TOSHIBA Density (Consistency) Meter LQ300

Introduction

The LQ300 density (consistency) meter uses microwave phase difference method to determine concentrations of solids in the material to be measured flowing through pipes. The LQ300 can perform a stable density (consistency) measurement in various fields because this method is not affected by flow velocity and is not easily affected by contaminants. As the LQ300 has no moving parts, it is reliable and maintenance is easy.
Since the output of the LQ300 is theoretically linear, it can be applied to a wide range of density (consistency) measurements from low to high density (consistency) and it is easy to change the measurement range. LQ300 complies with the EMC directive 89/336/EEC and the low voltage 93/68/EEC. The LQ300 can be operated from its operation panel and also it can be operated from remote places using the optional AF100 hand-held terminal with HART protocol.

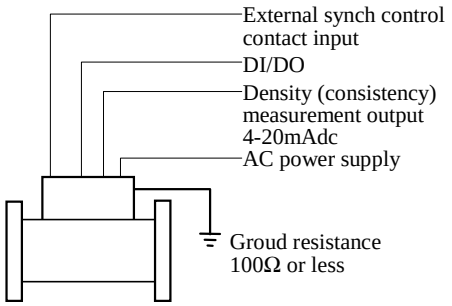


Figure1. LQ300 Configuration Diagram

■ Standard Configuration

- **Density (consistency) Meter:** 1 set (Detector / Converter integral type)
- **Accessories:** 1 set (see Table 1 below.)

Table 1. Standard Accessories

Items	Specifications	Quantity
Fuse	1 A (M), 250 V (glass tube, 5.2 dia. × 20 mm)	2
Document	Instruction manual	1

Specifications

■ Overall Specifications

Measurement method:
Microwave phase difference method

Figure2. LQ300 Density (consistency) Meter

CE

Measurement range:

Meter size	50 mm (2'')	80 mm (3'') to 300 mm (12'')
Span (*2)	2 to 50 %TS (*1)	1 to 50 %TS (*1)
Lower limit setting range (4 mA)	0 to 48 %TS	0 to 49 %TS
Upper limit setting rage (20 mA)	2 to 50 %TS	1 to 50 %TS
Setting incrementes	0.1 %TS	

*1 TS: Total Solids
*2 Span = Upper range - Lower range
*3 The material to be measured must be fluid and be filled evenly with no voids.

Repeatability:

Meter size	50 mm (2'')	80 mm (3'') to 300 mm (12'')
Repeatability	± 0.02 %TS	± 0.01 %TS

Note: *1 : Above values are the results of commuting ability in the phase measurements of converter.
*2 : Density (consistency) determination repeatabiliby for sample reagent;

Meter size		50 mm (2'')	80 mm (3'') to 300 mm (12'')
Densisty (consistency) determination repeatability	For the fullscale value of 2 %TS or greater	± 2 %FS	± 2 %FS
	For the fullscale value of less than 2 %TS		± 4 %FS

* The characteristics of sample reagent has errors due to sample tests such as uneven density (consistency) distribution.
* Fullscale is the mximum value in the measurement range, which points upper limit seting range.

Resolution:

Meter size	50 mm (2'')	80 mm(3'') to 300 mm(12'')
Resolution	0.002 %TS	0.001%TS

Note: *1 : Above values are the results of commuting ability in the phase measurements of converter.
*2 : Density (consistency) determination repeatabiliby for sample reagent;

Meter size	50 mm (2'')	80 mm (3'') to 300 mm (12'')
Density (consistency) determintaion repeatability	0.1 %TS	0.05 %TS

* The density (consistency) determination resolution stated above is defined due to manufacuturing limitaion to make reagents with stable distribution and a minimum difference of fluid density (consistency).

Environmental conditions:
- Temperature: 0 to 50 °C (32 to 122 °F)
- Humidity: 5 to 85%RH (no condensation)

Structure: IP65

Note: Outdoor installation is possible. However, provide a sunshade for the converter section if direct sunlight is unavoidable.

Conformance to European Community Directives:
- EMC directive 89/336/EEC
- The low voltage 93/68/EEC

Weight:
Refer to Outline Dimensions (Table 2).

■ Detector Specifications

Meter size: 50 mm (2''), 80 mm (3"), 100 mm (4"), 150 mm (6"), 200 mm (8"), 250 mm (10"), and 300 mm (12")

Flange standard and maximum working pressure:

Flange standard	Maximum working pressure
ANSI Class 150	1 MPa (150 psi)
BS10	1 MPa (10 bar)
DIN 10	1 MPa (10 bar)
JIS 10K	1 MPa (10 kgf/cm^2)

Fluid temperature:
Standard specification:
0 to 50 °C (32 to 122 °F) (no freezing)
High-temperature specification (option):
0 to 90 °C (32 to 194 °F) (no freezing)

Allowable fluid conductivity:

Meter size	Fluid conductivity
50 mm (2")	15 mS/cm maximum
80 mm (3")	12 mS/cm maximum
100 mm (4")	10 mS/cm maximum
150 mm (6")	7 mS/cm maximum
200 mm (8")	5 mS/cm maximum
250 mm (10")	3 mS/cm maximum
300 mm (12")	3 mS/cm maximum

NOTE:
Do not use the LQ300 for applications where liquids containing highly conductive particles are used. Liquids containing particles such as active carbon or metal particles are highly conductive and may interfere with density (consistency) measurement.

Wetted materials:

Name	Standard spec. 0 to 50 °C (32 to 122 °F)	High-temp. spec. 0 to 90 °C (32 to 194 °F)
Main pipe	316 stainless steel	
Temperature detector sheath	316 stainless steel	
Applicator window	Vinyl chloride	Polysulfone
Applicator window sealant	Fluorocarbon rubber (Viton)	

Note:
Do not use the LQ300 for applications where harmful liquids are used that cause corrosion, deterioration, or changes in quality for the wetted materials.

Applicator:
Serves as an antenna to send and receive microwave signals, one set provided.

Temperature detector: RTD (Pt100)

Fitting:
Direct fitting to vertical or horizontal piping.

Painting:
Ground color (stainless steel)

■ Converter Specifications

Output signals
- Density (consistency) measurement output: 4–20mAdc (load resistance 750Ω maximum, isolated output.)
- Density (consistency) fault or Maintenance signal:
  125Vac, 0.1A (resistive load) solidstate contact; opens when an error occurs in the converter or when the LQ300 is in the setting change mode, otherwise the contact remains closed.

