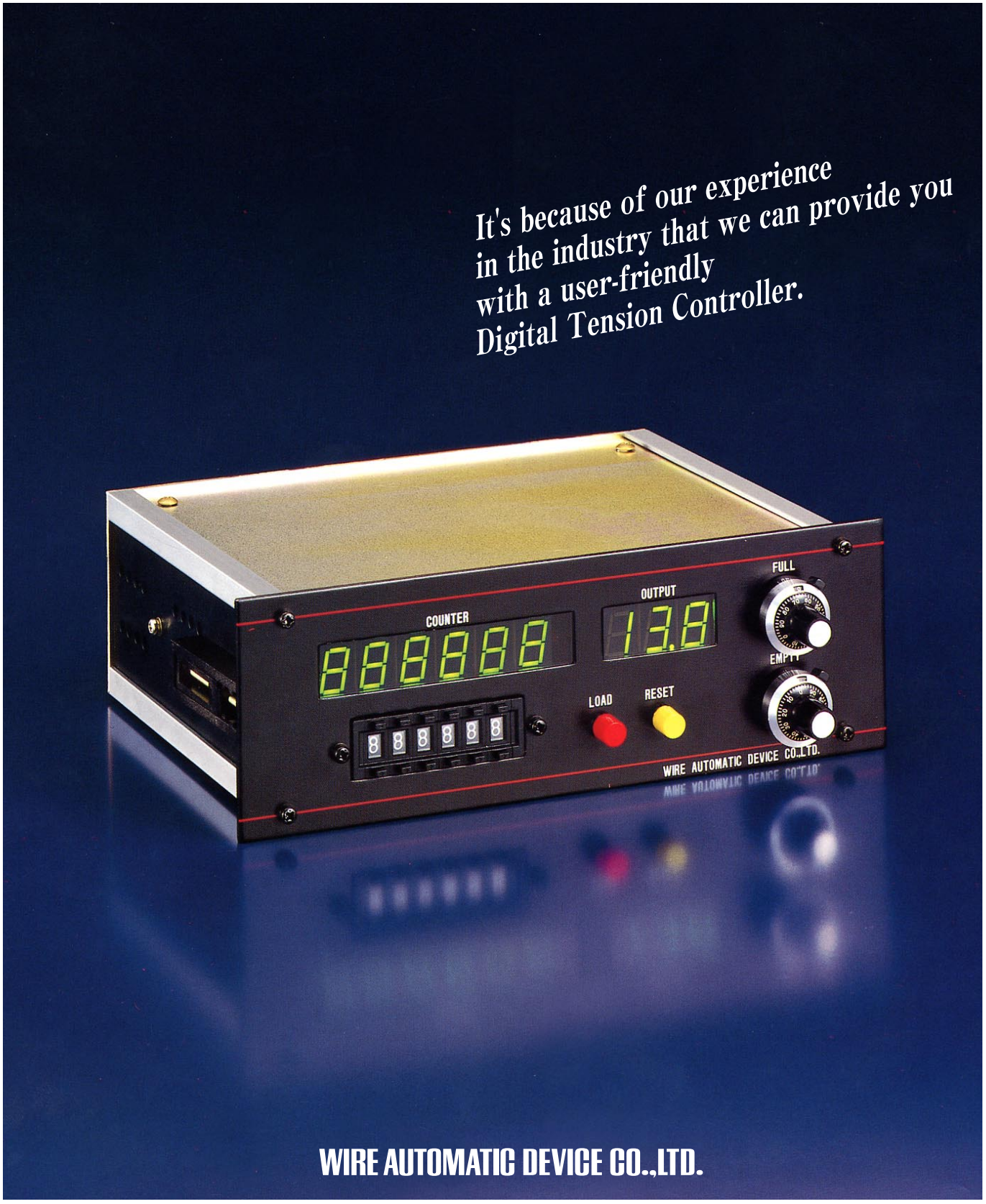
RusAutomation

WADECO

DIGITAL TENSION CONTROLLER

MODEL TC-3B PAT.



WIRE AUTOMATIC DEVICE CO.,LTD.

