



# TOSHIBA

Toshiba HV6FS Instruction Manual

Vacuum circuit breakers



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# INSTRUCTION MANUAL

INSTALLATION - OPERATION - MAINTENANCE

## HV6FS Vacuum Circuit Breakers - Fixed Type

4.8 & 7.2kV Voltage Classes

**(Fast Closing)**

APPLICABLE MODEL NUMBERS:

(Motor Operation Types)

**HV6FS-MU**

**HV6FS-ML**

Issued: 8/2004

Phone: 800.894.0412 - Fax: 888.723.4773 - Web: [www.clrwtr.com](http://www.clrwtr.com) - Email: [info@clrwtr.com](mailto:info@clrwtr.com)

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### [Circuit breakers Toshiba HV6FS-MLD Instruction Manual](#)

Vacuum circuit breakers - drawout type 4.8 & 7.2kv voltage classes fast closing w/uv release (38 pages)

### [Circuit breakers Toshiba VK Series Instructions Manual](#)

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### [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

[Page 1](#) Document: GF07Z303 Rev 1 INSTRUCTION MANUAL INSTALLATION - OPERATION - MAINTENANCE HV6FS Vacuum Circuit Breakers - Fixed Type 4.8 & 7.2kV Voltage Classes (Fast Closing) APPLICABLE MODEL NUMBERS: (Motor Operation Types) HV6FS-MU HV6FS-ML Issued: 8/2004 Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com...

[Page 2](#) Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com...

[Page 3](#) Preface For the Installation, Operation and Maintenance of HV6FS Vacuum Circuit Breakers - Fixed Type 4.8 & 7.2kV Voltage Classes (Fast Closing) Never attempt to install, operate, maintain or dispose of this equipment until you have first read and understood all of the relevant product warnings and WARNING 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 which 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 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](#)

Page 4 TABLE OF CONTENTS SAFETY.....1 INTRODUCTION .....7  
GENERAL DESCRIPTION.....8 Components.....8 Indicators and Controls  
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### [Page 11: Introduction](#)

INTRODUCTION Page 7 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 12: General Description](#)

Page 8 GENERAL DESCRIPTION The Toshiba HV6FS vacuum circuit breakers described in this manual are suitable for use on systems of 4.8kV and 7.2kV voltage classes that require interrupting ratings of 16kA and 14kA respectively and a continuous current rating of 630A.

### [Page 13: Indicators And Controls](#)

GENERAL DESCRIPTION Page 9 SAFETY DEVICES 5) Manual Trip Lever (Red) - Pushing the lever Safety interlocks and guards are provided as an in the direction of the arrow trips the circuit breaker (On-Off indicator changes to OFF). integral part of the equipment design. These devices are provided for safety to the operator.

### [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 Fig. 5 Insulating Cylinder damaged.

### [Page 15: Handling And Moving](#)

INSTALLATION Page 11 HANDLING AND MOVING When handling and moving the circuit breaker, the techniques shown in this section may be used. Care and caution should be used when handling the circuit breaker units to avoid damage to the equipment and personal injury. Always keep the circuit breaker in a generally upright position.

### [Page 16: Installation](#)

Toshiba representative for additional information. Toshiba HV6FS circuit breakers are intended for use in usual service conditions as defined in RATING VERIFICATION IEEE C37.20.2. The temperature of the cooling air (ambient air temperature) surrounding the Prior to Installation, the maximum fault current breaker should be between the limits of -5°C...

### [Page 17: Mounting The Circuit Breaker To Apanel](#)

11 ga. (.12 in.) thick steel. If the breaker must be mounted to a panel of different thickness, contact Toshiba. Panel cutout dimensions for the circuit breakers are given in Fig. 12. One cutout size is used for all breaker types.

[Page 18](#) Page 14 INSTALLATION 0.343 DIA 4 PLACES 0.25 0.38 RADIUS 4 PLACES 8.03 0.25 0.25 0.25 10.71 Dimensions in Inches Fig. 12 Panel Cutout Dimensions Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com...

### [Page 19: Mounting Directly To A Shelf](#)

INSTALLATION Page 15 MOUNTING DIRECTLY TO A SHELF The shelf should be flat and level within  $\pm 0.5$  PANEL mm ( $\pm 0.02$  in.). If there are any noticeable gaps between the breaker and the shelf, fill them in using flat washers as spacers. Check to make sure the breaker On-Off

indicator shows OFF (green), then mount it by following the steps below:...

### [Page 20: Main Circuit Cable Connections](#)

Page 16 INSTALLATION MAIN CIRCUIT CABLE CONNECTIONS Cables that connect to the circuit breaker should be routed to avoid interference with sharp edges and moving parts. Minimum bending radius for the type of cable used should be observed. Power cables should be braced and/or laced to withstand short-circuit forces wherever such cables are unsupported.

### [Page 21: Ground Connections](#)

INSTALLATION Page 17 GROUND CONNECTIONS The circuit breaker must be grounded in accordance with the requirements of the National Electrical Code, Article 250 or applicable local standards. Proper grounding WARNING connections must be made to the circuit breaker before incoming power is applied. It is very important that the circuit breaker and its enclosure be adequately grounded to protect the operator from injury in the event of short circuits...

