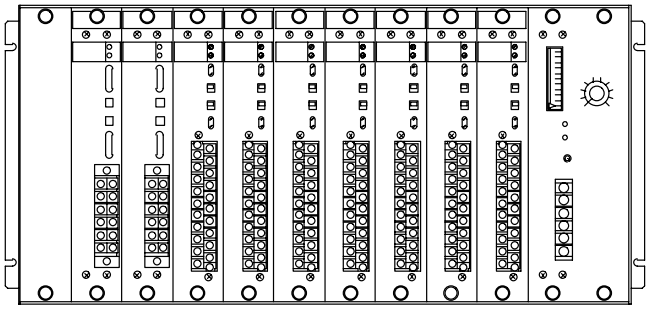
INSTRUCTION MANUAL

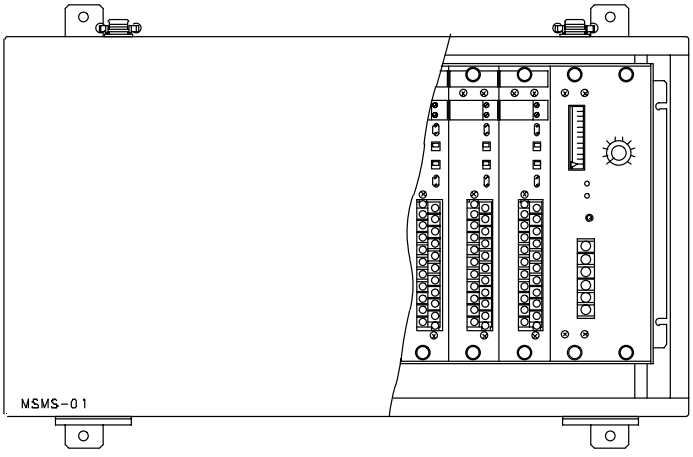
＊MULTICHANNEL TENSION METER＊

Model : MSM

Chassis type
ＭＳＭＳ－□



Box type
ＭＳＭＢ－□



EIKO

EIKO SOKKI CO., LTD.

ISSUED : JUN.2000

＊＊＊＊ INSTRUCTION MANUAL ＊＊＊＊

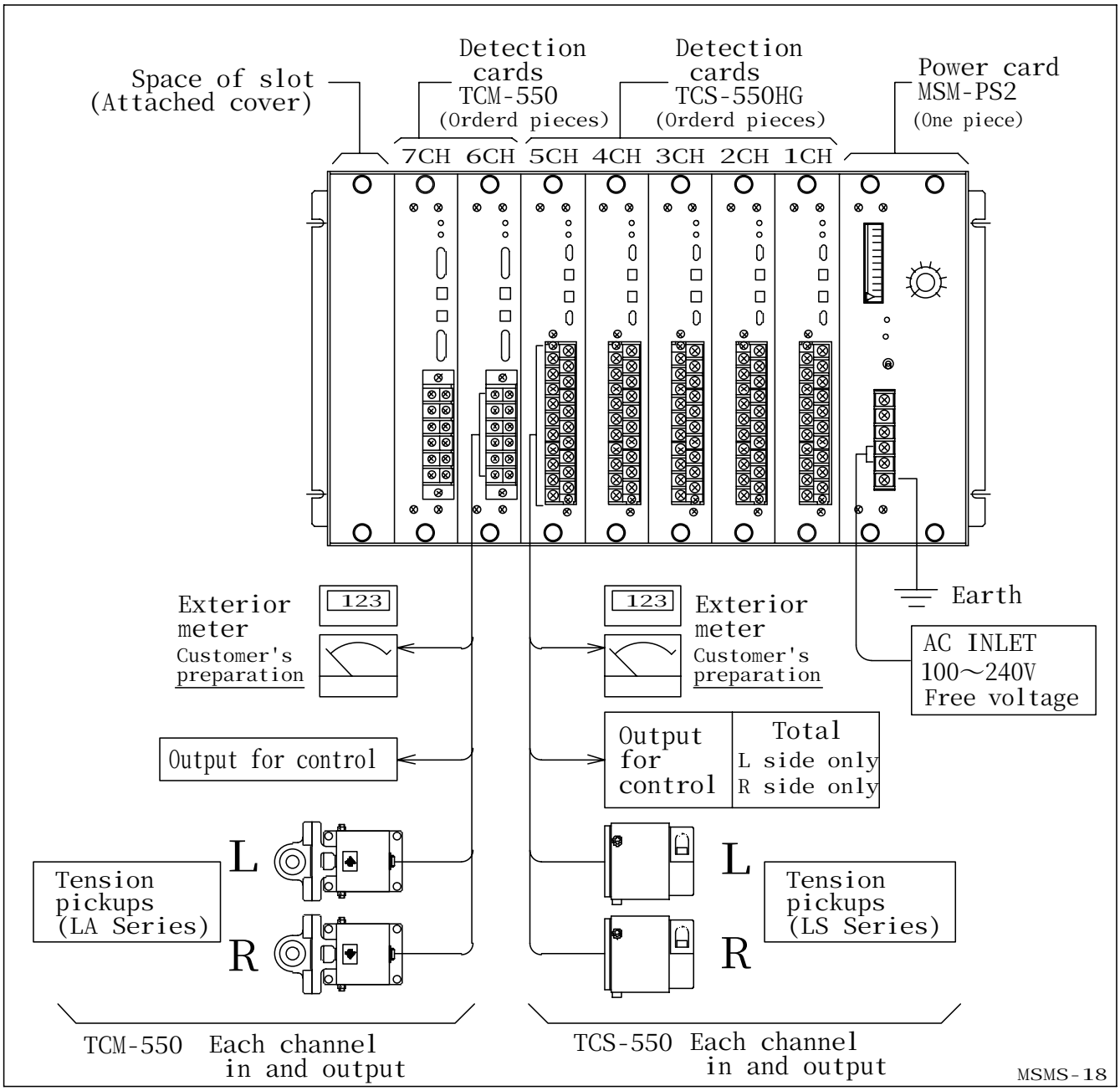
MULTICHANNEL TENSION METER

Model : MSM

＊＊ INDEX ＊＊

1 CONSTRUCTION

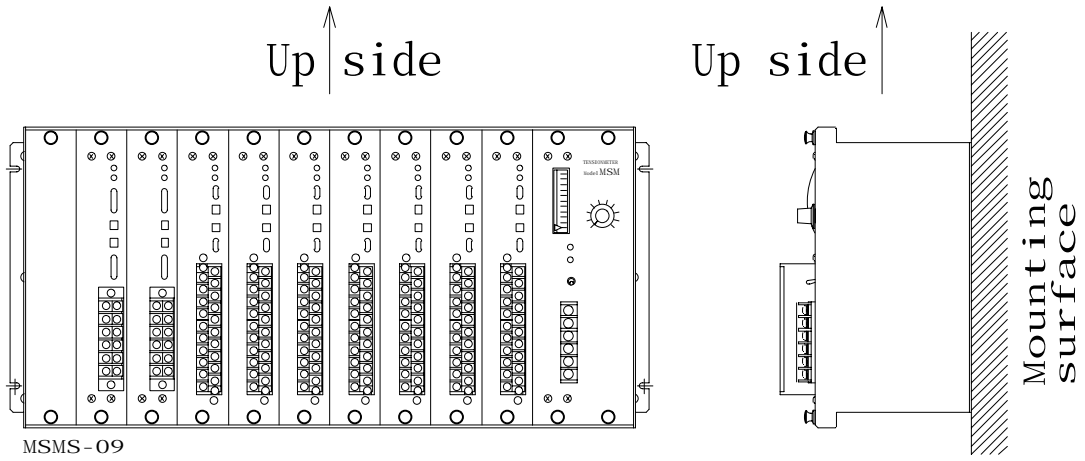
This multichannel tension meter is use for tension detection in such factoring filmy and stringy materials as paper, web, rubber, film, textile, wire and etc.,
Maximum channel is 10. Under illustrate shown it construction.



(1) This tension meter usable two different cards for tension detection each together, that is TCS-550 and TCM-550. In this manual explain the TCS-550 only. If use the TCM-550 card, refer to the instruction manual of the model MTM tension meter.
(2) A channel No., the maximum tension value and the using locations are specified on the each card.
(3) An ordered tension pickup is attached every each channel.
(4) Every each channel is provided the four output signals, i.e., for the exterior meter, for the controller (a tension signal), the L side tension, and the R side tension.
(5) Space of slot is attached a cover and it slot use for supplement.

2 INSTALLATION

Install in a location to the following conditions. That is free from…rainfall or drops of water, corrosive gases, dirt dust and vibration, and sunbeam. Ambient temperature is under +40℃(104 ℉). The mounting direction is in the vertical plane.



