Guided Microwave level measurements

1 Product Overview

LM-GW-51

Application:	Level measurement for liquids/solids, in severe ambience
Max. Measurement Range:	Rope:30m / Rod:6m
Measurement Accuracy :	±10mm
Process Connection:	G1 1 / 2 A,G2A,11/2NPT
Detection Component Material:	Stainless Steel 316L / PTFE
Rope/Rod:	Φ4mm / Φ6mm
Process Temperature:	- 40…+150℃
Process Pressure:	-1.0…40 bar
Signal Output :	2-Wire / 4-Wire 4…20mA / HART

LM-GW-52

Application:	Level measurement for liquids, especially for strong erosive ones
Max. Measurement Range:	6m
Measurement Accuracy:	±10mm
Process Connection:	PTFE Flange
Detection Component Material:	PTFE
Rope/Rod:	Φ10mm
Process Temperature:	- 40…+150℃
Process Pressure:	-1.0…16bar
Signal Output:	2-Wire / 4-Wire 4…20mA / HART

LM-GW-53

Application:	Level measurement for liquids, especially for ones with small dielectric constant, in severe ambience
Max. Measurement Range:	6m
Measurement Accuracy:	±10mm
Process Connection:	G1 1 / 2 A,G2A
Detection Component Material:	Steel 316L / PTFE
Outside Diameter of Coax:	Φ28mm
Process Temperature:	- 40…+150℃
Process Pressure:	-1.0…40bar
Signal Output:	2-Wire / 4-Wire 4…20mA / HART

LM-GW-54

Application:	Level measurement for liquids in severe ambience with high temperature / pressure
Max. Measurement Range:	Rope:30m / Rod:6m
Measurement Accuracy:	±10mm
Process Connection:	G1 1 / 2 A,G2A, 11/2NPT
Detection Component Material:	Steel 316L / Ceramic
Diameter of Rope/Rod:	Φ4mm / Φ6mm
Process Temperature:	- 40…+200℃
Process Pressure:	-1.0…40bar
Signal Output:	2-Wire / 4-Wire 4…20mA / HART

Guided Microwave level measurements

LM-GW-55

Application:	Level measurement for liquids, especially for liquid surface in severe ambience
Max. Measurement Range:	Rope:30m / Rod:6m
Measurement Accuracy:	±10mm
Process Connection:	G1 1 / 2 A,G2A, 11/2NPT
Detection Component Material:	Steel 316L / Ceramic
Diameter of Rope/Rod:	Φ4mm / Φ6mm
Process Temperature:	-200…+400℃
Process Pressure:	Vacuum…400bar
Signal Output:	2-Wire / 4-Wire 4…20mA / HART

LM-GW-56

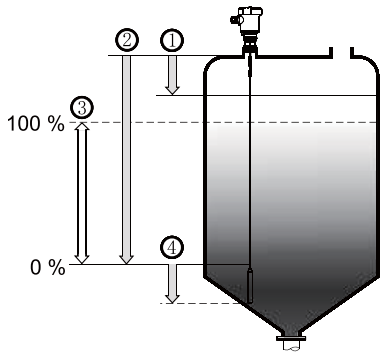
Application:	Level measurement for liquids with small dielectric constant or powder in severe ambience
Max. Measurement Range:	Rope:30m / Rod:6m
Measurement Accuracy:	±10mm
Process Connection:	G1 1 / 2 A,G2A, 11/2NPT
Detection Component Material:	Steel 316L / PTFE
Diameter of Rope/Rod:	Φ4mm / Φ6mm
Process Temperature:	- 40…+150℃
Process Pressure:	-1.0…40bar
Signal Output:	2-Wire / 4-Wire 4…20mA / HART

2 Mounting Requirement

Be cautious during the installation:

1. the highest level of target medium must Not enter into blanking zone;
2. the mounting location must keep a min distance to the vessel wall;
3. the rope or rod is perpendicular to the surface of measured medium;
4. Local or federal safety instruction must be abided when installation is in explosion hazardous area. Aluminium housing is used for intrinsically safe version, which can be used in explosion proof areas. The measurement must be connected to ground potential in this situation.

