

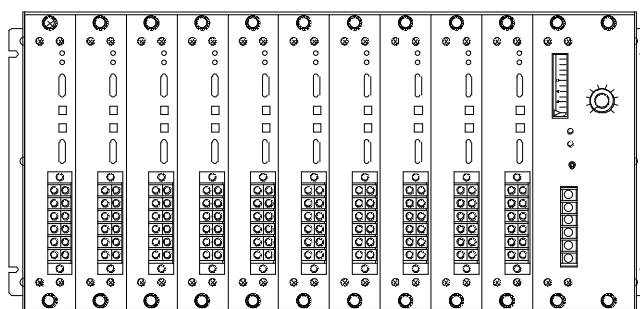
INSTRUCTION MANUAL

* MULTICHANNE TENSION METER *

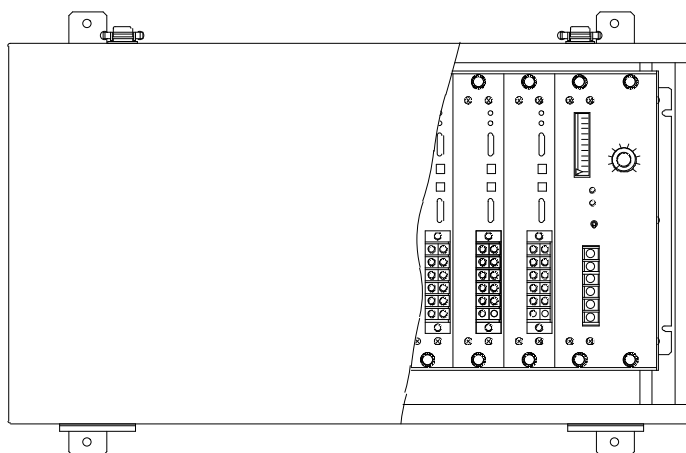
Model : **MTM**

(Detection card TCM-550)

CHASSIS Type
MTMS - ☐



BOX Type
MTMB - ☐



EIKO

EIKO SOKKI CO., LTD.

ISSUED : APR.2002.

* * * * INSTRUCTION MANUAL * * * *

MULTICHANNE TENSION METER **Model : MTM**

(Detection card TCM-550)

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This multichannel tension meter is use for tension detection in the manufacturing filmy and stringy materials. (e.g. : paper, web, rubber, film, textile, wire etc.,)

Maximum channel is 10, under illustrate show it construction.

