



PROVINCIAL ELECTRICITY AUTHORITY

TECHNICAL SPECIFICATION DIVISION

Specification No.: RTES-234/2562 : 115 KV CIRCUIT BREAKER ANALYZER SYSTEM

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C3 Schedule of detailed requirement

Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
1	-	set(s)	<p>Circuit breaker analyzer system, portable , for field testing of high-voltage circuit-breaker having rated voltage up to 145 kV, 50 Hz in live substation, consisting of timing function and motion analyzer. The system shall be able to test the circuit breaker while both sides of circuit breakers are grounded and can be used for testing circuit breaker dead tank and live tank, with :</p> <p>Standards :</p> <ul style="list-style-type: none">- EMC : IEC 61326-1, or equivalent- Safety : IEC 61010-1, or equivalent <p>Controlled system : PC (laptop) controlled system, or more.</p> <p>Display : by laptop computer</p> <p>Monitoring functions : 1) opening/closing timings of main contacts, resistor contacts, and auxiliary contacts 2) travel and velocity of mechanisms 3) trip coil and close coil currents 4) charge spring motor current 5) static contact resistance and dynamic contact resistance</p> <p>Number of timing channels : not less than six (6) channels (main and pre insert resistor)</p> <p>Number of auxiliary contacts channel : not less than six (6) channels</p> <p>Number of coil control channel : not less than three (3) channels with over current protection</p> <p>Number of analog channel : not less than three (3) channels</p> <p>Time measurement range : not less than 100 seconds</p> <p>Minimum resolution : 0.1 ms at minimum recording time</p> <p>Maximum sampling rate : not less than 10 kHz</p> <p>Timing accuracy : $\pm 0.05\%$ of reading ± 0.1 ms, or better</p> <p>Number of breaker motion transducer : not less than three (3) inputs inputs</p> <p>Number of breaker motion : three (3) sets, to be used at the same time transducers for circuit breaker</p> <p>Breaker operating sequence control : Close (C), Open (O), Close-Open (C-O), Open-Close (O-C), Open-Close-Open (O-C-O), multi-sequence, selectable</p>
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Item	PEA Material No.	Quantity	Description
			<p>Communication interface : USB port (or other ports with adaptor) with cable and connector</p> <p>Power supply : single-phase, 230 V AC, 50 Hz</p> <p>Operating temperature : up to 50^oC, or better</p> <p>Storage temperature : up to 70^oC, or better</p> <p>Maximum relative humidity : up to 95 % , or better</p> <p>Complete with :</p> <ol style="list-style-type: none">1. Power supply cord and plug.2. Protective device, for input/output circuits for auxiliary supply circuit(s).3. Control and indications.4. Test lead/cable with reels and connectors.5. Internal wiring, interconnection lead/cable connectors.6. Ground cable(s) with connector for copper conductor sizes 70 to 95 mm² and steel structure.7. Three (3) units of rotary motion transducers with universal transducer mounting kit, coupling and other accessories to complete function.8. Current shunt or other current measurement equipment (if any), for measuring trip coil and close coil currents.9. Shockproof transportation case with wheels for analyzer, cables and accessories.10. Display, reporting and analyzing software comprising useful function, suitable for operating on PC under Microsoft Windows 7 or 8 , or later version.11. Laptop computer, with:<ul style="list-style-type: none">Central Processing Unit (CPU) : up to 2.4 GHz, or betterMemory : 4 GB DDR3, or betterHard Disk : not less than 500 GBMonitor : 17 inch LED, or betterVideo Memory : not less than 1 GBDrive : DVD-RW drive, or betterPower Supply : single phase, 230 V AC 50 Hz and Lithium ion rechargeable batteryWeight : not more than 3.0 kgOperation System : Windows 7 Professional with window license, or later edition
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Item	PEA Material No.	Quantity	Description
			<p>12. Instruction manual with part list and circuit diagram and maintenance manual.</p> <p>13. Other accessories according to manufacturer's design which shall be clearly described.</p>
2	-	lot(s)	Spare parts for Item 1 (give detail).
3	-	lot(s)	Optional accessories for Item 1 (give detail).