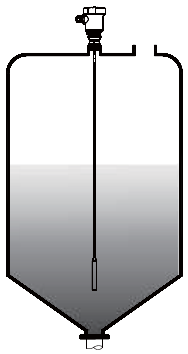
Illustration



Reference Plane for Measurement: the lower edge of the flange

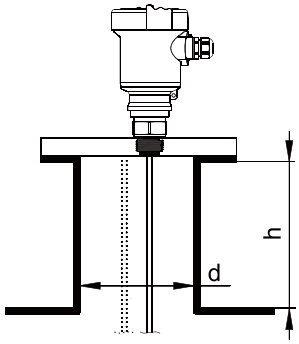
1. Blanking Zone (top)
2. Empty (Max. Measurement Distance)
3. Max. Measurement Range
4. Blanking Zone (bottom)

Note: The level of the measured medium must not be in either blanking zone.



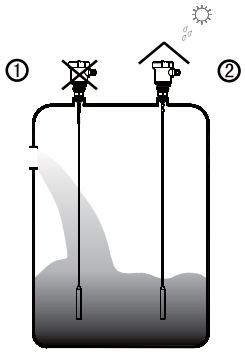
The best mounting location for a conical vessel with flat top is the center of its top, as the effective measurement can reach the bottom of vessel.

Socket



Avoid installation with socket if possible, otherwise try to minimize the length of socket. In case of long socket, small vessel or medium with low dielectric constant, you are advised to use double rod.

Installation



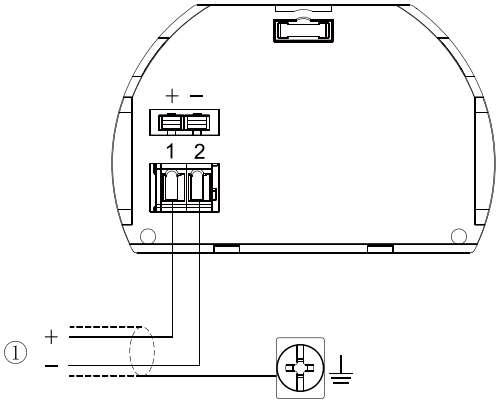
1 Wrong: The rod/rope is in/above filling stream, which results in the measurement of filling stream not the target medium.
2 Correct: Sun shield or rain-proof is required for outdoor mounting.

3 Electrical Connection

Wiring Diagram

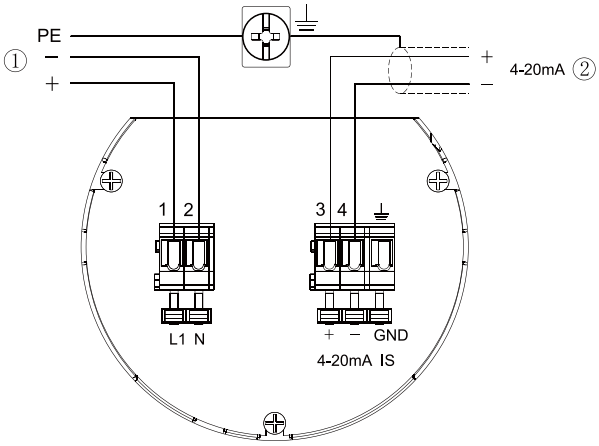
2-wire wiring used for HART

1. Power supply and signal output



Wiring plan suitable for 4-wire/2-chamber structure

1. Power Supply
2. Signal Output



Wiring in hazardous area

The intrinsic safety version sensors (Exia ⅡC T6)use Alu-die casting housing and filling silicone rubber encapsulants internal structure aimed to prevent sparks resulted from circuit failure from leaking out.