3 WIRING

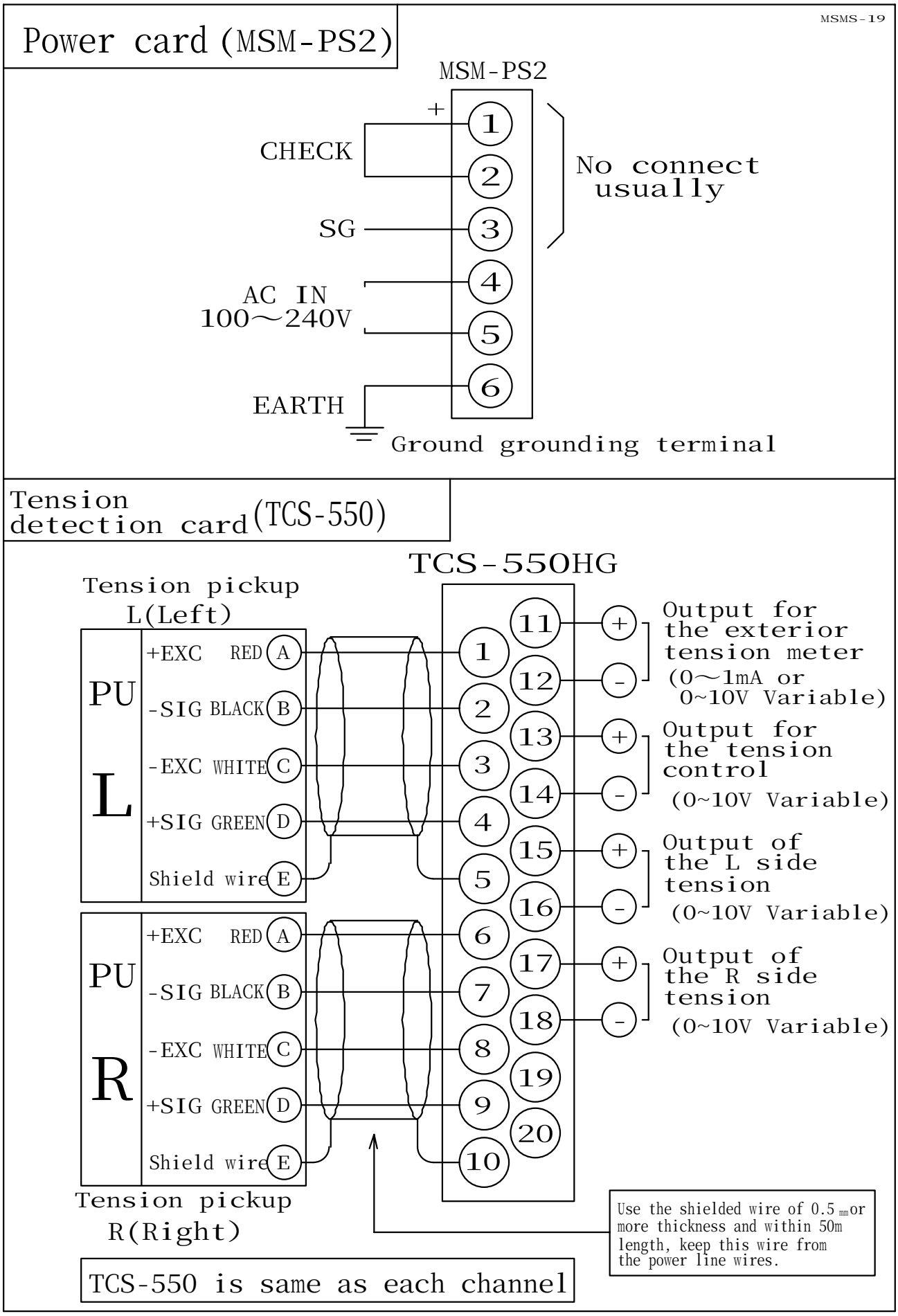
(1) Notice for wiring

- A screw size of the terminal board is M4 for the power line and M3.5 for the detection card. Use the Y or ○ type pressure terminals.
- Use the 4 conductors shielded cable to the tension pickups. Connect the shield wire of shielded cable to the terminals No., 5 and 10. In case of the wire length is over than 50m, and contact your EIKO SOKKI representatives.
- If make longer the wiring of control output line, or make connect to the non-grounding devices, and rarely causes the miss-operation. So make wiring as shortly as possible, and the connected devices is provided with the isolated input circuit.
- Ground grounding terminal of the power line.
- No connect to the CHECK and SG terminals.
- After wiring, however, check the fastening screws or miss wiring.

(2) In case of the single (or cantilever) type tension pickup.

In case, connect the pickup to terminal No. 1～5(L side) or, No. 6～10(R side), and turn to on switch of the use side only.
In this case, can't use the 2 pickups together, because this detecting circuit is set for the exclusive use only.
The cantilever type is indicated the "S" mark in red on the each channel upper side, and so, pay attention to the missing of connection channel.