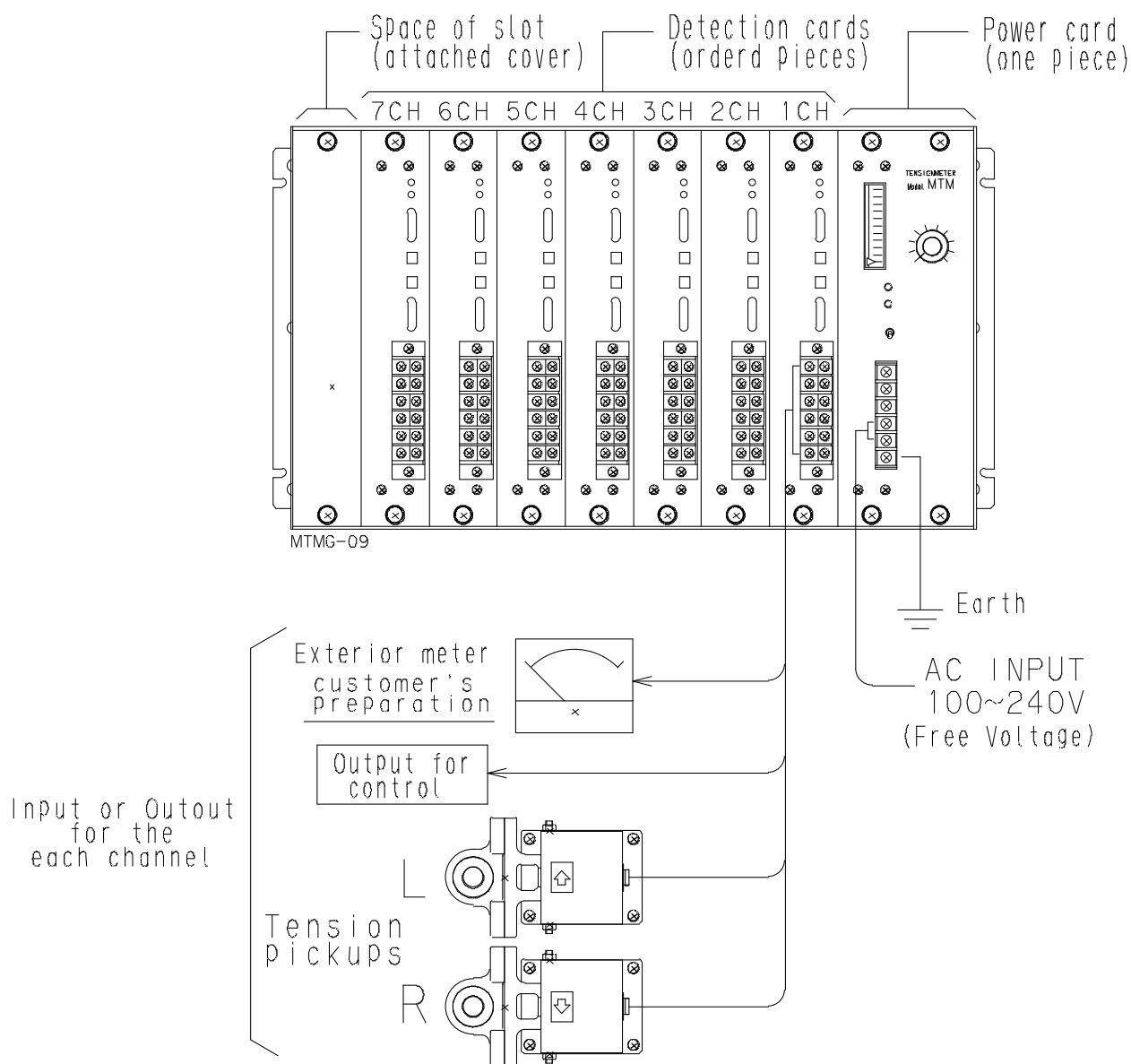


Fig1-1

- (1) The detection cards of specified pieces are mounted into the slots, and indicated the capacity of tension value and the place of use on the each cards.
- (2) Left side card is No.1 channel.
- (3) The tension pickup of specified type are attached the each channels.
- (4) The card of each channel has the exterior meter's signal and the control signal (tension signal) output.
- (5) Space of slot is attached the cover.

POWER SECTION
(MTM-PS1)

Fig.2-1

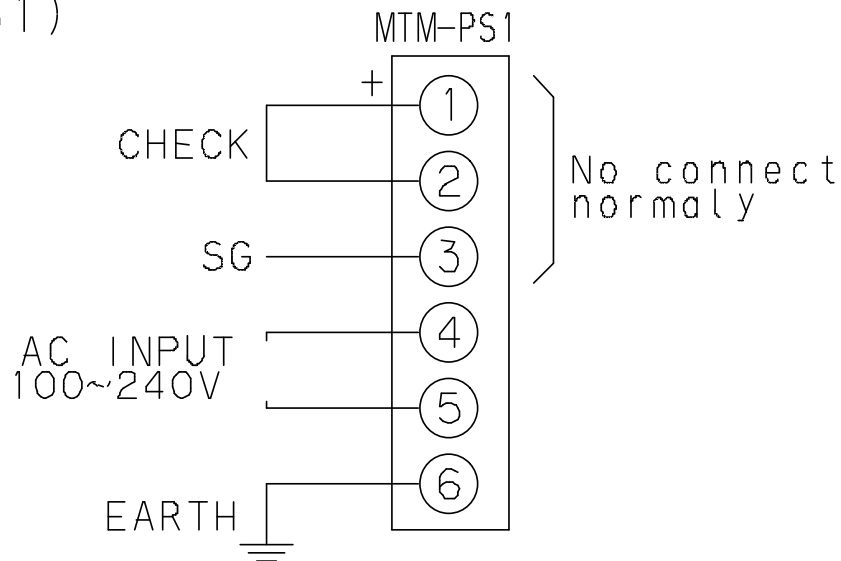
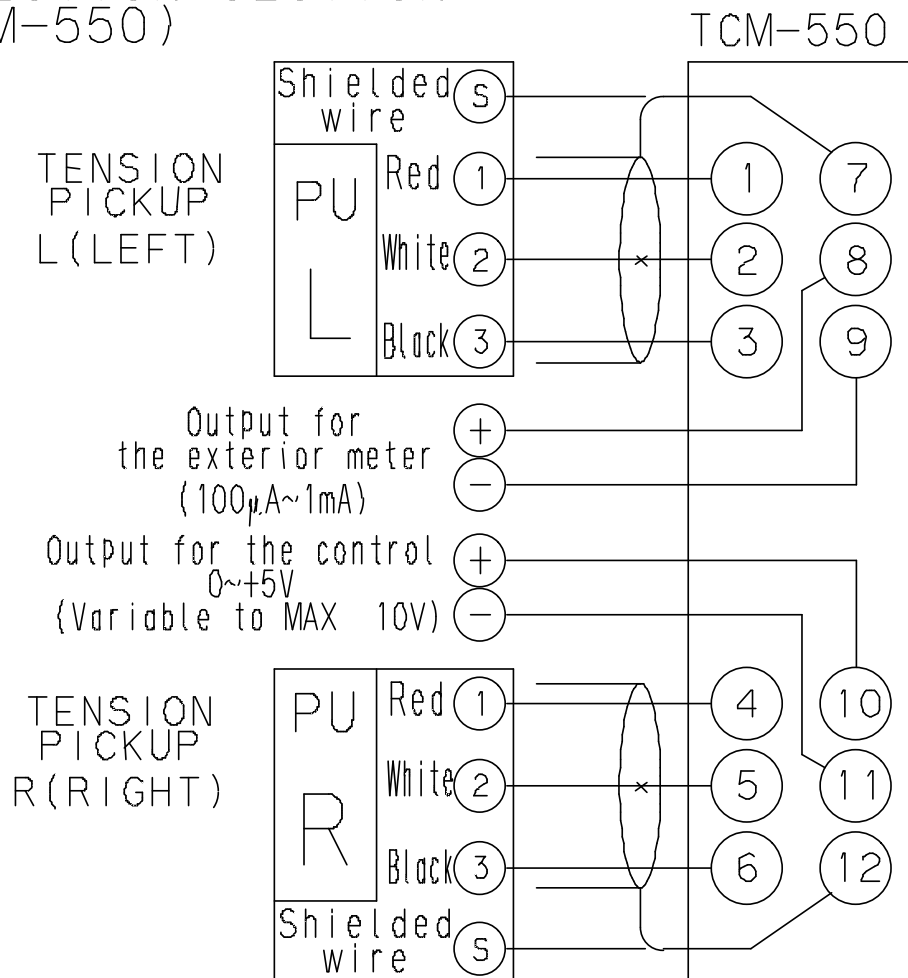
DETECTION SECTION
(TCM-550)