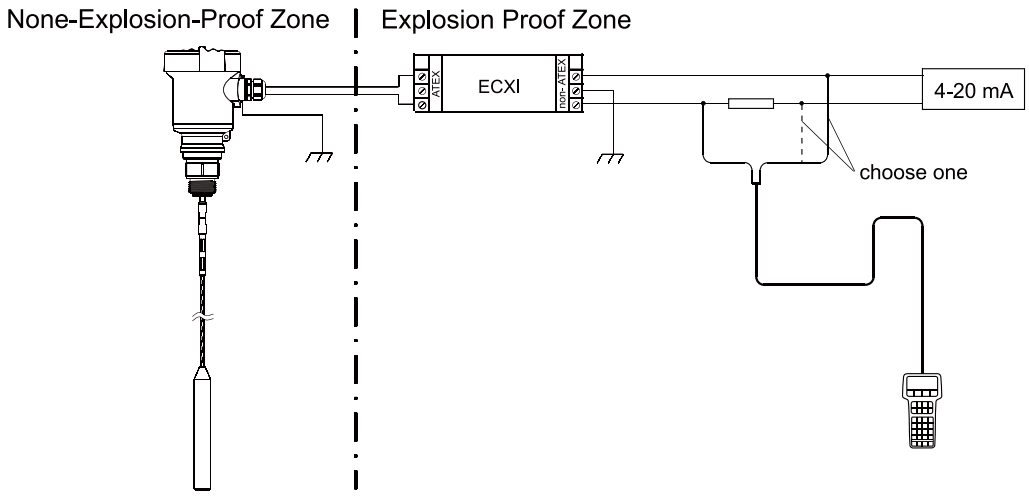
It is applicable for the continuous level measurement of flammable medium under Exia ⅡC T6.

A safety barrier must be used together with the intrinsic safety measurement.

It is an associated device to this product for the power supply of this product.

All cables must be shielded. Measurement must be connected to the ground potential.

Adjustment with HART Handheld Programmer

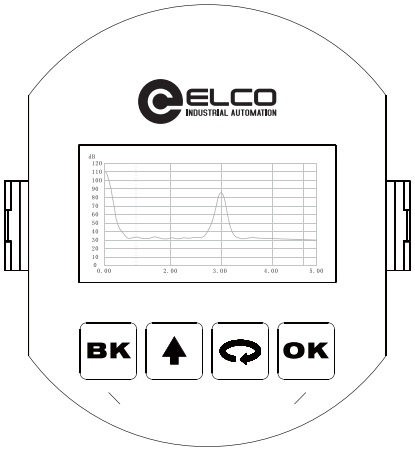


4 Adjustment Instructions

Adjustment Methods: Three adjustment methods are available for LM-RD-5X adjustment

1. Display /adjustment module
2. An adjustment software-GODA ware
3. HART handheld programmer

Display/Adjustment Module



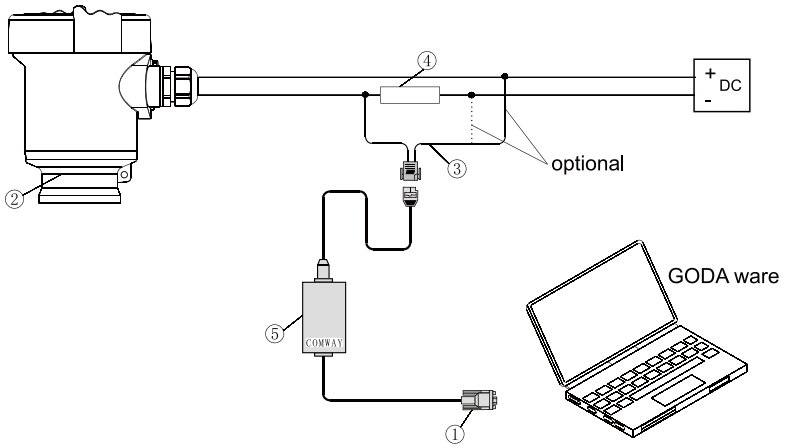
[OK]: - Enter programming mode;
- Confirm programming options;
- Confirm modifications to parameters.