4	-	set(s)	<p>Circuit breaker analyzer system, portable, for field testing of high-voltage circuit-breaker having rated voltage up to 145 kV, 50 Hz in live substation, consisting of timing function and motion analyzer. The system shall be able to test the circuit breaker while both sides of circuit breakers are grounded and can be used for testing circuit breaker dead tank and live tank, with :</p> <p>Controlled system : laptop computer controlled system, or more</p> <p>Display : by laptop computer</p> <p>Monitoring functions : 1) opening/closing timings of main contacts, resistor contacts, and auxiliary contacts</p> <p>2) travel and velocity of mechanisms</p> <p>3) trip coil and close coil currents</p> <p>4) charge spring motor current</p> <p>5) static contact resistance and dynamic contact resistance</p> <p>6) first trip for common operating mechanism</p> <p>Number of timing channels : not less than six (6) channels</p> <p>(main and pre insert resistor)</p> <p>Number of auxiliary contacts channels : not less than three (6) channels</p> <p>Number of coil control channels : not less than three (3) channels with over current protection</p> <p>Number of analog channels : not less than three (3) channels</p> <p>Time measurement range : not less than 199 seconds</p> <p>Minimum resolution : 50 μs at minimum recording time, or better</p> <p>Maximum sampling rate : not less than 40 kHz</p> <p>Timing accuracy : \pm(0.01% of reading + 0.1 ms), or better</p>
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Item	PEA Material No.	Quantity	Description
			<p>Maximum current output for contact : not less than 100 A resistance test</p> <p>Number of breaker motion transducer : not less than three (3) inputs inputs</p> <p>Breaker operating sequence control : Close (C), Open (O), Close-Open (C-O), Open-Close (O-C), Open-Close-Open (O-C-O), multi-sequence, selectable</p> <p>Communication interface : USB port or Ethernet port</p> <p>Power supply : single-phase, 230 V AC, 50 Hz</p> <p>Operating temperature : not less than 50°C</p> <p>Storage temperature : not less than 70°C</p> <p>Maximum relative humidity : up to 95 %, non-condensing</p> <p>Complete with :</p> <ol style="list-style-type: none"> 1. Power supply cord and plug 2. Protective device, for input/output circuits for auxiliary supply circuit(s) 3. Control and indications 4. Test lead/cable with reels and connectors for testing all monitoring functions according to manufacture design, with; <ul style="list-style-type: none"> - Timing cable shall be not less than 8 m in length. - Other cable length shall be suitable for field testing 115 kV circuit breaker in substation. 5. One (1) set of ac current clamp for first trip testing 6. Internal wiring, interconnection lead/cable connectors 7. Ground cable(s) with connector for copper conductor sizes 70 to 95 mm² and steel structure 8. Three (3) units of digital rotary motion transducers with universal transducer mounting kit, coupling and other accessories to complete function. 9. Shockproof transportation case with wheels for tester, cables and accessories 10. Display, reporting and analyzing software comprising useful function, suitable for operating on PC under Microsoft Windows 7, 8, 10, or later version. 11. Communication cable for the circuit breaker analyzer system and laptop computer 12. Laptop computer, with: <ul style="list-style-type: none"> Central Processing Unit (CPU) : up to 2.4 GHz Memory : not less than 8 GB DDR4 Hard Disk : not less than 1 TB
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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			<p>Monitor : not less than 15 inch LED</p> <p>Drive : DVD-RW drive, or better</p> <p>Power Supply : single phase, 230 V AC 50 Hz and Lithium ion rechargeable battery</p> <p>Weight : not more than 2.6 kg</p> <p>Operation System : Windows 7 Professional with window license, or later edition</p> <p>13. Instruction and maintenance manual, English, shall be contain following information:</p> <ol style="list-style-type: none"> Operating principle Operating instruction of test set and user interface software Setting and adjustments Maintenance instructions or troubleshooting instruction Part list and circuit diagram <p>14. Other accessories according to manufacturer's design which shall be clearly described.</p>
5	-	lot(s)	Spare parts for Item 4 (give detail).
6	-	lot(s)	Optional accessories for Item 4 (give detail).
	I		<p>Note:</p> <ol style="list-style-type: none"> The bidders have to quote the unit costs. The circuit breaker analyzer system shall be furnished with auxiliary equipment and accessories no specified in these specifications, but necessary to complete all function. The bidders shall be sole distributor or authorized representative and have a permanent office in Thailand; otherwise shall not be accepted. The certificate of distributor shall be submitted with the bid for consideration. For item 4, the following product are proved to be conformed with the specification: <ul style="list-style-type: none"> Megger/Sweden Model TM1720 Omicron/Austria Model CIBANO500 ISA/Italy Model CBA3000 <p>Other products can be proposed, but the bidder have to submit all technical document, with the bid for consideration.</p>