### [Page 22: Control Circuit Connections](#)

Page 18 INSTALLATION CONTROL CIRCUIT CONNECTIONS Control circuit wiring is connected to the terminal block on the top of the operating mechanism (Fig. 20). Connect control wires in accordance with the appropriate wiring diagram shown in Fig. 28 through Fig. 29 in the OPERATION section of this manual.

### [Page 23: Pre-Energization Check](#)

PRE-ENERGIZATION CHECK Page 19 GENERAL ELECTRICAL CHECKS BEFORE ENERGIZING CIRCUIT Electrical shock hazard. BREAKER for the first time, follow the procedure Do not touch energized WARNING below to verify that the equipment is properly components during a test installed and functional. using auxiliary power.

### [Page 24: Operation](#)

Page 20 OPERATION MANUAL OPERATION Powerful springs. Do not place your hands or any WARNING part of your body inside the circuit breaker while the indicators show CHARGED (yellow) or ON (red). To avoid damaging the mechanism, do not close CAUTION the circuit breaker when the On-Off Indicator shows...

### [Page 25: Electrical Operation](#)

OPERATION Page 21 MANUAL OPENING (All Types): 1. Push the trip lever in the direction of the arrow (Fig. 25). 2. The On-Off indicator changes to OFF (green). 3. The Spring Charge Indicator changes to WHITE. ELECTRICAL OPERATION The flow chart shown in Fig. 27 illustrates the Fig.

[Page 26](#) Page 22 OPERATION 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 - - - Spring Status Indicator Changes to White Circuit Breaker Closes...

[Page 27](#) OPERATION Page 23 Fig. 28 125 VDC Control Circuit Schematic for MU Type Circuit Breaker Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com...

[Page 28](#) Page 24 OPERATION Fig. 29 125 VDC Control Circuit Schematic for ML Type Circuit Breaker Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwtr.com - Email: info@clrwtr.com...

### [Page 29: Undervoltage Trip](#)

OPERATION Page 25 UNDERVOLTAGE TRIP All HV6FS fixed mounted circuit breakers are furnished with an undervoltage trip device. The undervoltage trip device operates to trip the circuit breaker OFF unless 120VAC control power is present at the terminals of relay UV.

### [Page 30: Maintenance](#)

Page 26 DISPOSAL MAINTENANCE PROGRAM 6) Comments The degree of detail of the record will depend In order to ensure continued reliable and safe operation of the equipment, a program of somewhat on the operating conditions. periodic maintenance must be established. Operating and environmental conditions will SERVICING EQUIPMENT usually dictate the

frequency of inspection...

### [Page 31: Inspection And Maintenance Types](#)

MAINTENANCE Page 27 RECOMMENDED INSPECTION AND Table 1 Tightening Torques  
MAINTENANCE TYPES Screw NOTE: Refer to the SAFETY section of this Nominal Tightening  
Torque manual for important information. Dia. 15-20 kgf-cm A. Acceptance Inspection 13-17 in-  
lb 30-40 kgf-cm This inspection confirms that the circuit 26-34 in-lb breaker unit is complete,  
correct as specified, 50-65 kgf-cm...

[Page 32](#) 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.  
Phone: 800.894.0412 - Fax: 888.723.4773 - Web: www.clrwr.com - Email: info@clrwr.com...

[Page 33](#) MAINTENANCE Page 29 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. Tighten not loose or disconnected. Switch or disconnected  
inspection. if loose.

### [Page 34: Vacuum Check](#)

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

[Page 35](#) MAINTENANCE Page 31 CRITERIA: 1. If a current flow above 5 milliamperes is  
observed or if breakdown occurs, one or 1 minute more of the interrupters has insufficient 22kV  
AC vacuum and must be replaced. (31kV DC) Exception: If the current exceeds 5 milliamperes  
the first time the voltage is brought up, reduce the voltage to zero and Voltage...

### [Page 36: Disposal](#)

Page 32 MAINTENANCE DISPOSAL Contact your state environmental agency for details on  
disposal of electrical components and packaging in your particular area. Phone: 800.894.0412 -  
Fax: 888.723.4773 - Web: www.clrwr.com - Email: info@clrwr.com...

### [Page 37: Storage](#)

STORAGE Page 33 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 38: Specifications](#)

Page 34 SPECIFICATIONS Table 3 Circuit Breaker Ratings - Motor Stored Energy Operation  
HV6FS-MU and HV6FS-ML Types Rated Voltage kV, rms Rated Low Frequency Withstand Voltage  
kV, rms Impulse Withstand Voltage kV, crest Rated Continuous Current A, rms Rated  
Frequency...

[Page 39](#) EQUIPMENT AND PARTS FURNISHED PURSUANT TO THE FOREGOING WARRANTY AND  
ALL IMPLIED WARRANTIES OF MERCHANTABILITY. The total liability of the Company, Toshiba  
Corporation and their suppliers and subcontractors for any loss, damage or claim, whether in  
contact, tort (including negligence and liability without fault), or otherwise, arising out of,...

This manual is also suitable for:

[Hv6fs-muHv6fs-m](#)