DIGITAL TENSION CONTROLLER

Introduction

In the pursuit of excellence, the popular TC-3A`s design is handed down to the new TC-3B making it more reliable and easier to handle.
The TC-3B operates as a tension controller, and it also has a pre-set counter.
The tension output can be preset to the counter's value and the TC-3B outputs voltage in proportion to the counting value so that it maintains continuous tension control between the empty bobbin tension and full bobbin tension.
In combination with a tension control device, ie powder clutch, you can keep continuous control of the tension in coiling and uncoiling, without the use of a dancer roller.

Special features

- When the empty and full bobbin tension output are preset to the counter's value, the tension output will change from one to another in proportion to the counter's value so that the tension control can be kept smoothly and continuously. Also before operating, you can see the tension for every counter's value and during anytime while operating, you can check the counting value and the tension.
- This can be used as a preset counter with an output relay, that actuates on the preset 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-3B in order to compensate the inertia during the staring and stopping of the machine.
- The TC-3B has an auxiliary input terminal, which can receive positive and negative signals from the dancer roll. The TC-3B will mix the signal with the counter 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 number of digits on the counter display can be changed very easily.
- The power supply of DC 15V, 50mA for sensor and DC ±15V, 10mA of auxiliary power supply are built in.
- The count value can be put into memory with a built-in battery.
- The TC-3B`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-3B
Control power supply : AC200V ±10%, 50/60Hz
Power consumption : 8VA
Except for the consumption of sensor and auxiliary power supply.
Main power supply : Max. AC 30V, 50/60Hz
Power output : DC 0~24V, 4A
Voltage output : DC 0~10V, 10mA
Counter : Changing - over of 4,5,6,-digit Green LED.
Output meter : 3-digit, Green LED.
Voltmeter 00.0~99.9V
Ammeter 0.00~9.99A
Counting : Increasing decreasing
In an increasing counting method :
The counter 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 :
30CPS. contact or non-contact input. Switching ratio : 1/1 or
2KCPS, 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 : AC250V, 3A(cos Ø=1), 1C
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 : 2.3Kg

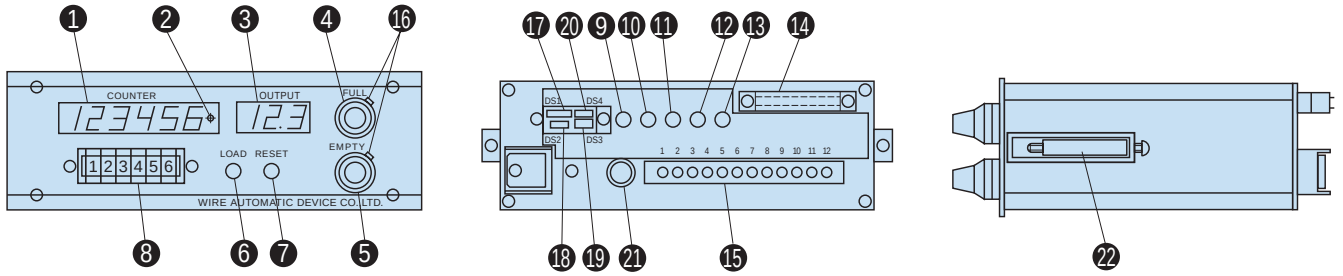
Preset and adjustment

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

1. The number of digit:
   The number of digits in the switch (DS1) is already preset at 6.
   Preset the number of digit, on the counter display at 4,5, or 6.
   The preset value should cover the counter's value that is measured from the empty bobbin to full bobbin by winding at most thin wire.
   The counter can be preset to read 4,5, or 6 digits, however only the first four digits can be converted to the output value.
   Therefore, preset the number of digits as close and above the maximum counting number from empty to full bobbin, in order to obtain enough output voltage.
   When the empty tension dial is set at "0", and the full tension dial is set at its maximum, the range of counting value to obtain the maximum output on full tension setting are as follows.
   4-digit: 40~9999 5-digit: 400~99999
   6-digit: 4000~999999
2. Maximum counting speed:
   The maximum counting speed in the switch (DS4) is factory preset at 30Hz however, it can be also preset at 2KHz.
3. Output meter as a voltmeter or ammeter:
   The output meter is factory set as a voltmeter (V), however it can be changed to an ammeter (A) by using the switch (DS3) on the back.
4. Output meter as a 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).
5. Counter gain adjustment:
   It is factory adjusted on the counting value of 100,000.