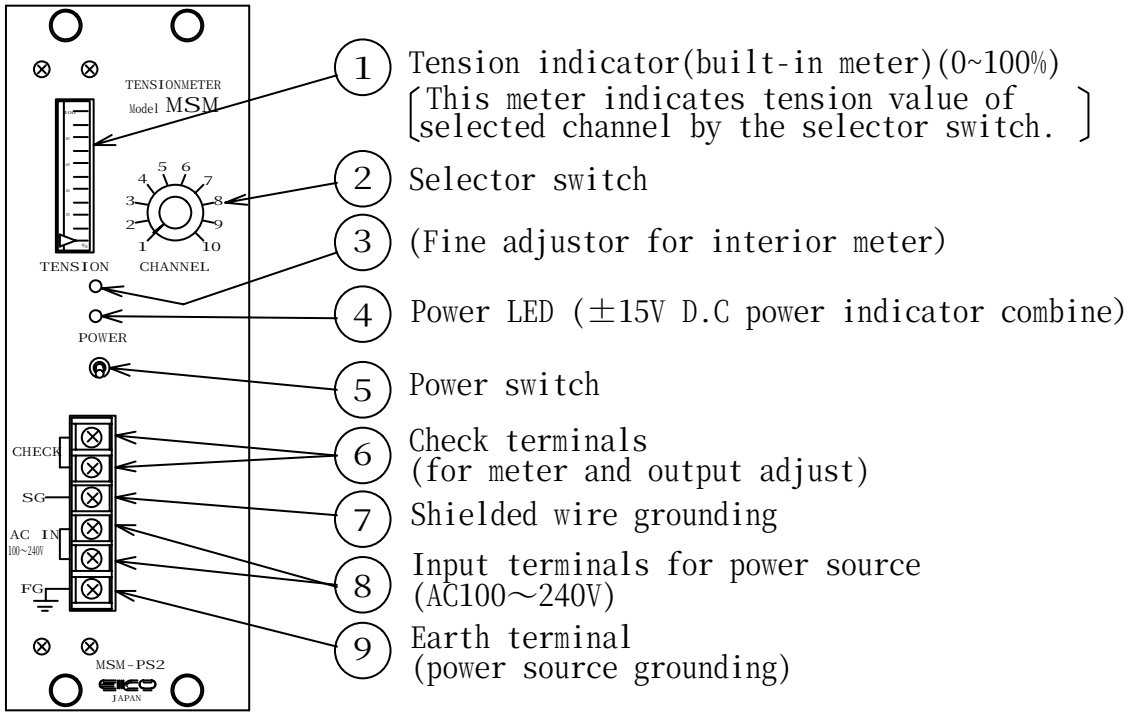
(3) External wiring



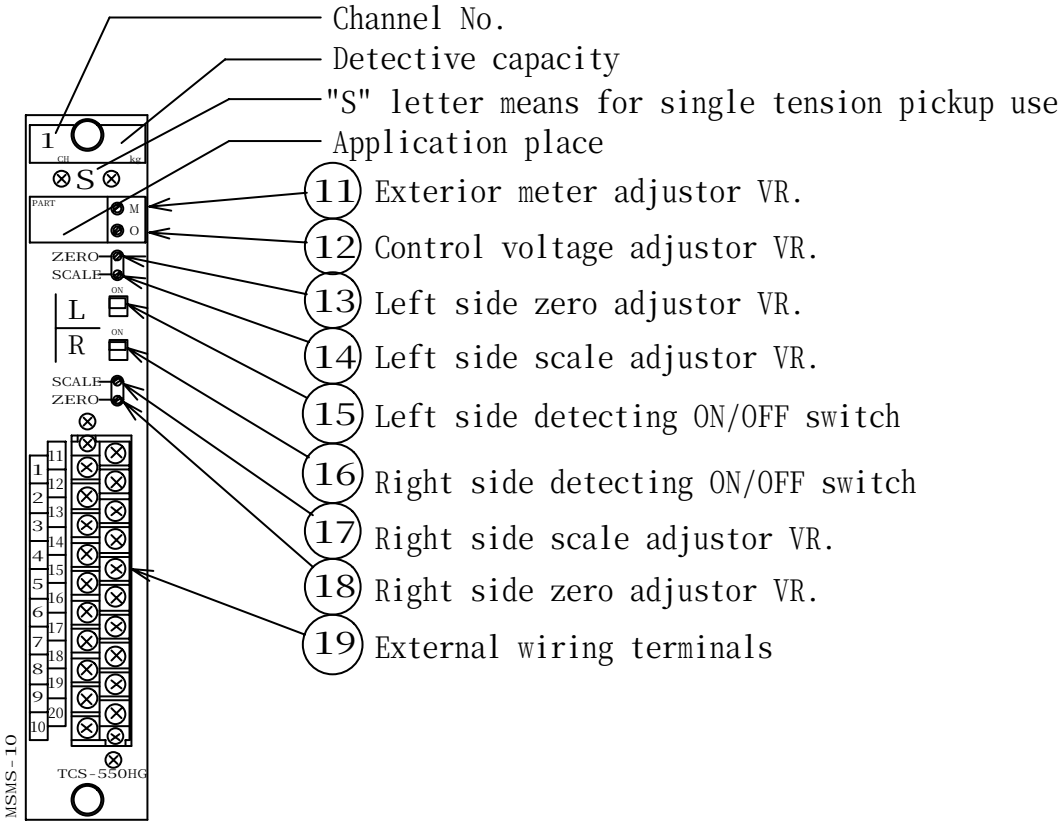
4 NAMES AND FUNCTIONS OF EACH SECTIONS

(1) NAMES

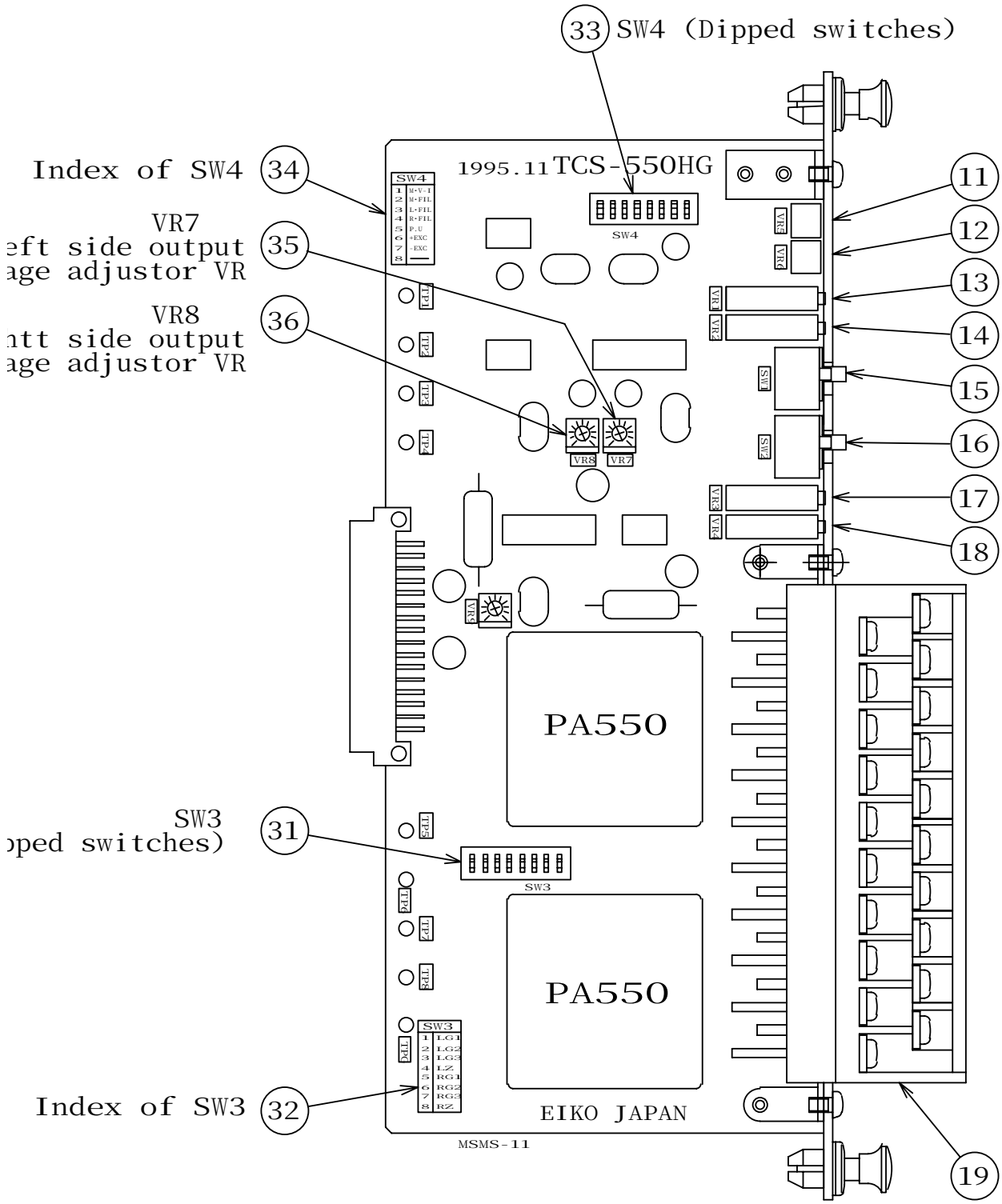
Power card **MSM－PS2**



Tension detection card **TCS－550**



Tension detection card layout （**TCS−550**）



(2) FUNCTION

No.	NAME	FUNCTION
①	Tension indicator	· Tension value of selected channel by ② switch, it's indicate 0 ～ 100% unit.
②	Channel select switch	· Channel select for intend to check on indicator.
③	VR. For built-in meter adjustor	· For ① indicator adjustor. · No use to customer side.
④	Power LED	· Lighten at the power sw. ON. · Combine indicates ±15V DC power.
⑤	Power switch	· Power line SW.
⑥	Check terminal	· Check for the base voltage on each detection card. · Use for adjusts on external meter and controller voltage.
⑦	Shield wire grounding	· Shield wire connected to terminals ⑨ & 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 No.,	· Each channel No., 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 exterior tension meter.
	Mark "S"	· "S" means for single tension pickup use.
	Using location	· If customer demanded that using location or channel No., and be specify here.
⑪	VR for exterior meter adjustor	· At the ⑥ check terminal is 5V DC , then be adjust to the exterior 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 ⑬-⑭ make to specific voltage.
⑬ ⑭ ⑰ ⑱	VR for calibration	· Use for calibrate on tension pickup.
⑮ ⑯	ON/OFF switch	· Use for the right or left select switch to the tension pickups.
⑲	External connection terminals	· Input or output terminals for each channel. · See page 4.

<table>
<tr><th>No.</th><th>NAME</th><th>FUNCTION</th></tr>
<tr><td>㉛</td><td>SW3</td><td>Sensibility adjustor for the tension pickup.
(See page 18, 19)
<table>
<tr><th>Bit</th><th>Name</th><th>Means</th><th>ON</th><th>OFF</th><th>Original setting</th></tr>
<tr><td>1</td><td>LG1</td><td>L side gain adj. 1</td><td></td><td></td><td>OFF</td></tr>
<tr><td>2</td><td>LG2</td><td>L side gain adj. 2</td><td></td><td></td><td>ON</td></tr>
<tr><td>3</td><td>LG3</td><td>L side gain adj. 3</td><td></td><td></td><td>OFF</td></tr>
<tr><td>4</td><td>LZ</td><td>L side zero adjustor range selector</td><td>wide</td><td>narrow</td><td>ON</td></tr>
<tr><td>5</td><td>RG1</td><td>R side gain adj. 1</td><td></td><td></td><td>OFF</td></tr>
<tr><td>6</td><td>RG2</td><td>R side gain adj. 2</td><td></td><td></td><td>ON</td></tr>
<tr><td>7</td><td>RG3</td><td>R side gain adj. 3</td><td></td><td></td><td>OFF</td></tr>
<tr><td>8</td><td>RZ</td><td>R side zero adjustor range selector</td><td>wide</td><td>narrow</td><td>ON</td></tr>
</table></td></tr>
<tr><td>㉝</td><td>SW4</td><td>Output adjustor (See page 9, 11 and 19)
<table>
<tr><th>Bit</th><th>Name</th><th>Means</th><th>ON</th><th>OFF</th><th>Original setting</th></tr>
<tr><td>1</td><td>M･V-I</td><td>Amp. or volt. Output selector for exterior meter</td><td>Amp.</td><td>Volt.</td><td>OFF</td></tr>
<tr><td>2</td><td>M･FIL</td><td>Filter on/off for exterior meter</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td>3</td><td>L･FIL</td><td>Filter on/off for L-OUT</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>4</td><td>R･FIL</td><td>Filter on/off for R-OUT</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>5</td><td>P.U</td><td>Detection mode selector</td><td>Single</td><td>Double</td><td>OFF</td></tr>
<tr><td>6</td><td>+EXC</td><td>Impresses voltage for + side pickup</td><td>+5V</td><td>+2.5V</td><td>ON</td></tr>
<tr><td>7</td><td>-EXC</td><td>Impresses voltage for −side pickup</td><td>-5V</td><td>-2.5V</td><td>ON</td></tr>
<tr><td>8</td><td>——</td><td>Spare</td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>㉟</td><td>L side output voltage adjustor VR.</td><td>・ Turn on the ⑮ switch only, and when set the voltage of ⑥ checking terminal is 2.5V by VR ⑬, then make adjust the voltage of the external terminals 15-16 is to a requirement value by this VR.
・ If no specified, it is set to 5V before shipping.</td></tr>
<tr><td>㊱</td><td>R side output voltage adjustor VR.</td><td>・ Turn on the ⑯ switch only, and when set the voltage of ⑥ checking terminal is 2.5V by VR ⑱, then make adjust the voltage of the external terminals 17-18 is to a requirement value by this VR.
・ If no specified, it is set to 5V before shipping.</td></tr>
</table>

5 ADJUSTMENTS

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 20 minutes after the power switch is ON.
(About a ○ make number, See page 5, 6)

5-1. EXTERIOR METER ADJUSTMENT

Usable exterior (tension) meter are all sorts of an amperemeter up to 1mA DC and a voltmeters up to 10V DC. Make adjust fit to the using meter.

(1) First, check the type of meter, that is, an amperemeter or a voltmeter, and set to that type. See section [3] on page 17, and then pull out the detection card of subject to adjustment. If it is not capable of pulling out affected by short wiring, refer to the section [2] on page 17, and pullout the card after removed the terminal block.

(2) See page 6 and 8, select a voltmeter or an amperemeter by the bit 1 of SW4 ㉝.

SW4 bit 1	ON	Voltmeter
	OFF	Amperemeter

(3) ON/OFF setting for a filter of the exterior (tension) meter. When the exterior meter is a digital type or an analog type, if it filters is ON, therefore the meter is indicated smoothly.

SW4 bit 2	ON	Filter ON
	OFF	Filter OFF

In case of necessity the high response, and this signal use expect to the exterior meter, must OFF the filter switch.

(4) Putting in the detection card to slot and connect the terminal block.

(5) Connect the circuit tester to the check terminal (CHECK) ⑥ on the power card. (MSM-PS2) (Upper terminal is “+”)

(6) Select the channel for adjustment by the select switch ②.

(7) Tune to ON the ⑮, ⑯ switches on the adjusting channel, and make adjust the check terminal voltage just to 5.0V by tuning of the zero adjustor VR as ⑬ or ⑱. (If only fit to 5.0V don’t care about the tuning range of VR.)

(8) When check terminal voltage is 5.0V DC., then set exterior meter set to full scale by the “M” VR ⑪. (This VR use to either meter type of ampere or voltage.)

(9) If not require an accurate tension indication on the exterior meter take following procedure. At the built-in meter ① point to full scale, set the exterior meter get to full scale by tuning VR ⑪. (Before shipping from factory, it set that as at the check terminal ⑥ is 5.0V DC., the built-in meter get to full scale.)

