TOSHIBA

Toshiba HV6FS-MLD Instruction Manual

Vacuum circuit breakers - drawout type 4.8 & 7.2kv voltage classes fast closing w/uv release

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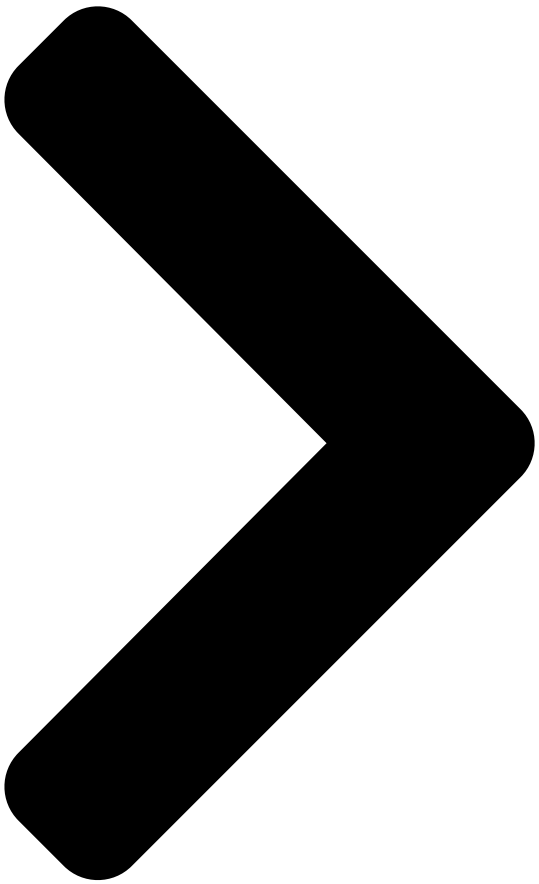

Document: GF07Z304 Rev. 2

INSTRUCTION MANUAL

INSTALLATION - OPERATION - MAINTENANCE

HV6FS-MLD Vacuum Circuit Breakers – Drawout Type 4.8 & 7.2kV Voltage Classes (Fast Closing w/UV Release)

Issued: 10/2006

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Related Manuals for Toshiba HV6FS-MLD

Circuit breakers Toshiba VK Series Instructions Manual

Vacuum circuit breakers 5-15kv (63 pages)

Circuit breakers Toshiba HV6FS Instruction Manual

Vacuum circuit breakers (39 pages)

Circuit breakers Toshiba VK Series Instructions Manual

Vacuum circuit breakers 5kv (57 pages)

Circuit breakers Toshiba EAS630G Instruction Manual

Moulded case circuit breakers (2 pages)

Circuit breakers Toshiba XVFN10 Instruction Manual

No-fuse circuit breakers, earth leakage circuit breakers (2 pages)

Summary of Contents for Toshiba HV6FS-MLD

Page 1 Document: GF07Z304 Rev. 2 INSTRUCTION MANUAL INSTALLATION - OPERATION - MAINTENANCE HV6FS-MLD Vacuum Circuit Breakers – Drawout Type 4.8 & 7.2kV Voltage Classes (Fast Closing w/UV Release) Issued: 10/2006 Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com...

Page 2 Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com...

Page 3 INSTRUCTION MANUAL For the Installation, Operation and Maintenance of HV6FS-MLD Vacuum Circuit Breakers – Drawout Type 4.8 & 7.2kV Voltage Classes (Fast Closing w/UV Release) Never attempt to install, operate, maintain or dispose of this equipment until WARNING you have first read and understood all of the relevant product warnings and user directions that are contained in this Instruction Manual.

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Page 5: Safety

SAFETY Page 1 IMPORTANT MESSAGES Read this manual and follow its instructions. Signal words such as DANGER, WARNING and CAUTION will be followed by important safety information that must be carefully reviewed. Indicates a situation that will result in death, serious injury, and severe DANGER property damage if you do not follow instructions.

Page 6 Be trained in rendering first aid. SAFETY CODES Toshiba HV6FS vacuum circuit breakers are designed and built in accordance with JIS C 4603-1990 and JEC-2300-1985. Installations must comply with all applicable state and local codes, adhere to all applicable National Electric Code (NFPA 70) standards and instructions provided in this manual.

Page 7 SAFETY Page 3 HAZARDOUS VOLTAGE will cause severe injury, death, fire, explosion and DANGER property damage. • Turn off and lock out Primary and Control Circuit Power before servicing. • Keep all panels and covers securely in place. • Never Defeat, Modify, or Bypass any Safety Interlocks •...

Page 8: Table Of Contents

Rating Verification .....12 Mounting the Circuit Breaker Cell .....12 Main Circuit Cable Connections.....13 Ground Connections .....14 Control Circuit Connections .....15...

