INSTRUCTION MANUAL

M-RESTER TESTER

MODEL **C-106A-1**

CONTENTS

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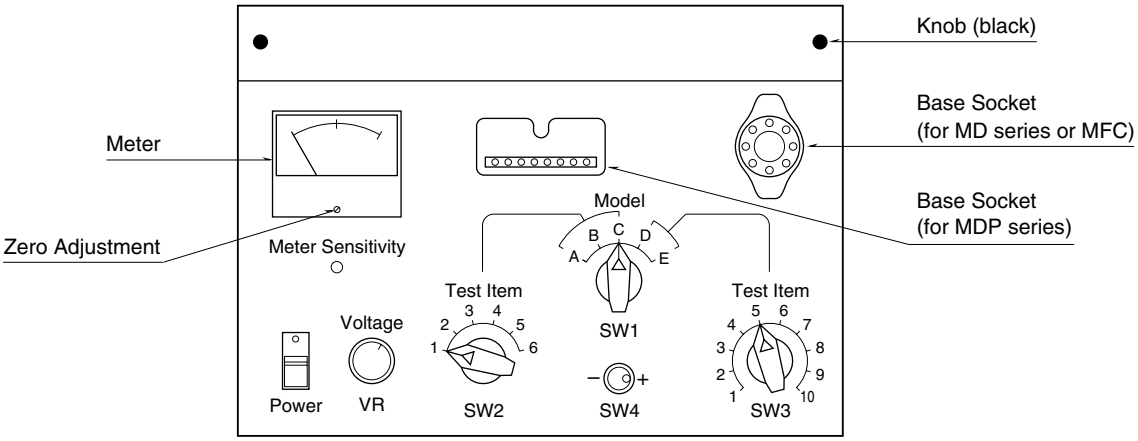
1. GENERAL INFORMATION

Excessive and/or repeated surges may cause an insulation failure of M-RESTER unit. It is strongly recommended to check proper function of your M-RESTER in use at the opportunity of annual inspection or after every strong storm.

2. FRONT PANEL

2.1 FRONT PANEL CONFIGURATION



Power Switch : Activates the internal circuitry.

Meter : Functions as a voltmeter or an ammeter according to the SW1 through SW3 settings (Table 1). The voltmeter is used to adjust test voltage applied to the M-RESTER. The ammeter is used to measure leakage current and to confirm discharging of the M-RESTER. Before turning the Power switch ON, check the meter indicates 0. When the meter indicates any other value, adjust to 0 using the Zero Adjustment.

Meter Sensitivity Button : Pressing the button switches the full-scale range of the meter, from 20μA to 200μA.

Voltage Potentiometer : Generates a specific voltage appropriate for checking each M-RESTER unit.

Table 1

SW SETTING			METER	
SW1	SW2	SW3	FUNCTION	RANGE
A, B, C (2-wire)	1, 3	----	Voltmeter	SW1 = A SW2 = 1 : 15V SW1 = B SW2 = 1 : 60V SW1 = C SW2 = 1 : 100V SW1 = A, B, C, SW2 = 3 : 600V
	2, 4, 5, 6	----	Ammeter	20μA (Switched to 200μA when the Meter Sensitivity button is pressed.)
D, E (3-wire)	----	1, 4	Voltmeter	SW1 = D SW3 = 1 : 20V SW1 = E SW3 = 1 : 200V SW1 = D, E SW2 = 4 : 600V
	----	2, 3, 5, 6, 7, 8, 9, 10	Ammeter	20μA (Switched to 200μA when the Meter Sensitivity button is pressed.)

