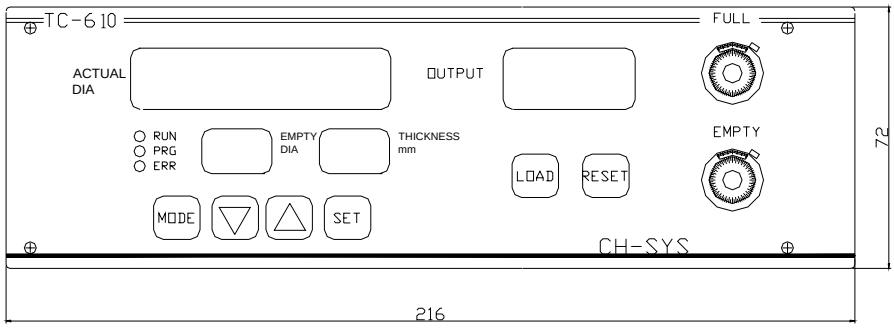
3. Control Panel Functions

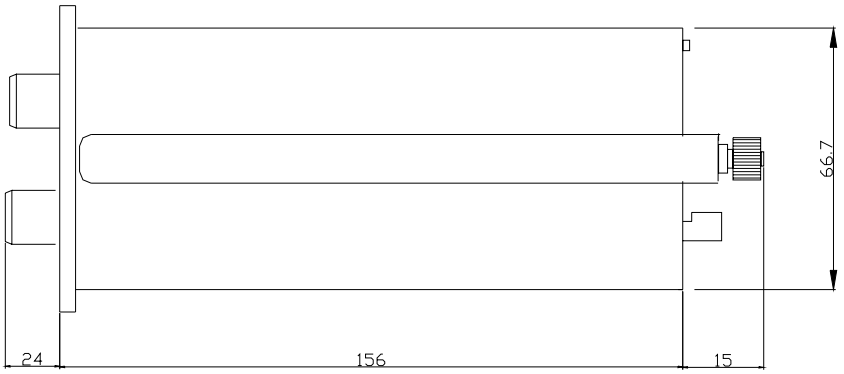


Control Panel Functions:

1	Count value display 5/8” RED LED, 6 Digit	
2	Count setting display 1/2” GREEN LED, 6 Digit	
3	RUN	Operation indicator
	PRG	Entry parameter indicator/limit signal input synchronization indicator
	ERR	RELAY output indicator
4	MODE	Entry parameter key/exit parameter key
	▲	Addend input key (count/parameter change/parameter modification)
	▼	Subtrahend input key (count/parameter change/parameter modification)
	SET	ENTER key after parameter modification
5	LOAD	Press this key to view final tension output
	RESET	Count number reset and tension output reset
6	Indicating tension output 5/8” RED LED, 3 Digit	
7	FULL	Full spool tension setting knob
	EMPTY	Empty spool tension setting knob

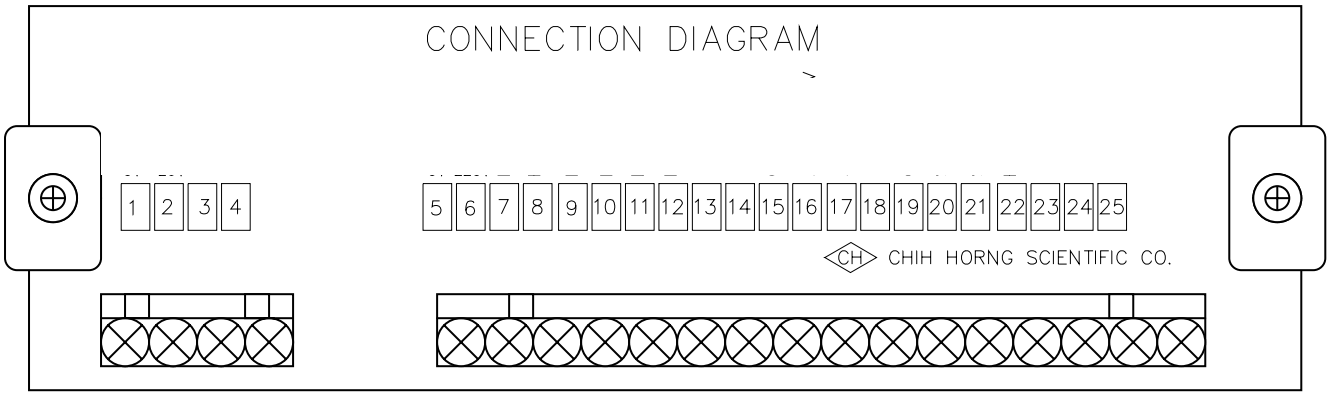
4. External Dimensions and Fastening Positions





