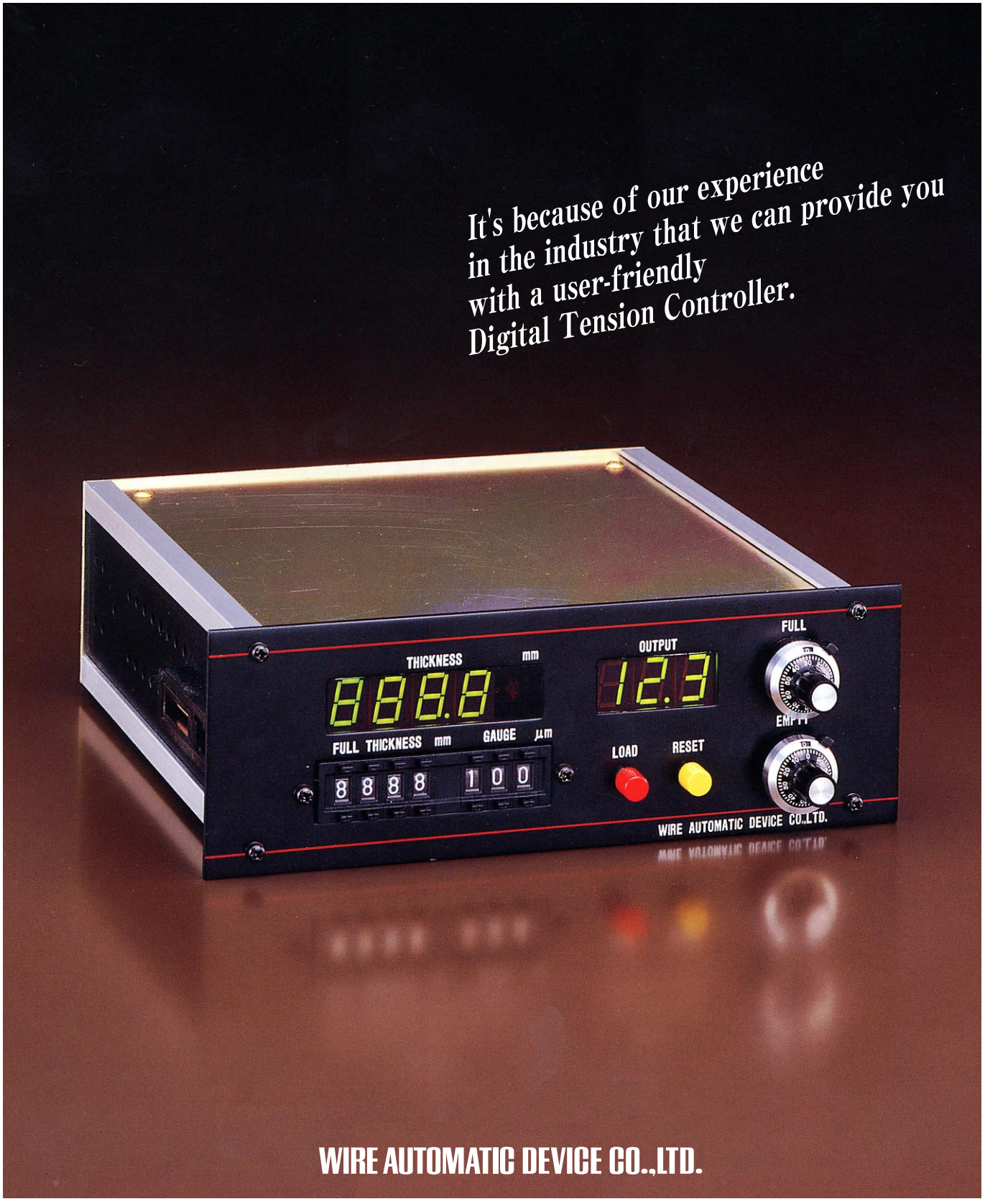
WADECO

DIGITAL TENSION CONTROLLER

MODEL TC-5B PAT.



WIRE AUTOMATIC DEVICE CO.,LTD.

DIGITAL TENSION CONTROLLER

Introduction

In the pursuit of excellence, the popular TC-5`s design is handed down to the new TC-5B making it more reliable and easier to handle.
The TC-5B operates as a tension controller, and it also has a preset function.
This unit indicates the current thickness of a coil by calculating the product of material thickness and number of turns of coil.
When the empty and full bobbin tension output is preset to the thickness value, the tension output will change from one to another in proportion to the thickness value.
In combination with a tension control device, ie powder clutch, you can keep continuous control of the tension in coiling and uncoiling, without the a use of dancer roller.

