Instruction Manual

Model LWGQ
Gas Turbine Fowmeter

Edition Sep.2010

CONTENTS

1. GENERAL DESCRIPTION

This manual mainly describes the installation, operation and maintenance of the LWGQ gas turbine flowmeter. Read this manual thoroughly before use.

Note that customer features have not been described and that the manual may not be revised every time there are changes in specifications, construction or parts when it is estimated that those changes will cause no problems in the functions or performance.

The LWGQ is thoroughly tested at the factory before shipment. When these instruments are delivered, perform a visual check to ascertain that no damage occurred during shipment. If you have any problems or questions, contact your nearest service center or sales representative describing in concise details the development of the failure and clearly showing the instrument model and serial numbers. DongYang Instrument & Trading CO.,Ltd
is not responsible for any instrument which does not perform as specified as a result of repairs by the user without permission from DongYang Instrument & Trading CO.,Ltd

1.1 Transportation cautions
To avoid damage, the flowmetershould be unpacked only after arriving at thecustomer's site.

1.2 Storage cautions
To avoid deterioration of insulation in the amplifier, corrosion of metal parts, etc., the instrument should be installed soon after it is delivered. If the instrument is stored, observe the following :
1. Where possible, store the flowmeter without unpacking
2. Select a storage area that is:
• Protected against precipitation and moisture
• Relatively free from mechanical vibration or impact shock
• At a temperature between -40 to 80 °C;
  -30 to 80 °C for the flowmeter with integral indicator/totalizer, preferably around 25 °C
• At a humidity 5 to 100 % (non-condensing), preferably near 50 %
3. Before storing a used Gas turbine flowmeter, completely remove fluid from the flowmeter pipe and sensor assembly
4. If the instrument is stored outdoors, its performance may be affected.

1.3 Selecting an installation area
The Gas turbine flowmeter is designed to operate even under severe conditions. However, to ensure its stable and accurate operation for many years, the following cautions must be observed in selecting an installation area:
1. Ambient temperature
Avoid an area which has wide temperature variations. When the installation area is subjected to heat radiation from process plant, ensure adequate heat prevention or ventilation.
2. Ambient air
Avoid installing the flowmeter in a corrosive atmosphere. When the flowmeter must be installed in a corrosive atmosphere, adequate ventilation must be provided.
3. Mechanical vibration and impact
The Gas turbine flowmeter is of sturdy construction, but select an area subject to minimize mechanical vibration or impact shock. If the flowmeter is subject to vibrations, it is recommended that pipeline supports be provided.

1.4 Restrictions on using transceiver
The Gas turbine flowmeter is considered to be immune to high frequency electrical noise. However, when a transceiver and its external wiring is used close to the flowmeter, the instrument may be influenced by the high frequency noise pickup. Check if there is an area where the flowmeter loop is influenced by a transceiver (by moving a transceiver towards the flowmeter from several meters away) and keep the transceiver outside that area.

1.5 Flameproof installation
The Model LWGQ gas turbine flowmeter is designed to be used in hazardous areas as specified in the requirements of NEPSI. To ensure the safety of flameproof equipment, the connections, wiring and piping need to be installed with care. Maintenance and repair also require care and are limited for maintaining safety.
2.Standard specifications

2.1 Specifications of gas turbine transducer

Specifications of gas turbine transducer are as Table 2-1 and 2-2

Table 2-1

Model	Range (m^3/h)			Medium Temp.	Ambient Temp.	Humidity	Nominal Pressure (MPa)	Pressure loss Max. (kPa)
	Error 1%	Error 1.5%	Error 2.5%					
LWGQ-15			1.5-7.5	-20 to +120℃	-20 to +60℃	≤95%	6.3	1
LWGQ-25			6-42					0.7
LWGQ-40	8.4-84	8.4-160					1.6 2.5 4.0	0.6
LWGQ-50	16.8-168	16.8-336						0.5
LWGQ-80	34-340	34-680						0.7
LWGQ-100	51-510	51-1020						0.7
LWGQ-150	98-980	98-1960						0.8
LWGQ-200	170-1700	170-2550						0.8
LWGQ-250	230-2300	230-3450						0.8
LWGQ-300	400-4000	400-6000						0.8

Table 2-2 Model and Code

Model	Code	Description
LW		Turbine type
G		Transducer
Q		For gas
Nominal Diameter	-15	15mm(PT 1″)
	-25	25mm(PT 1 1/4″)
	-40	40mm(Flange)
	-50	50mm(Flange)
	-80	80mm(Flange)
	-100	100mm(Flange)
	-150	150mm(Flange)
	-200	200mm(Flange)
	-250	250mm(Flange)
	-300	300mm(Flange)
Accuracy Class	A	2.5%(DN15, DN25) 1.5%(Span 1:15) 1 %(Span 1:10)
Output	P	Pulse
	I	Analog 4 to 20mA DC
	T	Total disply (Battery supply)
	M	Pulse,analog 4 to 20mA DC & LCD
	C	Auto Compensation(EVC)
Nominal Pressure	C1	PN1.0MPa
	C2	PN1.6MPa
Flameproof	/NE	No flameproof
	/EX	Flameproof Ex d Ⅱ BT4
Option	/□	

2.2 Specifications of model LRT-Idisplayer (battery supply) in the field

Accuracy:

±0.5% for instantaneous

±0.1% for total

Ambient temperature: -20 to 60℃

Medium temperature: -20 to 120℃

Ambient humidity: 5 to 100%(No dew)

Case material: SUS304

Power supply: 3.6V lithium battery (for 1 to 2 years)

Displayer: 6 digit LCD

RATE (%), RATE, TOTAL and 2 selections alternatively.