盤面開孔 L:196mm x H:76mm
Panel cut-out

5. Terminal Connection Diagram



Terminal #	Description		Contents
1	AC 28V±2V INPUT		MAX 6A
2			
3	DC 0-24V OUTPUT		TO magnetic powder brake/clutch
4			

5	AC220±10% INPUT		Power input
6			
7	FG 3rd ground wire		⊥
8	C	RELAY output: 250V AC、1A	C A B
9	A		
10	B		
11	+	D/A OUTPUT	0-10VDC
12	-		
13	+ 12V	Limit switch input	50Hz/2KHz
14	IN		
15	OV		
16	0-10V	A/D INPUT	Master speed 0-10V DC
17	OV		
18	+12V	DCV	MAX. 100Ma
19	COM	Control input common point	19 20 21 22
20	START	Initiating input	
21	E.STOP	Emergency stop	
22	RESET	Roller diameter reset	
23.24.25	Reserved		

6.TC-610 Parameter Contents and Definitions

Parameters	Definition
Pr01	Maximum outer diameter: full spool (9999mm), Ex-factory setting: 600mm
Pr02	Minimum outer diameter: empty spool (0000mm), Ex-factory-setting: 95mm
Pr03	Password, Ex-factory setting: 1234
Pr04	Pulse rate(PPR) amount per turn, Ex-factory setting: 1
Pr05	Compensated delay time for master speed input (Sec.)
Pr06	Tension compensated percentage on acceleration (%)
Pr07	Tension compensated percentage on decelerating (%)
Pr08	Tension compensated percentage at urgent stop (%)
Pr09	Tension compensated percentage at stop (%)
Pr10	Wind / Unwind Control Mode (1: Unwind 2: Wind)
Pr11	Max. Percentage for Brake output modification (%)
Pr12	Signal input frequency (0: 50Hz ; 1: 2KHz)
Pr13	Alarm point setting. There will be an inform before the actual value meets Full spool value.
Pr14	Decimal point setting of Thickness unit **(2：0.01mm 3：0.001mm)**
Pr15	Invert function of Pr06 0:positive direction 1: opposite direction
Pr16	Invert function of Pr07 0:positive direction 1: opposite direction
Pr17	Invert function of Pr08 0:positive direction 1: opposite direction
Pr18	Invert function of Pr09 0:positive direction 1: opposite direction

7.TC-610 Parameter Table

Parameter number	Definition	Unit	Range	Factory Setting
Pr01	Maximum outer diameter	mm	0000-9999	600
Pr02	Minimum outer diameter	mm	0000-9999	95
Pr03	Password	Digit	0000-9999	1234
Pr04	Signal sum per turn	PPR	0001-9999	100
Pr05	Compensated delay time for master speed input	Sec.	0.1- 25.5	0.1
Pr06	Tension compensated percentage on acceleration *	%	000-100	0
Pr07	Tension compensated percentage on decelerating *	%	000-100	0
Pr08	Tension compensated percentage at urgent stop	%	000-100	0
Pr09	Tension compensated percentage at stoppage	%	000-100	0
Pr10	Wind/unwind control mode	**1: Unwind 2: Wind**	0,1	1
Pr11	Tension modified factor(K)	%	000-999	0
Pr12	Signal input frequency	**0: 50Hz ; 1: 2KHz**	0,1	0
Pr13	Initial value for Full spool (D)/empty spool (d)	mm	000-999	0
Pr14	Thickness unit (Decimal point setting)	2：0.01mm 3：0.001mm	2,3	2
Pr15	Invert function of Pr06**	0,1	0:positive direction 1: opposite direction	0
Pr16	Invert function of Pr07**	0,1		0
Pr17	Invert function of Pr08**	0,1		0
Pr18	Invert function of Pr09**	0,1		0