Special features

- When the empty and full bobbin tension output is preset the thickness value, the tension output will change from one to another in proportion to the thickness value so that the tension control can be kept smoothly and continuously. Also before operating, you can see the tension for every thickness value and during anytime while operating, you can check the thickness value and the tension.
- This can be used as a preset counter with an output relay, that actuates on the preset thickness value or zero reading.
- Both power output and voltage output are provided. The power output can directly control a powder clutch, etc, while the voltage output can control devices such as a voltage regulator.
- An optional tension setter and calculator can be connected to the TC-5B in order to compensate the inertia during the staring and stopping.
- The TC-5B has an auxiliary input terminal, which can receive positive and negative signals from the dancer roll. The TC-5B will mix the signal with that of the thickness value and give the correct output voltage.
- The digital output display can be switched from a voltmeter to an ammeter and vice versa.
- The tension setters are precision dials with a lock so that the preset value can be locked, and tension can be finely adjusted.
- The power supply of DC 15V, 50mA for sensor and DC ±15V, 10mA of auxiliary power supply are built in.
- The thickness value can be put into memory with a built-in battery.
- The TC-5B`s display is easy on the operator's eyes because of green LED light and the large digital indicator. Each number is 13.46mm by 7.64mm, also push-button preset makes it easy to change the number.
- Unnecessary zeros are suppressed so as to avoid confusion for the operator.
- Light and compact.

Specifications

Model : TC-5B
Control power supply : AC 200V ±10%, 50/60Hz
Power consumption : 8VA
Except for the consumption of sensor and auxiliary power supply.
Main power supply : Max. AC 30V, 50/60Hz or DC 24V.
Power output : DC 0~24V, 4A
Voltage output : DC 0~10V, 10mA
Thickness indicator : 4-digit 999.9mm, Green LED.
Output meter : 3-digit, Green LED.
Voltmeter 00.0~99.9V
Ammeter 0.00~9.99A
Full thickness setter : 4-digit 999.9mm
Gauge of material thickness : 3-digit 999 μm
Counting in thickness : Increasing or decreasing
In an increasing counting method:
The thickness indicator keeps counting after the preset value is reached and after it comes to the maximum number it will begin from zero again.
In a decreasing counting method:
After reaching zero, it will stop counting.
Maximum counting speed :
30 CPS. contact or non-contact input.
Switching ratio : 1/1
Counting input : To be counted when OFF → ON, "H" → "L"
H:Over 5V, L: Under 3V.
Auxiliary input : ±10
Control output : AC 250V, 3A(cos Ø=1), IC
Keep or oneshot (500msec.)
In the increasing counting, the output relay will be actuated at or over the preset value.
In the decreasing counting, the output relay will be actuated at zero with one signal or one continuous signal.
Power supply for sensor : DC 15V, 50mA
Auxiliary power supply : DC ±15V, 10mA
Memory function : Over 500hours
Ambient temperature : -10°C ~ +50°C
Finish color : Black
Weight : 2.5Kg

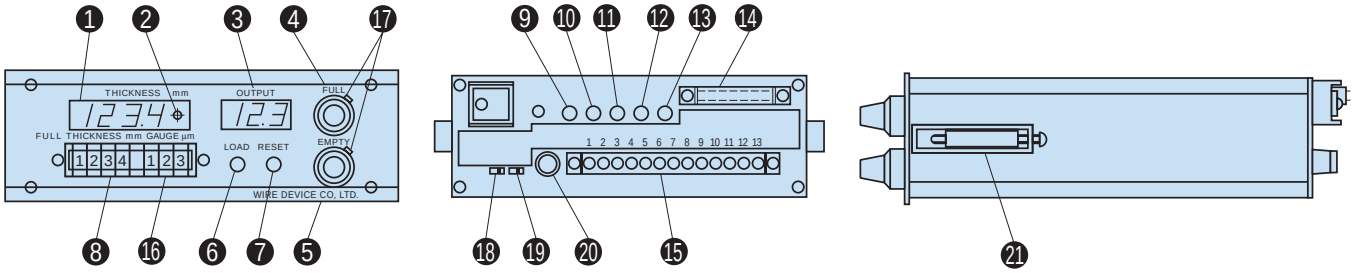
Preset and adjustment

Switches and rheostats at the back should be preset or adjusted as follows.

