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ELECTRICAL MEASURING INSTRUMENTS

INSTRUCTION MANUAL
FOR
CURRENT UNIT, TYPE 2862
Edit 1

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YEW

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1. GENERAL DESCRIPTION

1.1 Features

Type 2862 current unit is a power source supply device which is capable of accurately and stably extracting a DC large current in combination with Type 2853 DC voltage/current standard. The output current is within the rated 3 ranges of 1A/10A/30A, each one of which can be set at 4 digits with a accuracy of $\pm 0.2\%$ of reading +1 division. The output voltage can be extracted up to 1V. When the output voltage exceeds 1V, the output shall be turned off by means of the overload protector.

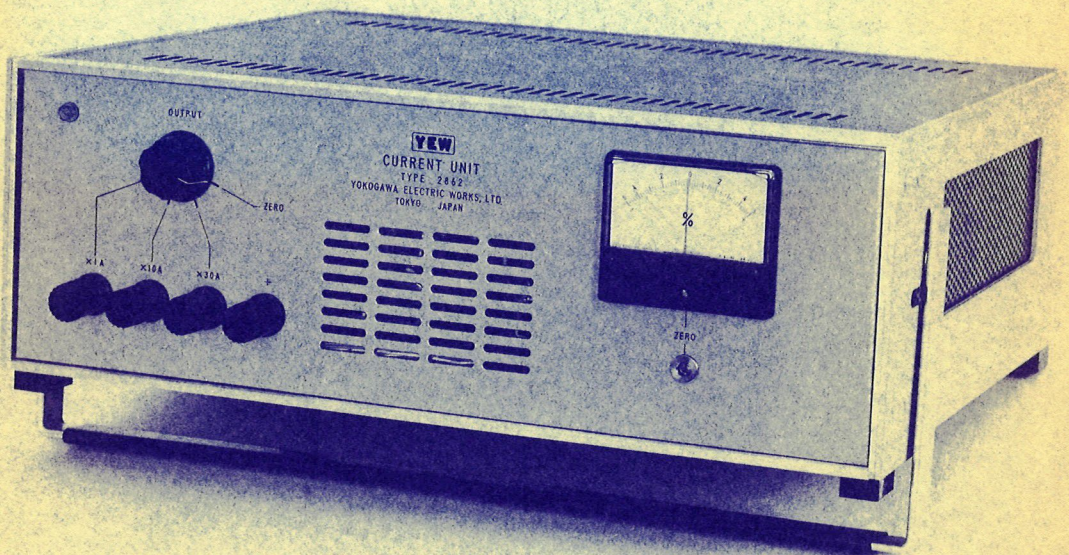


Fig. 1.1 External View of Current Unit, Type 2862

1.2 Specifications

(1) Ratings

Current Range		Accuracy of Setting (%)	Resolution
x 1A	0~1.1999A	±0.2% + 1 division	0.1mA
x 10A	0~11.999A	"	1 mA
x 30A	0~35.997A	"	3 mA

Max. Output	Internal Resistance	Ripple and Noise (1Hz~1kHz)
approx. 1V	approx. 5 kΩ	below 2mAp-p
"	approx. 500 Ω	below 20mAp-p
"	approx. 150 Ω	below 60mAp-p

Test condition (operated in combination with Type 2853)

Ambient temperature: 20°C ±2deg

Power line voltage: 100V

Warming-up time: more than 10 minutes

(2) Zero adjustment

Adjustable range: ±0.5% (0.02%/1 division) of rated output current

(3) Temperature influence (at 5~35°C)

Within ±0.1%/10deg.

(4) Line regulation

Within ±0.5%/10% change of line voltage

(5) Dielectric strength

AC 100V between output terminal and case

(6) Maximum temperature / humidity range

Temperature: 0~45°C

Humidity: below 75%

(7) Power supply

AC $100 \pm 10V$, 50Hz or 60Hz (or to specified voltage)
power consumption: approx. 200VA

Note: The power is supplied through Type 2853.