Fig.2-2



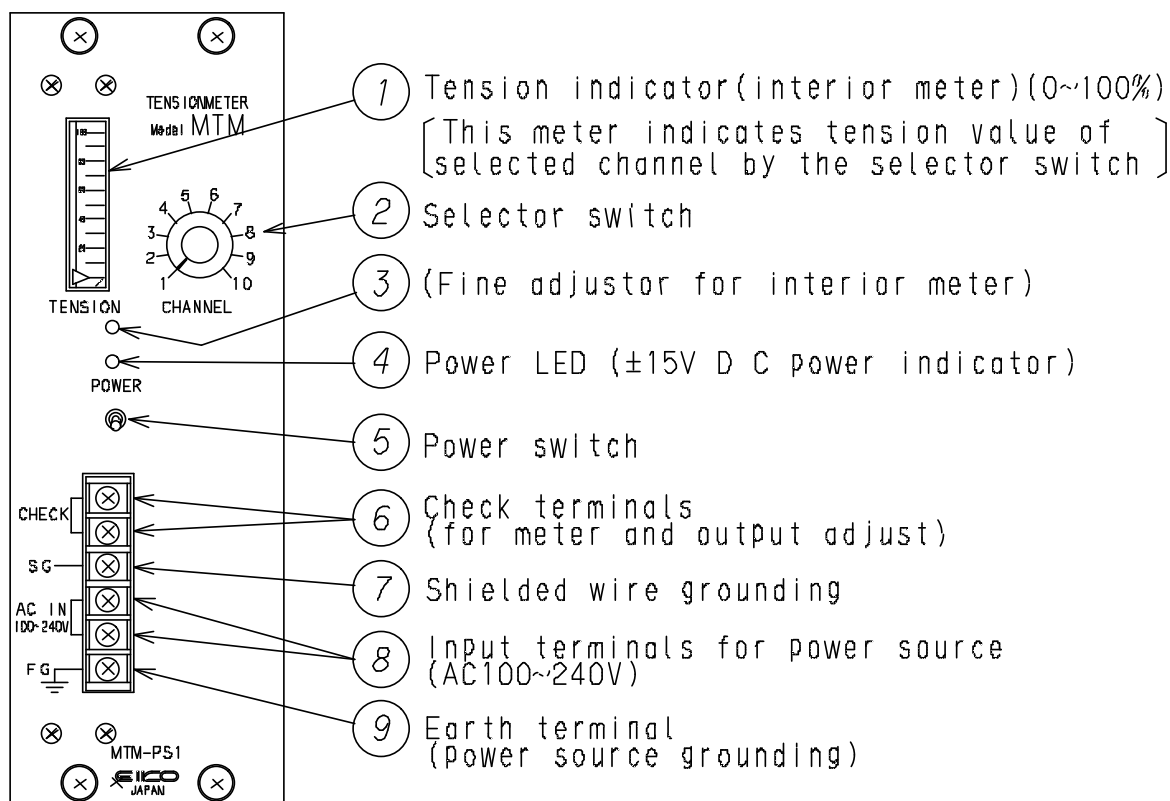
TCM-550 the same as each channel

3

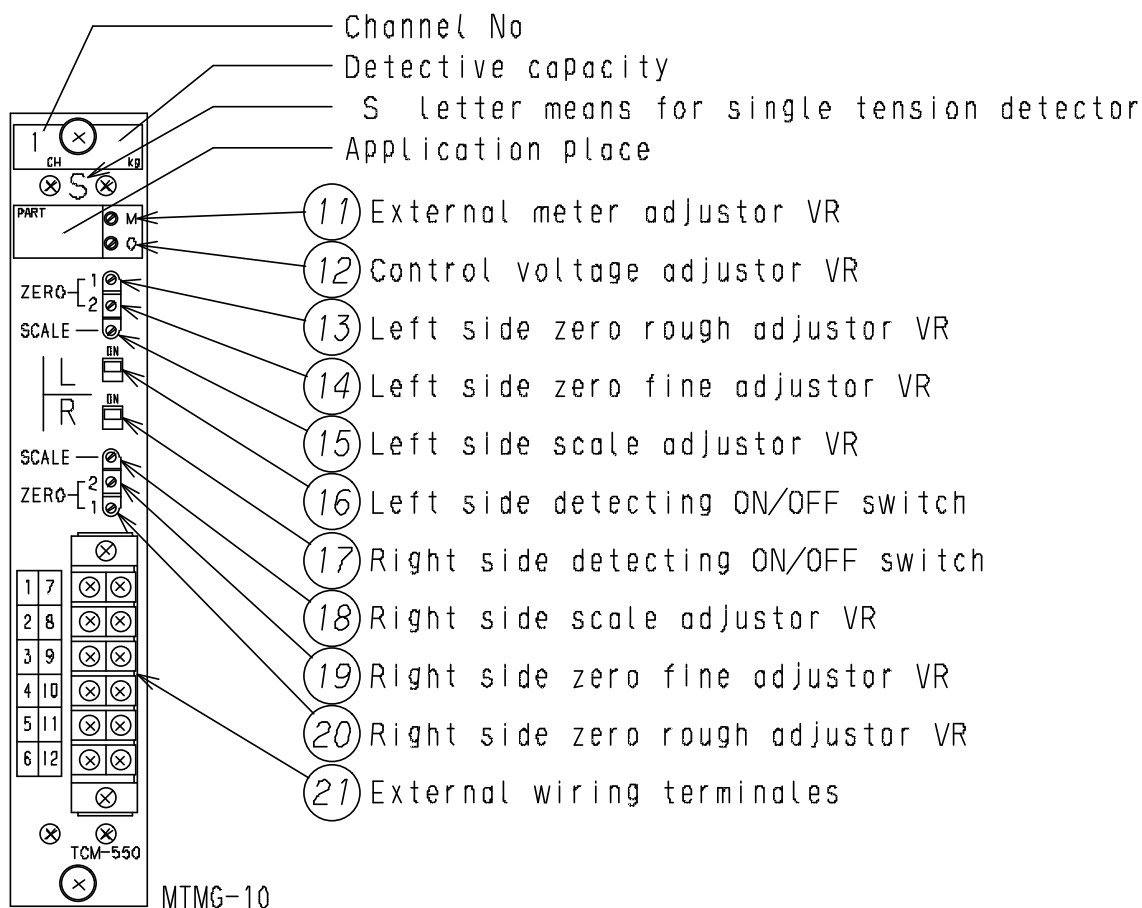
NAMES & FUNCTIONS OF EACH SECTIONS

(1) NAMES

Power Section MTM-PS1



Detection Section TCM-550



(2) FUNCTION

No.	NAME	FUNCTION
①	Tension indicator	• Tension value of selected channel by ② switch, it is indicate 0 ~ 100% unit.
②	Channel select switch	• Channel select for intend to check on indicator.
③	VR for interior meter adjustor	• For ① indicator adjustor. • No use to customer side.
④	Power LED	• Lighten at the power switch ON. • Combine indicates $\pm 15V$ DC power.
⑤	Power SW	• Power line SW.
⑥	Check terminal	• Check for the base voltage on each detection card. • Use for adjust on external meter and controller's voltage.
⑦	Shield wire grounding	• Shield wire connected to terminals ⑨ and ⑫ from each detection card. These terminals not connect to another terminal usually. But if under the influence of noise, try connect to FG terminal.
⑧	Power input	• Supply 100 ~ 240V AC. • Free voltage.
⑨	Earth terminal	• Ground the grounding.
	Channel number	• Each channel number is indicated here. • No.1 channel is side of power source.
	Detective capacity	• Detective capacity is indicated here, it's capacity equal to the full-scale number of external tension meter.
	Mark "S"	• "S" means as Special order.
	Using location	• If customer demanded that using location or channel number and be specify here.
⑪	VR for external meter adjustor	• At the ⑥ check terminal is 5V DC, then be adjust to the external meter indicate to the full scale.
⑫	VR for control signal adjustor	• At the ⑥ check terminal is 5V DC, then be adjust the output voltage on terminals ⑩ - ⑪ make to specific voltage.
⑬ ⑭ ⑮ ⑯ ⑰ ⑱	VR for calibration	• Use for calibrate on tension pickup.
⑰ ⑱	ON / OFF switch	• Use for the Right or Left select switch to the tension pickup.