Communication signal:
Digital signal is superimposed on 4–20mAdc current signal (conforming to HART protocol*).
Load resistance: 240 to 750Ω
Load capacity: 0.25μF maximum

* HART (Highway Addressable Remote Transducer) protocol is a communications protocol for industrial sensors recommended by HCF (HART Communication Foundation).

Note: The optional AF100 hand-held terminal can be used to operate the LQ300 from remote places by connecting the AF100's probe lead between the LQ300's 4-20mAdc output signal lines.

Input signals

- Externally synchronized input signal:
  One dry "make" contact; contact capacity of 24Vdc, 1 A or more is required. This contact signal can be used to start or stop density (consistency) measurement in synchronization with an external contact, such as the contacts on a pump. The measurement starts or stops as follows:
  Contact closed: Starts density (consistency) measurement.
  Contact open: Stops density (consistency) measurement.
- Density multiplier switching signal:
  Two voltage signals described below are required:
  Input voltage: H level 20 – 30Vdc
  L level 2Vdc or less
  Input resistance: Approx. 3kΩ
  One of four span calibration settings can be selected using these two signals. Measurements by selecting one of four kinds of liquids (with different compositions or with different mixing rates) can be performed using this function.

Update period for density (consistency) measurement output and display:

Approx. 1 second

Moving average:

The moving average of 1 to 99 measurements taken at a 1 second interval can be output. This output can be used to control density (consistency) value etc. for which averaged density (consistency) value is usually required.

Change-rate limit:

Allowable rate of change limit: 0.00 to 9.99% TS
Number of times: 0 to 99
This function is used to restrict sudden changes in output by rejecting values caused by sudden changes in density (consistency) or entrapped air in the fluid etc. The change-rate limit condition can be set using the allowable rate of change limit value and the number of times this condition occurs.

Additives Correction function:

Available for up to 10 kinds of mixed/blended liquids. Sensitivity compensation can be set using registered parameters depending on the type and the mixing rate of liquids.

Arrester:

Arresters are installed in the LQ300 current output (4–20mAdc) and AC power lines.

Display:

LED density (consistency) display as standard. 7-segment, 4-character LED (00.00 to 99.99 %TS) with window frame is provided.

Operation Panel (inside the converter):

Used to check data or to change various settings.
Operation switches: 5 switches
Display: 4-line, 20-character LCD (dot-matrix)

Password function:

This function is used to limit access to setting values that affect measured values by means of a password.

Power supply:

100 to 240Vac, 50/60 Hz
(Allowable voltage: 85 to 264Vac)

Power consumption: Approximately 50 VA

Housing material: Steel plate

Coating: Polyurethane

Installation

■ Outline Deimensions

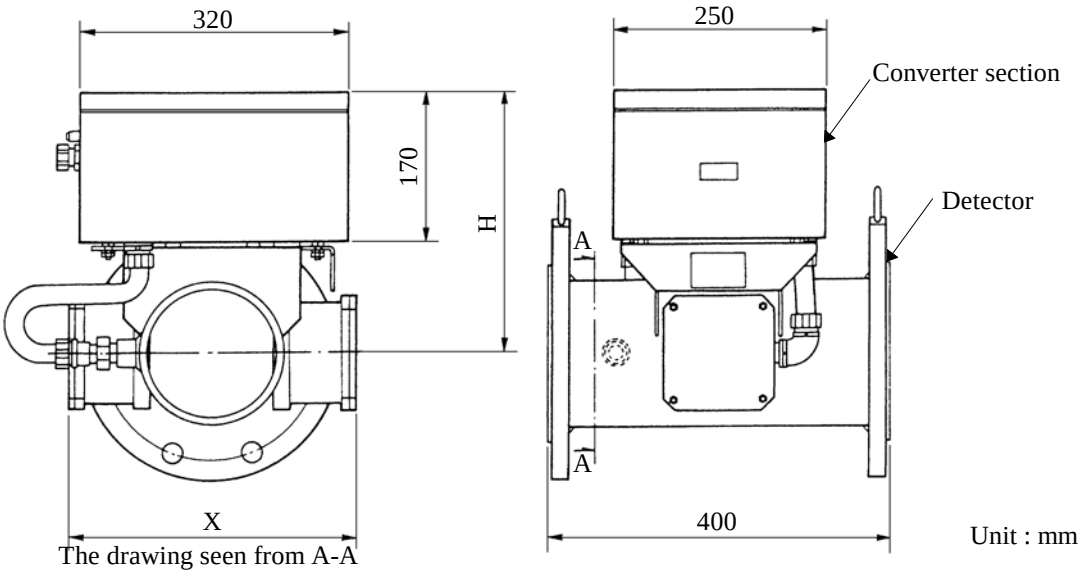


Figure3. LQ300 outline dimensions

Table 2. LQ300 outline dimensions

Meter size mm (inch)	H (mm)		X (mm)	Weight (kg)		
	Standard spec.	High-temp spec.		BS 10, DIN 10	ANSI 150	JIS 10K
50 (2”)	295	330	222	approx. 28	approx. 28 (62 lb)	approx. 27
80 (3”)	295	330	250	approx. 30	approx. 33 (73 lb)	approx. 33
100 (4”)	295	330	274	approx. 32	approx. 37 (82 lb)	approx. 37
150 (6”)	295	330	324	approx. 40	approx. 43 (95 lb)	approx. 43
200 (8”)	310	345	372	approx. 46	approx. 55 (121 lb)	approx. 55
250 (10”)	335	370	424	approx. 62	approx. 72 (159 lb)	approx. 72
300 (12”)	360	395	470	approx. 68	approx. 80 (176 lb)	approx. 80

Note: 1 inch = 25.4 mm

■ Installation Precautions

(1) Install the LQ300 in an environment free from vibration and corrosive gases and in a place allowing easy on-site maintenance.
(2) Provide a clearance space to the front, rear, and above side of the unit. See Figure 4 below.
(3) Provide a sunshade for the unit if direct sunlight is unavoidable when installing outdoors.
(4) This unit cannot be installed in an environment where there is a possibility that flammable or explosive gases may leak.