(8) Dimensions and weight

437(W) x 149(H) x 360(L) mm, approx. 21kgs.

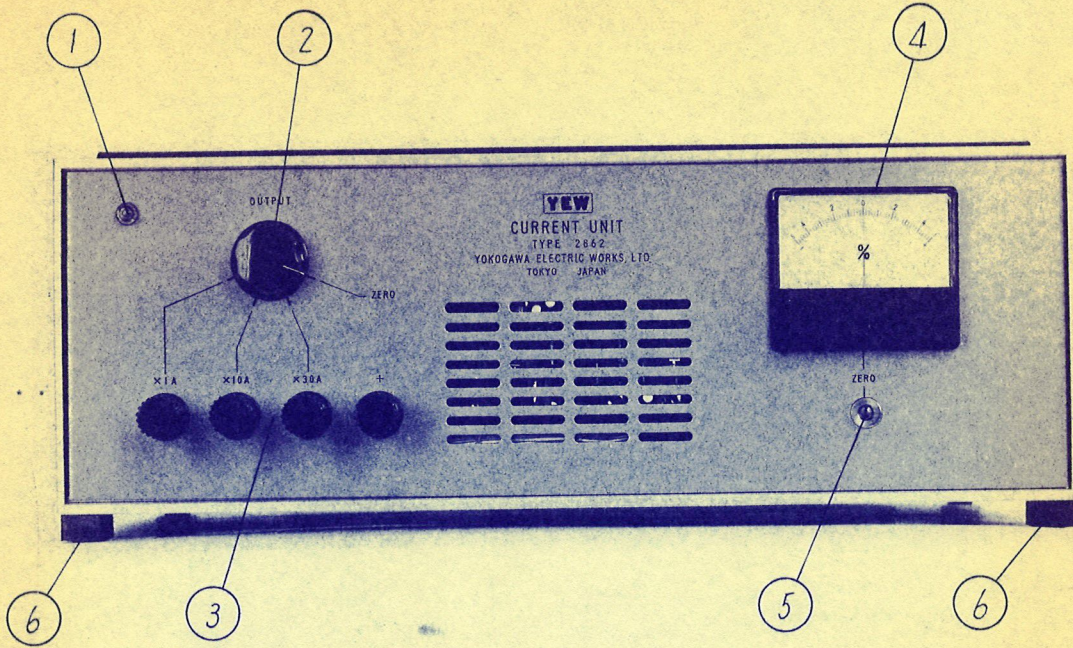
(9) Accessories

Fuse (5A) 2pcs.