1. Output meter as a voltmeter:
The output meter is factory set as a voltmeter (V), however it can be changed to an ammeter (A) by using the switch (DS1) on the back.
2. Output meter as voltmeter:
When used as a voltmeter, it can measure two kinds of circuits, power voltage output (PV) or signal voltage output (SV), by selecting the switch (DS2) that is factory set at (PV).
3. Thickness gain adjustment:
This tension controller should be adjusted so as to obtain the maximum output at the maximum thickness value of the tape pat. It is factory adjusted at the maximum thickness value of 250.0mm.

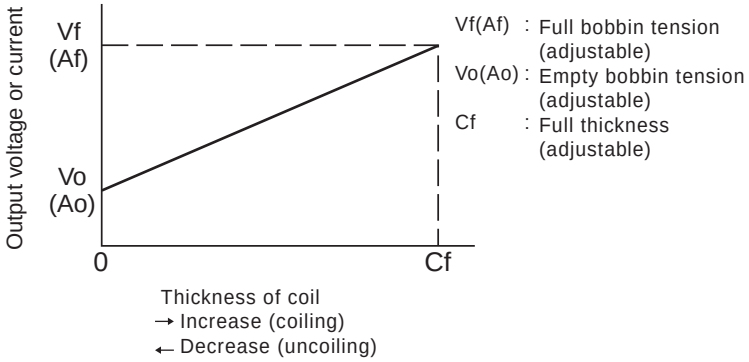
Ⅰ. Set the maximum thickness to the digital switch ⑧.
Ⅱ. Press the load button ⑥. The thickness indicator ① will automatically show the thickness that was set by the digital switch ⑧.
Ⅲ. Turn the empty bobbin tension dial ⑤ counter clockwise to the position "0".
Ⅳ. Turn the full bobbin tension dial ④ clockwise to the position "10".
Ⅴ. The value of the output meter will be increased while the counting gain main adjusting rheostat ⑨ or fine rheostat ⑩ turned clockwise. And stop turning when the output value of the meter has stopped from rising.

Description of parts



1. Thickness indicator
2. Contact output indicator
3. Output meter
4. Full bobbin tension dial
5. Empty bobbin tension dial
6. Load button
7. Reset button
8. Digital switch (Full thickness)
9. Counting gain main adjusting rheostat
10. Counting gain fine adjusting rheostat
11. Voltage output gain adjusting rheostat
12. Auxiliary input gain adjusting rheostat
13. Response time to auxiliary input adjusting rheostat
14. Connector
15. Terminal block
16. Digital switch (Gauge)
17. Lock levers
18. Changing over switch for the voltmeter (DS1)
19. Changing over switch for voltmeter or ammeter (DS2)
20. Fuse (5A rapid fuse)
21. Metal fittings

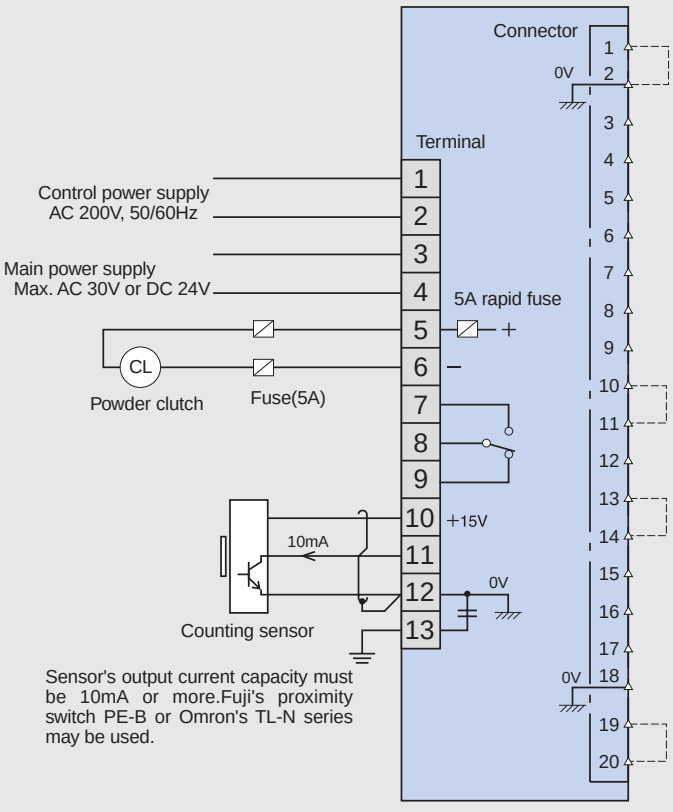
Operation



Vf(Af) : Full bobbin tension (adjustable)
Vo(Ao) : Empty bobbin tension (adjustable)
Cf : Full thickness (adjustable)