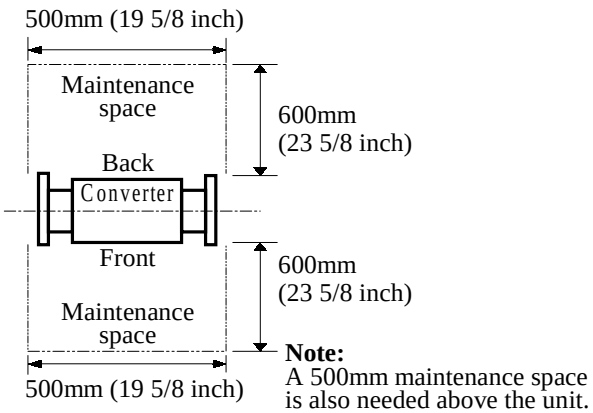


Figure 4. Clearance space

■ Piping Precautions

(1) LQ300 is recommended vertical installation as a standard.
Especially avoid to install horizontally (install LQ300 vertically) in case of the following environments:
- **a) Places where bubbles or entrapped air remain in the pipe.**
- **b) Places where solids concentration in the fluid is not even because solids in the fluid stay either at the bottom or top of the pipe due to slow fluid velocity or other reason.**
- **c) Pipe size is enlarged to install a larger meter sized LQ300.**

(2) Install the LQ300 in a pipeline where the pipe is always filled with fluid without bubbles or entrapped air. If the pipe is not filled with fluid, the measured value varies or may give an inaccurate reading.

(3) Avoid places where sediment collects at the bottom of the pipe.

(4) Avoid places where air gets into the fluid. To avoid this problem, install the LQ300 to the outlet of a pump, not to the suction side.

(5) When installing the unit horizontally, install it so that the converter section is oriented up (that is, a pair of applicators stay horizontally) to make it easier for maintenance work and to obtain its specified performance.

(6) The LQ300 can be installed in either direction (upstream or downstream) and without requiring a straight pipe section. Install it in a place allowing easy on-site maintenance.

(7) LED density (consistency) display is on the front of the converter. Therefore, install the LQ300 in a position and in a direction it is easy to see this LED display.

(8) Avoid piping in such a way that vibrations from a pump etc. are not transmitted to the LQ300 through the pipe.

(9) Install an adjustable piping mechanism if there is a possibility that the detector pipe may not fit between mating flanges.

(10) Install the LQ300 in a place where enough water pressure is applied. Therefore, it is recommended that the LQ300 be installed as far away as possible from the pipe outlet opened to atmosphere. This is to prevent the effects of air being trapped in the liquid.

(11) If there is a possibility of no liquid flows or uneven liquid distribution occurs when a pump is off, use an external synch control signal to operate the LQ300 only when the pump is working.

(12) Provide a stop valve at upstream and downstream of the LQ300 detector, and between these stop valves and the LQ300 provide the four valves described below with a stop valve attached to each: 1) sampling outlet valve; 2) zero point water inlet valve; 3) vent valve; and 4) drain valve. If it is not possible to stop the fluid at the point where the LQ300 is installed, provide a bypass pipe with a stop valve provided in the middle. These valves are needed to drain the fluid from the detector pipe and fill it with drinking water (density or consistency 0%) to adjust the zero point. See Figures 5 and 6.

(13) Use packings for piping of the size conformed to flange rating and of the material appropriate for the liquid to be measured.

Note:

•Zero point water valve:
Used to supply drinking water (density or consistency 0%) to the detector pipe for zero adjustment. Install this valve in the top of the pipe in the case of horizontal installation. It is recommended that a 1-inch ball valve be installed in the top of the pipe and zero point water is supplied through this inlet using a vinyl hose etc.

Note:
If valve water pipe is connected to this valve, air cannot be extracted. Therefore, another valve (vent valve) is needed to extract air.

•Vent valve:
Used to vent process fluids to open air when performing zero adjustment. This helps the drinking water (density or consistency 0%) enter the detector pipe easily. Install this valve in the top of the pipe in the case of horizontal installation.

•Drain valve:
Used to drain the fluids before supplying drinking water (density or consistency 0%) to the detector pipe for zero adjustment. Install this valve at the lowest point of the pipe. It is recommended that a 1-inch ball valve be installed at the lowest point of the pipe.

•Sampling valve:
Used to extract fluids for manual analysis. Install this valve to the side of the pipe in the case of horizontal installation. It is recommended that a 1-inch ball valve be installed to the side of the pipe.

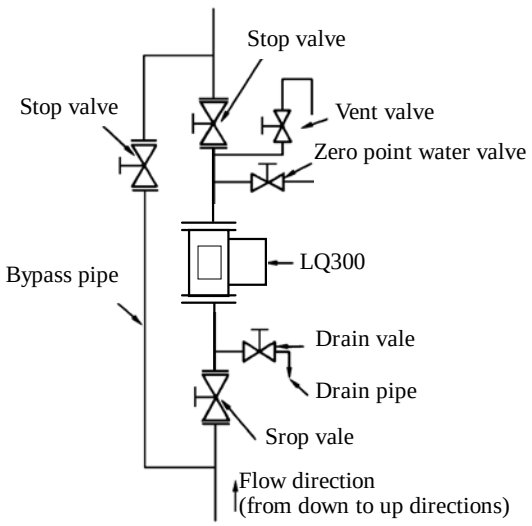


Figure 5. Installation example (vertical installation)

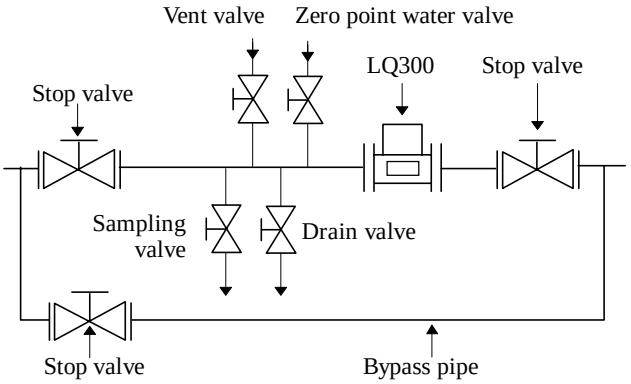


Figure 6. Installation example (horizontal installation)