(10) Finish the above-mentioned facts, and then make to the output signal adjustment. (Leave the check terminal output as 5.0V DC.) If not require an alteration of the output voltage of control; make a stop to 5-4 ZERO ADJUSTMENT.

5-2. OUTPUT SIGNAL ADJUSTMENT

At the tension meter point to full scale, the output signal level is changeable 0~5V DC of range. Standard level is 5.0V/FS.
If it is necessity for the change of the output level, take the following procedure.

(1) Select the channel for adjustment by the SW②.

(2) Set the check terminal voltage to 5.0V DC. See 5-1 (7).

(3) At that time, set the voltage of between terminals No.⑬-⑭ get to the specified level by “○” VR⑫. (Use a circuit tester and confirm this level.)

(4) And then, proceed to the section 5-3 ADJUSTMENT OF THE L & R OUTPUT VOLTAGE. If unnecessary the changing of the output level L & R, proceed to the section 5-4 ZERO ADJUSTMENT.

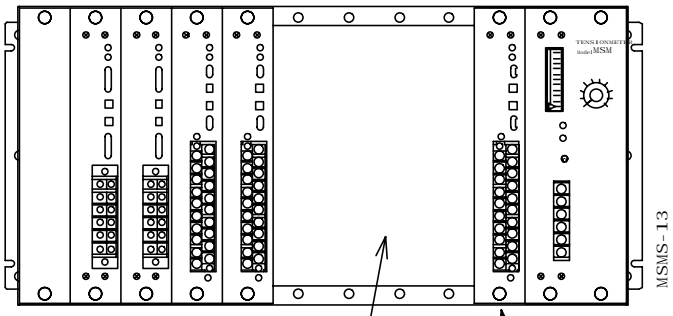
5-3. ADJUSTMENT OF THE L & R OUTPUT VOLTAGE

At the (tension) meter is full scale, it is an adjustable between 0~10V range.
If no require, it is set 5.0V/FS.
In case of change this level, make the following procedure.

(1) If necessary for the change of the filter setting, pulling off the detecting card.
(2) Set the filter ON/OFF by SW4 ㉝ dipping switch.
Standard setting is OFF. (See page 6, 8)

SW4	Bit 3	L side output	ON	Filter ON
			OFF	Filter OFF
	Bit 4	R side output	ON	Filter ON
			OFF	Filter OFF

(3) In case of change the output voltage, remove the card for adjustment to the right side slot, and pulling off the two or three cards from the left side of this card, and so the adjustor screw driver can into inside. Refer to the following drawing.



Pulling off cards for the adjustor screw driver put to inside.

Remove the card for adjustment to the right side slot.

(4) Select the channel of set the card for adjustment by SW②.
(5) Adjust the L side output voltage. Turn on SW⑮ and turn off SW⑯, both SW are on the channel for adjustment. And, make adjust the check terminal ⑥ voltage to 2.5V DC by VR⑬.
(6) At that time, set the voltage of between terminals No.15-16 gets to the specified level by VR ㉟.
(7) Adjust the R side output voltage. Turn off SW⑮ and turn on SW⑯, and make adjust the check terminal ⑥ voltage to 2.5V DC by VR⑱.
(8) At that time, set the voltage of between terminals No.17-18 gets to the specified level by VR ㊱.

	Standard voltage of check terminal ⑥		Output adjustor VR	Output terminals
		Setting VR		
L side output	2.5V	⑬	㉟ VR7	15—16
R side output	2.5V	⑱	㊱ VR8	17—18

5-4. ZERO ADJUSTMENT

[1] BOTH SIDE HOLD AND BOTH SIDE DETECTION TYPE (TWIN PICKUPS)

(1) Check about a no load on the tension detection roller.
(2) Select the channel No., for adjustment by SW② as at page 5, and connect the circuit tester to the check terminal ⑥.
(3) Turn on SW⑮ (L side only is on). SW⑯ is off.
(4) Adjust the indication of tester get into zero by VR⑬. This zero point confirmation are use either the built-in meter ① or corresponds to the exterior meter.
(5) Next, turn on SW⑯. (L and R side are ON.) adjust the indication of tester get into zero, or the built-in meter point to zero by VR⑱.
(6) After this, SW⑮ and ⑯ keep to ON.

[2] BOTH SIDE HOLD AND SINGLE DETECTION OR CANTILEVER TYPE (SINGLE PICKUP)

(1) First, make sure that the “S” mark seal attached on the upper side of the channel. “S” marks testify to that this channel is used for single pickup. As if change the detective mode at a customer refer to page 8 and 19, and make change.
(2) Select the channel No., for adjustment by SW② as at page 5, and connect the circuit tester to the check terminal ⑥.
(3) Turn on SW⑮ or ⑯, but the pickup is connected side only.
(4) Adjust the indication of tester get into zero by VR⑬ or ⑯. (Pickup connected side.) this zero point confirmation are use either the built-in meter ① or corresponds to the exterior meter.
(5) After this, SW⑮ or ⑯ keep on, but the pickup is connected only.

[3] ZERO ADJUSTMENT OF WHEN THE ONE CHANNEL USE AS THE TWO SEPARATE CIRCUITS.

Take adjustment as following procedure at when the one channel use as the two separate circuits, that is, this meaning is the two pickups for single use or cantilever type connected to the same channel, and gain the each tension output signals.

(1) Connect a tester to the external wiring terminals 15-16, of on adjustment.
(2) SW⑮ and ⑯ are ON.
(3) Adjust the indication of a tester get into zero point by VR⑬.
(4) Next, connect a tester to the terminals 17-18 (R side output), and adjust by VR⑱.

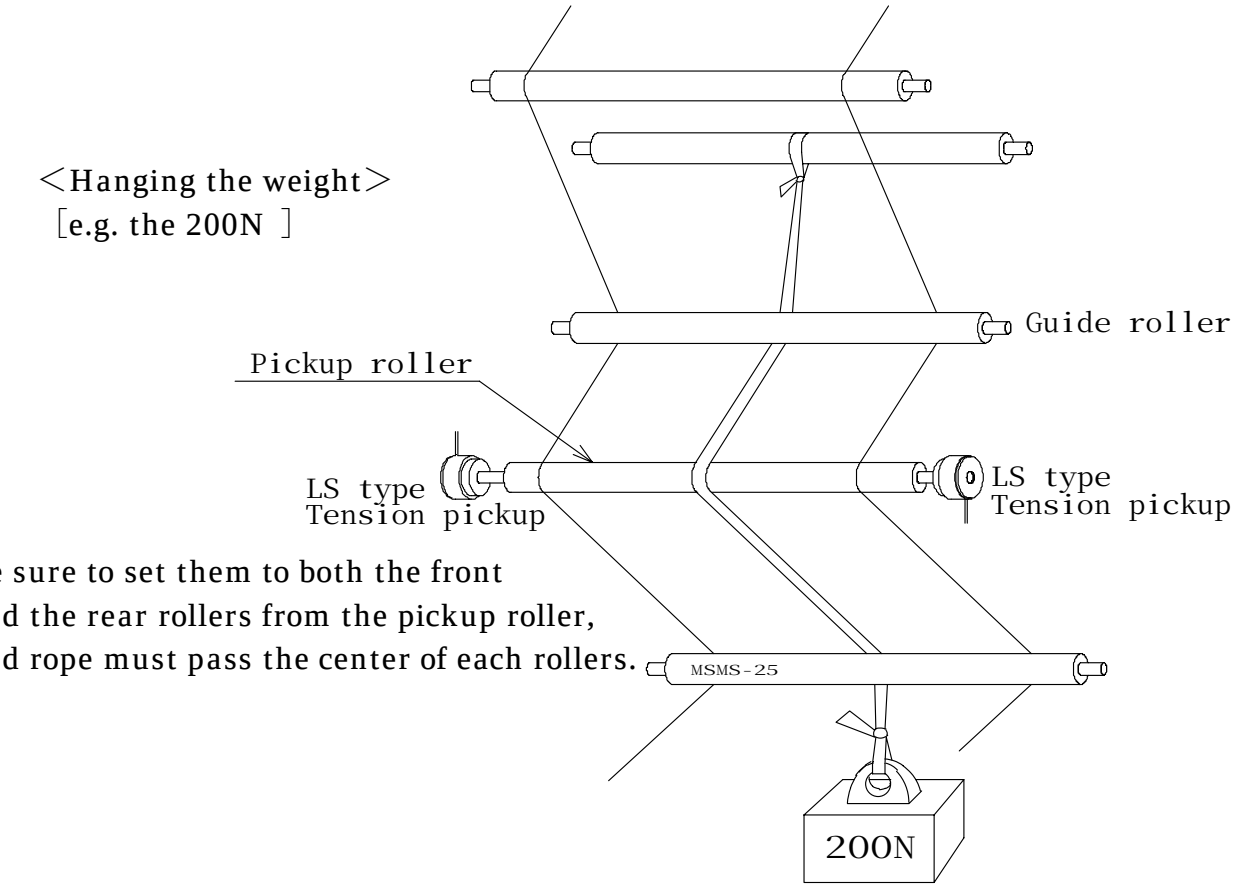
Note1) The check terminal ⑥ output the additional signal of the L and R sides, so it is unused in this case.
Note2) The built-in meter ① is indicated the additional output signal of the L and R sides. If when indicate the single side output signal of the L or R side, and turn on the SW either ⑮ or ⑯.
Note3) This use mode is the both side hold and both side detection.

5-5. SENSIBILITY (SCALE) ADJUSTMENT

- Take after the zero adjustment completed.
- The zero point gets wrong vary after the sensibility adjustment. In that case, make adjust the both adjustments twice or three times alternately, and the each adjustments result in all right.