SW1 : Used to select test voltage range applied to the voltage limiting element. Switch settings according the surge protector type.
A through C (2-wire type)
A : Test voltage range 15V
B : Test voltage range 60V
C : Test voltage range 100V
D through E (3-wire type)
D : Test voltage range 20V
E : Test voltage range 200V

SW2 : Used to adjust test voltage and to apply the voltage and measure current for two-wire type surge protectors.
1 : Voltage adjustment (voltage limiting element side)
2 : Apply (1) voltage and measure leakage current
3 : Voltage adjustment (discharge element side)
4 through 6: Apply (3) voltage and measure leakage current

SW3 : Used to adjust test voltage and to apply the voltage and measure current for three-wire type surge protectors.
1 : Voltage adjustment (voltage limiting element side)
2, 3: Apply (1) voltage and measure leakage current
4 : Voltage adjustment (discharge element side)
5 through 10: Apply (4) voltage and measure leakage current

SW4 : Used to reverse the signal polarity. When the test voltage is in minus range, the SW4 is set to (–) side.

2.2 REPLACING BATTERY

When you cannot adjust the voltage level, replace battery.
Use eight (8) R14 type batteries. Extract two black knobs at the top of front panel, take battery casing out, and replace the batteries.

SW1	MODEL	TEST SUBJECT	SW2	SW3	METER RANGE	TEST VOLTAGE / LEAKAGE CURRENT
A	MDP-TC MDP-FT MFC	Voltage Limiter	1	----	15V	TC : 7.5V / 10μA FT : ±1.2V / 20μA MFC : 11V / 50μA
			2	----	20μA (200μA)	
		Discharge Element	3	----	600V	TC : 140V / 5μA FT : 140V / 10μA MFC : 140V / 50μA
			4, 5, 6 (MFC : 5, 6)	----	20μA (200μA)	
B	MDP-EC MDP-D12 MDP-D24 MDP-24 MDP-24-1 MDP-24T MDP-PA MD-24	Voltage Limiter	1	----	60V	EC : ±12V / 10μA D12 : 14V / 5μA D24 : 27V / 5μA 24 : 30V / 5μA 24-1 : 30V / 5μA 24T : 30V / 30μA PA : 27V / 5μA MD-24 : 30V / 5μA
			2	----	20μA (200μA)	
		Discharge Element	3	----	600V	EC : 140V / 10μA D12 : 160V / 5μA D24 : 160V / 5μA 24 : 140V / 5μA 24-1 : 140V / 5μA 24T : 140V / 5μA PA : 160V / 5μA MD-24 : 140V / 5μA
			4, 5, 6	----	20μA (200μA)	
C	MDP-65 MDP-65-1 MDP-65T MD-65	Voltage Limiter	1	----	100V	65 : 70V / 5μA 65-1 : 70V / 5μA 65T : 70V / 30μA MD-65 : 70V / 5μA
			2	----	20μA (200μA)	
		Discharge Element	3	----	600V	65 : 140V / 5μA 65-1 : 140V / 5μA 65T : 140V / 5μA MD-65 : 140V / 5μA
			4, 5, 6	----	20μA (200μA)	
	MDP-100 MDP-100T	Discharge Element	3	----	600V	100 : 150V / 100μA 100T : 150V / 150μA
			4	----	20μA (200μA)	
			3	----	600V	100 : 300V / 100μA 100T : 300V / 150μA
			5, 6	----	20μA (200μA)	
	MDP-200 MDP-200T	Discharge Element	3	----	600V	200 : 300V / 100μA 200T : 300V / 150μA
			4, 5, 6	----	20μA (200μA)	
	MDP-DM	Discharge Element	3	----	600V	100V / 1μA
			4, 5, 6	----	20μA (200μA)	
	MDP-TL	Discharge Element	3	----	600V	160V / 100μA
			4, 5, 6	----	20μA (200μA)	
D	MDP-RB MDP-SP MDP-PM MDP-DM3	Voltage Limiter	----	1	20V	RB : ±3V / 2μA SP : 14V / 10μA PM : 7.5V / 10μA DM3 : 5V / 200μA
			----	2, 3	20μA (200μA)	
		Discharge Element	----	4	600V	RB : 140V / 2μA SP : 140V / 10μA PM : 140V / 10μA DM3 : 140V / 10μA
			----	5, 6, 7, 8, 9, 10	20μA (200μA)	
	MDP-4R	Voltage Limiter	----	1	20V	5V / 200μA
			----	2, 3	20μA (200μA)	
		Discharge Element	----	4	600V	60V / 10μA
			----	5, 6, 7	20μA (200μA)	
			----	4	600V	140V / 10μA
			----	8, 9, 10	20μA (200μA)	
	MDP-LWA	Voltage Limiter	----	1	20V	1.5V / 150μA
			----	2	20μA (200μA)	
E	MDP-DM2 MDP-MFA	Voltage Limiter	----	1	200V	DM2 : 20V / 10μA MFA : 55V / 50μA
			----	2, 3	20μA (200μA)	
		Discharge Element	----	4	600V	DM2 : 140V / 10μA MFA : 140V / 50μA
			----	5, 6, 7, 8, 9, 10	20μA (200μA)	
	MDP-LWA	Voltage Limiter	----	1	200V	100V / 20μA
			----	3	20μA (200μA)	
		Discharge Element	----	4	600V	140V / 20μA
			----	5, 8, 9, 10	20μA (200μA)	

