ADDITIONAL SPECIFICATIONS VOLTAGE REGULATION, CB FAIL, 3PHASE BUS CONNECTION DIFFERENTIAL & SYNCHROSCOPE RELAYS

SPECIFICATION FOR VOLTAGE REGULATING RELAYS, 3 PHASE BREAKER FAIL, SYNCHROSCOPE AND HV BUS CONNECTION DIFFERENTIAL PROTECTION RELAYS

4.4.19 3 Phase Breaker Failure Protection Relay

The breaker fail protection relay should have the following features:

4.4.19.1 Numeric design, with large LCD screen and HMI.
4.4.19.2 Circuit –breaker failure protection, single or three pole with or without current
4.4.19.3 Three phase overcurrent detectors.
4.4.19.4 Earth fault detector.
4.4.19.5 Using 110VDC Power supply and Binary input voltage
4.4.19.6 Using 1A and/or 5A CT inputs
4.4.19.7 Sufficient number Binary input and Outputs for a 3 Phase BF Scheme. At Least 8 BIs and 10 BOs.
4.4.19.8 2 out of 4 check of current detectors
4.4.19.9 Phase selective for single and three pole operation
4.4.19.10 Fast reset time with no Overshoot
4.4.19.11 Very sensitive current detection
4.4.19.12 Independently settable delay times for operation with and without current
4.4.19.13 "No current" condition control using the circuit-breaker auxiliary contacts
4.4.19.14 Two stage delay, hence two stages of operation
4.4.19.15 Trip command input.
4.4.19.16 Necessary logic to determine breaker fail condition.
4.4.19.17 Operator keypad with display
4.4.19.18 Display of line measured current values
4.4.19.19 Serial Interface
4.4.19.20 Annunciation and storage of previous events.
4.4.19.21 Self monitoring
4.4.19.22 Pole discrepancy
4.4.19.23 Flush mounting
4.4.19.24 LEDs to show phase and stage of operation.
4.4.19.25 A BF Relay with additional Breaker management features like AR, Interlocking, Synch check, Pole discrepancy etc will be an added advantage.

4.4.20 Voltage Regulating Relays.

4.4.20.1 Ratings: AC Inputs: 110Vac, 1 Amp (three phase), Power Supply Voltage range 80-260VDC/AC nominal 110VDC or wider range.
4.4.20.2 The relays shall be of Numeric Design with Keypad HMI
4.4.20.3 The sensing input shall be 110Vac (phase-phase) from VT secondary outputs.
4.4.20.4 Should have buttons for Raise and Lower Commands
4.4.20.5 Should have Selector Switches for Local and Remote.
4.4.20.6 Should have Selector Switches for Auto/Manual operation.

4.4.20.7 Tap-Position Indication on the LCD screen.
4.4.20.8 With functionality for Master/Follower/Independent Operation mode selection.
4.4.20.9 Binary Inputs that can work with 110VDC inputs >8BIs.
4.4.20.10 Binary Outputs that can work with 110VDC or 240VAC, >10BOs.
4.4.20.11 Bandwidth settings of 0.5 to 5%.
4.4.20.12 Voltage Level Setting from 80V to 120V or wider setting range.
4.4.20.13 At least 2 stage Time Delay settings (T1, T2) which are independently settable,
4.4.20.14 Displays should be programmable to display either secondary or primary values.
4.4.20.15 Should be able to display at least TPI, kV, A, MW, MVAR, pf, frequency and Harmonic Distortion.
4.4.20.16 Should be able to use Ethernet or direct Fibre for parallel operation implementation of Master/Follower scheme.
4.4.20.17 Provision of selection of Master/Follower possibility using binary inputs will be an added advantage.
4.4.20.18 Load profile data, voltage profile data availability is required.
4.4.20.19 Display of alarms on the screen and LEDs
4.4.20.20 Event records should be incorporated.
4.4.20.21 At least Ten (10) Binary outputs 4 of which must be of High Speed Power Outputs (HSPO) for controlling tapchanger.
4.4.20.22 Software for Programming the configuration and Relay Settings and also downloading and analysing the Relay Data.
4.4.20.23 Three sets of Installation, Commissioning, Operation and Maintenance manuals shall be provided.
4.4.20.24 Should be IEC61850 compliant.
4.4.20.25 Analogue input of 0….20mA dc for Tap Position indication coming from TPI Transducer
4.4.20.26 Optional BCD input for Tap Position Indication
4.4.20.27 Communication Cable for Relay to PC communication.
4.4.20.28 Should block operation for an Overcurrent, Under-Voltage and extreme Over-voltages.
4.4.20.29 HMI indication of Service or Blocked Operation of Relay
4.4.20.30 Flush mounting construction
4.4.20.31 Provide at least 3 hard copy manual or a manual for each relay.