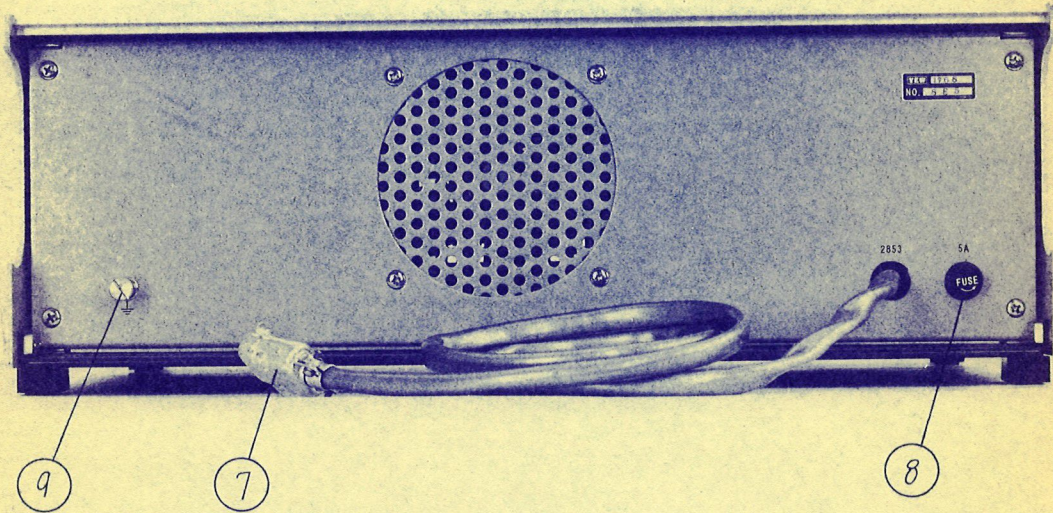
2. OPERATION

2.1 Panel Functions

- (1) Power source lamp: This lamp lights when the power switch of Type 2853 is turned on.
- (2) Range selector: This switch is for selecting the setting range.
- (3) Output terminals: These terminals are current output terminals. They are provided for each current range.
- (4) Zero adjustment indicator: The offset voltage at the time of "ZERO adjustment" is shown by means of a ratio (%) against the 100mV rated standard voltage.
- (5) Zero adjustment screw: This screw is used for cancelling the offset voltage.
- (6) Mounting screw of main body: Two screws are provided on both the front and rear part of the bottom surface.
- (7) Connector: This connector is connected to the connector "2862" on the rear panel of Type 2853.
- (8) Fuse: 5 ampere fuse.
- (9) \perp : This terminal is for grounding and has connection to the outer case.



(a) Front Panel



(b) Rear Panel

Fig. 2.1 Panel Functions

MEGA 280910 MEGA 280924

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2.2 Warm-up

- (1) The connection cord provided with Type 2862 shall be connected to the connector for Type 2862 located on the rear panel of Type 2853. (Refer to Fig. 2.2) (The cord must not be connected to the connector for Type 2861.)
- (2) The range selector of Type 2853 shall be set at STAND BY, and then the power source plug shall be plugged to AC 100V.
- (3) The power switch of Type 2853 shall be turned on. If the ALARM lamp is lit, the REST button should be pushed in order to set the device in a normal condition.
- (4) Approximately 10 minutes shall be allowed for warming-up the device under the above conditions. In this case, the setting dial of Type 2853 should be set at zero.

2.3 Connection of the Terminals and the Output Setting

- (1) When the load to be applied has the electrical potential against the ground, the grounding terminal should be grounded. It is recommended that the grounding terminal be grounded as much as practicable.
- (2) The load shall be connected to the output terminal of the desired current range. The connecting lead wire should be as thick as possible.
- (3) The range selector of Type 2853 shall be changed over to "2862" and the setting dial shall be set precisely at zero.
- (4) The range selector of Type 2862 shall be changed to "ZERO" and the zero adjustment screw shall be adjusted so that the zero adjustment indicator indicates 0%.
- (5) The range selector of Type 2862 shall be set at the desired setting range, and the setting dial of Type 2853 shall be set at the desired setting value.
An output current equivalent to the setting value multiplied by the magnification ratio shall be generated at the output terminal.
- (6) The setting value should be set at zero when the output is unnecessary.

"Caution"

- (A) The ALARM lamp will be turned on at the time of changing over the range selector. The REST button should be pushed after effecting the change over so that the device be placed under normal operating conditions.
- (B) The output voltage can be effected up to 1V. If the output voltage exceeds 1V, the ALARM lamp will be turned on. In the case of a large current (in the vicinity of special 30A), the connection lead wire diameter should be as large as practicable. In the case of continuously extracting a large current, the inside temperature of the instrument normally increased by approximately 20 deg.

2.4 Overload Protection and Re-setting

When the output voltage attains 1V and over in any one of the ranges, the overload protector circuit will be automatically actuated, thereby suspending the output circuit and turning on the ALARM lamp of Type 2853.

If the RESET button is pushed after eliminating the overload, the ALARM lamp will be turned off and the circuit will be restored to a normal operating condition.