Page 9 TABLE OF CONTENTS Page 5 STORAGE .....34 Storage.....34 Inspection During Storage.....34 SPECIFICATIONS.....35 Table 3. Ratings – Motor Operation HV6FS-MLD Type.....35 WARRANTY AND LIMITATION OF LIABILITY.....36 Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com...

Page 10: Introduction

Page 6 INTRODUCTION It is the intent of this manual to provide a guide for safely installing, operating and maintaining Toshiba vacuum circuit breakers. This manual consists of a section of general safety instructions and is marked throughout with warning symbols. Read this manual thoroughly before installation, operation and maintenance of this equipment.

Page 11 The circuit breaker can be tripped electrically. Arc interruption is accomplished inside sealed Fig. 1 Type HV6FS-MLD Circuit Breaker vacuum interrupters mounted on track-resistant insulators. Vacuum interrupters use low-surge contact materials that exhibit low current chopping levels reducing switching overvoltages.

Page 12: General Description

Page 8 GENERAL DESCRIPTION SAFETY DEVICES Safety interlocks and guards are provided as an integral part of the equipment design. These devices are provided for safety to the operator. Never defeat, modify or DANGER bypass any safety devices, interlocks or operating mechanism.

Page 13 GENERAL DESCRIPTION Page 9 INDICATORS AND CONTROLS (Fig. 4) The following front panel indicators and controls are provided: 1) On-Off Indicator - Indicates if the circuit breaker is OFF (Green) or ON (Red). When the indicator reads OFF, the main contacts of the circuit breaker are open.

Page 14: Receiving, Inspection And Handling

This may cause damage. 4) File a claim with the carrier for any damaged or missing items and immediately notify the nearest Toshiba representative. Do not install or energize WARNING equipment that has been damaged. Damaged...

Page 15: Handling And Moving

RECEIVING, INSPECTION AND HANDLING Page 11 HANDLING AND MOVING When handling and moving the circuit breaker and cell, the techniques shown in this section may be used. Care and caution should be used when handling the circuit breaker and cell units to avoid damage to the equipment and personal injury.

Page 16: Installation

Contact your nearest equipment failure. Toshiba representative for additional information. Toshiba HV6FS-MLD circuit breakers intended for use in usual service conditions as RATING VERIFICATION defined in IEEE C37.20.2.

Page 17: Mounting The Circuit Breaker Cell

INSTALLATION Page 13 MOUNTING THE CIRCUIT BREAKER CELL The circuit breaker cell is designed to mount to the floor or shelf of the installation compartment. Use two wrenches to torque CAUTION The floor or shelf to which the cell is mounted the connection to prevent should be flat and level within ±...

Page 18: Ground Connections

Page 14 INSTALLATION GROUND CONNECTIONS The circuit breaker cell must be grounded in accordance with the requirements of the National Electrical Code, Article 250 or applicable local standards. WARNING Proper grounding connections must be made to the circuit breaker cell before incoming power is applied.

Page 19: Control Circuit Connections

INSTALLATION Page 15 CONTROL CIRCUIT CONNECTIONS Control circuit wiring is connected to

the circuit breaker by means of a control plug (green color) located on the breaker front panel (Fig. 15). A control wire harness (Fig. 16) is furnished with circuit breaker making...

Page 20: Placing The Circuit Breaker In The Cell

Page 16 INSTALLATION PLACING THE CIRCUIT BREAKER IN THE CELL Hazard of fire, explosion, DANGER severe injury, death and property damage. Circuit breaker must be OFF before installation or removal from cell. Circuit breaker contains WARNING powerful springs. Discharge springs completely before installation or servicing.

Page 21

INSTALLATION Page 17 PLACING THE CIRCUIT BREAKER IN THE CELL (cont'd) Grasp the handles on the breaker with both hands and, while lifting the interlock release lever with the left hand, insert the breaker into the cell (Fig. 19. Continue to roll the breaker into the cell until the arrow front...

Page 22: Pre-Energization Check

Page 18 PRE-ENERGIZATION CHECK GENERAL ELECTRICAL CHECKS BEFORE ENERGIZING CIRCUIT BREAKER for the first time, follow the procedure Electrical shock hazard. below to verify that the equipment is properly WARNING installed and functional. Do not touch energized components during a test Hazardous Voltage.

Page 23

OPERATION Page 19 MOVING THE CIRCUIT BREAKER FROM THE DISCONNECTED TO THE CONNECTED POSITION DANGER Hazard of fire, explosion, severe injury, death and property damage. Circuit breaker must be OFF before moving to or from the CONNECTED position. WARNING Do not move the circuit breaker to the CONNECTED position without first connecting the secondary...

