

TOSHIBA

Toshiba LF664 Instruction Manual

Electromagnetic flowmeter detector

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TOSHIBA

ELECTROMAGNETIC FLOWMETER DETECTOR

NOTES

Before using the equipment, please read this manual carefully and understand the contents, and then use the equipment correctly.

- NEVER attempt to operate the equipment in any ways that are not described in this instruction manual.
 - After reading this manual, store it with care in a place where it can be referred to whenever needed.
 - Please be sure that this manual is delivered to the personnel who will use this product.
-

MODEL LF664
TOSHIBA
INSTRUCTION MANUAL



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[Measuring Instruments Toshiba LF622 Quick Start Manual](#)

Magmeter (13 pages)

[Security Sensors Toshiba GF630 Instruction Manual](#)

Electromagnetic flowmeter detector (63 pages)

[Security Sensors Toshiba TCB-LD1UPE Installation & Operation Manual](#)

Leak detector (22 pages)

[Security Sensors Toshiba TCB-LDS Series Installation Manual](#)

(2 pages)

[Security Sensors Toshiba LF150 Instruction Manual](#)

Electromagnetic flowmeter detector (36 pages)

[Security Sensors Toshiba TCB-IFDES1001P-UL Installation Manual](#)

Optional sensor (2 pages)

[Security Sensors Toshiba RBC-RD1-PE Owner's Manual](#)

Refrigerant detector, hfc r407c (44 pages)

[Security Sensors Toshiba RBC-AIP1 Installation Manual](#)

Leak detection panel (23 pages)

[Security Sensors Toshiba TCB-LDS1 Product Installation Manual](#)

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Summary of Contents for Toshiba LF664

[Page 1](#) □□□□□□□□ ELECTROMAGNETIC FLOWMETER DETECTOR MODEL LF664 INSTRUCTION MANUAL NOTES Before using the equipment, please read this manual carefully and understand the contents, and then use the equipment correctly. • NEVER attempt to operate the equipment in any ways that are not described in this instruction manual.

[Page 2](#) □□□□□□□□ NOTICE We thank you very much for your purchase of our LF664 series electromagnetic flowmeter detector. Integral type LF664/LF620F Separate type detector LF664 This instruction manual describes the notes on using an electromagnetic flowmeter detector, installation, configuration and maintenance. It is intended for the personnel in charge of installation, operation and maintenance.

[Page 3: Safety Precautions](#)

□□□□□□□□ SAFETY PRECAUTIONS Safety signs and labels affixed to the product and/or described in this manual give important information for using the product safely. They help prevent damage to property and obviate hazards for persons using the product. Make yourself familiar with signal words and symbols used for safety signs and labels.

[Page 4](#) Install a switch and fuse to isolate Do not modify or disassemble the the LF664 from mains power. LF664 unnecessarily. Power supply from mains Modifying or power can cause electric disassem-bling this...

[Page 5](#) Disclaimer Toshiba does not accept liability for any damage or loss, material or personal, caused as a direct or indirect result of the operation of this product in connection with, or due to, the occurrence of any event of force majeure (including fire or earthquake) or the

misuse of this product, whether intentional or accidental.

[Page 6: Safety And Handling Precautions](#)

Therefore, wear nonconductive gloves whenever you work on piping or wiring. (2) Do not use the LF664 detector in a way other than those specified in this manual. It may cause malfunction or damage to this product.

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[Page 8: Product Inspection And Storage](#)

1.2 Storage To store the LF664 detector after opening the package but you will install it at a later date, select a storing place as follows and keep it under the conditions as described: (1) Avoid the place where there is direct sunlight, rain or wind.

[Page 9: Overview](#)

2. Overview The LF664/LF620F and LF664 electromagnetic flowmeter can be use in the following hazardous (classified) locations. ClassI,II,III, Division 2, Groups A-G The electromagnetic flowmeter measures the volumetric flow rates of electrically conductive materials based on Faraday's Law of electromagnetic induction.

[Page 10: Names Of Parts](#)

For the detail of the converter, check the converter LF620F LF620F instruction manual. Converter LF620F For power cable 1/2-14NPT Hanging hooks For I/O cable 1/2-14NPT Detector LF664 Ground cable Figure 3.1.1 Appearance of the LF664/LF620F Meter size 20"(500mm), 24"(600mm) — ...