3. MEASURING PROCEDURE

3.1 MEASURING CONDITION

The ambient temperature must be 25 ±2°C (77 ±3.6°F).

3.2 LEAKAGE CURRENT

Refer to Table 2.
Set SW1 to select a surge protector type, and adjust test voltages appropriate for the respective type, and use SW2 and SW3 to measure leakage current.

3.3 DISCHARGE VOLTAGE

Refer to Table 2.
Set SW1 to select a surge protector type. Then in measuring leakage current, turn VR (voltage generator potentiometer) slowly clockwise until the meter indicates the maximum leakage current permissible to the M-RESTER unit. If it is impossible to adjust the maximum permissible limit because the indicator goes suddenly to the full-scale, stop the potentiometer just where it happened.
Then turn SW2 or SW3 counterclockwise read voltage value indicated on the meter. This is the discharge voltage.

4. TEST PROCEDURE

4.1 MDP-TC (thermocouple use)

◆ SW1 : A, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 7.5V (Full-scale range is 15V). Then turn SW2 to position 2 and check the indicator shows 10μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 15V (Full-scale range is 15V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.2 MDP-FT (3.4 kHz telemetering use)

◆ SW1 : A, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 1.2V (Full-scale range is 15V). Then turn SW2 to position 2 and check the indicator shows 20μA or less (leakage current).

   Turn SW4 to minus (–) side and check again the indicator shows 20μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 2V (Full-scale range is 15V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.

   Turn SW4 to minus (–) side and check again that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.3 MDP-EC (EC-CABLE use)

◆ SW1 : B, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 12V (Full-scale range is 60V). Read 600V full-scale as 60V. Then turn SW2 to position 2 and check the indicator shows 10μA or less (leakage current).

   Turn SW4 to minus (–) side and check again the indicator shows 10μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 17V (Full-scale range is 60V). Read 600V full-scale as 60V.

   Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.

   Turn SW4 to minus (–) side and check again that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V).

   Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.4 MFC (DAST coaxial cable use)

◆ SW1 : A, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 11V (Full-scale range is 15V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW2 to position 2 and check the indicator shows 50μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 15V (Full-scale range is 15V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW2 to positions 5 & 6 and check the indicator shows 50μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.5 MDP-D12 (DC power supply use)

◆ SW1 : B, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 14V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check the indicator shows 5μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 20V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 160V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 550V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.6 MDP-D24 (DC power supply use)

◆ SW1 : B, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 27V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check the indicator shows 5μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 40V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 160V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 550V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.7 MD-24 (signal line & pulse use — obsoleted model)
MDP-24 (signal line & pulse use — obsoleted model)
MDP-24-1 (signal line & pulse use)
MDP-24T (signal line & pulse use, for photovoltaic system, instrument shelter)

◆ SW1 : B, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 30V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check the indicator shows 5μA (30μA for MDP-24T) or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 40V (Read 600V full-scale as 60V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.