[1] BOTH SIDE HOLD AND BOTH SIDE DETECTION TYPE (TWIN PICKUPS)

(1) Set a lope to the roller along the path of sheet will actually travel. It is desirable for a rope to be flexible, light, and thin. The using standard weight is the same weigh as the actual tension value. At if not use the standard weight, use the spring balance. Connect the circuit tester to the check terminal⑥, and so this adjustment make simply. (See page 5)



(2) Make to OFF the right side ON-OFF SW as ⑯, (See page 5), L is on and R is off.
(3) On this state, adjust the tension indicates get as same as the half weigh of hanging weight (In this case is 100N) by the left side scale VR as ⑭. (Tester voltage is 2.5V)
(4) Then, turn to ON the right ON-OFF SW as ⑯, adjust the tension indicates get as same as the hanging weight (is 200N) by the right side scale VR as ⑰. (Tester voltage is 5.0V)
(5) After this, keep to ON the SW as ⑮ and ⑯.

[2] BOTH SIDE HOLD AND SINGLE DETECTION OR CANTILEVER TYPE (SINGLE PICKUP)

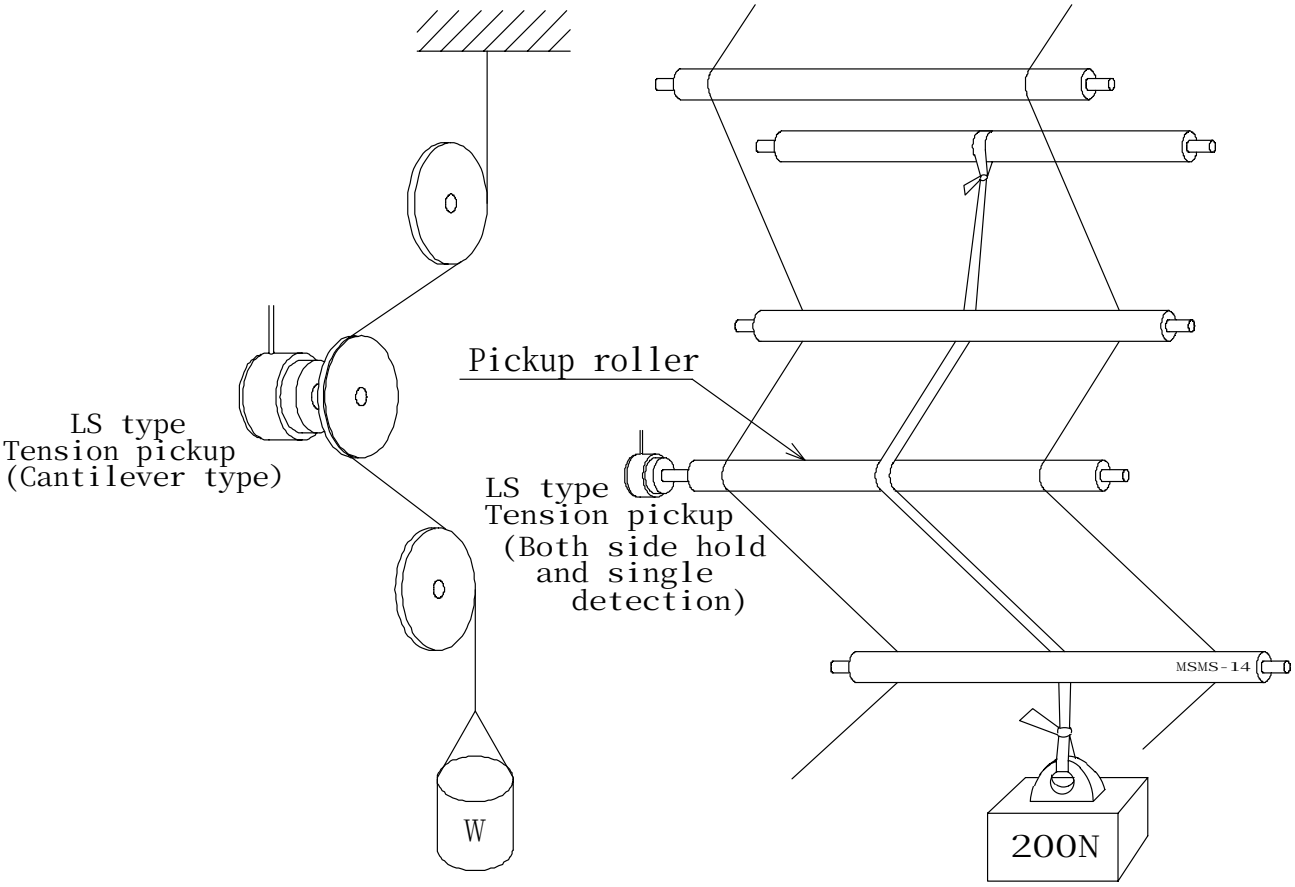
In this case, make adjustment as the following procedure of the illustration.

(1) Be sure the “S” mark seal is attached on the head of the detection card. (Refer to page 5) If not attached this mark, this card is not adjustment for this single pickup mode. As so change the mode with refer to the pages 8 and 19.

(2) Make the zero adjustment. (See page 12)

(3) Select the channel by SW②, and connect a circuit tester to the check terminal ⑥.

(4) Hang the weight as the following figure. Set a lope to the roller along the path of sheet or wire will actually travel.



(5) Between the two SW as ⑮ and ⑯, turn to ON either SW of the pickup is connected side.

(6) Adjust the circuit tester voltage come to 5.0V or the built-in meter come to the full scale ⑭ or ⑰.

Note 1) If both SW as ⑮ and ⑯ is ON, the accurate tension values is not indicated. So, be sure turn to OFF the unused side SW.

[3] SENSIBILITY ADJUSTMENT OF WHEN THE ONE CHANNEL USE AS THE TWO SEPARATE CIRCUITS

The two pickups of the single pickup connect to the one channel, and take the each output gain. In such a case, the sensibility adjustment make as the following procedure.

(1) Connect a circuit tester to the terminal number 15-16 of the external wiring terminals. (This is the L side tension output.)

(2) Turn to ON the SW as ⑮ and ⑯.

(3) Hang a weight to the tension pickup corresponds to the terminal number 15-16, as same as article [2].

(4) Adjust the circuit tester voltage come to the requirement value by the VR⑭.

(5) Next, connect the circuit tester to the terminal number 17-18 (Right side tension output)

(6) Hang a weight to the tension pickup corresponds to the terminal number 17-18.

(7) Then, adjuster the circuit tester voltage come to the requirement value by the VR ⑰. That is all for the sensibility adjustment about the two circuits portion on the one channel.

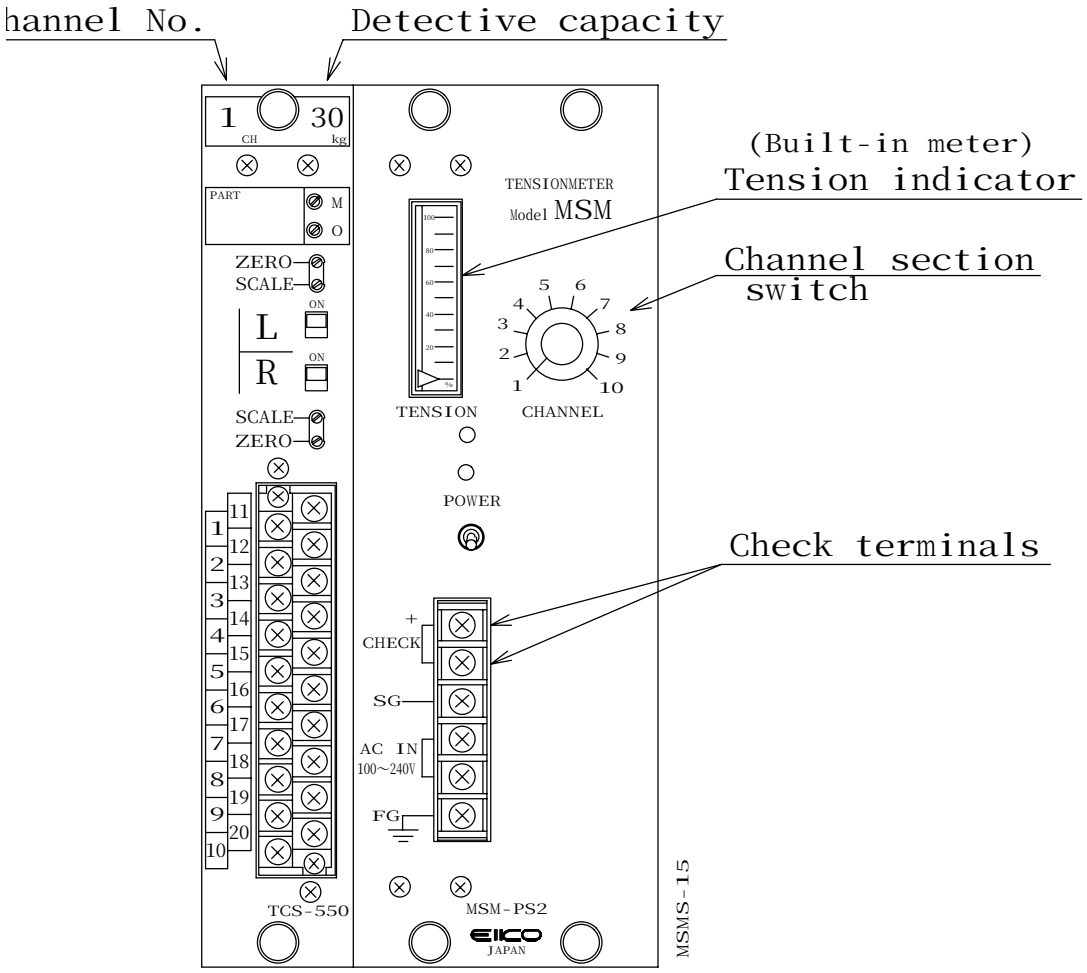
Note 1) In this case, the No.⑥ check terminal is unused, because it terminal outputs the one channel.