[ ]: - Choose programming options;
- Choose the digit of parameters to edit;
- Display the contents of parameters.

[▲]: - Modify parameter values;

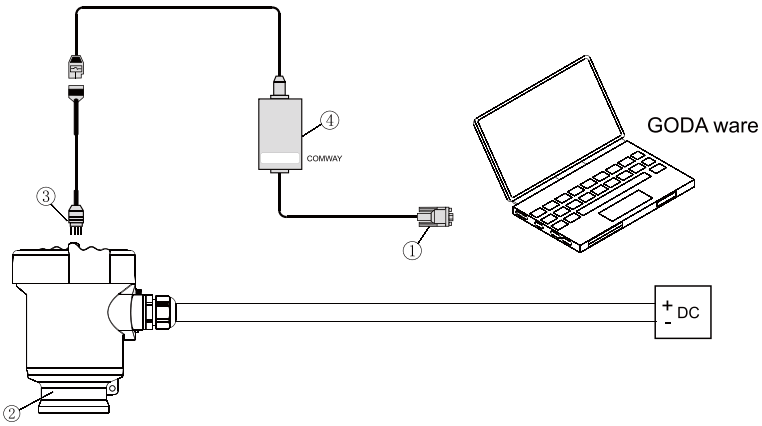
[BK]: - Programming mode exit;
- Return to higher menu level;
- Shortcut key mode, display echo curve.

GODA ware



Connect with another unit through HART

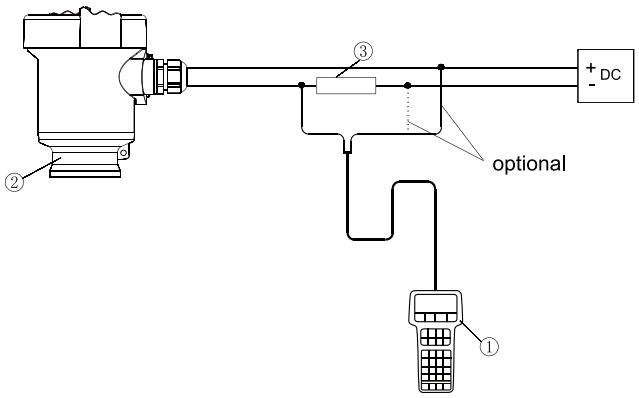
1. RS232 connection cable
2. LM-RD-5X
3. HART adapter used on COMWAY convertor
4. Resistance 250ohm
5. COMWAY convertor



Connect with another unit through I^2C

1. RS232 connection cable
2. LM-GW-5X
3. I2C adapter used on COMWAY convertor
4. COMWAY convertor

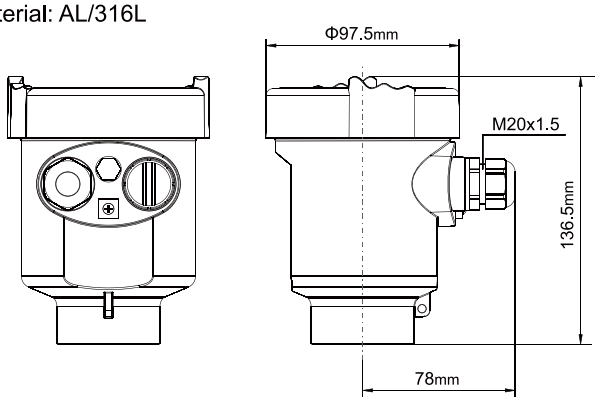
HART Handheld Programmer



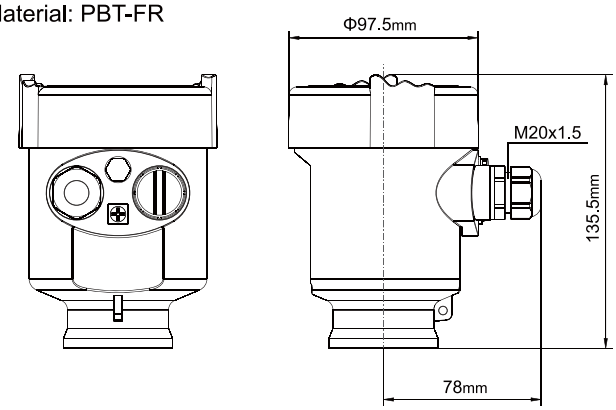
1. HART handheld programmer
2. LM-GW-5X
3. Resistance 250ohm