* Winding master motor accelerating VOUT=V × (100% + ?%)
  Unwinding master motor accelerating VOUT=V × (1 − ?%)
** Winding master motor accelerating VOUT=V × (100% − ?%)
  Unwinding master motor accelerating VOUT=V × (1 + ?%)

8. TC-610 Electrical Characteristics

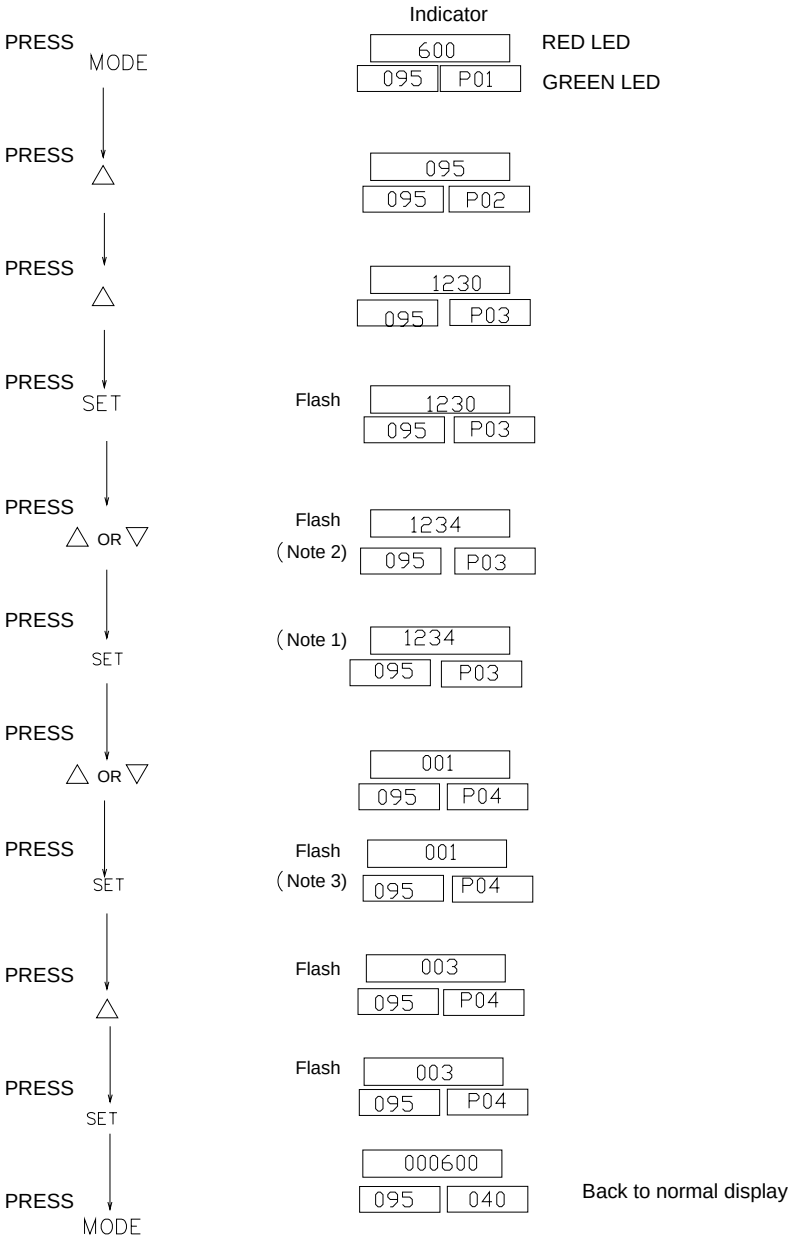
Power input	AC220V ±10% 50/60Hz consumption power 15W
POWER SUPPLY	AC28V ±2V current max. capacity 6A
0-24VDC output	Max. current 5.5A
DC power output	DC12V ±0.2V 110mA
Control contact input	NPN input, optic coupling isolated
CLK count speed	50Hz/2kHz Note: set in parameter 12
D/A OUTPUT diagnosis	12BIT D/A OUTPUT 0-10VDC
A/D INPUT diagnosis	10BIT A/D INPUT 0-10VDC
Relay output R1、R2	Contact 250V AC、1A
Protection level	IP40
Humidity	0-95% RH