<input type="checkbox"/>	External connection terminals	• Input or Output terminals for each channel. See page 3.

After mounted and wired to the tension pickups, and must be adjust or tune up before the machine driving. The following is method of adjusting about to the only one channel, but the other channels are same as procedure. Do begin the adjusting about ten minutes after the power switch is ON.

(Number makes are indicating each position of adjusting parts. See page 4.)

4-1. EXTERIOR METER ADJUSTMENT

Usable exterior (tension) meter is the digital type panel meter that the input voltage range is 1.1V \sim 10V DC and the impedance is over 1M Ω .

- (1) Connect the circuit tester probe to the check terminal⑥ on the (MTM-PS1) power supply unit. (Set tester range is 5 \sim 10V DC, upper terminal is plus.)
- (2) Select the SW② to the channel of adjusting.
- (3) Turn ON SW⑬ and ⑰ of the selected channel, then set the voltage of between terminals ⑬-⑭, and ⑰-⑱ to 5.0V DC by ZERO ADJ.VR.
- (4) When the check terminal voltage is 5.0V DC, then set the exterior meter get to full scale by the “M” VR⑪.
- (5) If not require an accurate tension signal, take following procedure. At the interior tension meter① point to full scale, set the exterior meter get to full scale by the “M” VR⑪. (Before shipping from factory, it set that as at the check terminal⑥ is 5.0V DC, the interior tension meter get to full scale.)
- (6) Finish the abovementioned facts, and then make to the output signal adjustment on the section 4-2. But it not necessary the output signal alteration, proceed to the section 4-3.

4-2. OUTPUT SIGNAL ADJUSTMENT

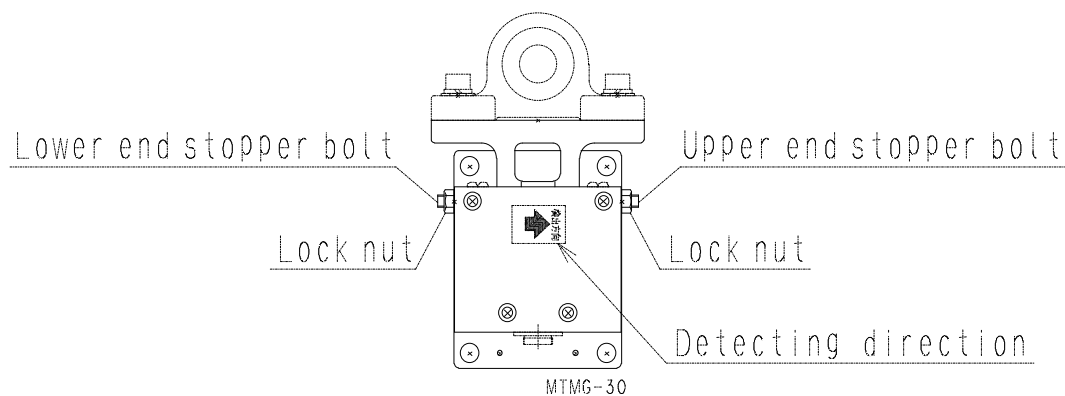
At the tension meter point to full scale, the output signal level is changeable 0 \sim 5V DC of range. Standard level is 5.0V/F.S.