5 Dimensional Drawings (Unit: mm)

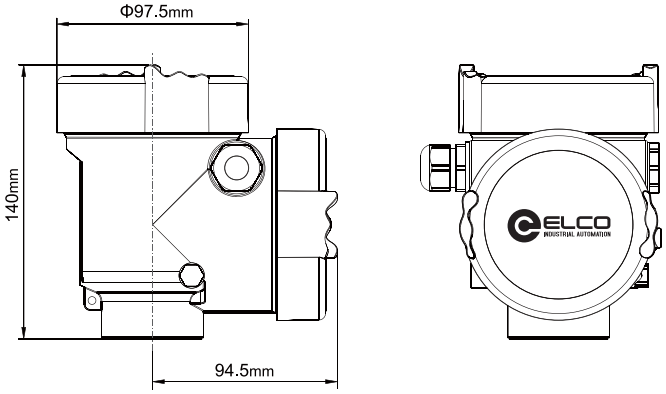
Material: AL/316L



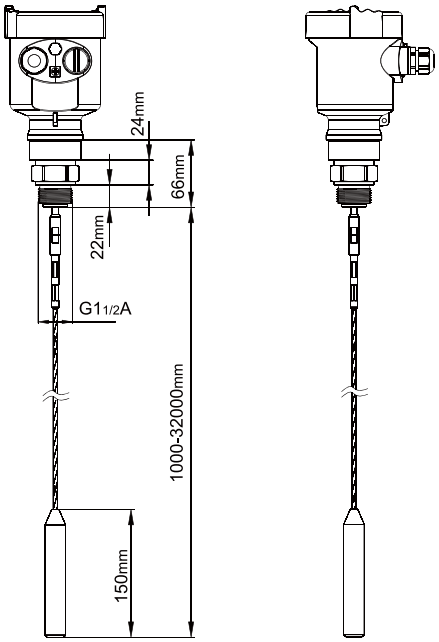
Material: PBT-FR



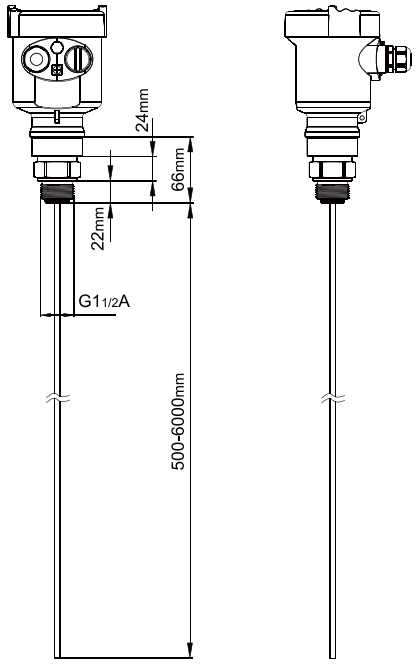
Material: AL (two-chamber)



