

# MAKLUMAT SPESIFIKASI ITEM

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## MAKLUMAT SPESIFIKASI ITEM

<b>No Pelawaan</b>	: UiTM/B1/PER/SHR/B/0625/0038
<b>Butiran Tawaran</b>	: Cadangan Membekal, Menghantar, Memasang, Mengujilari Dan Menyelenggara Peralatan Pengajaran dan
<b>Keterangan Item</b>	: 0609010700027 : Electrical/Electricity/Electronic Wares - Multimeter/Multitester/Ammeter/Voltmeter
<b>Nama Spesifikasi</b>	: FKE 2025 (V3) SEMI Curve Trace Precision Source/Measure Unit (2ch, 100fA resolution, 210V, 3A DC/10.5A
<b>Kuantiti</b>	: 1.000

### Butiran Keperluan

#### 1 GENERAL REQUIREMENTS

I Vendors must comply with all the requirements specified in this tender document

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II Vendors must bear all costs of supplying the specified quantity of items to UiTM. Such costs shall include the costs of delivery, installation, commissioning, training, troubleshoot and maintenance work (including parts labour and on-site service) within the specified warranty period

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#### 2 SPECIFICATION

##### I Measurement Capabilities

- Configuration supports 2-channel setup
- Minimum source resolution at 1 pA / 1  $\mu$ V, minimum measurement resolution at 100 fA / 100 nV
- Maximum output at 210 V, 3 A DC / 1 0.5 A pulse
- Waveform generation (arbitrary) and digitizing capabilities from 20  $\mu$ s interval

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##### Features

- Measurement capabilities with an integrated 4-quadrant source
- Color 4.3-inch display supports both graphical and numerical view modes
- Application software facilitates PC-based instrument control included at no charge
- High throughput and SCPI command support conventional SMU's command set

I **Front panel operation**

- Front panel interface: 4.3” TFT color display (480 x 272, with LED backlight) with keypads and rotary knob
- View mode: Single view, Dual view, Graph view and Roll view
- Hard keys: Single Trigger and Auto Trigger control, 10-key, Rotary Knob and Cursors, Channel on/off, View, Cancel/Local
- Softkeys: Function, System and Input Assist Keys
- Indicators: Channel (measurement) status, System status

II **SPECIFICATION CONDITIONS**

- Temperature : 23 °C ±5 °C
- Humidity : 30% to 80% RH
- After 60 minutes warm-up : Ambient temperature change less than ±3 °C after self-calibration execution
- Calibration period : 1 year
- Measurement speed : 1 PLC (power line cycle)

III **Maximum voltage and current**

- DC or pulsed : 210 V (max voltage), 0.105 A (max current)
- DC or pulsed : 6 V (max voltage), 3.03 A (max current)
- Pulsed only : 200 V (max voltage), 1.515 A (max current)
- Pulsed only : 6 V (max voltage), 10.5 A (max current)

IV **Maximum current limitation**

- Ch 1 voltage : ± (0 V V ≤ 6 V)
- Ch 2 voltage : ± (0 V V ≤ 6 V)
- Max total current limitation of Ch 1 and Ch 2 : Ch 1 current + Ch 2 current ≤ 4 A

- Ch 1 voltage : ± (6 V V ≤ 21 V)
- Ch 2 voltage : ± (6 V V ≤ 21 V)
- Max total current limitation of Ch 1 and Ch 2 : Ch 1 current + Ch 2 current ≤ 2.5 A

V **Voltage source specifications**

- Range : ±200 mV
- Programming resolution: 1 µV
- Accuracy (% reading + offset) : ± (0.015 % + 225 µV)
- Noise (peak to peak) 0.1 Hz to 10 Hz: ≤ 10 µV
- Max voltage (over range): ±210 mV

- Range : ±200 V
- Programming resolution: 1 mV
- Accuracy (% reading + offset) : ± (0.015 % + 50 mV)
- Noise (peak to peak) 0.1 Hz to 10 Hz: ≤ 2 mV
- Max voltage (over range): ±210 V