1. To set the dials, push the lock levers ⑰ counter clockwise.
2. Push the reset button ⑦ and thickness indicator ① will automatically indicates "0".
3. While reading the output meter ③, set the empty bobbin tension (Vo) with the empty bobbin tension dial ⑤.
   The empty bobbin tension should be set prior to setting the full bobbin tension.
4. Set the digital switch ⑧ to the full thickness (Cf) to be processed.
5. Press the load button ⑥, the thickness indicator ① will automatically indicate the value (Cf) entered from the digital switch.
6. While reading the output meter ③, set the full bobbin tension (Vf) with full bobbin tension dial ④.
7. To lock the dials, push the lock levers clockwise.
8. Set the digital switch ⑯ to the gauge of material thickness (µm).
9. In the coiling process, start the machine after pushing the reset button ⑦. In the uncoiling process, start the machine after pressing the load button ⑥.

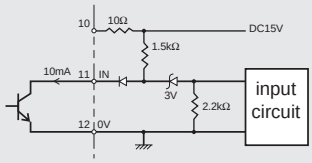
Connection



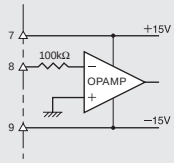
Note

1. The power output circuit (between terminal Nos.5 and 6) must not be short - circuited or connected to the ground.
2. The wires to be connected to the green connector should be shielded wires and it's protective mesh should be connected to pin numbers 2 or 18. The optional devices to be connected to pin numbers 10,11,12,13,14,15,19 and 20 should be installed as close to the TC-5B tension controller with the wire being as short as possible. Also these wires should be separated from other wires.
3. The wires to be connected to the counting sensor should be shielded wires, and its protective mesh should be connected to terminal number 12.
4. The connector pins are already connected in the factory, as the dotted line as indicated in the diagram.
5. The green connector can be removed easily by releasing the two screws, however, when replacing it, make sure not to attach it upside down.
6. Details of each input circuit.