- (1) Selected the SW② to the channel of adjusting.
- (2) Set the check terminal voltage to 5.0V DC.
- (3) At that time, set the voltage of between terminals No.⑩ \sim ⑪ get to the specified level by the “O” VR⑫. (Standard level is 5.0V)
- (4) And then, proceed to the section 4-3.

4-3. CALIBRATION OF TENSION METER & PICKUPS

4-3-[1]. Pre-adjustment

- (1) Make sure that the power is OFF and that each tension meter indicates zero. If there is an error in the adjustment, readjust with the mechanical zero adjusting screw located under the front face. (For the exterior analogue meter.)
- (2) Push upwards and tilt the power switch lever at the right end of the tension meter to turn the power ON. When the power is ON, the LED at the light will be ON as well.



4-3-【2】 Calibration

Calibrate the tension meter so that it will indicate the actual tension values.

The tension detecting signal from the micro dislocation tension pickups located at both ends of the roll are input into the tension detecting circuit.

The tension detection circuit feed signals to the tension meter. At the same time, it output signal the applicable to the tension control system.

The tension detecting circuit is a type TCM-550, and the requisite number of substrates are incorporated as necessary. Refer to Figs. 3-1, 3-2, and 4-1, 4-2 in the following order.

- (1) Loosening the pickup stopper screws: Refer to Fig.4-1

Completely loosen the pickup stopper screws to expand both the upper and the lower limits. The purpose of the stopper screws is to protect the mobile region of the detector from excessive forces and to prevent the dislocation of the zero position. In general, the stopper bolts have been adjusted before shipping from the factory and accordingly there it is not necessary to readjust except in special cases (for example, where the installed configuration or detector roll weight is different.)

(2) Roping : Refer to Fig.4-2

Set the ropes to the roll along the path the sheet will actually travel. It is desirable for the ropes to be flexible, light, and thin. When setting the ropes, be sure to set them to both the front and the rear rolls from the pickup mounted rolls. (Which are referred to as detecting rolls?)

The ropes must pass the center of each roll.

(3) Zero adjustment

Before hang a weight at the end of the rope, adjust the tension meter through the following procedure so that the needle will indicate zero:

- ① Turn the L switch ON and the R switch OFF.
(R switch: ⑰, L switch: ⑯)
- ② Adjust the L.ZERO2 (Fine) to the intermediate position.
(L.ZERO2: ⑭)
- ③ Adjust the L.ZERO1 (Rough) to set the tension indicator to zero.
(L.ZERO1: ⑬)
- ④ Adjust the meter to zero, by using the L.ZERO2 (Fine):
(L.ZERO2: ⑭)
- ⑤ Turn the R switch ON.
(At this time, the L switch must remain ON.)
- ⑥ Adjust the R.ZERO2 (Fine) to the intermediate position.
(R.ZERO2: ⑱)
- ⑦ Adjust the R.ZERO1 (Rough) to set the tension indicator to zero.
(R.ZERO1: ⑳)
- ⑧ Adjust the meter to zero, by using the R.ZERO2 (Dense):
(R.ZERO2: ⑱)

Despite the adjustment described above, if the tension indication does not read zero, the pickup must be adjusted.

(4) Scale adjustment

By connecting the weight to one end of the rope, adjust the tension indication through the following procedure:

- ① Turn the L switch ON and the R switch OFF.
- ② When doing this, adjust the L SCALE so that the tension indicator will indicate half of the applied weight.
(L.SCALE: ⑮)
- ③ Turn the R switch ON. (At this time, the L switch must also be ON.)
- ④ At the same time, adjust the R SCALE so that the tension indicator will indicate the applied weight itself.
(R.SCALE: ⑱)

(5) Stopper bolts adjustment

Set the stopper screws, which have previously been loosened. (See paragraph [2] -(1))

There are two stopper-screws: one is at the upper end and the other is at the lower end. The screw at the tension detecting direction is called the upper end screw and the screw on the opposite side (the ZERO side) is called the stopper screws through the following procedure (during adjustment, the weight must be kept off):