Note 2) The built-in meter ① is indicated the added signal output. As if indicates the one side of the L or R, turn to ON the either SW as ⑮ and ⑯.

Note 3) Use the detective mode as the both side hold and both side detection.

6 HANDLING OF THE PARTS

[1] CHANNEL SELECTION SW AND BUILT-IN METER



(1) This built-in meter is indicated the tension value of the selected channel by the channel selection switch. (This number is not card No., correspond to a slot position.)

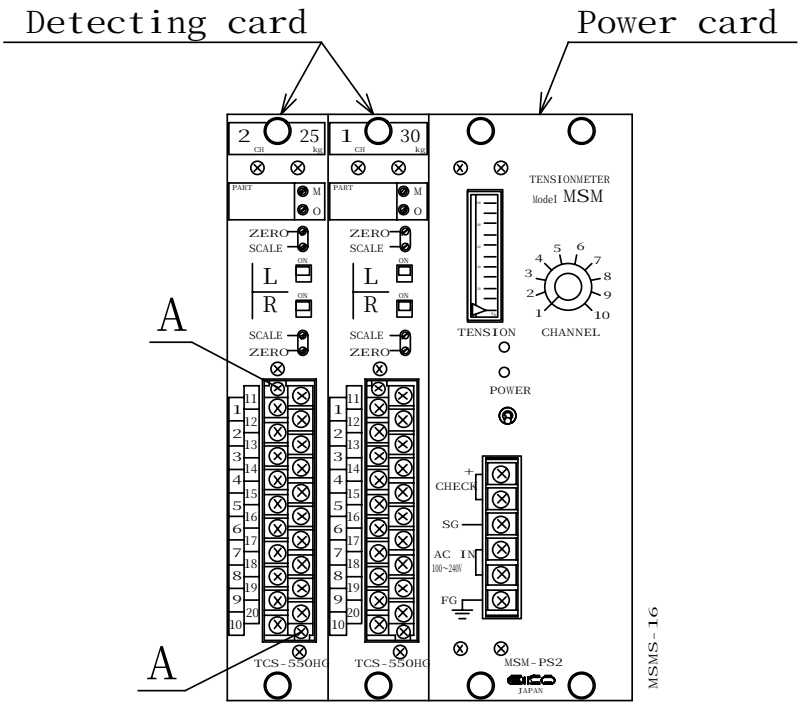
(2) This built-in meter unit is 0~100% range. The channel No., and the detective capacity are shown on the each channel upside. Reading of the actual tension value is necessary to conversion of the entry capacity for as the 100%.

e.g.) detective capacity : 300N
meter indication : 65%
actual tension : 300×0.65＝195N

Note) When if the all channel capacity are same value, the problem is not there. But the each capacity is different, and takes care of mistake to the channel No.

(3) The check terminal as above figure is provided the tension signal output of the selected channel with range 0~5V DC. Therefore, when the built-in meter indicate 100%, the output voltage is 5.0V.

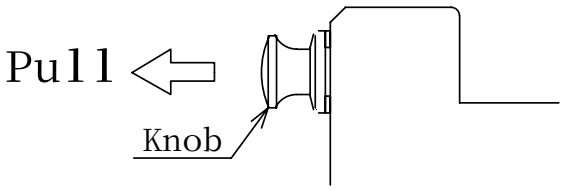
[2] HOW TO REMOVE A TERMINAL BOARD.



(1) All detecting cards removable with loosen the two screws as the above illustration A, on this occasion, it is possible without removing the connected wires. It is a convenience for checking or replacement of the detecting card.

(2) A terminal board on the power card is not removable. When remove this card, beforehand cut off the power supply and take off the all wirings.

[3] HOW TO REMOVE A CARD.



All cards removable with pull off the both up and down knobs on the card. When install this card, thrust the card into a slot, and fixes the knobs by pushing.

(Note) When remove the card, beforehand do cut off the power supply.

[4] ADDITION OF A CARD

In case of is the vacancy channel (as the cover board attached), it is possible addition of a card. (Please order the tension detecting card and the pickup.) The channel selection switch and the built-in meter are connected to all channels in advance, and can use instantly.

[5] ABOUT THE SETTING OF A DIPPING SWITCH. (Refer to page 6, 8)

About the setting and means of the dipping switch ㉛ and ㉜.

(1) Sensibility setting of the pickup

㉛ SW3 GAIN SET		○=ON ●=OFF							
Bit No.		SENSE. LOW ⟷ HIGH							
L-OUT	R-OUT	0	1	**2**	3	4	5	6	7
1	5	●	●	●	●	○	○	○	○
2	6	●	●	○	○	●	●	○	○
3	7	●	○	●	○	●	○	●	○
Magnification per a standard setting.		66	83	**100**	116	133	149	166	183

↑ Standard setting value

It is possible vary the amplification of an input signal form the pickup.
For example, as use the LS-1 pickup, this output range is 300~1000N, but if set this switch to "7" point of max. gain, and can obtain the 1.83 times as much the sensibility gain as per a standard setting.
In short, the formula is 300÷1.83＝163.9N, and a detective gain is only 164N. But in this case the output is produced 0~2.5V per a single side pickup, and can indicate of the meter indication.

As during scale adjusting, if not gain a sensibility level, or a VR revolution angle is not clearance, then make vary the gain with refer to under a graph.

Note) Make increase gain, all the exactness become wrong and wrong. Please contact us about the details.

(2) A SELECTION OF THE ZERO ADJUSTMENT RANGE OF THE PICKUP.

When change the gain (sensibility) setting, and the zero adjustment range varies also.
If a gain set to high level, and the zero adjustment range became wide.
If a gain set to low level, and the zero adjustment range became narrow.

If the zero adjustment range too wide, the VR motion turn a critical state, therefore the VR setting became difficult, and the adjustment range to narrow.

Selection of the zero adjustment range ㉛ SW3			
L side	bit 4	ON＝wide	Standard setting
R side	bit 8	OFF＝narrow	ON

(3) THE SETTING AND EXPLANATION ABOUT THE DIPPING SW4.

(Refer to page 8)

bit 1	M･V-I	Select SW for the connection of either a voltmeter or an amperemeter to the exterior meter output. Set this SW to fit the exterior meter.

bit 2	M･FIL	Filter ON/OFF SW to the exterior meter. When use the exterior meter is a digital indicator or an analogue amperemeter, make this SW turn ON, so the meter indication reading became easy.

bit 3	L･FIL	Filter ON/OFF SW to the L and R side outputs. Operation same as bit2 above.
bit 4	R･FIL	

bit 5	P.U	Mode setting SW for the tension detector. When use the tension pickup for the single detection or the cantilever type, this SW turn ON.

bit 6	+EXC	Setting of the supply voltage to the pickups. This setting fix to the specification of each pickup before shipping.
bit 7	-EXC	

Supply voltage	5V	7.5V		10V
bit 6	●	●	○	○
bit 7	●	○	●	○

○＝ON ●＝OFF

7 MAINTENANCE

（1）Avoid exert a strange shock on the tension pickup without a tension force. Never step on the pickup anyone.

（2）In case of exerted a heavy force on the tension pickup with a paper breaking or a film coiling, there is possibility of the zero point get out of order. Sometimes check a zero point, if it's off and make adjust again.

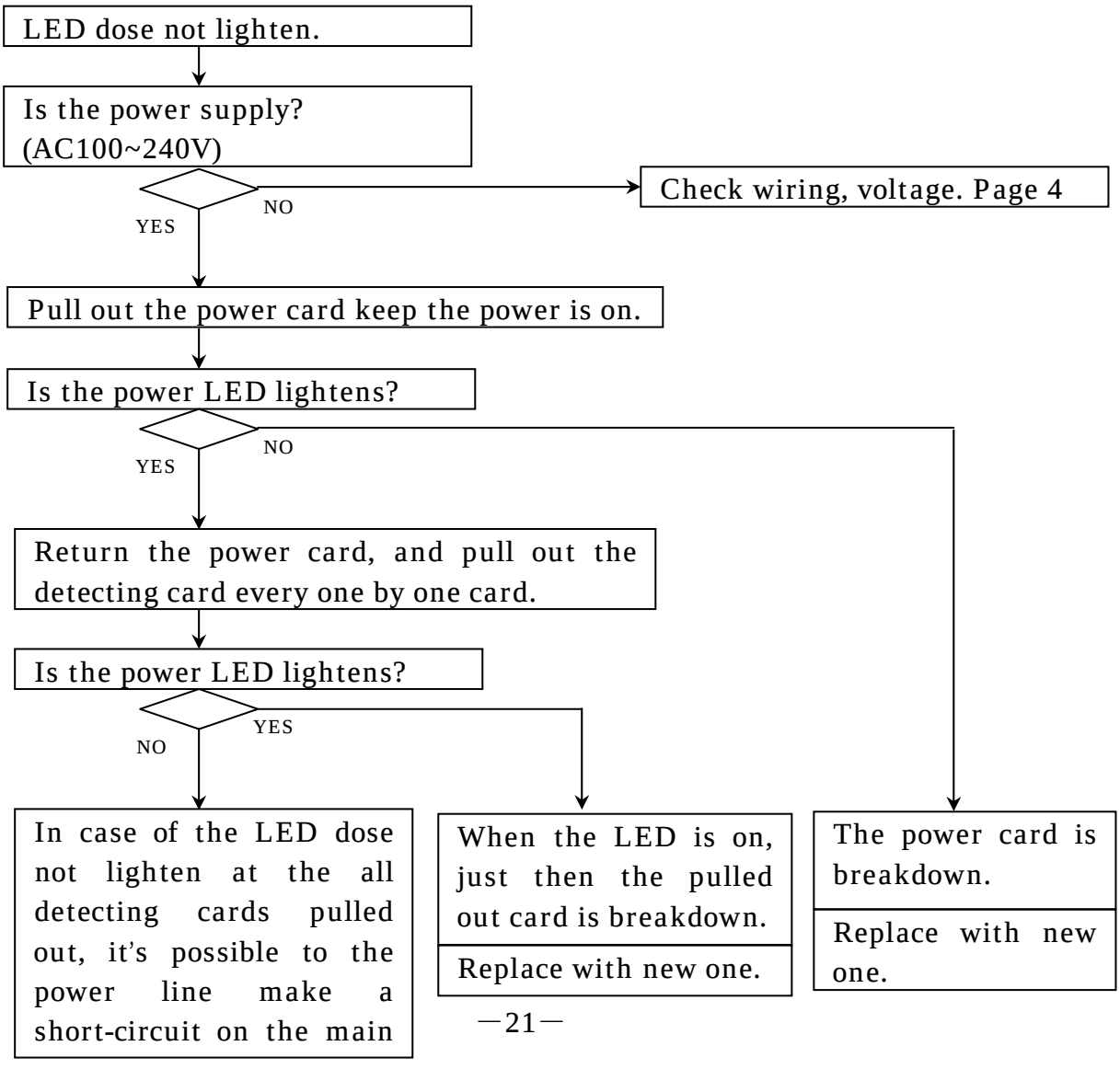
（3）In the long run using, a sensibility (scale) gain may get off the point. Make calibrate to the pickup, once or twice a year.