4.4.21 Synchroscope M8100 (SELCO Sychroscope Meter) Relay

The Synchroscope M8100 Control relay should have the following features:

4.4.21.1 LED Design capable of withstanding environmental influence from vibration, temperature and humidity.
4.4.21.2 Angle of Rotation 0..360°
4.4.21.3 Power Consumption ≤4VA for Mains and ≤6VA for Generator.
4.4.21.4 Insulation Resistance ≥20MΩ at 500VDC.
4.4.21.5 Dielectric Test: 2kV RMS for one minute.
4.4.21.6 Operating Temperature: -10°C to 55°C.

4.4.21.7 Voltage at Synchronism: 110V±2%.
4.4.21.8 Operating Voltage: 110V ±20%
4.4.21.9 Frequency: 50/60Hz ±5%,
4.4.21.10 Accuracy: 2°.
4.4.21.11 Storage Temperature: -20°C to 70° C.
4.4.21.12 Humidity with stand upto 95% RH.
4.4.21.13 Indication: Moving LED (Red/Green).
4.4.21.14 Conforming to IEC 60051-5 (IEC 51-5).
4.4.21.15 To be supplied complete with Box Housing for the synchroscope, voltmeters and Selector switches for Incoming and Running voltages.
4.4.21.16 Number of selectable incoming voltages is 5. Number of selectable Running voltages/Bus voltage is 5.
4.4.21.17 Housing Box to be side mounted onto Control Panel and be powder coated to RAL7032.
4.4.21.18 Provision for side mounting onto the control panel shall be provided.
4.4.21.19 Should have 38 illuminated points along the 360°rotation.
4.4.21.20 Fully Insulated violated inputs.
4.4.21.21 Optional closure relay mounted inside housing box with at least 2 contacts for closing circuit breaker(s).
4.4.21.22 Synchroscope and voltmeters should be flush mounted.

4.4.22 3 Phase High Impedance Bus Connection Differential Protection 7VH8300 Relay

The 3 Phase High Impedance Differential Protection Relay 7VH8300-4CA04/FB should have the following features:

4.4.22.1 Should be of Numeric/Static Design capable of withstanding environmental influence from vibration, temperature and humidity.
4.4.22.2 With in-built stabilizing Resistors
4.4.22.3 Power supply range 110..125VDC.
4.4.22.4 For use with 1A CT secondary inputs.
4.4.22.5 Voltage Setting Range 24V….250V
4.4.22.6 With latching Phase indicating LEDs (Red) to show which phase has operated.
4.4.22.7 With Green LED for indicating Relay healthy and powered.
4.4.22.8 With a general trip flag/LED indication.
4.4.22.9 With CT shorting Links when relay is racked out.
4.4.22.10 Must be able to fit in a slot/panel cut-out where existing relay 7VH8300-4CA04/FB has been used.
4.4.22.11 With at least 4 output contacts rated ≥10A, 250VDC for tripping, alarms and annunciation.
4.4.22.12 Dielectric Test: 2kV RMS for one minute.
4.4.22.13 Operating Temperature: -10°C to 55°C.
4.4.22.14 Humidity with stand up to 95% RH.
4.4.22.15 Operation Indication: LED (Red) per phase.
4.4.22.16 Conforming to IEC 60255 (IEC 255).
4.4.22.17 Suitable for flush mounting.
4.4.22.18 Suitable for use on HV/EHV Systems with up to 31.5kA

4.4.22.19 With suitable CT terminals that can take upto 4mm^2 cables

APPENDIX N

SCHEDULE A: GURANTEED RELAY TECHNICAL SCHEDULES.