Adjustment the tension pickup stoppers on the L side

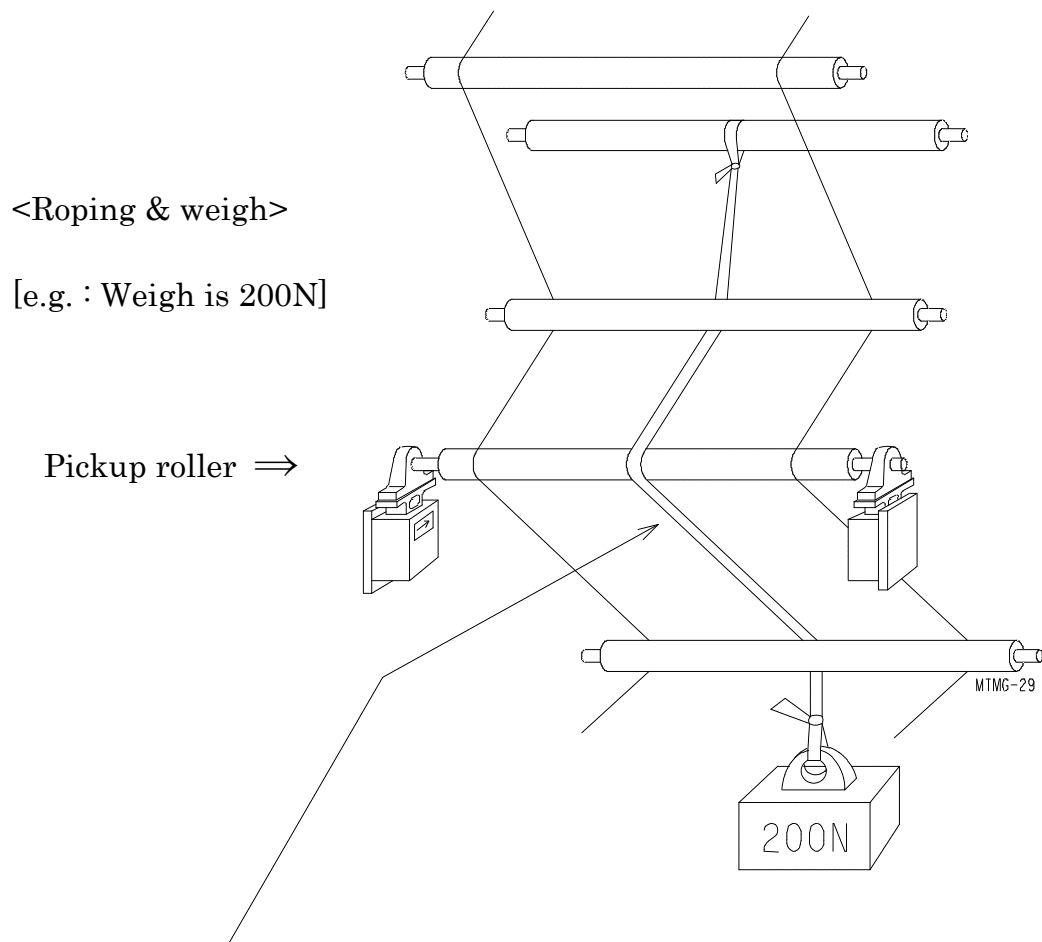
- ① Turn the L switch ON and the R switch OFF.
- ② Tighten the lower limit stopper screw so that the tension indicator will show approximately 70% of the full scale of the meter. (Since little tightening is required, tighten the stopper screw slowly while reading the indicator.)
- ③ Next, tighten the upper end stopper screw until the tension indicator shows approximately 60% of the full scale of the meter. At this time, tighten the locknuts and fix the upper end stopper screw.
- ④ Loosen the lower end stopper screw, and while the tension indicator is indicating zero, tighten the locknuts and fix the lower end stopper screw.

Adjustment the tension pickup stoppers on the R side

Turn the R switch ON and the L switch OFF, then make the same adjustments as in steps ② through ④ on the L side.

4-3- 【3】 Caution

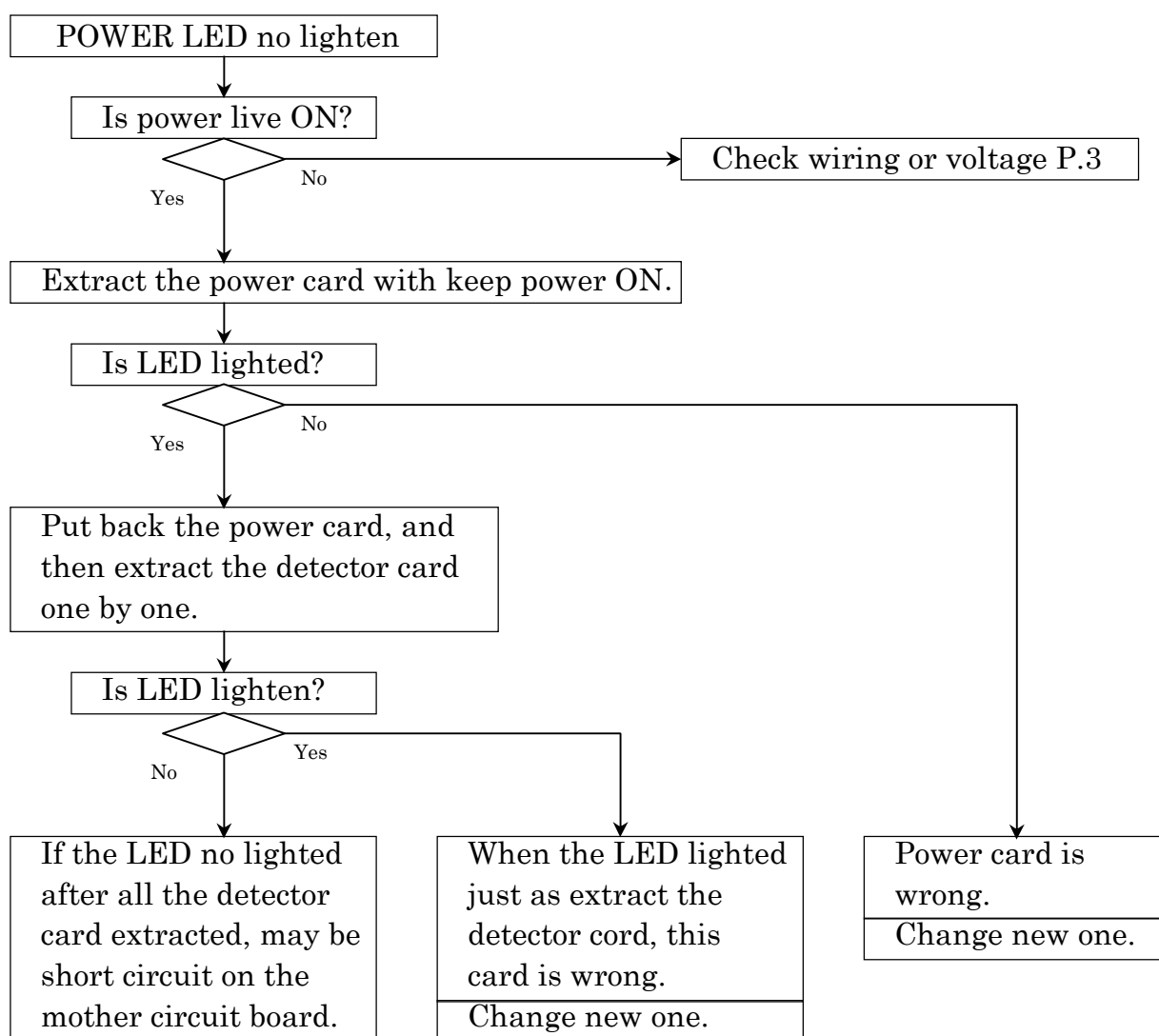
- (1) Each substrate on the tension meter can be pulled out with the handle by removing setscrews (2 or 4) on the upper and lower sections of the front side. To pull the screws out, turn OFF the power.
- (2) When the power is ON and the LED on the power substrate dose not go ON check the fuse which is located on its substrate.