For the detail of the converter, check the converter LF620F LF620F instruction manual. Converter LF620F For power cable Hanging hooks 1/2-14NPT For I/O cable 1/2-14NPT Detector LF664 Ground cable Figure 3.1.2 Appearance of the LF664/LF620F Meter size 28"(700mm) to 36"(900mm) — ...

3.1.2 Appearance of LF664 (1) Meter size 20"(500mm), 24"(600mm) LF622F For excitation cable For signal cable Terminal box 1/2-14NPT 1/2-14NPT Hanging hooks Detector LF664 Ground cable Figure 3.1.3 Appearance of the LF664 Meter size 20"(500mm), 24"(600mm) — ...

(2) Meter size 28"(700mm) to 78"(1950mm) LF622F For excitation cable For signal cable Terminal box 1/2-14NPT 1/2-14NPT Hanging hooks Detector LF664 Ground cable Figure 3.1.4 Appearance of the LF664 Meter size 28"(700mm) to 78"(1950mm) — ...

[Page 14: Construction Of The Terminal Blocks](#)

3.2 Construction of the terminal blocks 3.2.1 Terminal Block Construction of LF664/LF620F Type For the detail of the converter, check the converter LF620F instruction manual. LF620F 3.2.2 Terminal Block Construction of LF664 Type LF622F Don't connect wiring to this terminal.

[Page 15: Installation](#)

Install a switch and fuse to isolate the Do not modify or disassemble the LF664/LF620F and LF664 from mains power. LF664/LF620F and LF664 unnecessarily. Power supply from mains power Modifying or disassembling this product...

[Page 16: Notes On Selecting The Installation Location](#)

4.1 Notes on Selecting the Installation Location Avoid places within the immediate

proximity of equipment producing electrical interference (such as motors, transformers, radio transmitters, electrolytic cells, or other equipment causing electromagnetic or electrostatic interference). Avoid places where excessive pipe vibration occurs. Avoid places where fluid is pumped in a pulsating manner. Avoid places where there is direct sunlight.

[Page 17: Mounting Procedure](#)

4.2.1 Piping Connections The LF664 detector has flanges on both ends of detector main body. To mount the LF664, refer to Figure 4.1 and follow the procedure below: Place one of the flange packing next to the upstream (or downstream) pipe flange.

[Page 18](#) 863□1078 60" (1500) 1-3/4 1058□1323 66" (1650) 1-3/4 1066□1332 72" (1800) 1-3/4 1431□1789 78" (1950) *1: 1[N □m] is 0.7376 [ft□lbf]. Downstream flange Upstream flange Connection bolt Packing Flow direction Detector Figure 4.1 The LF664 detector piping connections — —...

[Page 19](#) Wire or cloth belt 90° or less 90° or less Wire or cloth belt is used. is used. (b) Meter size 20" and 24" (500mm and 600mm) (a) Meter size 28" and over (700mm and over) Figure 4.2 Transportation of LF664 flowmeter detector — —...

[Page 20: Precautions Of Piping](#)

A minimum of 3D (diameter) length of upstream straight pipe from the flange is required to maintain the performance specification. NOTE The test results were obtained and demonstrated at Toshiba admitted flow calibration facility. —...

[Page 21](#) □□□□□□□□ (2) Pipe Orientation The detector may be installed in horizontal, vertical or sloping pipe runs as shown in Figure 4.2. However, except for horizontal installation, fluid should flow from lower to upper directions. If no air bubble, Vertical down flow application are acceptable under pressured piping conditions.

[Page 22](#) □□□□□□□□ (3) Flow Direction Install the detector in accordance with the flow direction arrow on the detector. (4) Full Pipe Condition Design an upright pipe run (Figure 4.5) or enough water head (Fig. 4.6) at the downstream detector outlet if there is a possibility of the detector pipe being emptied.