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Invitation to Bid No.:

Item	PEA Material No.	Quantity	Description
			<p>5. The bidders have to submit the circuit breaker analyzer system for demonstration and function checks within five (5) working days after the bid closing date, except the Product/Country/Model as specified in 4. (for item 4); otherwise shall be rejected. The demonstration and function checks shall be done by the users, i.e. for circuit breaker analyzer system the user in the central area is "Substation maintenance division", and shall be done at least following items:</p> <p>5.1. Visual and/or dimension inspection</p> <p>5.2. Function checks tests</p> <p>5.3. Operation and/or installation tests</p> <p>5.4. Other inspection/test according to users</p> <p>6. The bidders have to quote spare parts and optional accessories with their lists of quantities and itemized prices, if any. The prices of spare parts and optional accessories shall not be taken into consideration for the purpose of the bid evaluation; and PEA reserves the right to purchase some or all of items, to adjust their quantities, or to cancel them.</p> <p>7. The contractor has to guarantee circuit breaker analyzer system for three (3) years from date of issuance of the notice of acceptance. During the guarantee period, the contractor will pay an amount equal to the exact purchasing costs for any defective of circuit breaker analyzer system.</p> <p>8. Training course for operation and maintenance the proposed circuit breaker analyzer system shall be provided by the contractor for PEA's personal. The training shall not be less than three (3) days. The training shall be free of charge.</p> <p>9. The contractor has to submit the Certificate of calibration and calibration test report from Accreditation Bodies (PTB, NPL, NIST, or equivalent) or from the laboratories, which have been accredited by such the Accreditation Bodies.</p>
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C4 Price schedule

Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	-		<p>Circuit breaker analyzer system, portable , for field testing of high-voltage circuit-breaker having rated voltage up to 145 kV, 50 Hz in live substation, consisting of timing function and motion analyzer, . The system shall be able to test the circuit breaker while both sides of circuit breakers are grounded and can be used for testing circuit breaker dead tank and live tank, with :</p> <p>Standards :</p> <p>-EMC :</p> <p>-Safety :</p> <p>Controlled system :</p> <p>Display :</p> <p>Monitoring functions :</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>Number of timing channels :channels (main and pre insert resistor)</p> <p>Number of auxiliary contacts channel :channels</p> <p>Number of coil control channel :channels</p> <p>Number of analog channel :channels</p>	set(s)		



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C4 Price schedule

Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Time measurement range :seconds Minimum resolution :ms Maximum sampling rate :Hz Timing accuracy : Number of breaker motion transducer :inputs inputs Number of breaker motion transducers:sets Breaker operating sequence control : Communication interface : Power supply : Operating temperature :°C Storage temperature :°C Maximum relative humidity :%			
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C4 Price schedule

Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
	I		<p>Complete with :</p> <p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p> <p>5.</p> <p>6.</p> <p>7.</p> <p>8.</p> <p>9.</p> <p>10.</p> <p>11. Laptop computer, with:</p> <p>Central Processing Unit (CPU) :</p> <p>Memory :</p> <p>Hard Disk :</p> <p>Monitor :</p> <p>Video Memory :</p> <p>Drive :</p> <p>Power Supply :</p>			



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Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
2	-		Weight : kg Operation System : 12..... 13..... Spare parts for Item 1 (give detail). 1. 2. 3.	lot(s)		
3	-		Optional accessories for Item 1 (give detail). 1. 2. 3.	lot(s)		
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Invitation to Bid No.:

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Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
4	-		<p>Circuit breaker analyzer system, portable, for field testing of high-voltage circuit-breaker having rated voltage up to 145 kV, 50 Hz in live substation, consisting of timing function and motion analyzer. The system shall be able to test the circuit breaker while both sides of circuit breakers are grounded and can be used for testing circuit breaker dead tank and live tank, with :</p> <p>Controlled system :</p> <p>Display :</p> <p>Monitoring functions :</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>Number of timing channels :channels (main and pre insert resistor)</p> <p>Number of auxiliary contacts channels :channels</p> <p>Number of coil control channels :channels</p> <p>Number of analog channels :channels</p>	set(s)		



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Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			Time measurement range :seconds Minimum resolution : μ s Maximum sampling rate :Hz Timing accuracy : Maximum current output for contact : not less than A resistance test Number of breaker motion transducer : Inputs Breaker operating sequence control : Communication interface : Power supply : Operating temperature : $^{\circ}$ C Storage temperature : $^{\circ}$ C Maximum relative humidity :%, non-condensing			
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Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
	I		<p>Complete with :</p> <p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>5.</p> <p>6.</p> <p>7.</p> <p>8.</p> <p>9.</p> <p>10.</p> <p>11.</p>			



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Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
			12. Laptop computer, with: Central Processing Unit (CPU) : Memory : Hard Disk : Monitor : Video Memory : Drive : Power Supply : Weight : kg Operation System : 13..... 14.			
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Invitation to Bid No.:

Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
5	-		Spare parts for Item 4 (give detail). 4. 5. 6.	lot(s)		
6	-		Optional accessories for Item 1 (give detail). 4. 5. 6.	lot(s)		
	I					