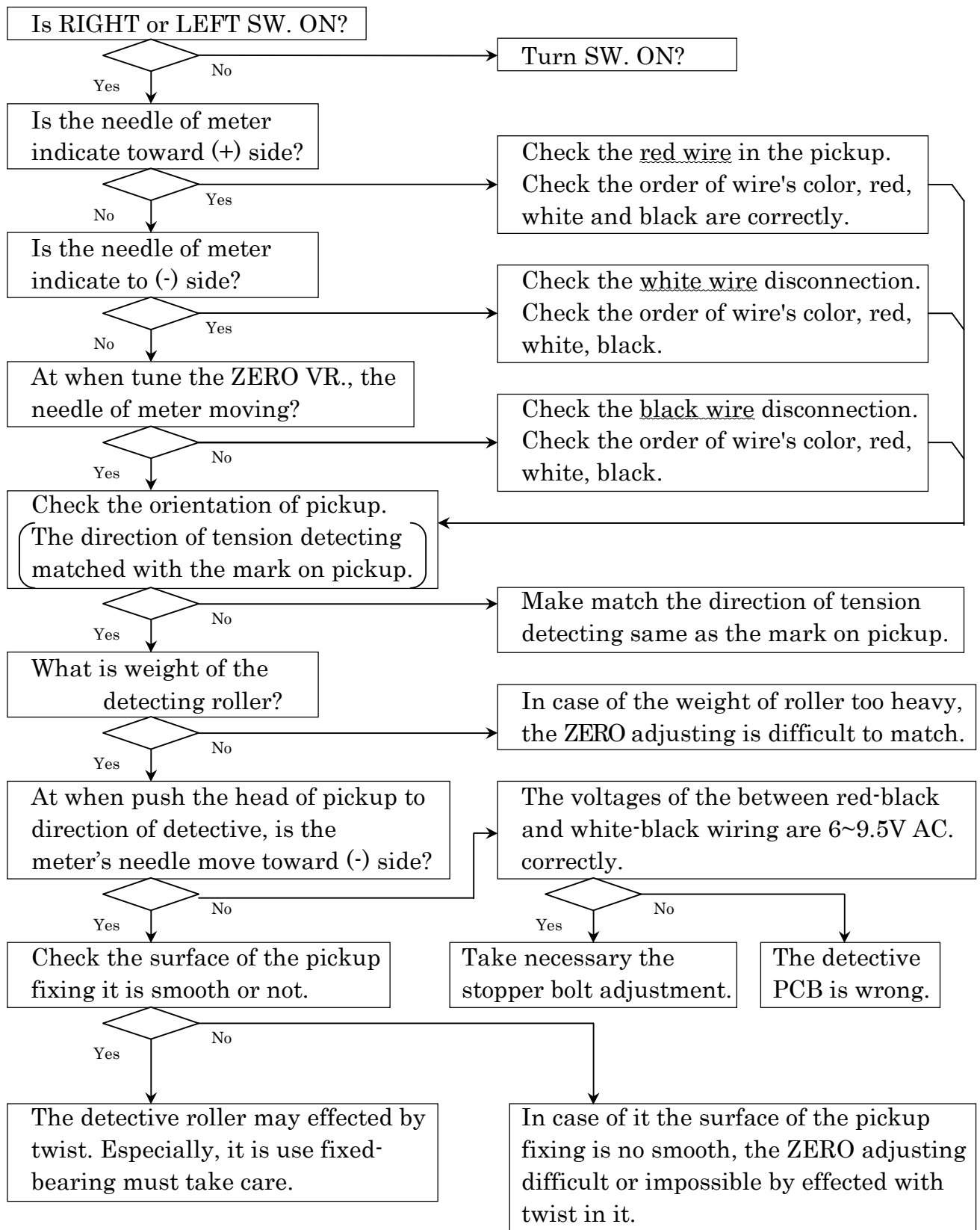
The rope must pass the center of each roll.
And to set then to both the front and the rear pickup mounting rolls.
Set the rope to the roll along thee path the sheet will actually travel.

No.	CONDITIONS	Page to ref.
(1)	Power indicator no light. (Not power supply.)	This P.
(2)	Impossible to the zero adjust of the tension pickups.	P12
(3)	Impossible to the scale adjust of adjustment.	P13
(4)	Lose stability of the tension.	P14
(5)	Trouble on the tension meter is no smooth.	P14
	① Not indicate zero point at power OFF.	
	② Moving of meter is no smooth.	
	③ Meter needle's sway.	
	④ Meter indicant is change at the machine stop.	
	⑤ Meter needle's sway at machine operates high speed.	