[Page 23: Grounding](#)

DON'T DON'T (1) Grounding of the LF664/LF620F type Ground as shown in Figure 4.11. Make the grounding wire as short as possible. Use grounding wire material of IV wire 5.5mm or more. Do not share a grounding wire with other instruments where grounding current may flow.

[Page 24](#) • If the piping material is conductive, connect the • If the piping material is non-conductive, perform grounding grounding wires to the both ends of the piping flange. resistance 100Ω or less. Figure 4.8 Grounding the LF664 Type Detector — —...

[Page 25: Wiring](#)

□□□□□□□□ 5. Wiring Safety Precautions for Wiring WARNING DO NOT DISCONNECT WHILE CIRCUIT IS LIVE UNLESS LOCATION IS KNOWN TO BE NONHAZARDOUS. Live part of electric circuit or a high temperature department can cause explosion. DON'T Do not active live circuits While assembly of all components is not over. Protective performance degradation for hazardous location can cause explosion.

[Page 26](#) Install a switch and fuse to isolate the Turn off mains power before conducting wiring LF664/LF620F and LF664 from mains power. work. Power supply from mains power can Wiring while power is applied can cause cause electric shock or circuit electric shock.

[Page 27: Cables](#)

□□□□□□□□ Notes on wiring CAUTION (1) The apparatus does not be provided with the cable connections. Please prepare yourself for the cable connections which could be used in Division2 hazardous locations. The cable lead -in section must be tightened securely to keep air tightness. (2) Select the cable runs away from electrical equipment (motors, transformers, or radio transmitters) which causes electromagnetic or electrostatic interference.

[Page 28: External Device Connections And Grounding](#)

When replacing the flow rate signal cable and excitation cable, also refer to the instruction manual of the relevant detector. Order the detector terminal box cover packing from Toshiba or a Toshiba distributor.

[Page 29: Wiring](#)

5.4 Wiring 5.4.1 Terminal Treatment of Cables Follow the procedures below to treat the terminals (at the converter side) of various cables and install the cables to the terminal block. Use appropriate cables based on the description in Section 5.1 "Cables."...

[Page 30](#) (3) Connecting the input signal cable Strip the sheath from the end of each conductor of a 2-core individually shielded cable as shown in Figure 5.4. Twist those shields and cover them with a thermal contraction tube or vinyl tube not to make contact with the case or core wires.

[Page 31](#) 5.4.2 Cable Connection LF622F Connect and install the terminal-treated cables to the terminal block. *Connect the cables to the terminal block securely. A loose connection may cause incorrect measurement. After connecting a cable, try to pull it to check whether it has been connected securely.

[Page 32: Operation](#)

6. Operation CAUTION Do not touch the terminal board when the main body when high power is supplied. Do not touch the temperature fluid is being measured. Touching the terminal board The fluid raises the main body when power is supplied can cause burns.

[Page 33: Maintenance And Troubleshooting](#)

Appendix 1. Unsuitable conduit connections for hazardous location can cause explosion. CAUTION Do not conduct wiring work when the LF664/LF620F and power is applied. LF664 main body when high temperature fluid is being measured. Wiring while power is applied The fluid raises the main body can cause electric shock.

[Page 34: Maintenance](#)

7.1 Maintenance Cleaning Adhesion might be created in the detector over a long period of time when used on certain materials. Try to confirm whether to cause the adhesion in the detector pipe when the phenomenon is seen, and an abnormality (ex.

[Page 35: Troubleshooting](#)

7.2 Troubleshooting If a problem occurs while using the LF664/LF620F, LF664/LF622F follow the flowcharts described below. You may find a way to solve the problem. The flowcharts are based on three symptoms (1) to (3). If you cannot solve the problem, contact your nearest Toshiba representative.

[Page 36](#) Connect the two load resistors in resistors connected to series, if necessary. the output in parallel? Is accuracy calculated as follows? Calculate as shown on the left. (Measured flow rate)-(Actual flow rate) × 100% Actual flow rate Contact your nearest Toshiba representative. — —...

[Page 37](#) Note 1: If the detector tube is not filled with operating fluid, the flow is indefinite and measurement is impossible. Be sure to fill the detector tube with operating fluid. Contact your nearest Toshiba representative. ...