Page 24: Operation

Page 20 OPERATION MOVING THE CIRCUIT BREAKER FROM THE CONNECTED TO THE DISCONNECTED POSITION Hazard of fire, explosion, DANGER severe injury, death and property damage. Circuit breaker must be OFF before moving to or from the CONNECTED position. TO MOVE THE CIRCUIT BREAKER TO THE DISCONNECTED POSITION: 1.

Page 25: Manual Operation

PRE-ENERGIZATION CHECK Page 21 MANUAL OPERATION Powerful springs. Do not WARNING place your hands or any part of your body inside the circuit breaker while the indicators show CHARGED (yellow) or ON (red). CAUTION To avoid damaging the mechanism, do not close the circuit breaker when the On-Off Indicator shows ON (red).

Page 26

Page 22 OPERATION MANUAL OPENING: 1. Push the trip lever in the direction of the arrow (Fig. 27). 2. The On-Off indicator changes to OFF (green). ELECTRICAL OPERATION The flow chart shown in Fig. 30 illustrates the sequence of electrical operation. Refer to the schematic shown in Fig.

Page 27: Electrical Operation Flow Chart

OPERATION Page 23 Circuit Breaker Open Control Power Applied Motor Begins Operating Closing Springs Begin Charging - - - - Spring Status Indicator Changes to Yellow Closing Springs Charged - - - - Standby for Close Operation Motor Stops Closing Signal Given Close Coil Energized Circuit Breaker Closes - - - - Spring Status Indicator Changes to White...

Page 28: Maintenance

Page 24 MAINTENANCE Green PR3 NT3 A01 A02 B01 B02 Fig. 31 125 VDC Control Circuit Schematic SYMBOL DESCRIPTION Motor Voltage Trip Coil Close coil Undervoltage Trip Coil a1 to a3 Auxiliary Contacts (N.O.) b1 to b3 Auxiliary Contacts (N.C.) Control Relay Control Relay Contact (N.O.) Control Relay Contact (N.C.)

Page 29: Maintenance Program

MAINTENANCE Page 25 MAINTENANCE PROGRAM MAINTENANCE RECORD In order to ensure continued reliable and safe Keep a permanent record of all maintenance operation of the equipment, a program of work. At a minimum, this record should include periodic maintenance must be established. information on: Operating and environmental conditions will usually dictate the frequency of inspection...

Page 30: Inspection And Maintenance Types

Page 26 MAINTENANCE RECOMMENDED INSPECTION AND MAINTENANCE TYPES Table 1 Tightening Torques NOTE: Refer to the SAFETY section of this Screw manual for important information. Nominal Tightening Torque Dia. A. Acceptance Inspection 15-20 kgf-cm 13-17 in-lb This inspection confirms that the circuit 30-40 kgf-cm breaker unit is complete, correct as specified, 26-34 in-lb...

Page 31 Insulator Dust, foreign Visual Make sure there is no Wipe with a clean, matter or inspection. dust, foreign matter or dry cloth. If damage breakage. damaged, contact Toshiba.

Page 32 Page 28 MAINTENANCE Table 2. Check Points for Inspection (cont'd) Check Point Check Item Check Method Criteria What to do Repair if Auxiliary Terminals loose Visual Make sure terminals are disconnected. Switch or disconnected inspection. not loose or disconnected. Tighten if loose. Tighten using a screwdriver.

Page 33: Vacuum Check

TEST EQUIPMENT: 2. Connect all the line side primary terminals Toshiba offers a compact vacuum checker (Type together and to the output of the vacuum CI35-1D) which enables a quick and easy check checker or AC hi-pot machine. Connect all...

Page 34 Page 30 MAINTENANCE CRITERIA: 1. If a current flow above 5 milliamperes is observed or if breakdown occurs, one or more of the interrupters has insufficient 1 minute vacuum and must be replaced. 22kV AC (31kV DC) Exception: If the current exceeds 5 milliamperes the first time the voltage is brought up, reduce the voltage to zero and increase it again.

Page 35: Disposal

DISPOSAL Page 31 DISPOSAL Contact your state environmental agency for details on disposal of electrical components and packaging in your particular area.

Page 36 STORAGE Page 32 STORAGE If the circuit breaker is to be stored for any length of time prior to installation, the following precautions should be taken: 1) The original packing should be restored, if possible. 2) Do not subject the equipment to moisture or sun rays.

Page 37 SPECIFICATIONS Page 33 Table 3 Circuit Breaker Ratings – Motor Stored Energy Operation HV6FS-MLD Type Rated Voltage kV, rms AC Withstand Voltage kV, rms 22 – 1 Min. Basic Impulse Level Maximum Continuous Current A, rms Rated Frequency 50/60 Rated Interrupting Current (0.15 P.F.) kA (Sym.), rms...

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