■ Wiring Precautions

1) Provide a switch and a fuse to isolate this unit from the mains power for ease of maintenance.
2) Ground the LQ300 with 100Ω or less ground resistance. Do not use a common ground shared by other power equipment.
3) Use a sheathed cable with 2mm^2 cross-sectional area for AC power cable and make sure the voltage drop across the cable is less than 2 V.
4) The cables should be free from vibration or sway. The cables should be placed in think-walled steel conduits.
5) Wire the LQ300 output in conduit separated from those of AC power cable, control signals, alarm signal or other cables which could become the source of noise.
6) Use a 2-wire shielded sheathed cable to wire the LQ300 output (4–20mAdc). And ground the shielded cable on the receiving instrument side.
7) As the cable port is made air-tight using a packing, tighten the cable gland securely when all the wiring is completed. If the diameter of the cable is smaller than the inside diameter of the packing, enlarge the cable diameter to the same size as the packing by wrapping valves around the cable.
8) Tighten the terminal screws securely.
9) Appropriated torque to tighten the screws is 1.2 N·m (12kgf·cm).

●Wiring when communications function is used

By connecting the cable lead of the optional AF100 hand-held terminal to the density (consistency) measurement output, you can operate the LQ300 from remote places.

1) Make sure the load resistance of 4-20mAdc line of output is between 240 and 750Ω and the load capacitance is 0.25μF maximum.
2) The AF100's cable lead can be connected to the LQ300 anywhere along the current output line. Therefore, by connecting the cable lead to the signal terminals on the receiving side in the control room, you can operate the LQ300 from the control room. See Figure 8.
3) To use the hand-held terminal in the field, it is recommended that you install a junction box near the LQ300 where maintenance work is easy. See Figure 8. This junction box should be water proof and should contain junction terminals only. We can provide a junction box for this purpose if specified at the time of order.

