GIS ELK-4/800 I&C Training

Level 3 Field Service Engineer Training

TRAINING CENTER CHINA – COURSE DESCRIPTION

PREPARED BY	STATUS	SECURITY LEVEL		
ZhiWu Wu	Approved	Internal		
APPROVED BY	APPROVAL DATE			
Sam-QingZhong Shen	2022-12-28			
OWNER	DOCUMENT KIND			
Head of Training Function	Agenda			
TITLE				
GIS ELK-4/800 I&C Training				
OWNING ORGANIZATION	DOCUMENT ID	REV.	LANG.	PAGE
2657-Service CN	2GHE004109	B	en	1/7

Hitachi Energy

Course goal:

The course conveys profound knowledge on the assembly of GIS type ELK-4/800kV.

Main learning objectives:

- Understand the functions of all GIS components of ELK-4/800kV
- Known about all relevant documents (drawings, instructions, protocols) to perform an installation
- Perform a complete GIS ELK-4 coupling

Prerequisites:

- SF_6-Gas-handling course with certificate
- Heavy load course with certificate
- Good English skills (written and spoken)
- Ability to read wiring diagrams is required
- On-site experience on GIS Installation and/or Commissioning
- Attended the local required Health & Safety Training
- First aid course with certificate
- Own PSE
- Computer with admin rights

Topics:

- Circuit-breaker and breaker operating mechanism
- Disconnector, earthing switch, fast acting earthing switch
- Statically components like connecting elements, busbars
- Lateral dismantling elements, compensators
- Surge arrester
- Site assembly instructions

Assembly steps and procedures:

- Overview and detailed drawings of assembly units, packing list and layouts
- Positioning and alignment of Bays
- Coupling and alignment of bays
- Secondary systems commissioning
- Isolator and earth switch testing
- Protocols and Reports

This is a theoretical and practical training course.

Certification:

A confirmation will be issued after successful participation in this course, as part of the certification process.

Within a 12 months period, an on-site assessment must be carried out along with a final review to complete certification.

Duration:

20 days

Enrolments:

Send your request to

cn-hvtraining@hitachienergy.com

Day	Subject	Location
1	**Welcome / Introduction to Hitachi Energy China** ❖ Training Introduction / Presentation ❖ Safety Induction ❖ Certification Process ❖ Hitachi Energy China GIS-Product Portfolio **Product overview and components** ❖ Comparison “single line diagram” and “products” (x-ray view) ❖ Circuit breaker arcing chamber ❖ “HMB-operation mechanism” components and function ❖ Disconnector / Earthing Switch component and function incl. mechanism ❖ Fast Earthing Switch components and function incl. drive mechanism ❖ Transversal/lateral dismantling modules, compensators, elbow elements, ❖ Insulators ❖ Cable termination (transformer and cable housing) ❖ Current and voltage transformers, ❖ Bushings ❖ Density monitors and sensors working principle	Classroom
2	**Documentation** **Preparation previous the job** ❖ Documentation flow with Product Service Center (PSC) and Project Manager (PM) ❖ Site preparation check list ❖ Documentation map list (from installation PM to technician) **During the job on site** ❖ Checklist for installation start ❖ Protocols (gas Q, path resistance, shock indicators, etc.) ❖ Spare parts list, building acceptance and local H&S aspects ❖ Non-Conform Report (NCR) ❖ Field service daily and monthly site report (logbook) ❖ As built documents / correction (red marks)	Classroom