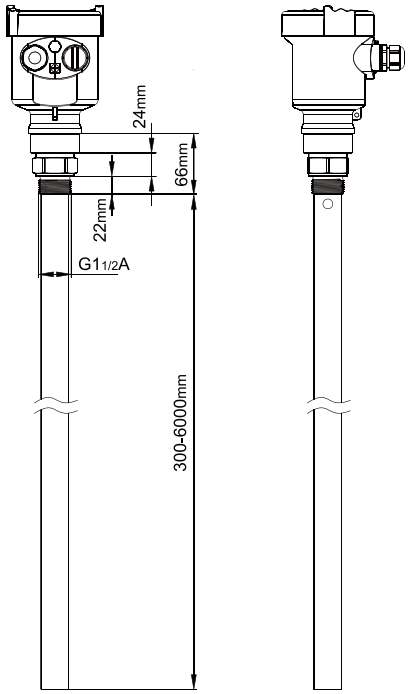
LM-GW-51



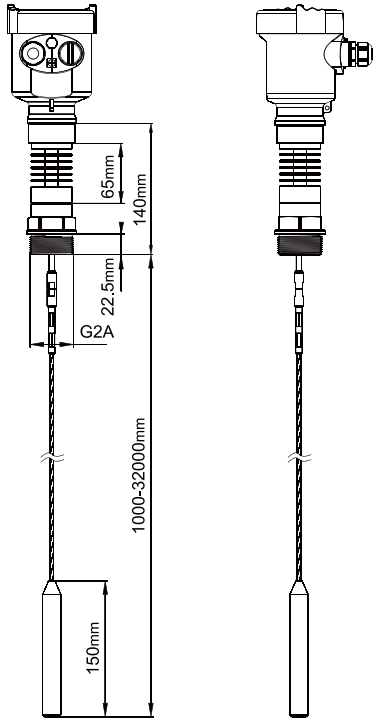
LM-GW-52



LM-GW-53

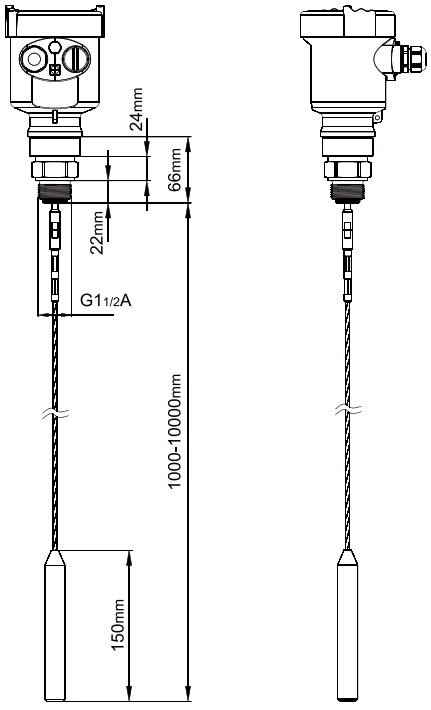


LM-GW-54 (Series of rope, rod and coax)



Take rope as an example

LM-GW-55 (Series of rope, rod and coax)



Take rope as an example

6 Technical Data

Material of detecting component	
Rod: Stainless Steel 316L/PTFE	Weight
Rope: Stainless Steel 316L/PTFE/ceramic	LM-GW-51：9kg (Depend on process connections and housing)
Coax: Stainless Steel 316L/PTFE	LM-GW-52：5.5kg(Depend on process connections and housings)
Seal: Viton fluoroelastomer, Kalrez per fluoroelastomer	LM-GW-53：6kg (Depend on process connections and housings)
Process Connection: Stainless Steel 316L	LM-GW-54：12kg(Depend on process connections and housings)
Housing: Alu-die casting, Stainless Steel 316L	LM-GW-55：9kg(Depend on process connections and housings)
Seal ring between housing and housing cover: Silicone rubber	LM-GW-56：9kg (Depend on process connections and housings)
Viewpoint window: Polycarbonate	
Ground terminal: Stainless Steel 316L	
Power	
Standard Version: 15…36V DC	
Ex ia: 15…30V DC	
Power Consumption: Max. 22.5mA	
Ripple Allowed: <100Hz - Uss<1V	
<100-100KHz - Uss<10mV	
4-wire/2-chamber: Intrinsic Safe+ Explosion-Proof 24V DC±10%, 220V AC±10%	
Power Consumption: Max. 4VA, 2.1W	
Output	
Output Signal: 4…20mA/HART	
Resolution: 1.6μA	
Fault Signal: Constant current output: 20.5 mA;22 mA,3.8mA	
2-wire load resistance: See diagram below	
4-wire load resistance: Max. 500ohm	
Integration Time: 0…99sec,adjustable	