（4）In the very long run using, the dust has collect in the amplifier, and sometimes it causes the operation trouble. Make clean the inside by the air flashing, once a year or two years.

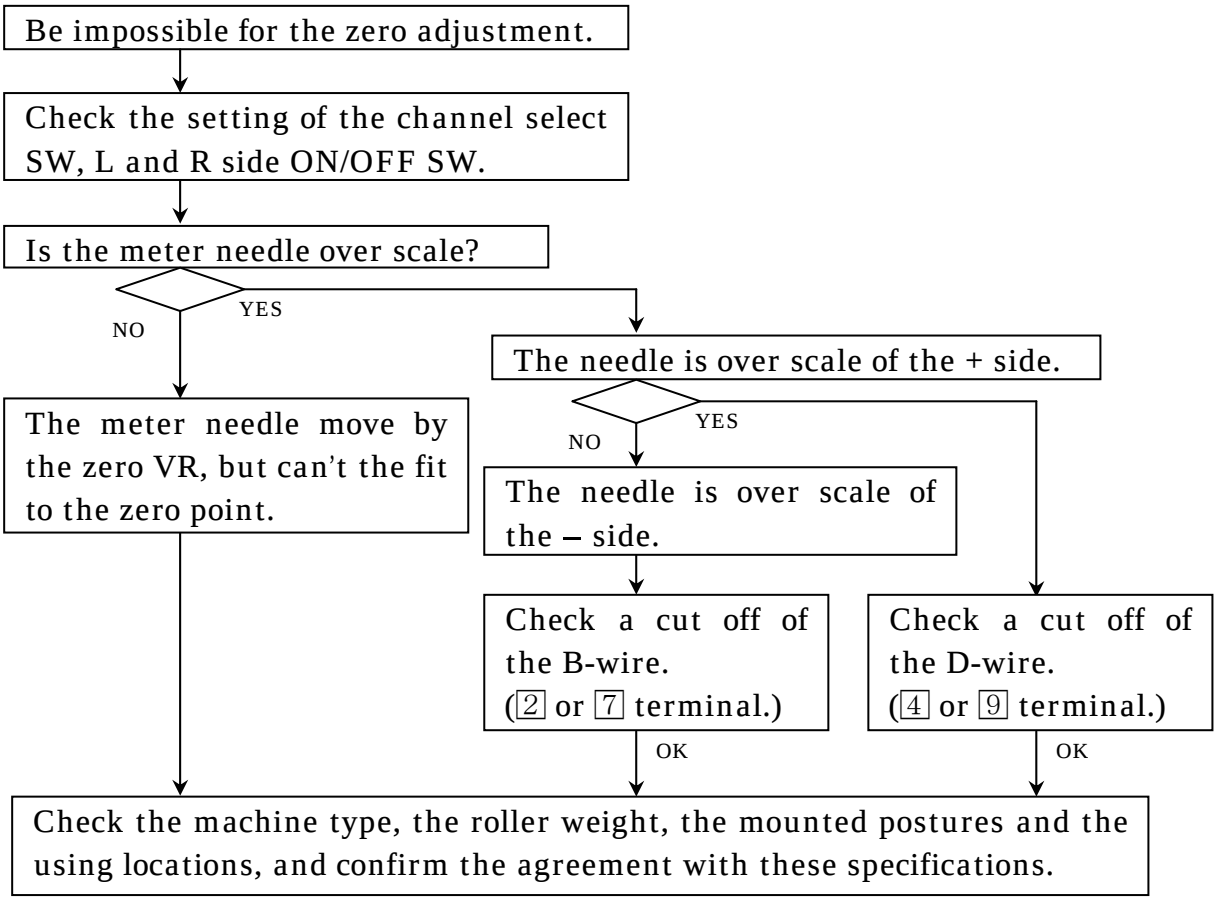
8 TROUBLE SHOOTING

No.	Details	Refer to
(1)	Power dose not supply.	This page
(2)	Be impossible for a zero adjustment of the pickup.	Page 22
(3)	Be impossible for a scale adjustment of the pickup.	Page 23
(4)	A tension is irregularity.	Page 24
(5)	The tension indicator is irregularity. (As the analogue meter.)	Page 24
	① When power is off a meter dose not indicates the zero point.	
	② Meter needle moving is not smoothly.	
	③ Meter needle move back and forth.	
	④ Meter indication is change under the machine is stop.	
	⑤ Meter needle move right and left under the machine is high-speed operation.	
(6)	Main irregular phenomenon and it's causes.	Page 25

(1) Power dose not supply.



(2) Be impossible for the zero adjustment of the pickup.



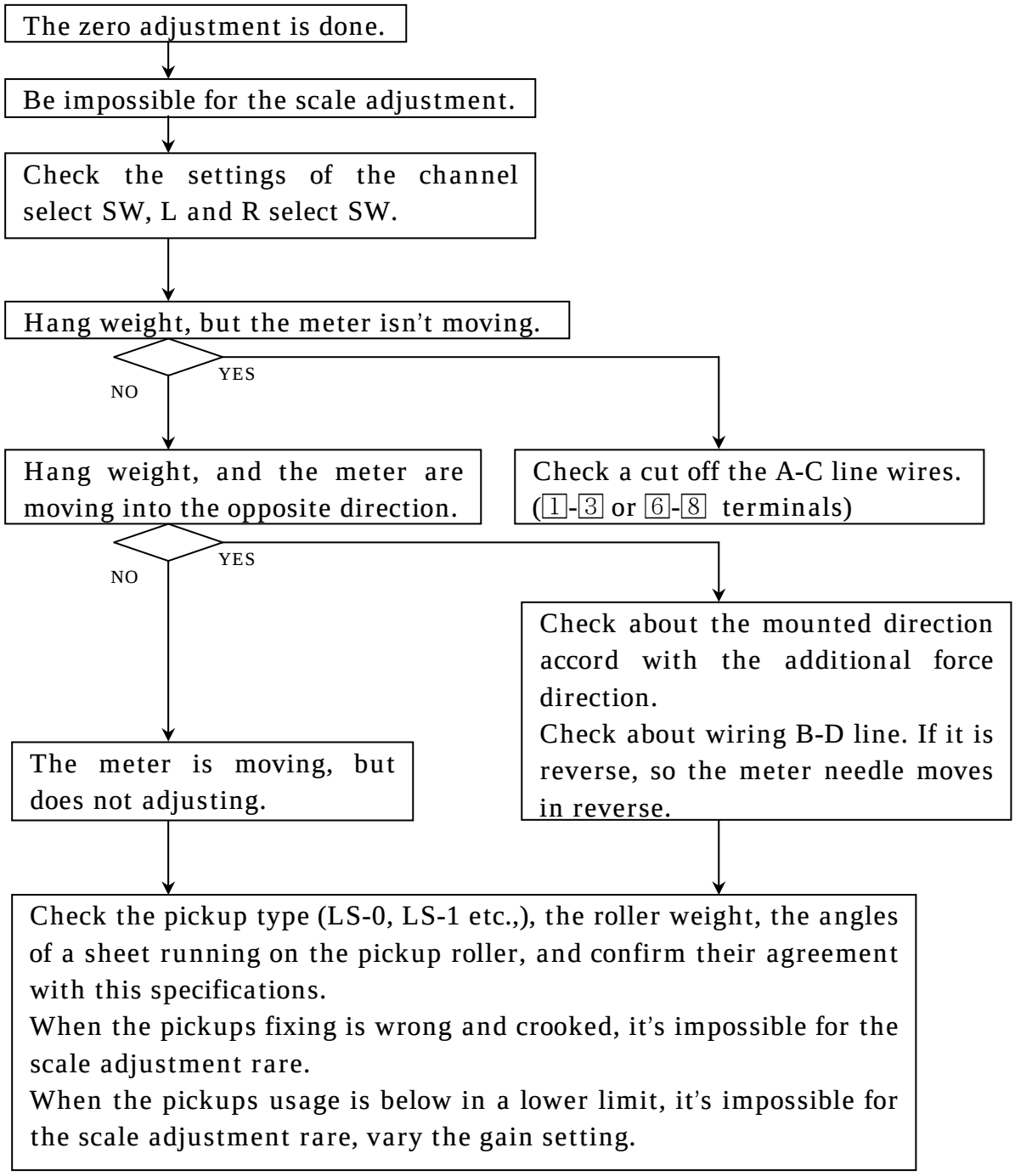
《 information 》

Judgment methods for in case of missing the wiring from the pickups.