   For model MD-24, the indicator normally reaches its maximum limit with the SW2 positioned at 4.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.8 MD-65 (signal line & pulse use — obsoleted model)
MDP-65 (signal line & pulse use — obsoleted model)
MDP-65-1 (signal line & pulse use)
MDP-65T (signal line & pulse use, for photovoltaic system, instrument shelter)

◆ SW1 : C, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 70V (Full-scale range is 100V). Then turn SW2 to position 2 and check the indicator shows 5μA (30μA for MDP-65T) or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 80V (Full-scale range is 100V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.

   For model MD-65, the indicator normally reaches its maximum limit with the SW2 positioned at 4.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.9 MDP-DM (DATA-M use)

◆ SW1 : C, SW3 : 1

1. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 100V (Full-scale range is 600V). Then turn SW2 to position 4, 5 & 6 and check the indicator shows 1μA or less (leakage current) at each position.
2. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW2 to position 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.

4.10 MDP-100 (power supply line use)
MDP-100T (power supply line use, for photovoltaic system, instrument shelter)

◆ SW1 : C, SW3 : 1

1. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 150V (Full-scale range is 600V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW2 to position 4 and check the indicator shows 100μA (150μA for MDP-100T) or less (leakage current).
2. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 300V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check that the indicator shows 100μA (150μA for MDP-100T) or less (leakage current) at each position.

   Finally turn SW2 to position 4 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 540V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check the indicator that the indicator reaches its maximum limit at each position.

4.11 MDP-200 (power supply line use)
MDP-200T (power supply line use, for photovoltaic system, instrument shelter)

◆ SW1 : C, SW3 : 1

1. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 300V (Full-scale range is 600V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 100μA (150μA for MDP-200T) or less (leakage current) at each position.
2. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 540V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit.

4.12 MDP-TL (telecommunication line use)

◆ SW1 : C, SW3 : 1

1. The following testing can be conducted when the module is connected either at the screw terminals or at the modular jack. Be sure to remove the telecomm. line from the modular jack.
2. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 160V (Full-scale range is 600V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 100μA or less (leakage current) at each position.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 330V (Full-scale range is 600V). Then turn SW2 to position 4 and check that the indicator reaches its maximum limit.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 400V (Full-scale range is 600V). Then turn SW2 to positions 5 & 6 and check that the indicator reaches its maximum limit.

4.13 MDP-RB (RTD use)

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 3V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check the indicator shows 2μA or less (leakage current) at each position.

   Turn SW4 to minus (–) side and check again the indicator shows 2μA or less (leakage current).
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 15V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.

   Turn SW4 to minus (–) side and check again the indicator reaches its maximum limit.

   Note: For those manufactured in or before the lot No. 9207, the indicator normally reaches its maximum limit due to their circuit design.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 2μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.14 MDP-SP (low frequency use)

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 14V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check the indicator shows 10μA or less (leakage current) at each position.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 18V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.15 MDP-PM (potentiometer use)

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 7.5V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check the indicator shows 10μA or less (leakage current) at each position.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 15V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.16 MDP-MFA (50 bps telemetering use)

◆ SW1 : E, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 55V (Read full-scale range 20μA as 200V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW3 to positions 2 & 3 and check the indicator shows 50μA or less (leakage current) at each position.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 110V (Read full-scale range 20μA as 200V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 50μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7 & 9 and check that the indicator reaches its maximum limit at each position.