Output: No

Remember: Keep data when power off

Correcting instrumental error

Enclosure classification: IP65

Electrical classification: NEPSI Ex d Ⅱ BT4

Weight: 1.5kg

2.3 Specifications of model LRT-IIdisplayer in the field

Accuracy:
±0.5% for instantaneous
±0.1% for total
Ambient temperature: -20 to 60℃
Medium temperature: -20 to 120℃
Ambient humidity: 5 to 100％(No dew)
Case material: Aluminum alloy
Power supply: 18 to 30V DC
Displayer: 6 digit LCD
RATE (%),RATE, TOTAL and 2 selections alternatively.
Output: Pulse or analog 4 to 20 mA DC
Remember: Keep data when power off
Correcting instrumental error
Enclosure classification: IP65
Electrical classification: NEPSI Ex dⅡBT4
Weight: 1.8kg

2.4 Specifications of model LRT-IIIdisplayer in the field
Accuracy:
±0.5% for instantaneous
±0.1% for total
Ambient temperature: -20 to 60℃
Medium temperature: -20 to 120℃
Ambient humidity: 5 to 100％(No dew)
Case material: Aluminum alloy
Power supply: 18 to 30V DC
Displayer: 3 lines LCD
Temperature, Pressure, Rate in work condition and standard condition, Total in work condition and standard condition
Output: Pulse or analog 4 to 20 mA DC
Remember: Keep data when power off
Communication (option): RS485
Record: Trace back to 1 year recorder (rate, temerature, pressure)
Correcting instrumental error
Enclosure classification: IP65
Electrical classification: NEPSI Ex dⅡBT4
Weight: 1.8kg

3.Structrre and Principles of operation

3.1 Structrre

The brief structure of transducer is shown in Fig. 3-1. It is mainly composed of housing units, rotor units, front and rear guide assembly, clamp ring and electro-magnetic amplifier.

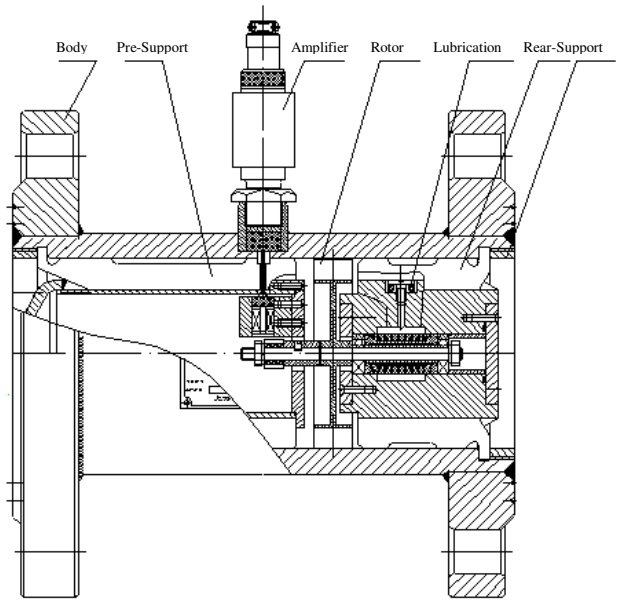


Fig 3-1 The Structure of LWGQ gas turbine

3.2 Principles of operation

As liquid running through the transducer, the rotor rotates with the help of the kinetic energy of the fluid and periodically to alter the magnetic resistance of the electro-magnetic converter. Then the magnetic flux density of the pik-up coil is altered by the passage of the magnetic blade. This change generates a pulse signal that is amplified by an amplifier and transmitted to an electric instrument to indicate or totalize the flow rate of liquid.

4.External dimensions and installation

4.1 External dimensions

a).DN15,25 as Fig. 4-1 and Table 4-1(Nominal pressure PN6.3MPa)

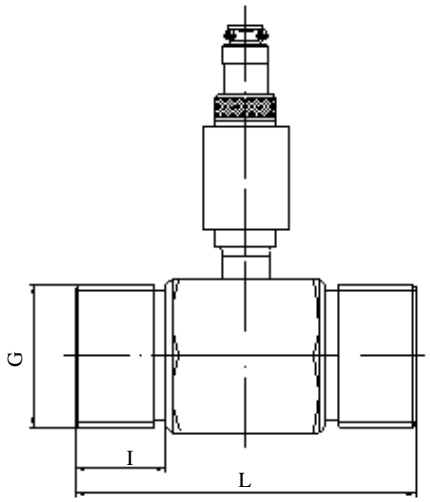


Table 4-1

Size / DN(mm)	G	I(mm)	L(mm)	Weight（kg）
15	G 1″	18	75	1.0
25	G $1^{1}/_{4}$″	23	100	1.5

Fig. 4-1 DN15,25 external dimensions

b). DN40 to 300 as Fig. 4-2 and Table 4-2

Table 4-2

Size(mm) / DN(mm)	D_1	D_2	d	N	L	Weight(kg)
40	145	110	18	4	140	7
50	160	125			150	8
80	195	160		8	200	10
100	215	180	18		220	12
150	280	240	22		300	16
200	340	295		12	360	19
250	405	355	26		400	73
300	460	410			420	85