VI **Current source specifications**

- Range : ±10 nA

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- VI Programming resolution: -  
Accuracy (% reading + offset) : $\pm (0.10 \% + 50 \text{ pA})$   
Noise (peak to peak) 0.1 Hz to 10 Hz:  $\leq 1 \text{ pA}$   
Max voltage (over range):  $\pm 10.5 \text{ nA}$
- Range :  $\pm 10 \text{ A}$  , 5  
Programming resolution: 100  $\mu\text{A}$   
Accuracy (% reading + offset) : $\pm (0.4 \% + 25 \text{ mA})$   
Noise (peak to peak) 0.1 Hz to 10 Hz: -  
Max voltage (over range):  $\pm 10.5 \text{ A}$
- VII **VOLTAGE MEASUREMENT SPECIFICATIONS**  
Range:  $\pm 200 \text{ mV}$   
Measurement resolution: 100 nV  
Accuracy (% reading + offset):  $\pm (0.015 \% + 225 \text{ }\mu\text{V})$
- Range:  $\pm 200 \text{ V}$   
Measurement resolution: 100  $\mu\text{V}$   
Accuracy (% reading + offset):  $\pm (0.015 \% + 50 \text{ mV})$
- VIII **CURRENT MEASUREMENT SPECIFICATIONS:**  
Range:  $\pm 10 \text{ nA}$   
Measurement resolution:-  
Accuracy (% reading + offset):  $\pm (0.10 \% + 50 \text{ pA})$
- Range:  $\pm 10 \text{ A}$  3, 5  
Measurement resolution: 10  $\mu\text{A}$   
Accuracy (% reading + offset):  $\pm (0.4 \% + 25 \text{ mA})$  6
- IX **TIMER AND TRIGGERING SPECIFICATION**  
Timer  
Time stamp: TIMER value automatically saved when each measurement is triggered  
Trigger timing resolution: 1  $\mu\text{s}$  to 100 ms  
Accuracy:  $\pm 50 \text{ ppm}$   
Arm/trigger delay: 0  $\mu\text{s}$  to 100,000 s  
Arm/trigger interval: 20  $\mu\text{s}$  to 100,000 s  
Arm/trigger event: 1 to 100,000
- Triggering  
Digital I/O Trigger IN to Trigger OUT:  $\leq 5 \text{ }\mu\text{s}$   
Digital I/O Trigger IN to source change:  $\leq 5 \text{ }\mu\text{s}$   
LXI Trigger IN to source change: Minimum 100  $\mu\text{s}$ , Typical 200  $\mu\text{s}$ , Maximum unknown  
LXI Trigger IN to measurement: Minimum 100  $\mu\text{s}$ , Typical 200  $\mu\text{s}$ , Maximum unknown  
Internal event to external LXI trigger output: Minimum 100  $\mu\text{s}$ , Typical 200  $\mu\text{s}$ , Maximum unknown  
Minimum trigger interval: 10  $\mu\text{s}$

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Butiran Keperluan

X SOURCE RESOLUTION

- Digit: 5.5 digit or equivalent
- Min. voltage: 1uV or equivalent
- Min. current: 1pA or equivalent
- Lowest current range: 100nA or equivalent

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XI MEASUREMENT RESOLUTION

- Digit: 6.5 digit or equivalent
- Min voltage: 100nV or equivalent
- Min current: 100fA or equivalent
- Min trigger interval: 20 us or equivalent
- Max. trigger count: Infinite
- Max. data buffet size: 100,000 or equivalent
- Limit Test: Included
- Fast transient mode: Included
- Easy file access: Included

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XII INCLUDED WITH (SUPPLIED ACCESSORIES)

- Current-Voltage Curve Measurement Software with Node-locked perpetual license and Care Support 12 months
- PC desktop with specification TWR i5-14500/16GB/512GB/Wif/W11P/3/3/3
- > Tower, Windows 11 Pro 64, CPU INTL i5-14500 5.00 14C 65W, RAM 16GB (1x16GB) DDR5 4800, SSD 512GB 2280 PCIe NVMe Value, with wired keyboard and wired mouse, UHD Graphics 770, WLAN AX211 Wi-Fi 6E 160MHz +BT 5.3 WW equivalent or better
- BNC Plug to Banana Plug Adapter x4
- BNC CABLE M to M x5
- BNC Tee (female)
- DSUB 29

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3 CATALOGUES / BROCHURES

- I Vendors must provide the catalogues / brochures / technical specification manuals with the tender proposal
- II Original copies of user and operational manual of the equipment must be provided

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4 TRAINING

**Butiran Keperluan**

- I Tenderers are required to provide training for the use, maintenance and troubleshoot of the equipment to the Technical Staff & Lecturer of Faculty of Electrical Engineering, UiTM Shah Alam and all training-related costs are borne by the tenderers.
- II A minimum of one (1) day training for a minimum of one (1) participant covering each module. (Vendors must provide details/syllabus of the training module)
- III Complete training materials and documentation must be provided to all participants
- IV The training MUST be conducted by trainers who are certified by principal. Please attach the trainer's certification that is certified by principal supplier.

**5 WARRANTY AND SUPPORT**

- I Vendors must have local service for repair services and provide on call services when required by UiTM
- II Vendors must provide details of warranty. INCLUDING ALL parts, labour, basic phone support for hardware issue, repairs onsite). Please attach the Letter of Warranty (LOW) from the principle, which states that UiTM is entitled to 3 years of warranty upon project completion
- III Vendors be responsible for the installation, commissioning and test-run of the equipment and accompanying software (if applicable) to the satisfaction of UNIVERSITI TEKNOLOGI MARA before final acceptance.
- IV All cost on delivery, installation, commissioning and test run shall be borne by the vendor.
- V The vendors MUST provide a genuine product. The vendors must be supported back-to-back by a principle (manufacturer) to provide maintenance services for equipment supplied. The vendors should attach a Letter of Authorization (LOA) from Distributors/ Principal.
- VI Free support through fax, email, telephone must be provided during the warranty period

**6 OTHER REQUIREMENTS**

- I Note that all other related material, components and cabling, which are required to ensure full operation of the above package must be supplied and borne by vendors

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