Characteristic Parameters of Transducer

Max Measurement Distance			
LM-GW-51	30m/6m (Rope / Rod)	Relative Humidity	< 95%
LM-GW-52	6m	Pressure	Max.40bar
LM-GW-53	6m	Vibration Proof	Mechanical vibration10m/s²,
LM-GW-54	30m/6m		10...150Hz
LM-GW-55	30m/6m	Max Pulling Force	See the illustrative diagram on
LM-GW-56	30m/6m		pulling force
Measurement Interval	1sec (Depend on parameter settings)	Max Pulling Force or Lateral Load	
Adjustment Time	1sec (Depend on parameter settings)	Cable Φ4mm (Max Pulling Force)	5KN
Resolution of Display	1mm	Cable Φ6mm(Lateral Load)	30NM
Accuracy	10mm/ <0.1% (See the accuracy illustration diagram)	Cable Φ8mm (Max Pulling Force)	35KN
Temperature for Storage/ Transport	- 40...+80℃	Rod Φ10mm(Lateral Load)	30NM
Process Temperature (Probe)			
LM-GW-51	- 40...+150℃		
LM-GW-52	- 40...+150℃		
LM-GW-53	- 40...+150℃		
LM-GW-54	- 40...+200℃		
LM-GW-55	- 40...+400℃		
LM-GW-56	- 40...+150℃		

7 Selection & Ordering Information

LM-GW-51	LM-GW-52
Explosion Proof Approval	**Explosion Proof Approval**
P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Explosion proof (Exd [ia] ia ⅡC T6)	P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Flameproof Approval (Exd [ia] ia ⅡC T6)
Type of detection component/Material/Process Temperature	**Type of detection component/Material/Process Temperature**
A Rope/Stainless Steel 316L/PTFE X special customized B Rod/ Stainless Steel 316L/PTFE C PP extension/Rope/ Stainless Steel 316L D PP extension/Rod/ Stainless Steel 316L E PTFE extension/Rope/ Stainless Steel 316L F PTFE extension/Rod/ Stainless Steel 316L	A Rod/PTFE
Process Connection/Material	**Process Connection/Material**
GP Thread G1 1/2A KP Thread G2A NP Thread 1 1/2NPT YP special customized	GP Flange DN50 PN1.6 Stainless Steel316L NP Flange DN50 PN1.6 Stainless Steel316L EP Flange DN100 PN1.6 Stainless Steel316L FP Flange DN150 PN1.6 Stainless Steel316L YP special customized
Seal/Process Temperature	**Seal/Process Temperature**
A Viton fluoroelastomer/-30…+150℃ B Kalrez per fluoroelastomer/-40…+150℃	A -40...+150℃
Electronic	**Electronic**
A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20 mA /22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire	A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20Ma/22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire
Housing/Protection	**Housing/Protection**
A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67	A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67
Cable Entry	**Cable Entry**
M M20x1.5 N 1/2NPT	M M20x1.5 N 1/2NPT
Display Programming	**Display Programming**
A Yes X No	A Yes X No
Rope/rod length	**Rope/rod length**
5-digit number (unit:mm)	4-digit number (unit:mm)
Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-51PAPBGPAAANA2000	Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-52PAGPABANA3000