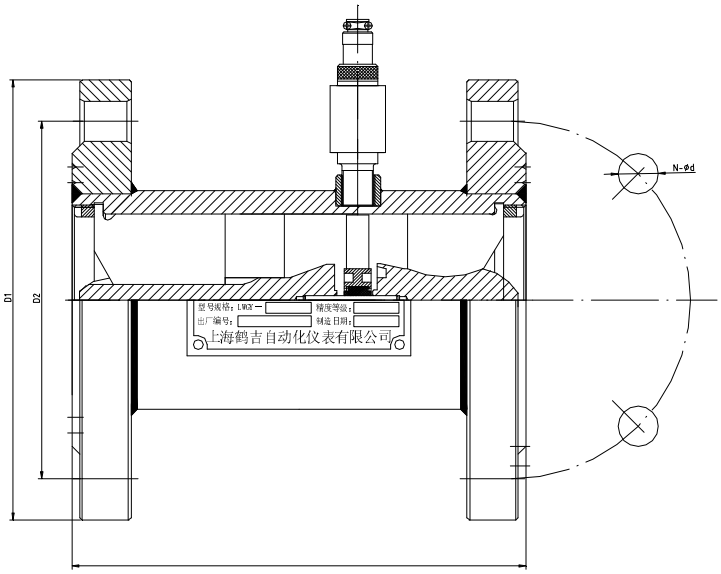


Fig. 4-2 DN40 to 300 external dimensions

c) LRT-I displayer in the field as Fig. 4-3

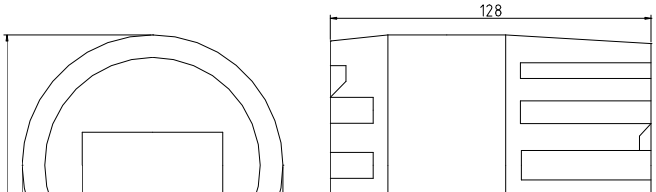


Fig. 4-3 LRT-I displayer in the field

d) LRT-II and LRT-III displayer in the field as Fig. 4-4

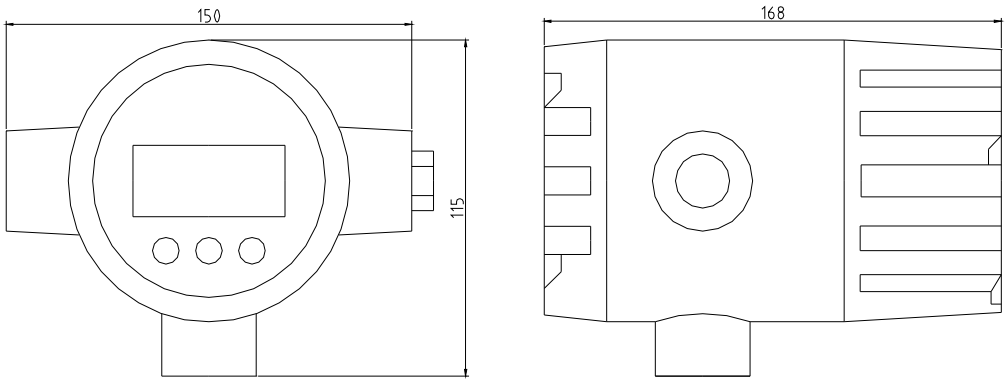


Fig. 4-4 LRT-II and LRT-III displayer in the field

4.2 Installation

a) Installation Area

The transducer should be used under the operating condition with the measuring medium temperature

from -20 to +120℃ and ambient relative humidity no greater than 100%. Avoid installing the transducer in a corrosive atmosphere. Select an area subject to minimumize mechanical vibration or impact shock, minimumize thermal radiation, minimumize magnetic field. If the transducer is subject to the strong magnetic field, it is recommended that shield must be covered on the preamplifier.

b) Installation Direction

The transducer should be installed horizontally. The flow direction of fluids should be in accordance with the arrow point which is on the label of the transducer for indicating the flow direction.

c) Piping

(1) For inevitable reason from installation point of view, install a fluid vibration damping device such as strainer on the upstream side of the transducer. The upstream and downstream straight pipe requirements are generally recommended that the straight pipe 15 to 20 times as long as the inner pipe diameter upstream of the turbine flow transducer and 5 times as long as the inner pipe diameter downstream of the turbine flow transducer.

The length of the straightner installed on the upstream and downstream sides of the turbine flow transducer following as Fig.4-5.

If a reducer is installed on the upstream of the pipline：L＝15D

If a single elbow is installed on the upstream of the pipline：L＝20D

If two elbows are installed on the upstream of the pipline：L＝25D (on the same plane)

L＝30D (on the different plane)

If a right angle elbow is installed on the upstream of the pipline：L＝40D

If a shut-off valve is installed on the upstream of the pipline：L＝20D(the valve open fully)

L＝50D(the valve open partially)

And more, A strainer with 20 to 60 mesh / sq. in. Screen should be installed in the pipe-line before the front straightner which is on the upstream side of the transducer in order to ensure the proper function and durability of the transducer.

(2) Avoid mounting gaskets which protrude into the pipline. This may cause inaccurate readings. In order to maintain easily, two shut-off valves must be located on the upstream and downstream of the pipline separately.

Fig 4-5 The length of the straightner

5.WIRING

A. Pulse out amplifier（Model LWGQ-□□□□P）

Pulse out amplifier connection as Fig. 5-1.

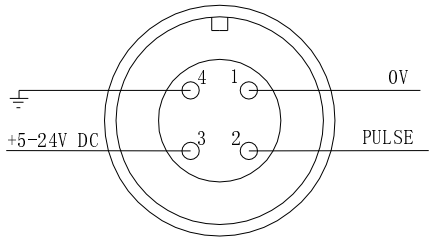


Fig. 5-1 Pulse out amplifier connection

- Power supply：＋5 to +24V_{DC}
- Pulse out (Push and pull output)：
  Low level：0 to 0.5V DC
  High level：(V_{DD}-2)V DC
- Ambient temperature: -25℃ to ＋55℃。
- Humidity : less than 85%.

B. Analog output 4 to 20mA DC（Model LWGQ-□□□□I）
Analog output 4 to 20mA DC connection as Fig. 5-2.

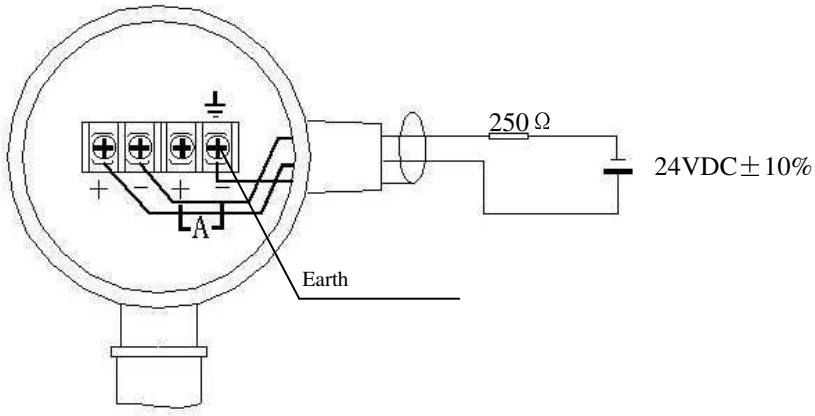


Fig. 5-2 Analog out connection

C. Connection for LRT-II （LWGQ-□□□□M）

a) Analog out (two wires):
Power supply: 18 to 42V DC,
Connection as Fig. 5-3

b) Pulse out (three wires):
Power supply: 18 to 30V DC,
Connection as Fig. 5-4

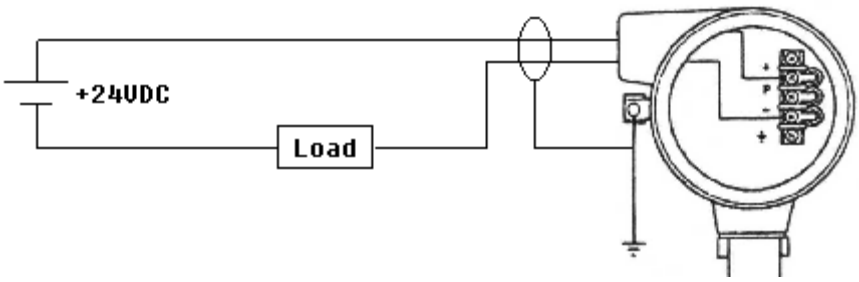


Fig. 5-3 Analog out connection(two wires)