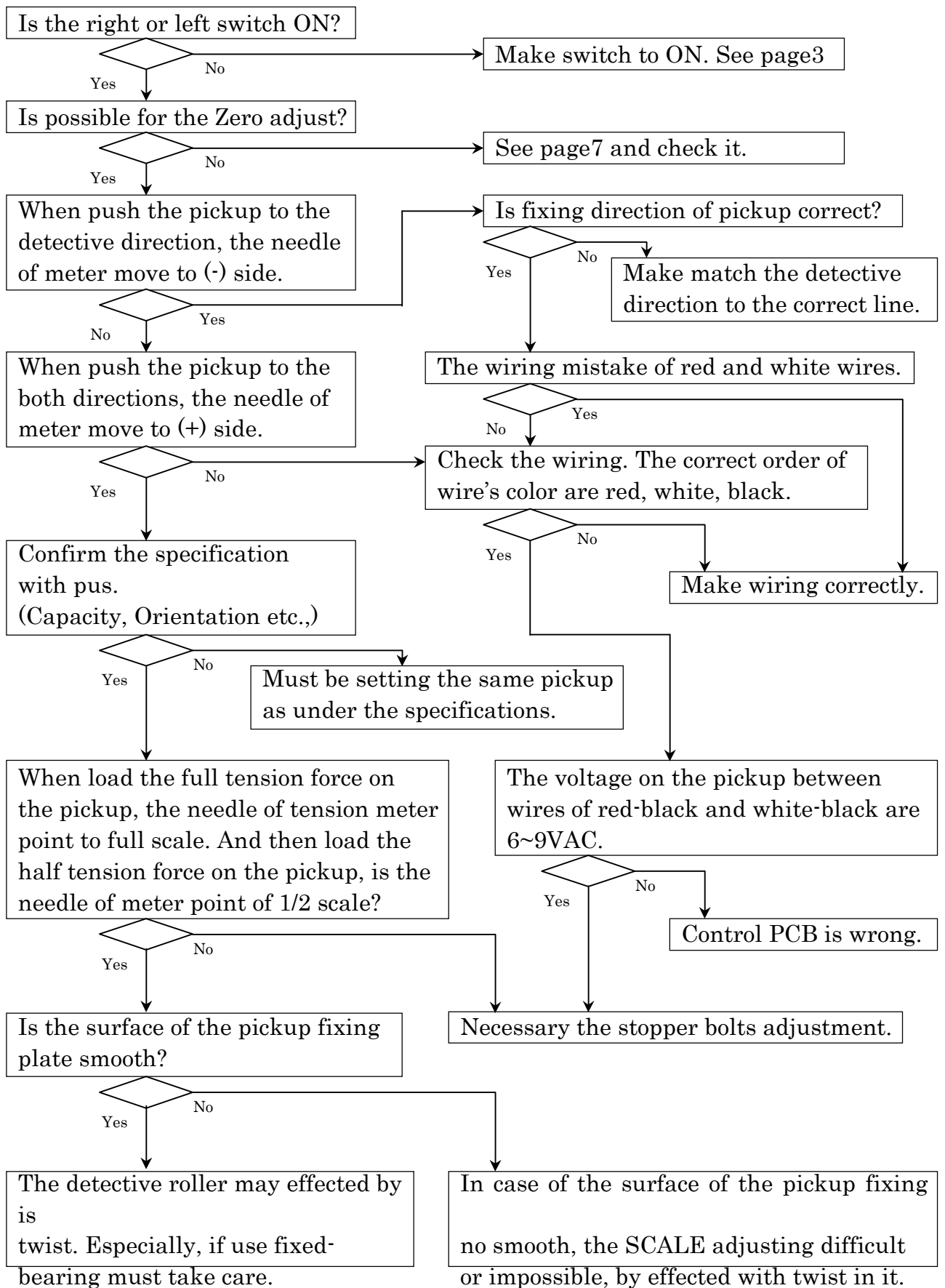
(1) Not power supply



(2) Impossible to the zero adjust of the tension pickups.



(3) Impossible to the scale adjustment.



(4) Lose stability of the tension.

Check the followings.

- ① Is the paper roll center unbalanced?
- ② Is the rewinder shaft turning unbalanced?
- ③ Is the line speed stability?
- ④ Check the guide roll unbalanced, turning stability and the dynamic balance.
- ⑤ Is the paper shaft slip?

(5) Trouble on the tension meter is no smooth.

- ① The needle of tension meter does not indicate to zero point at the power off.
 - Set to zero point by the Meter Zero Screw.
- ② The moving of meter dose not smooth. (The needle of meter may catch in it self.)
 - If the static electricity charges on the mater, sometime the needle gets to catch.
 - Remove the static electricity or change for new meter.
- ③ Meter needle's sway.
 - May be cause of the machine vibrate.
 - Separate the meter from frame of machine. And take an anti-vibration measure.
- ④ Meter indicant is change at the machine stop.
 - May be affecting of the electric noise.
 - Make wiring of pickup's are separate from the power lines.
 - Select wiring to the SG or FG terminals, whichever that most effective of the noise reducing.
- ⑤ Meter needle's sway at machine operates high speed.
 - May be get resonant with the machine.
 - When if change the machine speed, and vibration goes reducing it is the proof that the machine into resonant.
 - In such case, take the balance of rollers, but not to reducing yet, may necessary change a suitable springs for the pickup's.