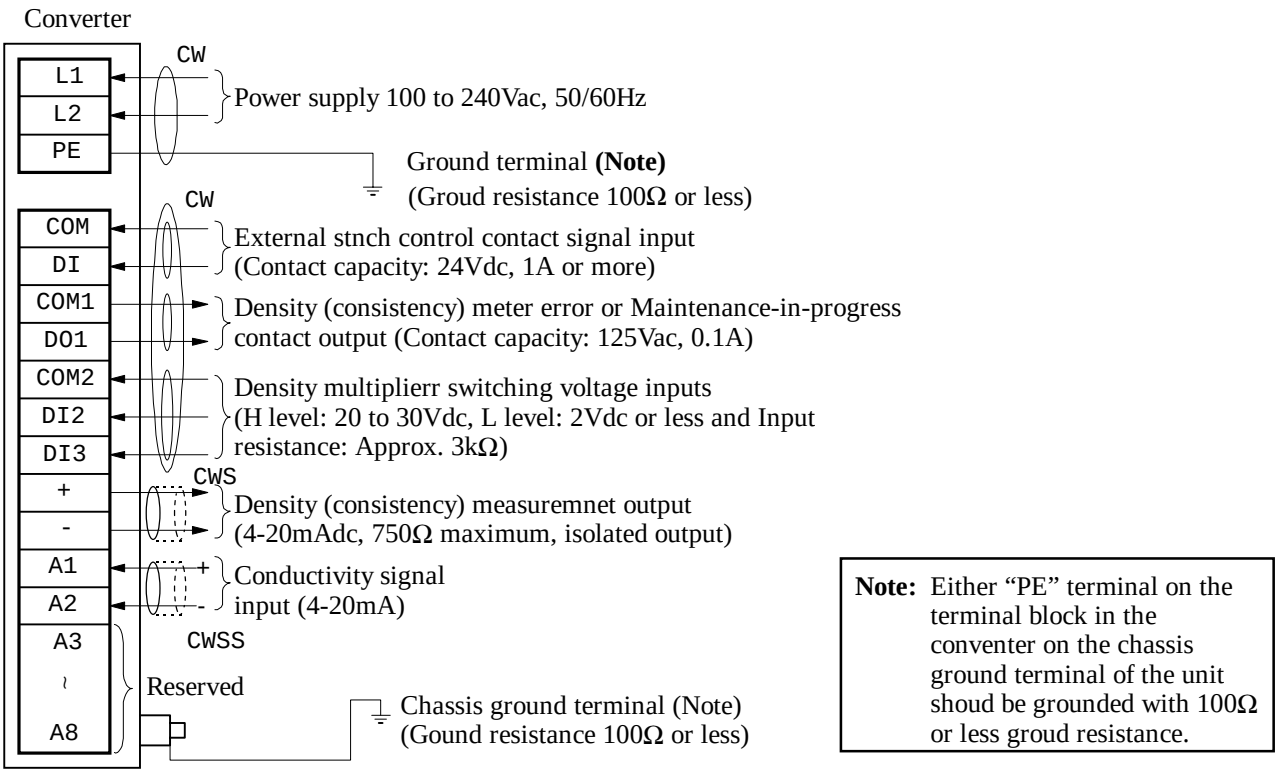


Figure 7. External connections

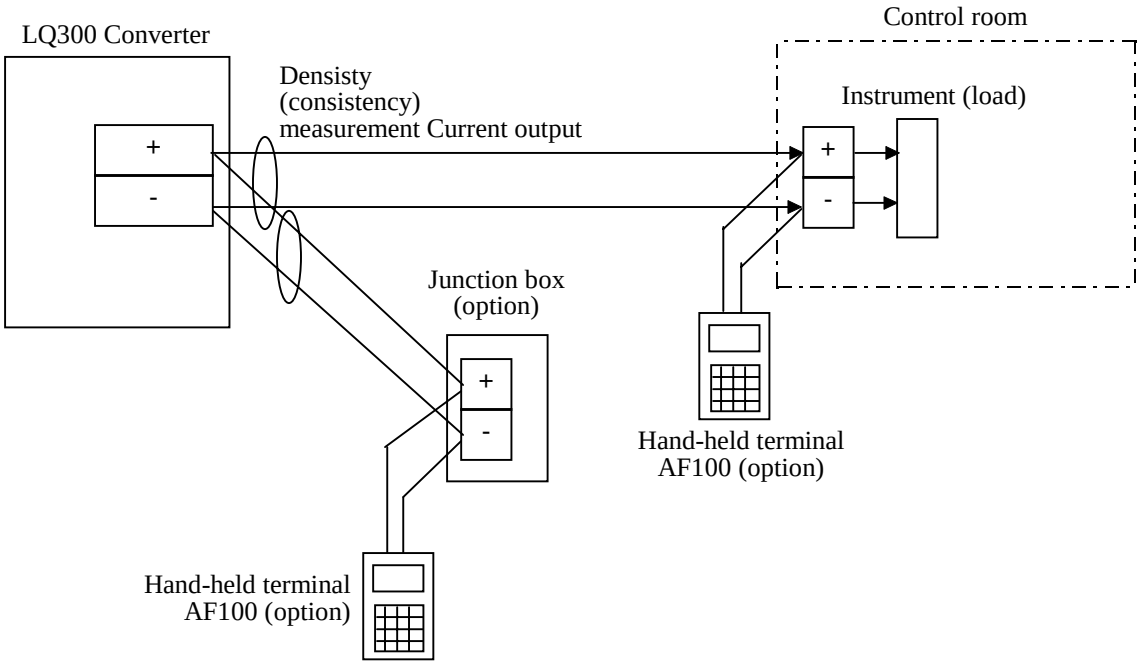


Figure 8. Wiring to use communication function

Ordering Information

When ordering the LQ300, refer to Table 3. Type Specification Code. An entry must be made for each of the columns.
The following items must also be specified:

1. Fluid characteristics:
   - Type of material to be measured
   - Density (consistency) (maximum, normal, minimum)
   - Temperature (maximum, normal, minimum)
   - Pressure (maximum, normal)
   - Conductivity (maximum, normal)
2. Measurement range
3. Tag number (specify “None” if not needed)
4. Hand-held terminal Required or not (Refer to Table 4 below.)
5. Junction box for hand-held terminal Required or not
6. Other specific items

Table 3. Type Specification Code (LQ300 Density (consistency) Meter)

Model					Specification Code									Description
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
L	Q	3	0	0	A									LQ300 Density (consistency) meter
														Meter size
						0	5							50 mm (2'')
						0	8							80 mm (3'')
						1	0							100 mm (4'')
						1	5							150 mm (6'')
						2	0							200 mm (8'')
						2	5							250 mm (10'')
						3	0							300 mm (12'')
														Detector flange standard
								C						ANSI Class 150
								E						DIN 10
								G						BS10
								B						JIS10K
								Z						Other
														Fluid temperature
									A					Standard temperature
														0 to 50 deg. C (32 to 122 deg. F)
									B					High temeperature
														0 to 90 deg. C (32 to 194 deg. F)
														Power Supply
										A				100 to 240 Vac, 50/60 Hz
														Applications
											A			Standard
														Wetting parts materials (Note 1)
												A		Standard (316 stainless steel)
												B		Teflon PFA coating
														(sticky resistance) (Note 2)
												C		317L stainless steel
														Otherrs
													A	Standard

Note1: Wetting parts; Main pipe, Applicator base unit, and RTD sheath.

Note2: RTD sheath is not coated with teflon PFA (316 stainless steel).
And the material of appicator window is polysulfone.

Table 4. Type Specification Code (AF100 Hand-held Terminal)

Model					Specification Code							Description
1	2	3	4	5	6	7	8	9	10	11	12	
A	F	1	0	0								Hand-held terminal
					L	Q	3					For use with LQ300
												Display language
								A				English
									A	A	3	Standard

■ **Year 2000 Compliance:**
This equipment does not have any clock in itself. Thus, there is no problem in the year 2000 compliance.

Misuse of this product can result in damages to property or human injury.
Read related manuals carefully before using this product.

Introduction

The remote display unit for the Density (Consistency) meter LQ300 displays the value of density (consistency). This allows for a remote display of this value. This enables the sub converter to be used not only as an external terminal (junction box) but also as a HART protocol communication port using the AF100 hand-held terminal or HART modem. The sub converter has as external connector for the AF100 so there is no need to open its front cover. Therefore it is possible to operate the LQ300 via the HART protocol with ease.

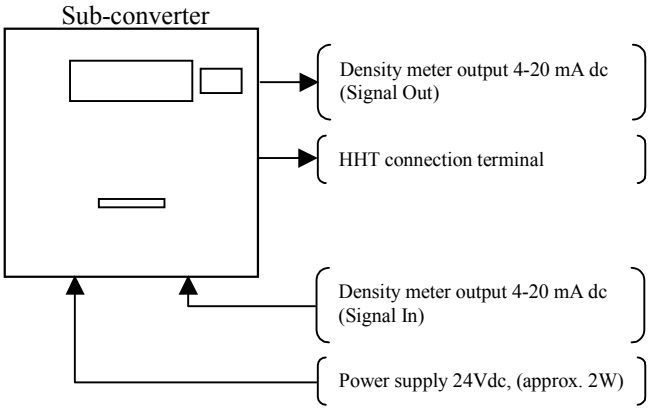


Figure 1. Configuration

■ Standard Configuration

1. Sub-converter : 1unit
2. Instruction manual : 1

Specifications

■Overall Specifications

Input signal : Density (consistency) measurement value 4-20 mA dc

(Note) The input signal to this unit is a current output from the LQ300 and is shown in the configuration diagram as the density meter output 4-20 mA dc (Signal In).

Input resistance : 12.5Ω

Density (Consistency) indication : 0.00 to 50.00% TS shown in red (character height : 15 mm) 7-segment 4 digits LED

(0.00 to 99.99% TS) (two digits after the decimal point)

Scaling function : Density display upper side

1 to 50% TS

Density display lower side

0 to 49% TS

Setting increments 0.1% TS

Figure 2. Sub-converter for LQ300

(Note 1) TS : Total Solids

(Note 2) The scaling should be set in accordance with the meter size of the LQ300.

(Note 3) The low limit indication is linear down to 0 mA. The LED flickers when the signal goes above the upper limit.