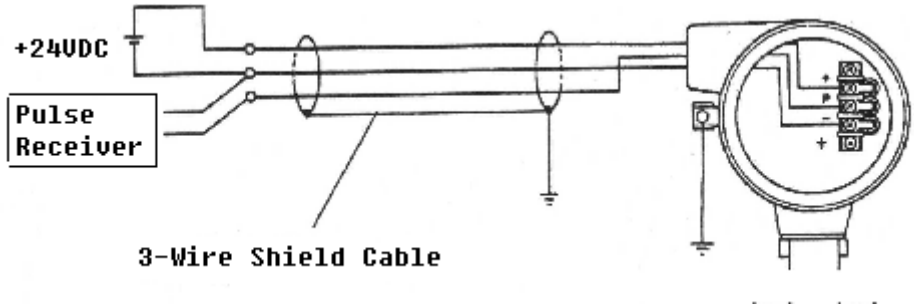


Fig. 5-4 Pulse out connection(three wires)

D. Connection for LRT-III （LWGQ-□□□□C）

c) Analog out (two wires):
Power supply: 18 to 42V DC,
Connection as Fig. 5-5

d) Pulse out (three wires):
Power supply: 18 to 30V DC,
Connection as Fig. 5-6

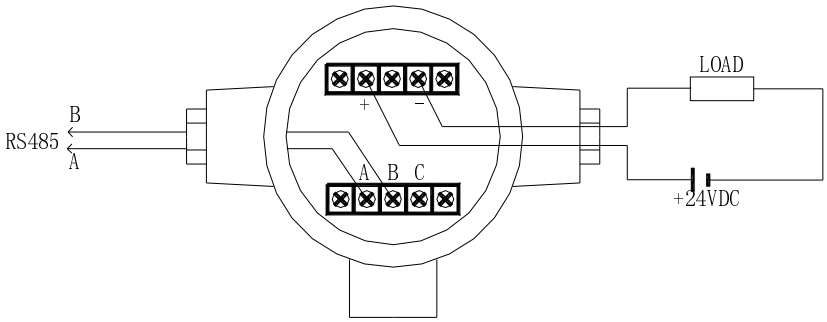


Fig. 5-5 Analog out (two wires)

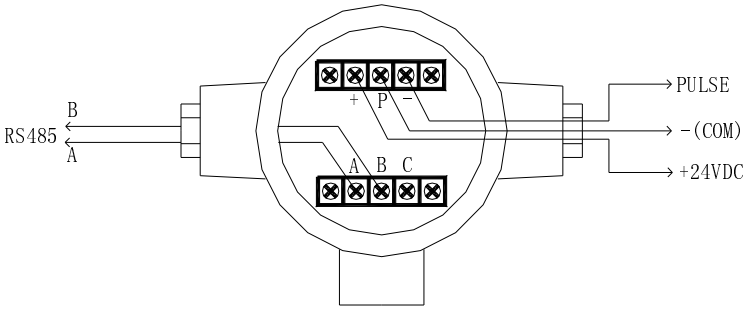


Fig 5-6 Pulse out (three wires)

6.Installation and operation of LRT-I and LRT-Ⅱ

6.1 Installation

The LRT-I displyer connected with transducer from the screw M14×1 Open the front cover, Pull the power jumper from “OFF” position and plug in “ON” position or press power switch down.

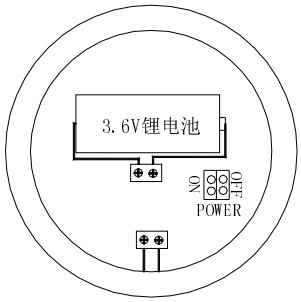


Fig 6-1 Turn on the power

6.2 Structure and functions

This chapter describes display contents using an integral indicator/totalizer (option) and the parameter setting procedure.

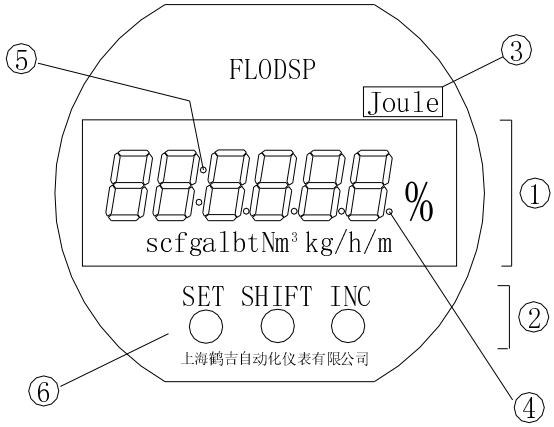


Fig 6-2 integral indicator/totalizer

1) Display section: Displays data, units, parameter setting item numbers and parameters.
2) Setting section: Sets parameter item numbers and parameter data using SET, SHIFT, and INC parameter setting keys.
3) Attach unit labels if those other than displayed units are to be used.
4) Decimal point
5) A symbol for delimiting a parameter setting item number and a parameter data
6) Setting key

Table 6.1 Types of unit display

Unit	Description
%	Percent
l	Liter
t	Ton
Nm^3	Normal cubic meter
m^3	Cubic meter
kg	Kiligram
/h	Per hour
/m	Per minute