The bidder is required to complete this schedule by indicating the offer details against each requirement and to give a reference in the attached Manuals/Publications where the details entered can be verified.

NB: Failure to complete this schedules will result in the rejection of the bid.

Tender No…….

ELECTRICAL PROTECTION RELAYS		
KPLC REQUIREMENTS		**BIDDER/MANUFACTURER'S RESPONSE**
4.4.19 3 Phase Circuit Breaker Failure Protection Relay		
	Relay Manufacturer	
	Relay model, offered	
	Country of Origin	
4.4.19.1	Numeric design, with large LCD screen and HMI.	
4.4.19.2	Single or three pole with or without current	
4.4.19.3	Three Phase Overcurrent Detectors 2 out of 4 check of current detectors	
4.4.19.4	Earth Fault Detector	
4.4.19.5	Using 110VDC Power supply and Binary input voltage	
4.4.19.6	Using 1A and/or 5A CT inputs	
4.4.19.7	Binary input and Outputs for a 3 Phase BF Scheme. At Least 8 BIs and 10 BOs	
4.4.19.8	2 out of 4 check of current detectors	
4.4.19.9	Phase selective for single and three pole operation. Two Stage time delay, hence two stages of operation	
4.4.19.10	Fast reset time with no Overshoot	
4.4.19.11	Very sensitive current detection. Indicate sensitivity	
4.4.19.12	Flush Mounting Independently settable delay times for operation with and without current	
4.4.19.13	"No current" condition control using the circuit-breaker auxiliary contacts	

4.4.19.14	Two stage delay, hence two stages of operation	
4.4.19.15	Trip command input.	
4.4.19.16	Necessary logic to determine breaker fail condition	
4.4.19.17	Operator keypad with display	
4.4.19.18	Display of line measured current values	
4.4.19.19	Serial Interface provision	
4.4.19.20	Annunciation and storage of previous events	
4.4.19.21	Self -Monitoring Watchdog	
4.4.19.22	Pole discrepancy Feature	
4.4.19.23	Suitable for Flush mounting	
4.4.19.24	LEDs to show phase and stage of operation	
4.4.19.25	Additional Breaker management features like AR, Interlocking, Synch check, SF6 Gas monitoring	
4.4.20	**Voltage Regulating Relay**	
	Relay Manufacturer	
	Relay model, offered	
	Country of Origin	
4.4.20.1	Ratings: AC Inputs: 110Vac, 1A (three phase)	
4.4.20.2	Power Supply Voltage range 80-260VDC/AC nominal 110VDC or wider range.	
4.4.20.3	The relays shall be of Numeric Design with Keypad HMI	
4.4.20.4	Buttons for Raise and Lower Commands	
4.4.20.5	Selector Switches for Local and Remote	
4.4.20.6	Selector Switches for Auto/Manual operation	
4.4.20.7	Master/Follower/Independent Operation mode selection.	
4.4.20.8	Binary Inputs that can work with 110VDC inputs >8BIs.	
4.4.20.9	Binary Outputs that can work with 110VDC or 240VAC, >10BOs.	
4.4.20.10	Bandwidth settings of 0.5 to 5%.	
4.4.20.11	Voltage Level Setting from 80V to 120V	

	or wider setting range.	
4.4.20.12	2 stage Time Delay settings (T1, T2)	
4.4.20.13	Displays should be programmable to display either secondary or primary values	
4.4.20.14	Display at least TPI, kV, A, MW, MVAR, pf, frequency and Harmonic Distortion.	
4.4.20.15	Ethernet or direct Fibre for parallel operation implementation of Master/Follower scheme.	
4.4.20.16	Master/Follower Selection possibility using binary inputs	
4.4.20.17	Display of alarms on the screen and LEDs	
4.4.20.18	Event records should be incorporated.	
4.4.20.19	At least 4 High Speed Power Outputs (HSPO) for controlling tapchanger 2 for Raise and 2 for Lower).	
4.4.20.20	Software for Programming the configuration and Relay Settings	
4.4.20.21	Should be IEC61850 compliant.	
4.4.20.22	Analogue input of 0….20mA dc for TPI	
4.4.20.23	BCD input for Tap Position Indication	
4.4.20.24	Communication Cable for Relay to PC communication.	
4.4.20.25	Block operation for an Overcurrent, Under-Voltage and extreme Over-voltages	
4.4.20.26	HMI indication of Service or Blocked Operation of Relay	
4.4.20.27	Flush mounting construction	
4.4.20.28	Provide at least 3 Hard copy operating manual or manual per Relay	