Display update period : 400 msec

Combination error of indication

(Indication difference between the LQ300 and the Sub-converter) : ± 0.0018% FS

(Example) When full scale is set to 5%TS, the calculated error is 5×0.0018 = 0.009% TS

Therefore, the maximum error is ±0.009% TS

Withstand voltage : Between Input and Case

1500 V ac, 1 minute

Between power supply terminals and Case

1500 V ac, 1 minute

Between Power supply terminals and Input

1500 V ac, 1 minute

Insulation resistance : 20 MΩ or more at 500 V dc

Communications signal : HART protocol (Digital signal is superimposed on 4-20 mA dc current signal)

Load resistance : 240 to 750Ω

Load capacity : 0.25μF maximum

(Note 1) HART (Highway Addressable Remote Transducer) protocol is a communications protocol for industrial sensors recommended by HCF (HART Communic-ation Foundation).

(Note 2) The optional AF100 hand-held terminal can be used to execute various operations from remote places by connecting the AF100's probe lead between the 4-20 mA dc output signal.

Communication distance : 2 km (1.24miles) between the LQ300 and the instrument

(Install this unit between the LQ300 and the instrument)

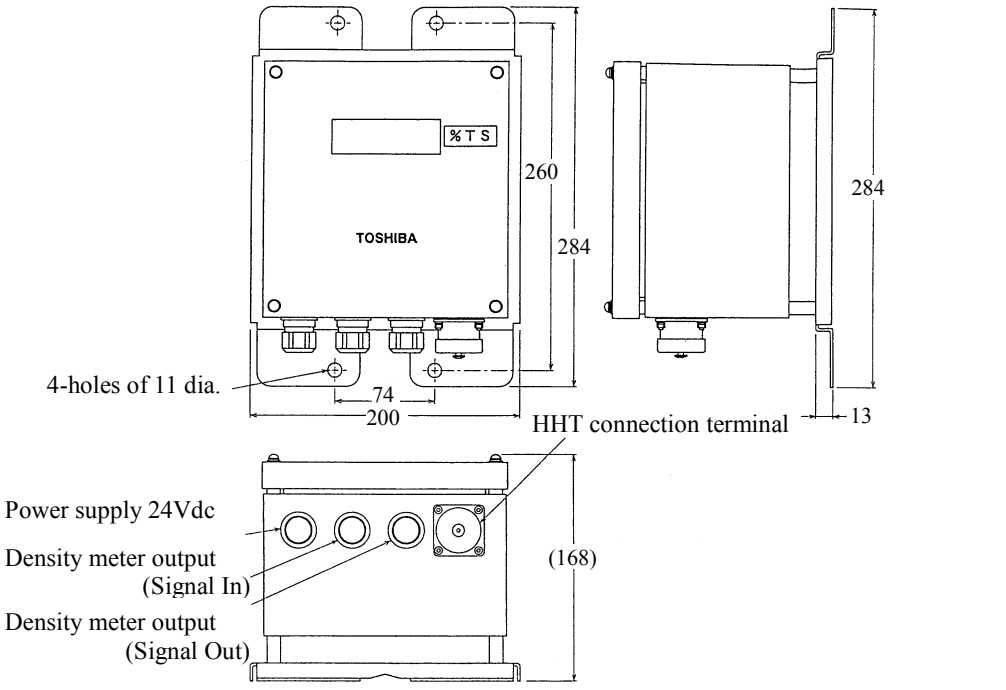
Environmental conditions : Temperature 0 to 50 °C (32 to 122 °F)
Humidity 5 to 85% RH (no condensation)
Structure : IP65
(Note) Outdoor installation is possible. However, provide a sunshade if direct sunlight is unavoidable.

Weight : approx. 5kg (11 lbs)
Power supply : 24V dc ± 10%
Power consumption : approximately 2W
Case material : Steel plate
Painting : Polyurethane painting

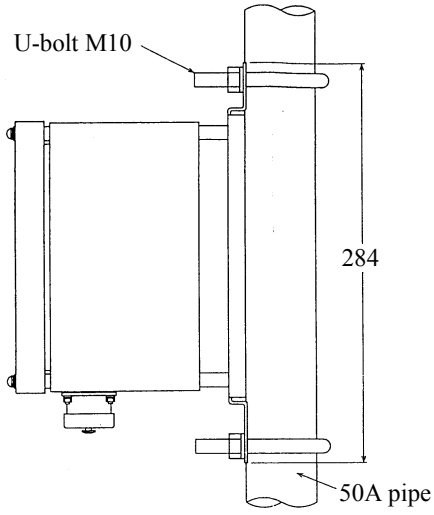
Installation

■ Outline Specifications

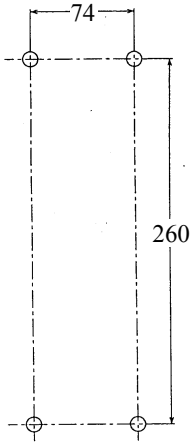
Unit : mm



Examples of Sub-converter installations



Holes for mounting



Note : 1 inch = 25.4mm

Figure 3. Outline Specifications

■ Installation Precautions

(1) Install this unit in an environment free from vibration and corrosive gases and in a place where onsite maintenance is accessible with ease.
(2) Provide a maintenance space to the front of the unit. (Refer to Figure 4.)
(3) Provide a sunshade for the unit if direct sunlight is unavoidable.
(4) It is recommended that this unit be installed about 1.5m (5 feet) (the height of normal windows) above the ground.
(5) This unit cannot be installed in an environment where there is a possibility that flammable or explosive gases may leak.

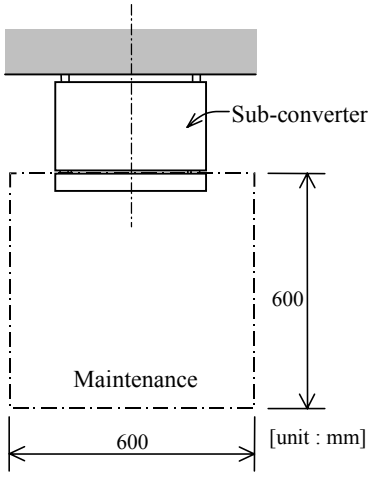


Figure 4. Maintenance space

■ Wiring Precautions

(1) Provide a switch and a fuse to isolate this unit from the main power supply for ease of maintenance. Power consumption of this unit is approximately 2W.
(2) Use a cable with 2mm^2 or more cross-sectional area for AC power line and make sure the voltage drop across it is less than 2V. Use M4 size compression terminal lugs for connection to the terminal block.
(3) The cables should be free from vibration or sway. It should be placed in thick-walled steel conduits.
(4) Install the LQ300 output cables in conduit separated from AC power line or other cables which could become the source of noise.
(5) Use a two-wire shield cable for the LQ300 output (4-20 mA dc) and ground the shield of cable at end on the receiving instrument side.
(6) As the cable port for each cable is made for airtight using packing, tighten the cable gland securely when wring is completed. Enlarge the internal size of packing by wrapping tapes around your cable when the diameter of yours is smaller than the packing of Sub-converter. Overall diameter of your cables should be 11mm.
(7) Tighten the terminal screws securely. Appropriate torque to tighten the screws is 1.2 Nm.