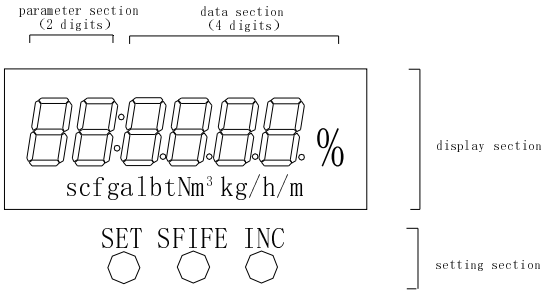


Figure 6.4 Setting section and display section

6.3 Parameter setting procedure

(1) Press [SET] key, trsfer “normal mode” to “setting mode”, for example display “b0： 00”;
(Note: Meter will go into sleep mode when no signal input for 1 minute. Here no key is in active. There are three methords to awake the meter: spin the rotor of the flow transducer, scratch the end of the screw; or put the power jumper “on” again to reset the meter)
(2) Flashing display position “b” is changeable by [INC] key;
(3) Press [SET] key again, “b” concealed, display two data only. As if “b0” turn to display “06”;
(4) Moving cursor by [SHIFT] key. Changing code by [INC] key;
(5) Changing item number finished, press [SET] key again, the cursor jump to data section;
(6) Changing data and moving decimal point by [INC key, and moving cursor by [SHIFT] until last bit;
(7) Press [SET] key, here code and data section flashing, press [SET] key again, save the data;
(8) Press [SHIFT] key to turn back normal mode.

[Setting data example]
[1] Setting K-factor (item [b06])
Adjusting b06 from 68.6 to 1068.6 as Table 6.2.
Table 6.2 Setting K-factor

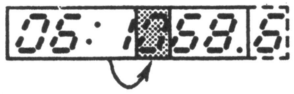
Mode change and operation	Display	Description
SET □Press [SET] to enter setting mode ↓ SET □Press [SET] again, “b” conceled, display “00:” only ↓ □ Press [SHIFT] to move the cursor at “00:” position, press [INC] until “06:” ↓ SET □ Press [SET] key to enter data section. □ □ change the data with [INC], move cursor with [SHIFT], fix decimal with [INC] □ □Repeat until 1068.6000, setting is performed, SET □Press [SET],all data flashing ↓ SET □Press [SET] again, saving data ↓ SHIFT □Press [SHIFTT] key,turn back normal display mode	   	● The item is “b06”, setting K-factor ● Move cursor with [SHIFT], adjust value and confirm the decimal point by press [INC] key ● Data 68.6 is initial value ● Changing 68.6 to 1068.6。

Table 6.3 is Parameter list

Table 6.3 Parameter list

Item	Name	R/W	Data range	Unit	Decimal point	Description	Initial value
B00	Pass Word	W	132			Data can be adjusted only when 132	000
B02	OUTPUT	W	4 to 20mA DC (0) PULSE (1)			Selection out mode (meanwhile change the jumper), LRT-II only	0
B04	FLUID	W	GAS Qn (3) GAS M (4) GAS Qf (5) LIQ Qf (6) LIQ M (7)			Selection of fluid M: Mass flow Qn: Volumetric flow under standard conditions Qf: Volumetric flow under operating conditions	6
B06	K-FACTOR(KM)	W	0.0001~32000	P/l	0~5	K-factor (KM at 15°C)	320.2435
B08	DENSITY	W	0.0001~32000	kg/m^3	0~5	Density under operating conditions	1.000
B09	TEMP UNIT	W	Deg C (0) Deg F (1)			Temperature Unit under operating conditions	0
B10	TEMP Tf	W	-500~1000	B09	0~5	Temperature under operating conditions: Tf	15.00
B15	FLOW UNIT	W	kg (0) ton (1)			Selection of Flow unit	0
B25	TEMP Tn	W	-500~1000	B09	0~5	Temperature under standard conditions: Tn	15.00
B26	PRESSURE Pf	W	0.00001~32000	absolute	0~5	Pressure under operating conditions: Pf	1.0332
B27	PRESSURE Pn	W	0.00001~32000	absolute	0~5	Pressure under standard conditions: Pn	1.0332
B29	FLOW UNIT	W	Nm^3 (0) Nl (1)			Selection of flow unit	0
B35	FLOW UNIT	W	m^3 (0) l (1)			Selection of Flow unit	0
B50	TIME UNIT	W	/m (1) /h (2)			Selection of Time unit flowrate	2
B51	SPAN FACTOR	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8) E-2 (9) E-1 (10)			Selection of Span factor E+1=10 E+2=100 E-2=0.01	0
B52	FLOW SPAN	W	0.00001~32000	B29,B35,B50	0~5	Flow span	10.00
B53	DAMPING	W	2 (0) 4 (1) 8 (2) 16 (3) 32 (4) 64 (5) 0 (6)	sec		Selection of Damping time	6
C01	TOTAL RATE	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8) E-2 (9) E-1 (10)			E0=1 E+1=10 E+2=100	0
C02	PULSE RATE	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8) E-2 (9) E-1 (10)			Scaled pulse factor, E0=1 E+1=10 E+2=100	0

Item	Name	R/W	Data range	Unit	Decimal point	Description	Initial value
D20	FLOW ADJUST	W	NOT ACTIVE (0) ACTIVE (1)			Selection of correcting instrumental error	0
D21	FREQ1	W		Hz	0~5	First break-point frequency (f1)	1.0
D22	K1	W		%	0~5	First test point K-factor (K1)	1.0
D23	FREQ2	W		Hz	0~5	Second break-point freq. (f2)	1.0
D24	K2	W		%	0~5	Second test point K-factor (K2)	1.0
D25	FREQ3	W		Hz	0~5	Third break-point freq. (f3)	1.0
D26	K3	W		%	0~5	Third test point K-factor (K3)	1.0
D27	FREQ4	W		Hz	0~5	Fourth break-point freq. (f4)	1.0
D28	K4	W		%	0~5	Fourth test point K-factor (K4)	1.0
D29	FREQ5	W		Hz	0~5	Fifth break-point freq. (f5)	1.0
D30	K5	W		%	0~5	Fifth c test point K-factor (K5)	1.0
E01	TOTAL RESET	W	NOT EXCUTE (0) EXECUTE (1)			Resetting Totalized value	0
E02	DISP SELECT	W	RATE(%) (0) RATE (1) TOTAL (2) RATE(%),TOTAL (3) RATE,TOTAL (4) RATE,RATE(%) (5)			Selection of Display	4
H07	L.C. FLOWRATE	W	0~B52	B52	0~5	Low cut flowrate	0.06122
H08	TRIM 4mA	W	-1~10	%	0~5	Trim 4mA	0.0
H09	TRIM 20mA	W	-10~10	%	0~5	Trim 20mA	0.0
〖H08，H09：TRIM 4mA，TRIM 20mA〗 Setting value in H08 or H09 equal display value. E.g. When setting H08, The display value is “4.02”, then setting “4.02” in H08, press [set] key 2 times. repet above prosdure until display “4.00”.							
H12	RESTORE	W	NOT EXCUTE (0) EXECUTE (1)			Restore factory setting	0
H30	REVISION	R				Revision number of software	

6.4 Exchange battery（only for LRT-I）

Exchange battery sequence:

(1) Unscrew the rear-cover;
(2) Put the power jumper on “OFF” position or press power switch;
(3) Unscrew two screws settled the battery;
(4) Fix the new battery, Note the polarity of the battery;
(5) Contradictorily above steps to reassembly the meter.