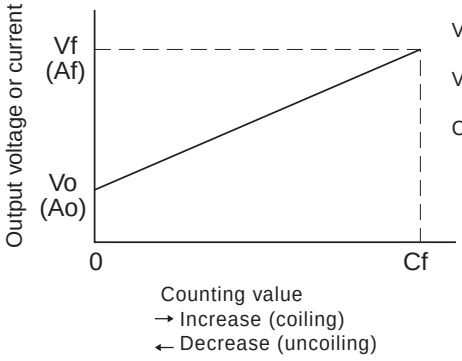
   Ⅰ. Set the counting number to the digital switch⑧ , which measures from the empty bobbin to the full bobbin , by winding the thickest wire to get the minimum count number of a full bobbin.
   Ⅱ. Press the load button⑥. The counter① will automatically show the number that was set by the digital switch⑧.
   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. Counter
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
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. Lock levers
17. Digit preset switch (DS1)
18. Changing over switch for the voltmeter (DS2)
19. Changing over switch for voltmeter or ammeter (DS3)
20. Max.coiling speed selecting switch (DS4)
21. Fuse (5A rapid fuse)
22. Metal fittings

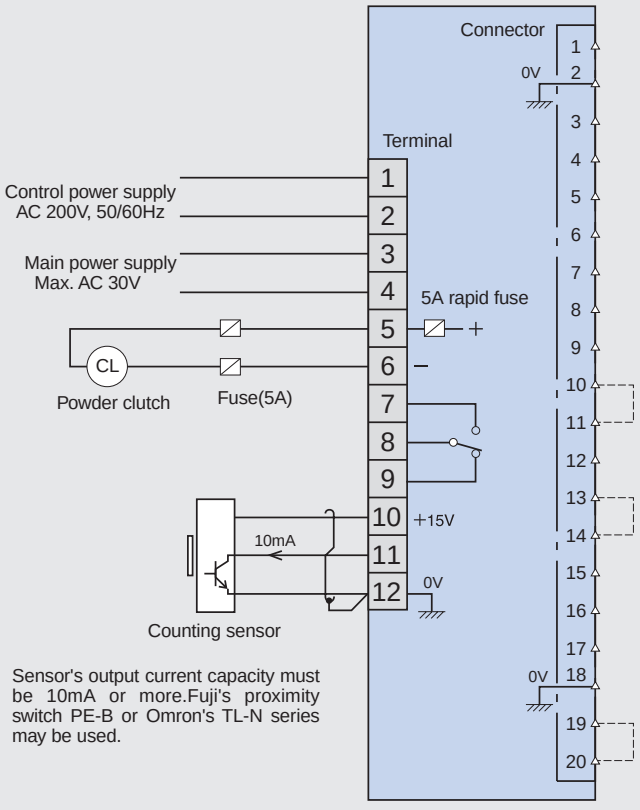
Operation



Vf(Af) : Full bobbin tension (adjustable)
Vo(Ao) : Empty bobbin tension (adjustable)
Cf : Maximum number of turns or length of full bobbin. (adjustable)

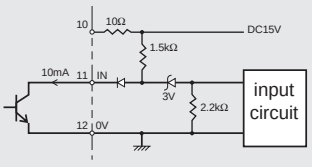
1. To set the dials, push the lock levers counter clockwise.
2. Push the reset button ⑦ and counter ① will automatically indicates "0".
3. While reading the output meter ③, set the empty bobbin tension (Vo) with the empty bobbin tension dial ⑤.
   The empty bobbin tension should be set prior to setting the full bobbin tension.
4. Set the digital switch ⑧ to the maximum number of turns or length (Cf) to be processed.
5. Press the load button ⑥, the counter 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. 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

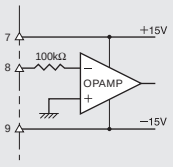


Note
1. The power output circuit (between terminal Nos.5 and 6) must not be short - circuited or connected to the ground.
2. The wires to be connected to the green connector should be shielded wires and its protective mesh should be connected to pin numbers 2 or 18. The optional devices to be connected to pin number 10,11,12,13,14,15,19 and 20 should be installed as close to the TC-3B 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.