ELECTRICAL PROTECTION RELAYS		
KPLC REQUIREMENTS		**BIDDER/MANUFACTURER'S RESPONSE**
4.4.21 Synchroscope M8100 Control Relay		
	Synchroscope Manufacturer	
	Synchroscope model, offered	
	Country of Origin	
4.4.21.1	LED design, with 38 illuminated LEDs	
4.4.21.2	Angle of Rotation : 360°	

4.4.21.3	Withstand of vibration and environmental influence of temperature & humidity.	
4.4.21.4	Power Consumption ≤4VA	
4.4.21.5	Insulation Resistance at 500VDC	
4.4.21.6	Dielectric withstand of 2kV RMS for one minute	
4.4.21.7	Operating temperature : -10°C to 55°C	
4.4.21.8	Voltage at Synchronism: 110V±2%	
4.4.21.9	Operating Voltage: 110V ±20%	
4.4.21.10	Operating Frequency: 50/60Hz ±5%	
4.4.21.11	Accuracy of ±2°	
4.4.21.12	With stand humidity of 95% RH	
4.4.21.13	Indication : Moving light LEDs	
4.4.21.14	Conforming to IEC 51-5	
4.4.21.15	To be supplied complete with housing Box side mounted onto control panel.	
4.4.21.16	Number of Selectable incoming voltages : 5	
4.4.21.17	Indication whether the two systems are live or dead	
4.4.21.18	38 illuminated points (LEDs)	
4.4.21.19	Fully insulated voltage inputs	
4.4.21.20	Provision of Circuit Breaker Closing Relay mounted inside housing	
4.4.21.21	Provision for side mounting onto Control panel	
4.4.21.22	Powder painted housing box to RAL7032 and IP class 42	

ELECTRICAL PROTECTION RELAYS		
KPLC REQUIREMENTS		**BIDDER/MANUFACTURER'S RESPONSE**
4.4.22 3 Phase HV Bus Connection Differential Protection Relay 7VH300-4CA04/FB		
	Relay Manufacturer	
	Model, offered	
	Country of Origin	
4.4.22.1	Should be of Numeric/Static, with Power supply 110….125VDC.	
4.4.22.2	Capable of withstanding environmental influence from vibration, temperature	

	and humidity	
4.4.22.3	With in-built stabilizing Resistors.	
4.4.22.4	For use with 1A CT secondary inputs.	
4.4.22.5	Insulation Resistance at 500VDC	
4.4.22.6	Dielectric withstand of 2kV RMS for one minute	
4.4.22.7	Operating temperature : -10°C to 55°C	
4.4.22.8	Voltage Setting Range 24V….250Vac	
4.4.22.9	With latching Phase indicating LEDs (Red) to show which phase has operated.	
4.4.22.10	With Green LED for indicating Relay healthy and powered.	
4.4.22.11	With a general trip flag/LED indication	
4.4.22.12	With CT shorting Links when relay is racked out.	
4.4.22.13	Must be able to fit in a slot/panel cut-out where existing relay 7VH8300-4CA04/FB has been used.	
4.4.22.14	Conforming to IEC 60255	
4.4.22.15	With at least 4 output contacts rated ≥10A, 250VDC for tripping, alarms and annunciation.	
4.4.22.16	Working in High Impedance Differential Protection mode Relay 7VH300-4CA04/FB	
4.4.22.17	Should be suitable for use on HV/EHV systems with up to 31.5kA through fault.	
4.4.22.18	Suitable for Flush mounting	
4.4.22.19	With suitable terminals that can take up to $4mm^2$ CT cables	
4.4.22.20		
4.4.22.21		
4.4.22.22		