If the RESET button is pushed under the overloaded condition, the ALARM lamp will be kept on and the overload protection circuit will repeat its function. If the ALARM lamp is not turned off in spite of the RESET button actuation, the load conditions shall be checked again and the RESET button shall be pushed after setting the setting value within the range of zero to 1/2 of the rated value.

3. MAINTENANCE

3.1 Calibration

As this instrument is to be operated in combination with Type 2853, The characteristics of the combined instrument as a unit shall be determined by the characteristics of Type 2862 and Type 2853.

The impossibility of effecting the zero adjustment due to an excessive amount of zero-drift voltage or a large extent of error in the amount of the output current is, to a large extent, attributable to the error within Type 2853. Therefore, Type 2853 shall be calibrated in accordance with the instruction manual prepared for Type 2853.

3.2 Trouble

If it is impossible to extract any output voltage in spite of a normal functioning of Type 2853, it is evident that Type 2862 is malfunctioning. In case of any malfunctioning, notice should be made to YEW for servicing.

4. STRUCTURE AND FUNCTIONAL THEORY

4.1 Structure

Fig. 4.1 shows a block diagram of this device combined with Type 2853.

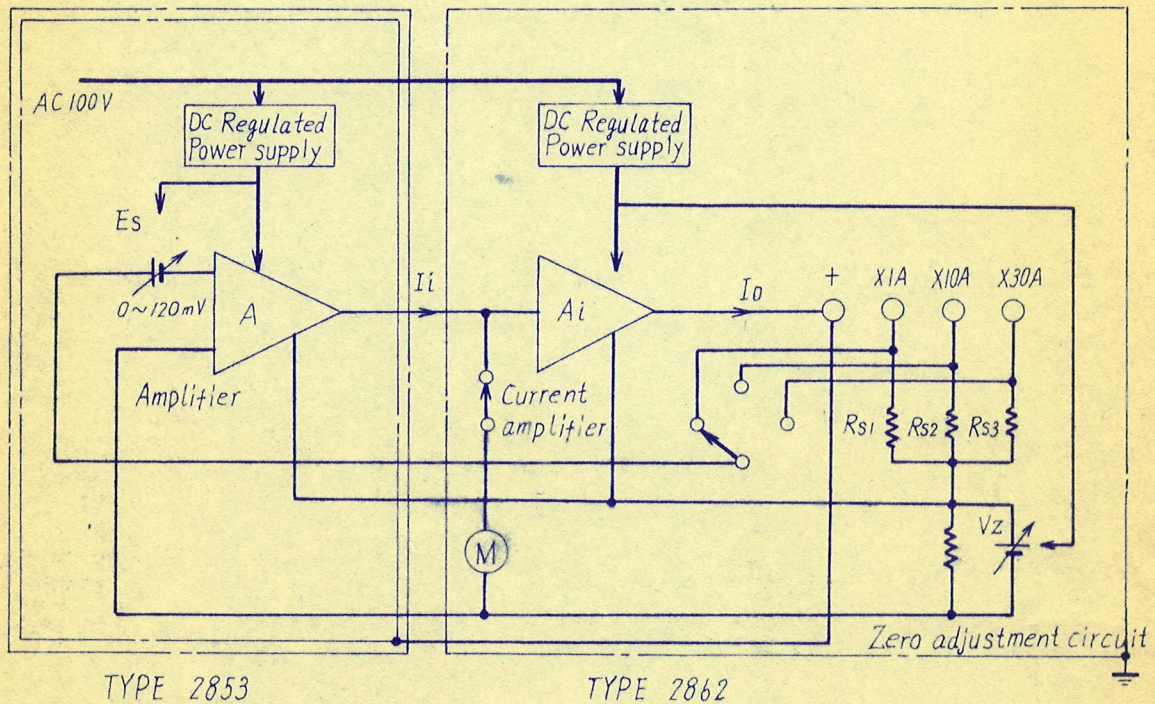


Fig. 4.1 Block Diagram

4.2 Functional Theory

E_s shown in Fig. 4.1 signifies a variable standard input voltage. The output current I_i of Type 2853 shall be current amplified so that an output current I_o be generated.