[Page 38: Principle Of Operation](#)

Figure 8.1 Principle of Operation The LF664 flange-type electromagnetic flowmeter uses square-wave excitation method, which provides a long-term stable operation. With square-wave excitation, the LF664 offers reliable measurement without being affected by electrostatic or electromagnetic interference, or electrochemical polarization between the electrode and the fluid to be measured.

[Page 39: Specifications](#)

9. Specifications Overall specifications of the LF664 detector and type specification code tables to specify each item of the detector specifications are described in the following sections. 9.1 Specifications Meter size: ANSI 150 20", 24" (500, 600mm) AWWA class D 28", 30", 32", 36", 40", 42", 48", 54", 60", 66", 72", 78"...

Page 40 Principal materials: Case carbon steel Lining Natural rubber Electrodes AISI316L (std.), Titanium (opt.), Hastelloy C equivalent (opt.) Grounding rings None (std.), AISI304(opt), AISI316(opt), Titanium (opt.), Hastelloy C equivalent (opt.) Measuring tube AISI304 Coating: Polyurethane coating (std.), pearl-gray colored Note: If the optional IP68 and NEMA 6P continuous submersible type structure is specified, the coating is tar epoxy resin coating.

Page 41 Flow and calibration velocity range: specified. It calibration by standard Range shown in the table below when Range is not It calibration when there is specification by flowing quantity Range in which the customer is specified. Is this specification Range flowing quantity of Table 9.2. Please confirm becoming in the upper bound value from the flow velocity chart.

Page 42 To select the meter size: See Table 9.3 and find meter sizes within the velocity of 0.3 to 10 m/s for a specified full-scale (measuring range high limit) flow. Select one that has its full-scale velocity between 1 and 3 m/s.

[Page 43: Type Specification Code](#)

9.2 Type Specification Code Table 9.3 Type Specification Code (Model LF664 Detector) Model number Specification code Contents Electromagnetic flowmeter detector ● Hazardous location certification type Meter size 20" (500mm) ● 24" (600mm) ● 28" (700mm) ● 30" (750mm) ●...

Page 44 Table 9.4 Type Specification Code (Exciting Cable and Signal Cable) Model Specification Code Description 1 2 3 A C C Dedicated preformed cable Nominal cross-sectional area of Exciting cable (Note 1) 1.25 mm² 2 mm² Nominal cross-sectional area of Signal cable (Note 2) 0.75 mm²...

[Page 45: Outline Dimensions](#)

10. Outline Dimensions 10.1 Outline dimensions of LF664/LF620F ■ Meter size 20"(500mm), 24" (600mm) ANSI class 150 dimensions: Meter size Weight inch (mm) inch (mm) inch (mm) inch (mm) lb(kg) 20" (500) 23.62 (600) 17.54 (445.5) 31.29 (794.8) 530 (240) 24"...

Page 46 ■ Meter size 28"(700mm) to 36" (900mm) AWWA class D dimensions: Meter size Weight inch (mm) inch (mm) inch (mm) inch (mm) lb(kg) 28" (700) 27.56 (700) 21.79 (553.5) 40.04 (1017.1) 640 (290) 30" (750) 29.53 (750) 22.80 (579.0) 42.17 (1137.8) 710 (320)

[Page 47: Outline Dimensions Of Lf664](#)

10.2 Outline dimensions of LF664 ■ Meter size 20"(500mm), 24" (600mm) ANSI class 150 dimensions: Meter size Weight inch (mm) inch (mm) inch (mm) inch (mm) lb(kg) 20" (500) 23.62 (600) 16.24 (413) 29.99 (762) 530 (240) 24"...

Page 48 ■ Meter size 28"(700mm) to 78" (1950mm) ANSI class 150 dimensions: Meter size Weight inch (mm) inch (mm) inch (mm) inch (mm) lb(kg) 28" (700) 27.56 (700) 20.49 (521) 38.74 (984) 640 (290) 30"(750) 29.53 (750) 22.62 (575) 41.99 (1067) 710 (320) 32"(800)

Page 49 Write down the address and phone number of the distributor from which you purchased this product, the product code, SER.NO. and so on. Distributor Address Name Phone number -...

Page 50 ...