Day	Subject	Location
3	**Project specific documents** ❖ Site I&C “test manual” and/or instruction (site inspection mapping, tools, ❖ drawing, etc.) ❖ Site layouts (earthing, civil work, loading plan, assembly and supports) ❖ Single line gas diagram ❖ Electrical diagrams ❖ Cable tray arrangement ❖ Packing list and/or shipping documents ❖ Resistance measurement paths and calculation ❖ Gas volume table ❖ Time schedule Continuation components ❖ Manual operation and locking device for disconnectors, earthing switches and fast acting earthing switches ❖ Gas monitoring system ❖ Density Monitor ❖ Factory tour to respective assembly line	Classroom
4	**Place and level the CB** ❖ Working area preparation (e.g. shelves, tools, drawings, organization) ❖ Building foundations check according to protocol (measurement of X/Y/Z axes) ❖ Unpacking and lifting procedure ❖ Checking of received goods and loose parts according to packing list/shipping documents ❖ Setting and adjusting of CB-pole frame ❖ Alignment of the CB at determined “X” and “Y” axes	Classroom
5	**Installation of Assembly – Units** ❖ Basic steps for cleaning and installing the unit ❖ Flange treatment (indoor and outdoor), connection ❖ Install of all three CT’s (with regarding of CT polarity) ❖ Transversal/lateral dismantling modules installation ❖ Install of all three cable outgoing units, which contain a combined discon-nector/earthing switch and fast acting earthing switch ❖ Align the units and assembling, incl. adjusting of the steel support **Week Review** **Q and A session**	Classroom& Training field

6	**Product exercise(s)** ❖ Cable termination installation (if available) ❖ Steel support mounting ❖ VT installation	Training field
7	**SF_6-gas** ❖ General Information about SF_6-gas ❖ Instruments/Tools ❖ SF_6-gas reporting ❖ Content of decomposition product ❖ Handling of contaminated SF_6-gas ❖ SF_6-gas handling with reclaimer ❖ Maximum differential pressures on barrier insulators ❖ Filling with gas refilling trolley	Classroom Training field
8	**CB operation mechanism** ❖ Operation mechanism basics and working principle ❖ Handling for 1st charging ❖ Interlocking device ❖ Carbon brushes ❖ Venting of the low-pressure tank ❖ Manual charging device with PSC Movie ❖ Troubleshooting	Classroom Training field
9	**Product exercise(s)** ❖ Cabling and earthing/grounding part ❖ Cable “first” connection ❖ Cable trays arrangement ❖ Studying of Earthing layout ❖ Installation of the earthing and system grounding	Classroom Training field
10	**Week Review** **Q and A session** **Installation exam** **End of Installation part**	Classroom Training field

11	**General Introduction to Commissioning** **Personal Skills of the Commissioning Engineer**	Classroom Training field
12	**General Introduction to Commissioning** **continuation**	Classroom Training field
13	**Circuit breaker drives HMB Theory** ❖ Introduction to HMB drive ❖ HMB Functionalities **Circuit breaker drives HMB Practical** ❖ HMB Drive Testing & Test Protocol	Classroom Training field
14	**CB Time-stroke testing Theory** ❖ Introduction to time-stroke testing ❖ Testing equipment ❖ Introduction to ACTAS software ❖ Dual ground timing test **CB Time-stroke testing Practical** ❖ Setting up the testing area ❖ Connecting the equipment ❖ Installation of the software ❖ Evaluating the results ❖ Adjusting the breaker ❖ Time-Stroke Test Protocol	Classroom Training field
15	**Isolators and Earth Switches Theory** ❖ Overview ❖ Electronic board ❖ Interlocking board **Isolators and Earth Switches Practical** ❖ On-Site Testing & Test Protocol **Week Review** **Q and A session**	Classroom Training field

16	**Instrument Transformers Theory** ❖ VT & CT introduction ❖ Applicable Regulations **Instrument Transformers Practical** ❖ VT Testing ❖ VT Test Protocol ❖ CT Testing ❖ CT Test Protocol	Classroom Training field
17	**Secondary systems Theory** ❖ Density monitors(TRAFAG) ❖ MSM	Classroom Training field
18	**Drawings and Interlocking Theory** ❖ Introduction to Hitachi ABB Drawings ❖ Explanation of the interlocking ❖ Interlocking matrix ❖ Exercises	Classroom Training field
19	**Practical On-Site training day** ❖ Drawings ❖ Interlocking ❖ Practical exercises	Classroom Training field
20	**Documentation Theory** ❖ Test Reports ❖ Red Marks ❖ Field Report ❖ NCRs **Final Examination** **Final Q and A session**	Classroom