The voltage drop $R_s I_o$ of output current I_o by means of a shunt R_s shall be compared with E_s . The compared difference voltages shall be amplified by an amplifier so that an accurate output current I_o shall be generated.

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When the gain of the amplifier is sufficiently large, the voltage difference can be disregarded in proportion to E_s so that the following will result:

x 1A; $I_{o1} R_{s1} = E_s$	$I_{o1} = E_s/R_{s1}$ ($R_{s1} = 0.1 \Omega$)
x 10A; $I_{o2} R_{s2} = E_s$	$I_{o2} = E_s/R_{s2}$ ($R_{s2} = 0.01 \Omega$)
x 30A; $I_{o3} R_{s3} = E_s$	$I_{o3} = E_s/R_{s3}$ ($R_{s3} = 0.00333 \Omega$)

Thus, regardless of the amplifier gain variation or the extent of the load resistance R_L , an output regulated by E_s , R_s shall be obtained. The rated value of E_s is 100mV and R_{s1} , R_{s2} and R_{s3} are rated currents for which a 100mV shunt is used.

4.3 Zero Adjustment Circuit

The zero point drift may sometimes attain a maximum of $100 \mu V$ in Type 2853 due to a temperature variation or power source instability. Under such conditions, errors will occur due to an improper effect of the current even if the setting value is fixed at zero. A zero adjustment circuit is provided in order to cancel the drift voltage. The range of zero adjustment is $\pm 500 \mu V$, and the meter "M" is scaled in terms of a percentage against the rated standard voltage 100mV (e.g., $500 \mu V \text{ --- } 0.5\%$). In the actual operation, the zero adjustment shall be effected once per day.