1) Take off wire from a terminal board, and measure the combined resistance of every two resistors by the circuit tester. (4 pieces and 6 ways)
2) The maximum resistance out of the combined resistance is A-C line wires. The rest two wires are B-D line.
3) Connect the A-C line wires to the 1-3 or 6-8 of the terminal board. Not care connect A-wire either terminals.
4) Connect the B-D line wires to the 2-4 or 7-9 of the terminals board. Not care connect B-wire either terminals.
5) Hang a weight in this state, if the meter point to the －side, exchange B-D line wires each other.

Note) Be sure to check either R and L, and confirm that the meter indicates + range at hanged weight.

(3) Be impossible for the scale adjustment.



(4) Tension became irregular at machine in operation.

Check the followings.

① Is a paper roll center unbalanced? (An excentric state)

② Is a rewinder shaft inconsistent turning?

③ Is the line speed stability?

④ Check a guide roller unbalanced, turning stability and the dynamic balance.

⑤ Is the paper shaft slip?

(5) Unusual tension indicator. (On the analogue type)

① Meter not indicates zero point at the power is off.
- Adjust the mechanical zero of the meter itself.

② Meter needle moving isn't smooth. (Moving as like catch on the way.)
- Needle occasionally clings to a cover inside by the static electricity, and needle moving become wring. Eliminate the static electricity, or replace a new meter.

③ Needle move back and forth.
- This cause is the machinery vibration. Separate a meter from the machine, and defend from the machinery vibration.

④ Meter indication is change under the machine is stop.
- Is supposing that by the noise influence. Use a shielded cable for the pickup cable, and separate from the power line. Compare that the SG terminal connect to the FG terminal or unconnected each other, and choice either the SG connect or unconnected.

⑤ Meter needle move right and left at the machine is high speed operation.
- Pickups occasionally resonant with the pickup roller revolution. (Especially on a high-speed machine) In this case, on trail change the machine speed, and if the resonant is put down, that is the resonance. Be sure make the dynamic balance of the pickup roller.

9 SPECIFICATION & DIMENSIONS

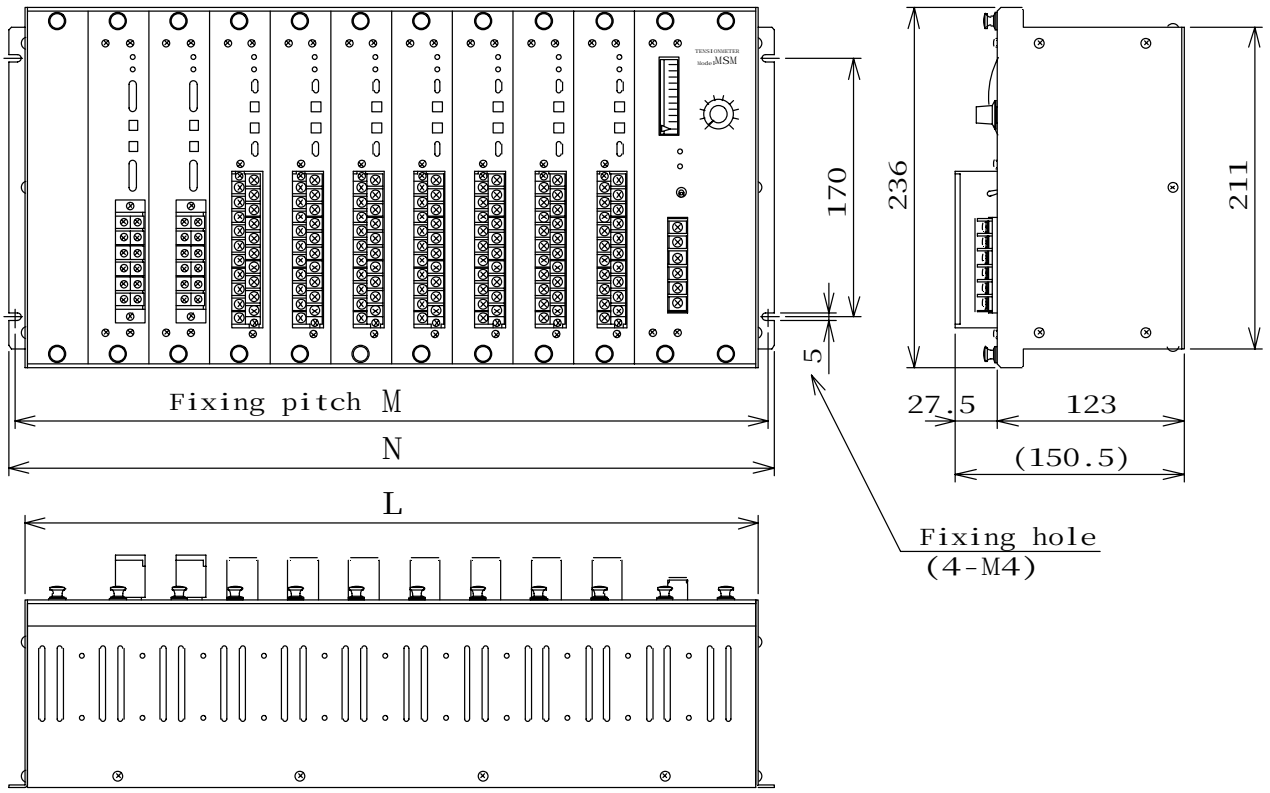
Tension meter MSM SPECIFICATIONS		
POWER SOURCE	AC100～240V 40VA or less（10 CH） 50／60Hz	
ENVIRONMENTS	0～40℃ / temperature	
	80% below (Avoid dew)	
DIMENSIONS	This is different from the channel number. Refer to the figure of dimension.	
WEIGHT	about 5.7kg ／ chassis type 10 channels.	
BODY COLOR	MSMS (Chassis type)	Body : Hammer tone black Panel : Hairline silver (A letter is black)
	MSMB (Box type)	Follow the customer's specified.

Tension detection card TCS-550 SPECIFICATIONS			
OUTPUT FOR CONTROL (R.O)	Total output (R+L output)	DC0～＋10V var. (RL = 2KΩ or over)	5V/FS Standard setting value
	Output of the L side	DC0～＋10V var. (RL = 2KΩ or over)	5V/FS Standard setting value
	Output of the R side	DC0～＋10V var. (RL = 2KΩ or over)	5V/FS Standard setting value
OUTPUT FOR EXTERIOR METER {Changeable to the output of a voltage or a ampere}	Output for voltmeter	DC0～＋10V var. (RL = 2KΩ or over)	
	Output for amperemeter	DC0～1mA var.	500μA Standard setting value
FREQUENCY RESPONSE	OUTPUT FOR CONTROL	Total	7Hz / －3dB
		L, R Filter OFF	7Hz / －3dB
		L, R Filter ON	0.2Hz / －3dB
	OUTPUT FOR EXTERIOR METER	Filter OFF	7Hz / －3dB
		Filter ON	0.2Hz / －3dB
ACCURACY	Linearity	±0.02% R.O	
	Temperature drift	±0.24% R.O／0～40℃ (input 17mV／FS)	
Connectable tension detector (The strain gauge type only)		LS series FT series	

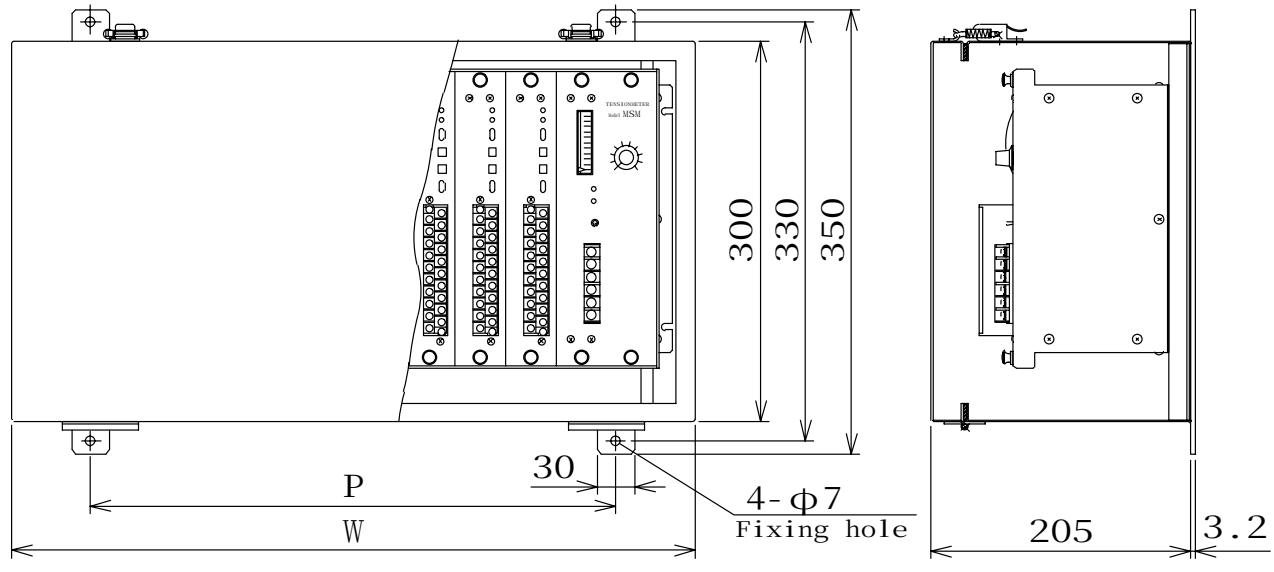
Refer to the specifications of "multi channel tension meter model MSM" for details. And see the specifications of "MTM" for about the TCM-550 with the LA-type tension pickups.

DIMENSIONS

Chassis type MSMS-□



Box type MSMB-□



MSMS-05

Type	Chassis type			Box type	
Chassis	L	M	N	W	P
2ch	163.2	176	184	-	-
4ch	243.2	256	264	300	190
6ch	323.2	336	344	380	265
8ch	403.2	416	424	460	340
10ch	483.2	496	504	540	415