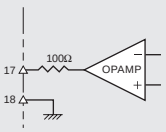
Counting input



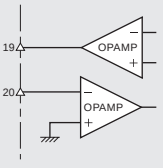
Auxiliary input



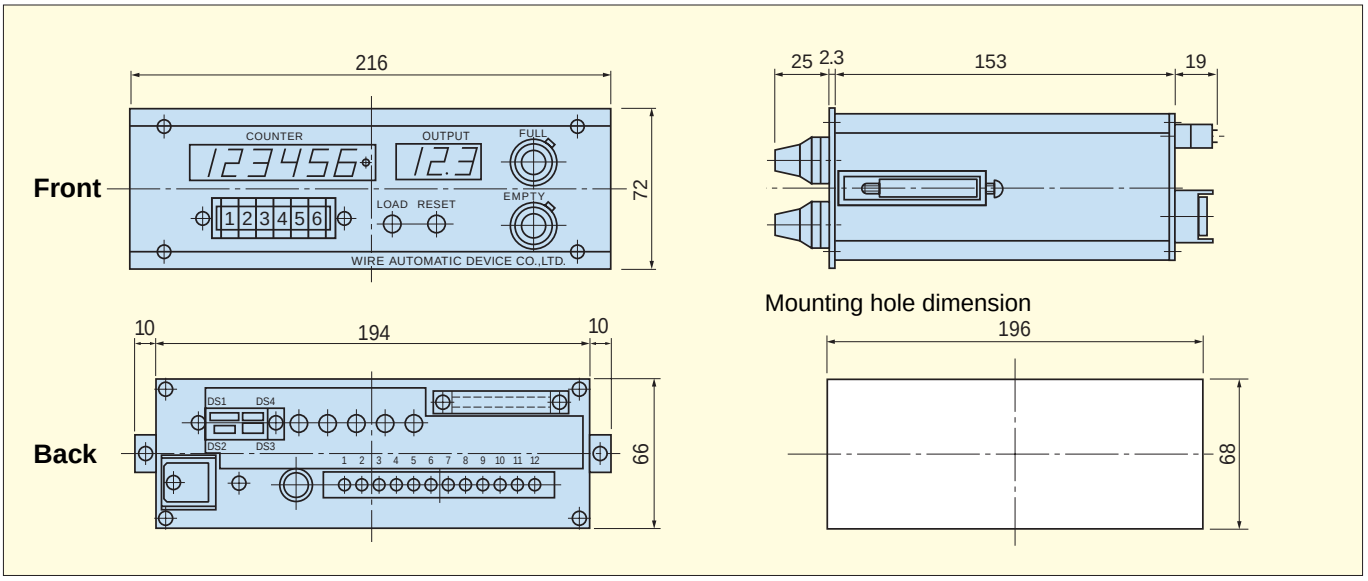
Voltage output



For external calculator



Dimensions



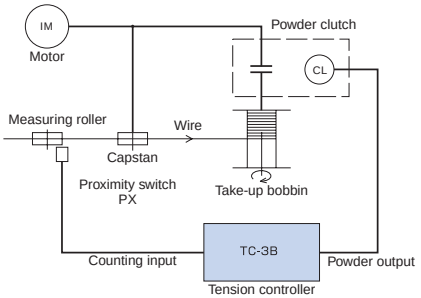
Terminal description

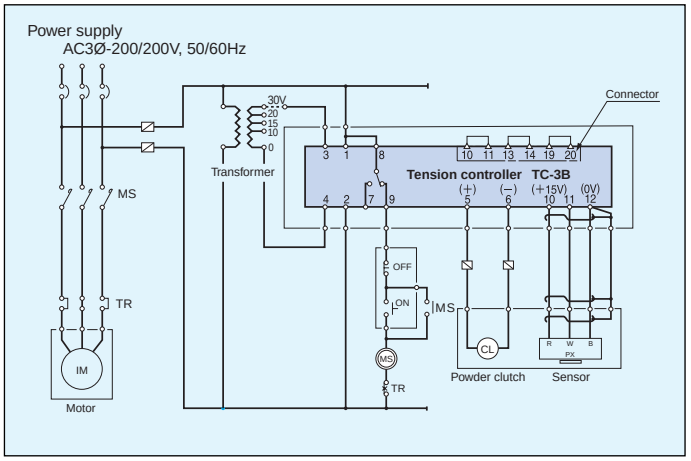
Nos.		Name	Description
Terminal	1·2	Control power supply	To be connected to the supply of the AC 200V.
	3·4	Main power supply	To be connected to the maximum of AC 30V of main power supply.
	5·6	Power output	DC load such as powder clutch can be connected with max. DC24V, 4A
	7·8·9	Output contact	This 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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