Guided Microwave level measurements

LM-GW-53	LM-GW-54
Explosion Proof Approval	**Explosion Proof Approval**
P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Explosion proof (Exd [ia] ia ⅡC T6)	P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Flameproof Approval (Exd [ia] ia ⅡC T6)
Type of detection component/Material/Process Temperature	**Type of detection component/Material/Process Temperature**
A Coax/Stainless Steel 316L	A Rope/ Stainless Steel316L/PTFE X special customized B Rod/ Stainless Steel316L/PTFE C PP extension/Rope/ Stainless Steel 316L D PP extension/Rod/ Stainless Steel 316L E PTFE extension/Rope/ Stainless Steel 316L F PTFE extension/Rod/ Stainless Steel 316L
Process Connection/Material	**Process Connection/Material**
GP Thread G1 1/2A KP Thread G2A NP Thread 1 1/2NPT YP special customized	GP Thread G1 1/2A KP Thread G2A NP Thread 1 1/2NPT YP special customized
Seal/Process Temperature	**Seal/Process Temperature**
A Viton fluoroelastomer/-30…+150℃ B Kalrez per fluoroelastomer/-40…+150℃	A Viton fluoroelastomer/-30…+150℃ B Kalrez per fluoroelastomer/-40…+200℃
Electronic	**Electronic**
A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20 mA /22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire	A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20Ma/22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire
Housing/Protection	**Housing/Protection**
A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67	A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67
Cable Entry	**Cable Entry**
M M20x1.5 N 1/2NPT	M M20x1.5 N 1/2NPT
Display Programming	**Display Programming**
A Yes X No	A Yes X No
Rope/rod length	**Rope/rod length**
4-digit number (unit:mm)	5-digit number (unit:mm)
Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-53PAGPAAANA3000	Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-54PAGPAAANA1000

Guided Microwave level measurements

LM-GW-55	LM-GW-56
Explosion Proof Approval	**Explosion Proof Approval**
P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Explosion proof (Exd [ia] ia ⅡC T6)	P Standard (Without Approval) I Intrinsically Safe (Exia ⅡC T6) C Intrinsically Safe+ Ship Approval (Exia ⅡC T6) G Intrinsically Safe+ Flameproof Approval (Exd [ia] ia ⅡC T6)
Type of detection component/Material/Process Temperature	**Type of detection component/Material/Process Temperature**
A Rope /Stainless Steel 316L/Ceramic B Rod /Stainless Steel 316L/Ceramic	A Two-Rope /Stainless Steel 316L/PTFE B Two-Rod /Stainless Steel 316L/PTFE
Process Connection/Material	**Process Connection/Material**
GP Thread G11/2A KP Thread G2A NP Thread 11/2NPT YP special customized	GP Thread G11/2A KP Thread G2A NP Thread 11/2NPT YP special customized
Electronic	**Electronic**
A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20 mA /22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire	A 4…20mA 2-Wire B 4…20mA HART (2-Wire) C 4…20Ma/22.8…26.4V DC/HART 2-wire/4-wire D 198…242V AC/HART 4-wire
Housing/Protection	**Housing/Protection**
A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67	A Aluminium/IP67 B Plastic/IP66 D Aluminium (2-chamber)/IP67 G Stainless Steel 316L/IP67
Seal/Process Temperature	**Seal/Process Temperature**
A -200…+400℃/(Vacuum…4)MPa B -200…+400℃/(Vacuum…40)MPa	A Viton fluoroelastomer/-40…+150℃ B Kalrez per fluoroelastomer/-40…+150℃
Cable Entry	**Cable Entry**
M M20x1.5 N 1/2NPT	M M20x1.5 N 1/2NPT
Display Programming	**Display Programming**
A Yes X No	A Yes X No
Rope/rod length	**Rope/rod length**
5-digit number (unit:mm)	5-digit number (unit:mm)
Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-55PBGPAAANA2000	Note: Version I (Exia ⅡC T6) must be matched with electronic components B and housing A; Version C (Exia ⅡC T6) must be matched with electronic components B and housing G; Version G (Exd [ia] ia ⅡC T6) must be matched with electronic components C&D and housing D; Refer to GB/T9119-2000 PN1.6MPa dimension for target configuration flange, 15 for thickness Example: LM-GW-56PBGPBAANA2000