4.4 Overload Protector

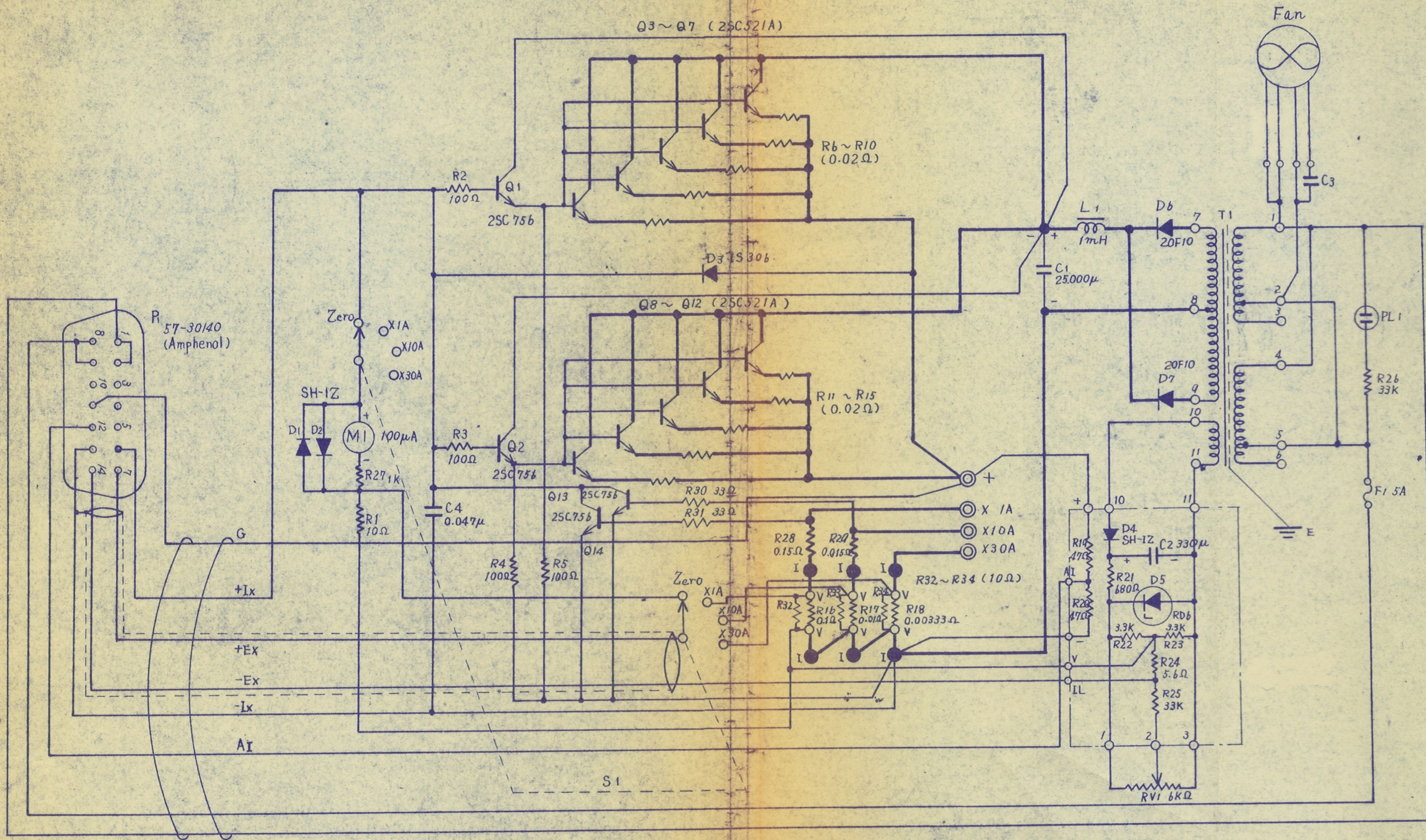
Each range is designed so as to detect the output voltage and then feed the detected output to the current side "A" of the overload protection circuit of Type 2853 (Refer to pages 23/27 of Type 2853 Instruction Manual.)

Type 2862 is so designed that when the output voltage attains approximately 1V, the overload protection circuit shall be actuated so that the output circuit be turned off.

5. CIRCUIT DIAGRAM

The circuit diagram of the current unit, Type 2862, is shown in the attached drawing.

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Main Products

Industrial Process and Laboratory Instruments :

Electronic & Pneumatic Indicators, Recorders & Controllers for process measurement and control of temperature, pressure, flow, liquid level, pH, gas analysis, solution conductivity, illumination, humidity, dewpoint, viscosity, turbidity, etc. Polarocorders, Platrode, Process Titrator, Laboratory pH Meters, Beta Ray Thickness Gauge, Computer Control System, Meteorological Observation Equipment, Gas Chromatographs, etc.

Electrical Indicating Instruments :

Laboratory Standard Instruments; Portable, Panel and Switch board Instruments; Recording Instruments; (Voltmeters, Ammeters, Frequency Meters, Wattmeters, Power Factor Meters, Varmeters, Tachometers). Electrostatic Voltmeters, Instrument Transformers, Line Current Testers, Battery Tester, VU Meters, Thermocouple Thermometers, Thermistor Thermometers, Optical Pyrometers, etc.

Electrical Measuring Instruments :

DC Voltage Standard, DC Galvanometers, DC Potentiometers, DC Bridges, Standard Resistors, Variable Dial Resistors, Slide Resistors, Circuit Testers, Insulation Testers, Earth Resistance Testers, Leakage Current Testers, Digital Ohmmeter, Digital Voltmeter, X-Y Recorders, Laboratory Recorders, Scratch Recorders, Electromagnetic Oscillographs & Peripheral Equipment, Flux Meters, Gauss Meters, Epstein Iron Loss Test Set, Magnetic Hysteresis Loop Tracers, All-Electronic AC Network Analyzers, Analog Computer, etc.

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