7.Installation and operation of LRT-III

7.1 Installation of LRT-III
LRT-III connects with transducer by M14*1 screw. Screw must be revolved to the bottom of hole as far as possible in order to avoid losing signal.

If you will change direction of displayer towards reader, you can reverse revolve the screw half turn, then tight the oblate nut.
7.2 Structure and functions of LRT-III
This chapter describes display contents using an integral indicator/totalizer (option) and the parameter setting procedure.

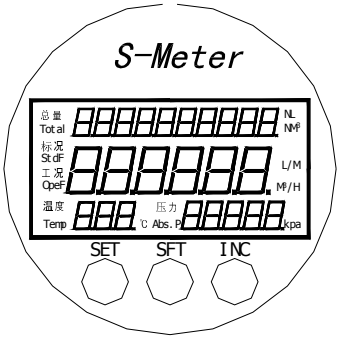
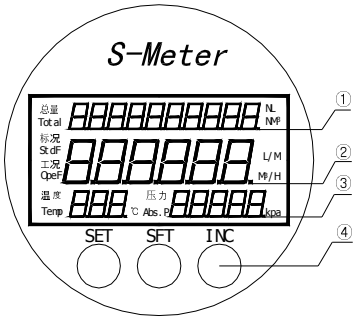


Fig 7-1 integral indicator/totalizer

The integral indicator/totalizer displays a numerical value, a percentage, and an engineering unit in its LCD display. If a unit other than those that appear in the display is to be set, attach an unit symbol label to the right shoulder of the display window. Parameters can be set using [SET], [SFT], and [INC] keys in the setting section.

Table 7-1Types of unit display

Unit	Description
℃	Centi degree
l	Liter
Nl	Normal liter
m^3	Cubic meter
Nm^3	Normal cubic meter
kpa	Kilopascal
/h	Per hour
/m	Per minute



Item	Description
1	Total display section/Parameter displays section.
2	Rate display section/Code displays section.
3	Temperature and pressure（abs） display section
4	Setting keys

Fig. 7-2. Integral indicator/totalizer configuration and functions

7.3 Display contents in display section

The display content items are classified in the following three items:

Table 6-3. Mode name list

Nr.	Mode (status) name	Key operation	Display contents
1	Normal mode	—	A mode in which instantaneous flow rates, totalized values, temerature and pressure(abs) are displayed.
2	Setting mode	SET □	In this mode, parameter contents are confirmed or data is updated using the setting section. The mode is changed to this mode when [SET] key is pressed in normal mode.
3	Alarm number display mode	—	This mode is overlapped in 3th section when an alarm is occuring in normal mode. The alarm number presentation to indicate alarm contents (about 2 sec) and the normal data display (about 4 sec) are repeated

Totalized flowrate, instantaneous flowrate, temperature and pressure are displayed in normal mode as table 7-4.

Table 7-4. Display mode number list

Display area nr.	Name	Description
①	Totalized flow display	Totalized flow is displayed using 0 to 9999999999 without indicating the decimal point.
②	Flow rate display area in engineering unit	Instantaneous flowrate in an engineering unit is displayed using 0 to 999999 without indicating the decimal point.
③	Temperature and pressure (abs.) display	Temperature is displayed using –99 to 999 ℃ and pressure is displayed using 0 to 99999 kpa without indicating the decimal point.

Setting mode is as Table 7-5.

Table 7-5. Setting mode number list

Display area nr.	Name	Description
①	Parameter value display	Parameter value is displayed using –999999999 to 9999999999 without indicating the decimal point.
②	Item nr. display	Refference parameter list Table 6-7

Alarm mode is as Table 7-6.

Table 7-6. Alarm mode number list

Display area nr.	Alarm Code	Description	Clean up alarm method
③	Err 01	Total flowrate value display overflow	Re-selection engineering unit or scale
	Err 02	Instantaneous flowrate value display overflow	Re-selection engineering unit
	Err 03	Clock error	Resetting currently date
	Err 04	Communication error	Power reset

7.4 Parameter setting procedure

This section describes how to set parameters required for operating Model LRT-III intelligent converter using the integral indicator/totalizer (option) setting section.

Keys function:

[SET]-Enter setting or save setting value

[SFT]-Shift cursor

[INC]-Increase value

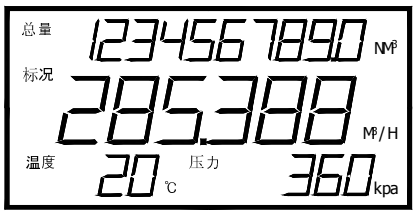
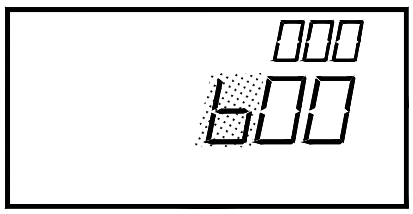
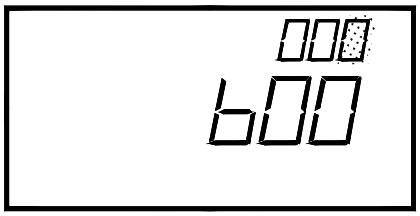
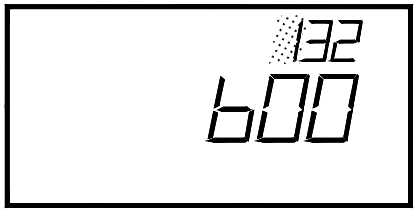
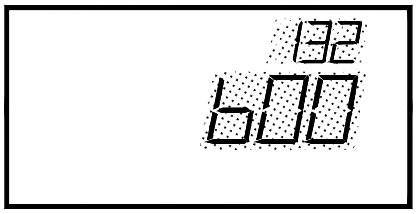
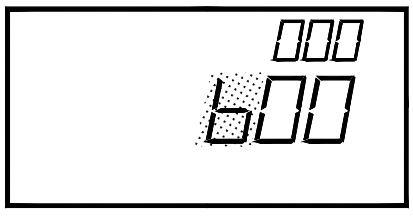
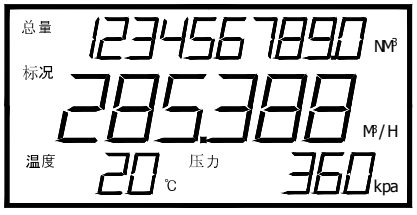
【**Example**】Setting K-factor 320.4567 P/L