(Note 1) Input style is isolated type.
(Note 2) Load resistance is 750ohm or less in total of Density meter output. (input and output signal)

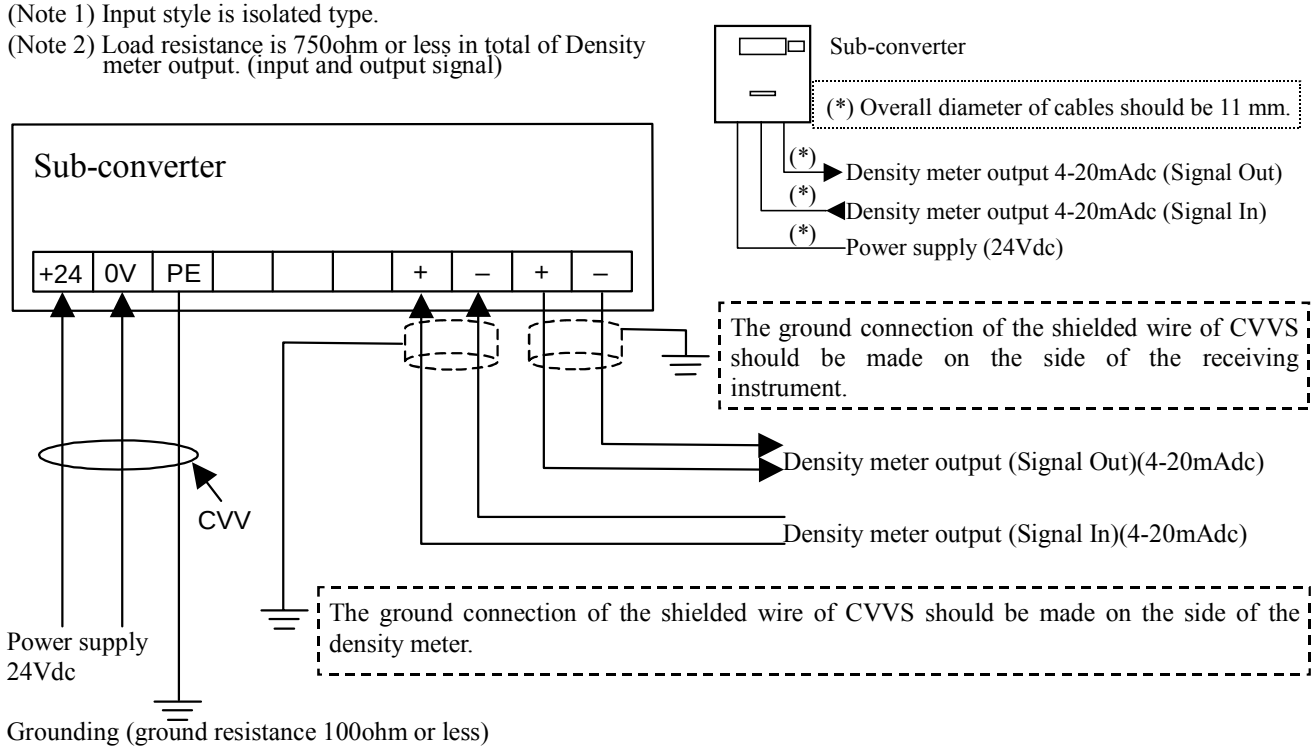


Figure 5. Wiring Diagram

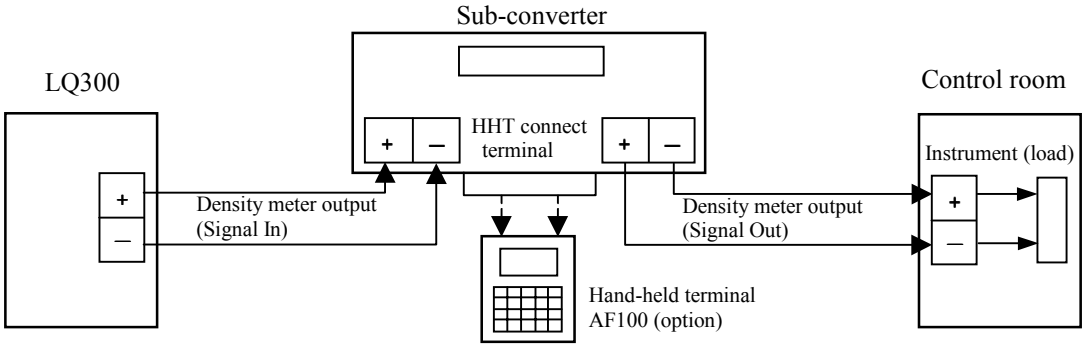


Figure 6. Wiring to use communications function

Wiring when communications function is used

By connecting the cable lead of the optional AF100 hand-held terminal to the HHT connection terminal, you can execute various operations from remote places using the AF100. (Refer to Figure 6.)

(1) Make sure the load resistance for the density meter output signal is between 240Ω and 750Ω, and the load capacitance is 0.25μF maximum.

(2) The AF100's cable lead can be connected anywhere along the 4-20 mA dc density meter output line. You can connect the AF100 directly to the HHT connection terminal of this unit.

(3) To use the communication function in the field, it is recommended that you install this unit in a place near the LQ300 and where its maintenance is easy.

Ordering Information

When ordering the Sub-converter for LQ300, refer to Table 1.