   For the products manufactured before July 2002 (Serial numbers start with H through K and LA through LG, 8-digit alphanumeric characters or 4-digit numbers):

   Turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.17 MDP-DM2 (MsysNet, RS-485/422 use — obsoleted model)

◆ SW1 : E, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 20V (Read full-scale range 20μA as 200V). Then turn SW3 to positions 2 & 3 and check the indicator shows 10μA or less (leakage current) at each position.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 30V (Read full-scale range 20μA as 200V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.18 MDP-DM3 (MsysNet use)

The M-RESTER Tester is not applicable to the products manufactured earlier than Year 2004 (identified by 8-digit serial No. starting with H thr. M, or 4-digit serial No.).

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 5V (Read full-scale range 20μA as 20V). Press Meter Sensitivity Switch and switch the full-scale value to 200μA. Then turn SW3 to positions 2 & 3 and check the indicator shows 200μA or less (leakage current) at each position.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 10V (Read full-scale range 20μA as 20V). Then in pressing Meter Sensitivity Switch, turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.19 MDP-4R (RS-485/422 use)

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 5V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check the indicator shows 200μA or less (leakage current) at each position when the Meter Sensitivity button is pressed.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 10V (Read full-scale range 20μA as 20V). Then turn SW3 to positions 2 & 3 and check that the indicator reaches its maximum limit at each position.
3. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 60V (Full-scale range is 600V). Then turn SW3 to positions 5, 6 & 7 and check the indicator shows 10μA or less (leakage current) at each position.
4. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 8, 9 & 10 and check the indicator shows 10μA or less (leakage current) at each position.
5. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 6, 7, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.20 MDP-LWA (LONWORKS use)

◆ SW1 : D, SW2 : 1

1. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 1.5V (Read full-scale range 20μA as 20V). Then urn SW3 to position 2 and check the indicator shows 150μA or less (leakage current) when the Meter Sensitivity button is pressed. Then turn SW4 to (–) position and check the indicator shows 150μA or less (leakage current) when the Meter Sensitivity button is pressed.
2. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 3V (Read full-scale range 20μA as 20V). Then turn SW3 to position 2 and check that the indicator reaches its maximum limit when the Meter Sensitivity button is pressed. Then turn SW4 to (–) position and check that the indicator reaches its maximum limit when the Meter Sensitivity button is pressed.

◆ SW1 : E, SW2 : 1

3. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 100V (Read full-scale range 20μA as 200V). Then turn SW3 to position 3 and check the indicator shows 20μA or less (leakage current). Then turn SW4 to (–) position and check that the indicator shows 20μA or less (leakage current).
4. Turn SW3 to position 1. Turn VR potentiometer until the indicator reaches 200V (Read full-scale range 20μA as 200V). Then turn SW3 to position 3 and check that the indicator reaches its maximum limit. Then turn SW4 to (–) position and check that the indicator reaches its maximum limit.
5. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 140V (Full-scale range is 600V). Then turn SW3 to positions 5, 8, 9 & 10 and check the indicator shows 20μA or less (leakage current) at each position.
6. Turn SW3 to position 4. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 5, 8, 9 & 10 and check that the indicator reaches its maximum limit at each position.

4.21 MDP-PA (PROFIBUS-PA use)

◆ SW1 : B, SW3 : 1

1. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 27V (Read full-scale range 600V as 60V). Then turn SW2 to position 2 and check the indicator shows 5μA or less (leakage current).
2. Turn SW2 to position 1. Turn VR potentiometer until the indicator reaches 60V (Read full-scale range 600V as 60V). Then turn SW2 to position 2 and check that the indicator reaches its maximum limit.
3. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 160V (Full-scale range is 600V). Then turn SW2 to positions 4, 5 & 6 and check the indicator shows 5μA or less (leakage current) at each position.
4. Turn SW2 to position 3. Turn VR potentiometer until the indicator reaches 500V (Full-scale range is 600V). Then turn SW3 to positions 4, 5 & 6 and check that the indicator reaches its maximum limit at each position.