STEP 1: Unlock the pass word. The pass word is “132”. The procedure is as Table 7-7.

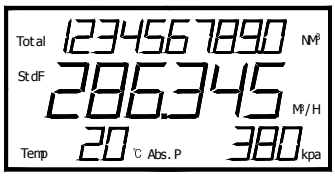
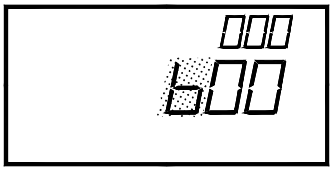
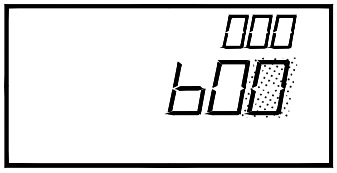
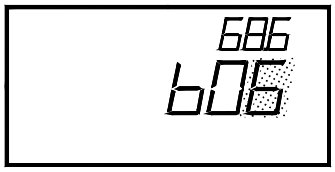
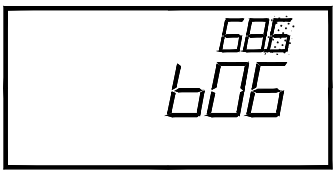
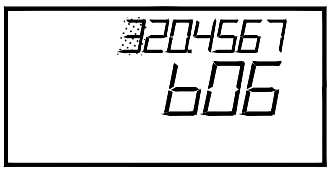
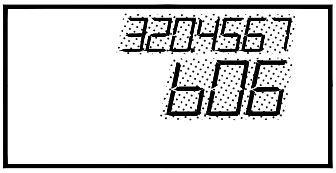
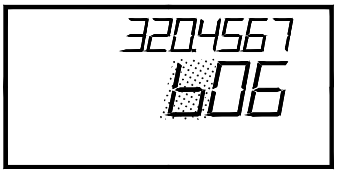
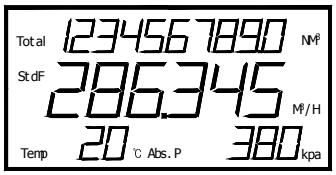
STEP 2: Input K-factor 320.4567. The procedure is as Table 7-7.

Table 7-7 Setting K-factor(for example)

STEP 1: Unlock the pass word.

Mode change and operation	Display	Description
Normal display mode		
Press 【SET】 key		Enter setting mode, the first letter shinning
Press 【SET】 key again		Enter value section
Press 【INC】 & 【SFT】 key		Chang the value until “132”
Press 【SET】 key		All shinning
Press 【SET】 key again		Sane value and return setting mode
Press【SET】【SFT】keys at the same time，		Return to normal display mode

STEP 2: Input K-factor 320.4567.

Mode change and operation	Display	Description
Normal display mode		
Press 【SET】 key		Enter setting mode, the first letter shinning
Press 【SFT】 key		Move the cursor the position to be changed
ress【INC】key		Press【INC】key until “b06”
Press 【SET】 key		Enter value section
Press 【INC】 & 【SFT】 key		Chang the value until “320.4567”
Press 【SET】 key		All value shinning
Press 【SET】 key again		Sane value and return setting mode
Press【SET】【SFT】keys at the same time，		Return to normal display mode

7.5 Alarm mode

The displayer will display alarm code and normal value alternately when error happens.

Table 7-8 Alarm code example

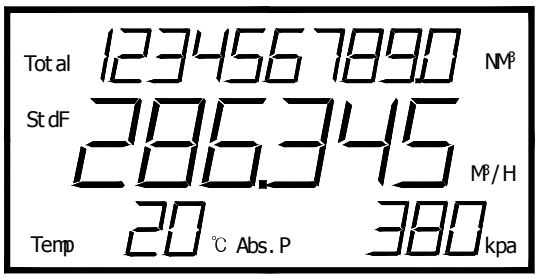
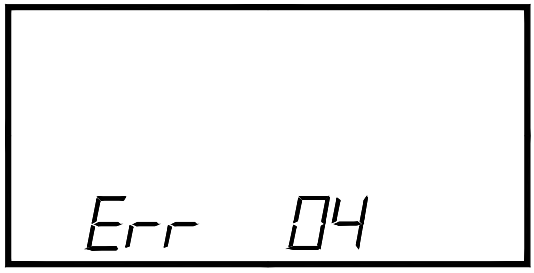
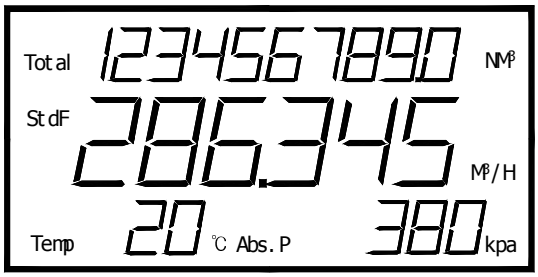
Alarm code: 4	
	Normal display for 4 seconds
	Display alarm code for 2 seconds
	Then return to normal display mode , reppet above procedure.