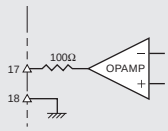
Counting input



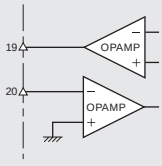
Auxiliary input



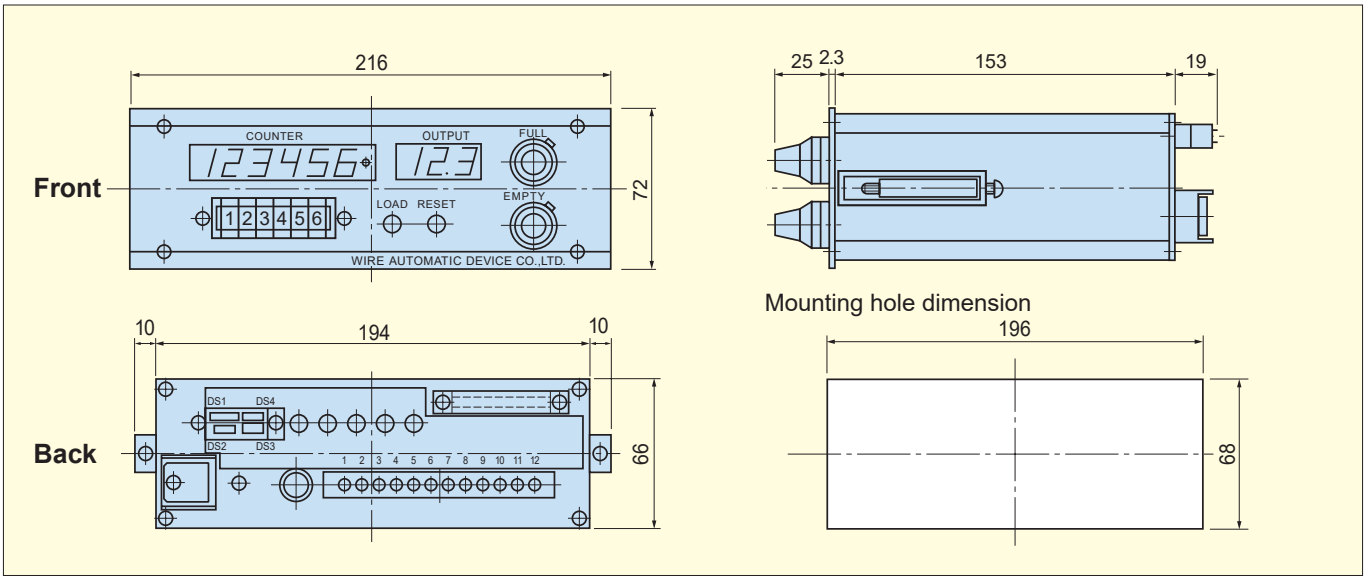
Voltage output



For external calculator



Dimensions



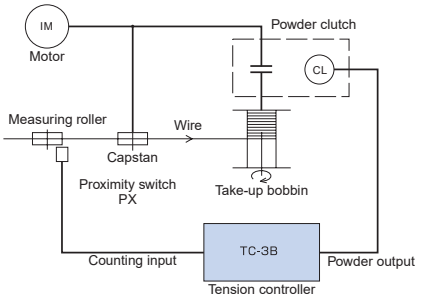
Terminal description

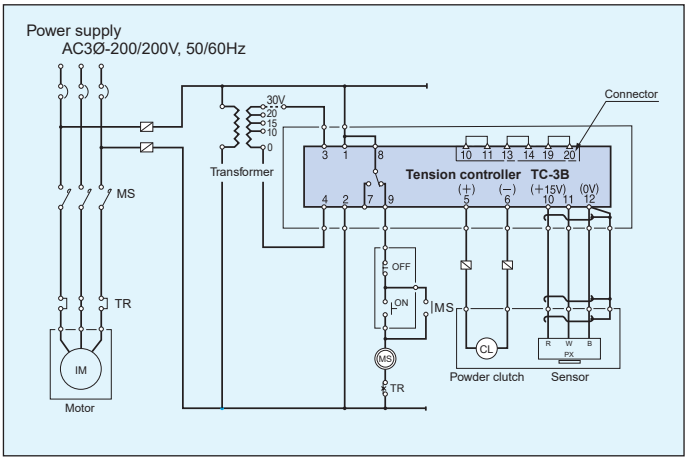
Nos.		Name	Description
Terminal	1·2	Control power supply	To be connected to the supply of the AC 200V.
	3·4	Main power supply	To be connected to the maximum of AC 30V of main power supply.
	5·6	Power output	DC load such as powder clutch can be connected with max. DC24V, 4A
	• • 7·8·9	Output contact	This can be actuated at the preset value for the increasing process or at "0" for the decreasing process.
	10·12	Power supply for sensor	The DC 15V power supply for sensor, with up to a max. of 50mA.
	11	Counting input	The output of the counting sensor is connected.
Connector pin	1	Increasing decreasing change over	Opening between 1 and 2 increases the count, and closing decreases count.
	2	Common pin	"0"V
	3	Load pin	Closing between 3 and 2 enters the preset value to the counter.
	4	Reset pin	Closing between 4 and 2 resets the counter.

Nos.		Name	Description
Connector pin	5·6	Keep and single shot change over	Closing between 5 and 6 makes the output relay keep and opening it makes a signal shot.
	7	Auxiliary power supply ⊕	DC +15V, Max.10mA
	8	Auxiliary input signal pin	Used for auxiliary input
	9	Auxiliary power supply ⊖	DC-15V, Max.10mA
	• • 10·11·12	Pins for external full bobbin tension dial	When an external full bobbin tension is required, remove the jumper between pin numbers 10 and 11 and connect the option.
	• • 13·14·15	Pins for external empty bobbin tension dial	When an external empty bobbin tension is required, remove the jumper between pin numbers 13 and 14 and connected the option.
	17	Voltage output pin	Output voltage 0-10V, 10mA, useable for controlling voltage regulator.
	18	Common pin	"0"V
	• • 19·20	Pins for external calculator	Optional external calculator can be connected. When connected, remove the jumper between pin numbers 19 and 20.

Application

The take up bobbin is driven by a motor via the powder clutch. The capstan draws the wire, which is coiled on the take-up bobbin.
The tension controller's empty bobbin and full bobbin tension dials are set, then push the reset button, and start the machine.
The tension controller counts the length measuring pulse, that is generated from the proximity switch, and outputs and the output voltage.
This output voltage increase the converted torque of the powder clutch in proportion to the counting value.
Therefore, the tension controller can keep the wire's tension constant during a coil empty to a coil full bobbin.
In addition to the build-up tension control, the tension controller can automatically stop the machine when it reaches its preset length.
With the use of optional units, the tension during accelerating and decelerating can also be easily controlled.





This specification may be changed without notifying the buyer.

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