Model	Specification Code	Description
Sub-converter for LQ300	3Y8A1606G001	Sub-converter
One set of bolts and nuts for wall mounting (option)	2BLM10x35*U*Z	M10×35mm bolt (Note) 4pieces
	2NUM10***1U*Z	M10 nut (Note) 4pieces
	2WB*10****U*Z	M10 spring washers (Note) 4pieces
	2WHM10****U*Z	M10 plain washers (Note) 4pieces
One set of U-bolts and nuts (option)	3A8A1314P010	U-bolt for 50A-pipe mounting (Note) 4pieces
	2NUM10***1U*Z	M10 nut (Note) 4pieces
	2WB*10****U*Z	M10 spring washers (Note) 4pieces
	2WHM10****U*Z	M10 plain washers (Note) 4pieces

Note : The material is used stainless steel.

Misuse of this product can result in damage to property or human injury.
Read related manuals carefully before using this product.

Specifications are subject to change without notice
Printed in Japan 10/2000 (TDOC)

Introduction

LQterm is a maintenance software program for the LQ300 Microwave Density (Consistency) meter. It performs monitoring, configuration, data analyzing and statistic treating of your data from the LQ300. The program has many functions including; diagnostics, simulation, tends, alarm settings and event functions. With this data you can determine suitable control parameters for your process. The software runs under Microsoft Windows 95 or 98(*1) (English version).

(Note) *1: Microsoft and Windows are registered trademark of Microsoft Corporation in the US and /or other countries.

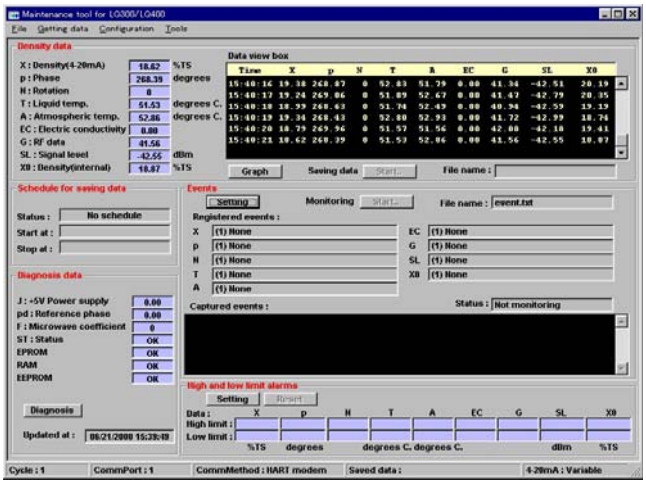


Figure 1. LQterm

Features

(1) **Two communication methods:**
HART protocol(*2) or RS-232C.

(2) **Monitoring function:**
The software allows you to check all the data from the LQ300.

(3) **Real time graphs:**
The software allows you to have 9 different real time graphs at the same time, each graph is updated from the LQ300.

(4) **Simulation function:**
Make it possible to simulate the process by using suitable parameters from your PC without changing the current and actual parameters. This will improve your control of your process.

(5) **Event monitoring function:**
The LQterm captures the set parameters as their event happens (builds flags) when the current data is received. It also will show unexpected data in real time.

(6) **Alarm function:**
The high and low limits can be set to inform you quickly on any unusual changes.

(7) **Scheduled data saving function:**
Enable you to save the measuring data by inputting the "date" and "time" in advance.

(Note) *2: HART protocol;
HART (Highway Addressable Remote Transducer) protocol is a communication protocol for industrial sensors recommended by HCF (HART Communication Foundation).

■ Standard Configuration

CD-ROM: 1 set (software of LQterm and Operation manual)

Specifications

1. Main Functions.

Field	Function	Description
Monitoring	Data monitoring and saving function.	Monitoring the data of measured consistency by LQ300 at the window, and their saving as a file.
	Appointing data saving function.	Measuring data saving function when you appoint its start and stop time before using.
	Time stamp function.	Date and time stamping function for measured data toward the monitored and saved data.
	Alarm function.	Enable to set high and low alarms for gotten data from LQ300.
	Event function.	Picking up a particular data of all as its event. This data enables to show on this software and to save them.
	Graphic function.	Enable to show the current data along with simulated data at the window.
Configuration	Parameter R/W function.	Parameter reading and writing.
	History function.	History of changed parameters.
	Simulation function.	Calculating via simulated data, and comparing between the current data at your PC without changing set parameters of LQ300.
Data Analyzing and Statistics	Data statistics function.	Enable to calculate the saved data or actual data as their max., min., average, and standard deviation.

2. System Configuration.

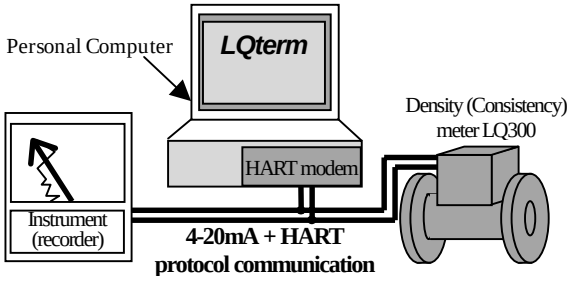


Figure 2. LQterm Configuration Diagram

3. System requirements of PC.

(1) OS: Microsoft® Windows 95 or 98 (*1) (English version) (*3)
(2) CPU: Pentium(*4) 133MHz or faster.
(3) RAM: 32 Mbytes as minimum.
(4) HD: 20M bytes as minimum.
(5) I/F for communication: HART modem or RS-232C.
(6) Screen: 800 X 600 dots or greater.
(7) Others: CD-ROM drive, Acrobat® Reader (*5)
(8) ***ROM version of LQ300: Ver. 106 or later.***

(Notes)
*1: Microsoft and Windows are registered trademark of Microsoft Corporation in the US and /or other countries.
*3: The LQterm requires to use **"Ver. 4.00.950a" or later**.
*4: Pentium is a registered trademark of Intel Corporation in the US.
*5: Acrobat Reader is registered trademark Adobe Systems Incorporated.

4. Notices.

This software has copyright by Toshiba Corporation. It is not allowed to make any copies except the following cases.

(1) Installing to a PC.
(2) Make copies as your system backup.
(3) Accepted by Toshiba Corporation as special case.

Ordering information

When ordering the LQterm, refer to table 1.

Table 1. Type Specification Code (LQterm, maintenance tool of LQ300)

Name	Model	Specification
Maintenance tool of LQ300	3Y8A1609G001	CD-ROM (Software and operation manual): 1set

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