Table 7-9. Parameter list

Item	Name	R/W	Data range ( )	Unit	Decimal point	Remarks	Initial value
B00	PASS WORD	W				132	0
B01	TAG NO.	W	8 LETTERS			TAG NUMBER	0
B02	OUTPUT	W	4～20mA DC (0) PULSE (1)			Selection of output	0
B04	FLUID	W	GAS Qn ……..(3) GAS Qf…….. (5)			Qn：Volumetric flow under standard conditions Qf：Volumetric flow under operating conditions	5
B06	K-FACTOR(KM)	W	0.001~9999999999	P/l	0~5	K-factor (KM at 15°C)	68.6
B08	DENSITY ρn	W	0.001~9999999999	kg/m³	0~5	Density under standard conditions	1.000
B10	TEMP Tf	W	-99~999	℃	0~5	Temperature under operating conditions	15.0℃
B14	DENSITY ρf	W	0.001~9999999999	kg/m³	0~5	Density under operating conditions	1000
B25	TEMP Tn	W	0.001~9999999999	B09	0~5	Temperature under standard conditions	15.0℃
B26	PRESSURE Pf	W	0.001~9999999999	kpa	0~5	Pressure under operating conditions	101.3
B27	PRESSURE Pn	W	0.001~9999999999	kpa	0~5	Pressure under standard conditions	101.3
B29	TOTAL	W	Nm³ (0) N l (1)			Selection of flow unit	0
B35	TOTAL	W	m³ (0) l (1)			Selection of Flow unit	0
B40	BAUD RATE	W	300 （0） 600 （1） 1200 （2） 2400 （3） 4800 （4） 9600 （5）			Baude rate selection	3
B41	DEVICE NO.	W	0～255				0
B42	CURRENTLY TIME	W	####.##.##.##			####Y##M##D##H	2006.01.01.01
B50	INSTANTIOUS FLOW UNIT	W	m³ /h (0) l/m (1)	B09/ B35		Selection of Instantious Flow unit	0
B51	SPAN FACTOR	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8) E-2 (9) E1 (10)			Selection of Span factor E0=1 E+1=10 E+2=100 E-2=0.01 ……	0
B52	FLOW SPAN	W	0.00001~32000	B50/ B51	0~5	Flow span	10
B53	DAMPING	W	3 (0) 5 (1) 9 (2) 17 (3) 33 (4) 65 (5) 0 (6)	sec		Selection of Damping time	6
C01	TOTAL RATE	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8) E-2 (9) E-1 (10)			E0=1 E+1=10 E+2=100 ……	0
C02	PULS RATE	W	E0 (0) E+1 (1) E+2 (2) E+3 (3) E+4 (4) E+5 (5) E-5 (6) E-4 (7) E-3 (8)			Scaled pulse factor,E0=1 E+1=10 E+2=100 ……	0

			E-2 (9) E-1 (10)				
Item	Name	R/W	Data range ( )	Unit	Decimal point	Remarks	Initial value
D20	FLOW ADJUST	W	NOT EXCUTE (0) EXCUTE (1)			Selection of correcting instrumental error	NOT EXCUTE
D21	FREQ1	W	0.0~32000	Hz	0~5	First break-point frequency (f1)	0.0
D22	DATA1	W	0.0~32000	P/L	0~5	k1	0.0
D23	FREQ2	W	0.0~32000	Hz	0~5	Second break-point freq. (f2)	0.0
D24	DATA2	W	0.0~32000	P/L	0~5	k2	0.0
D25	FREQ3	W	0.0~32000	Hz	0~5	Third break-point freq. (f3)	0.0
D26	DATA3	W	0.0~32000	P/L	0~5	k3	0.0
D27	FREQ4	W	0.0~32000	Hz	0~5	Fourth break-point freq. (f4)	0.0
D28	DATA4	W	0.0~32000	P/L	0~5	k4	0.0
D29	FREQ5	W	0.0~32000	Hz	0~5	Fifth break-point freq. (f5)	0.0
D30	DATA5	W	0.0~32000	P/L	0~5	k5	0.0
E01	TOTAL RESET	W	NOT EXCUTE (0) EXCUTE (1)			Resetting Totalized value	NOT EXCUTE
E02	DECIMAL POINT SELECT	W	N0. 1 (1) N0. 2 (2) N0. 3 (3)			Dencimal point selection	1
H07	L.C. FLOWRATE	W	0~B52	B52	0~5	Low cut flowrate	0.06122
H08	TRIM 4mA	W	AROUND 4		0~5	Trim 4mA	4
H09	TRIM 20mA	W	AROUND 20		0~5	Trim 20mA	20
H10	INQUIRE HISTORY RECORDS		####.##.##.##	B29/ B35		####Y##M##D##.H	2006.01.01.01
H12	RESET	W	NOT EXECUTE (0) EXECUTE (1)			Restore initional value	
H30	EDITION NO.	R				Software edition number	

8.MAINTENANCE

1) The transducer must be run in regulate flow range and pressure. Note the flow direction.
2) The LWGQ must be regularly lubricated with the oil quantities detailed in Table 8-1 (For DN more than 80 mm).For lubrication, the cap on the oil pump should be unscrewed and the reservoir can be carefully filled with oil. The reservoir may need refilling during the lubrication session. Always close the cap of reservoir to avoied contaminating the oil with dirt and moisture. In standard applications (clean and dry gas, nominal meter usage), the lubrication interval is every 3 months. When the gas is dirty or when the meter is operated at design extremes more frequent lubrication is recommended.

Table 8-1 Periodical lubrication: quantities

Size	Periodical lubrication	
80	1cc	2 Strokes
100	1cc	2 Strokes
150	2cc	3 Strokes

9.Trouble and troubleshooting

The transducer seldom fails under normal operating condition. Hower, improper installation of the instrument or pipeline may cause trouble.

If it does not operate properly, carefully check, remedy troubles as per the following troubleshooting Table 9-1. If it is difficult to remedy any trouble, contact our company service center.

Table 9-1. Trouble and troubleshooting

Trouble Phenomena	Trouble Reason	Remove Method
No Output	Wiring not correct Sludge adhering to the rotor Preamlifier failed No Power or voltage error	Check wiring Clean the pipeline & rotor Change the preamplifier Chech the power supply
Has Output when no flow	Outside magnetic field Pipeline vibration	Check the shield Eliminated the vibration
Large Flow Errors	Outside magnetic field and pipeline vibration Vapor in the medium Back pressure low Bearing weared out Sludge adhering to the rotor Pipe error	Check the shield and eliminated the vibration Install air eliminater Increase back pressure Change the bearing Clean the pipeline & rotor Select proper pipe

Appendix: Packing list

1. One copy of Instruction manual
2. One copy of certificate