➢ Applying RELAY

Selection 1	RELAY executes before count length reaches set value.
Selection 2	During winding period, RELAY executes before actual value meets maximum outer diameter. During unwinding period, RELAY executes before actual value meets minimum outer diameter.

9.Parameters Setting Procedures

Example: Changing Parameter 4 from 1.00 to 3.00 as follows:



Changes to other parameters are similar to the above.

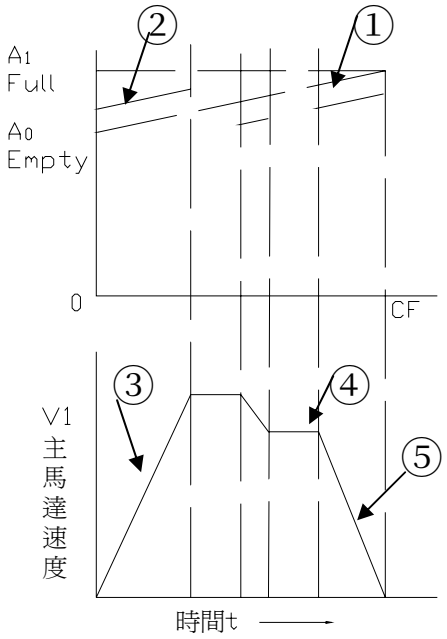
Note 1: Ex-factory password is 1234. Wrong password won't be allowed to modify the content of Parameters.

Note 2: Change parameter when Prxx on red LED flashes.·

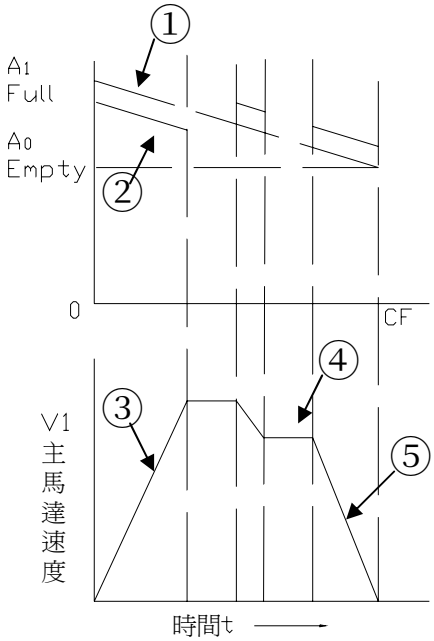
Note 3: Confirm by pressing SET after parameter change.

10. TC-610 Output vs. Count Value and Speed Description

1. Outputting graphics when winding.



2. Outputting graphics when unwinding.



Notations:

A1	FULL tension (adjustable) at full spool
A0	EMPTY tension (adjustable) at empty spool
CF	Count value from empty to full spool (adjustable)
V1	MAIN MOTOR SPEED
t	Operation time
1	Output curve at fixed speed
2	Post-compensation output at acceleration/deceleration
3	Main motor accelerating
4	Speed locking
5	Main motor decelerating