

Electromagnetic Flowmeter LF400 Series Operation Guide



LF410/LF400

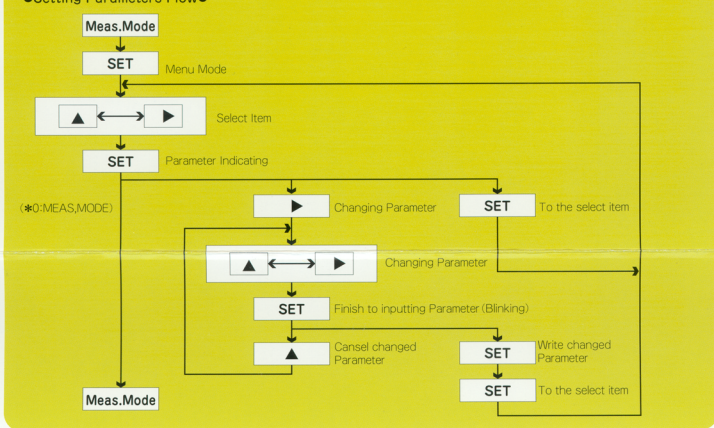


LF420



LF430

●Setting Parameters Flow●



●Setting Menu● Note: key means "Totalizer Start/Stop", key means "Totalizer Reset" in the measurement mode.

Items	Display sample	Setting or selecting value
A Measurement Mode		
0	Excitation Current	A1: EX. CLRR 0.2100 A 0.0500 - 0.2300 (A) (0.0001each)
2	Meter Size	A2: METER SIZE 4 in 0.1in - 16in, 2.5mm - 400mm
3	Excitation Frequency	A3: EX. FREQ. 24 Hz 6, 12, 24 (Hz)
B Measurement Mode		
1	Measuring Unit 1	B1: UNIT 1 gal/min m ³ /s, m ³ /min, l/s, l/min, l/h, m ³ /s, m ³ /min, m ³ /h, m ³ /l, ml, %, COUNT, RANGE, (gal/s, gal/min, gal/h, gal, ft/s)
2	Indicating Unit 2	B1: UNIT 2 %
C Measurement Mode		
1	Range Type	C1: RANGE TYPE 1 SINGLE SINGLE, 4F - OR, 2F - 2R, EXT.2F - OR, EXT.2F - 2R
2	Range 1	C2: RANGE 1 08.000 gal/min Unit: m ³ /s, m ³ /min, m ³ /h, l/s, l/min, l/h, m ³ /s, m ³ /min, m ³ /h, gal/s, gal/min, gal/h
3	Range 2	C3: RANGE 2 06.000 gal/min When multiple ranges are used, the following must be observed:
4	Range 3	C4: RANGE 3 04.000 gal/min Range 1 > Range 2 > Range 3 > Range 4 (Unidirectional flow, multiple range)
5	Range 4	C5: RANGE 4 02.000 gal/min Range 1 > Range 2, Range 3 > Range 4 (Bidirectional flow, multiple range)
6	Range Hysteresis	C6: RANGE HYST. 03.0 % 0.00 - 25.0 (%) (0.1 % each)
D Measurement Mode		
1	Damping Constant	D1: DAMPING 00.5 s 00.5, 01.0 - 60.0 (S) (0.5, 1.0, and each 1.0 sec)
2	Low Cutoff	D2: LOW CUT 01.0 % 0 - 10 (%) (0.1% each)
E Measurement Mode		
1	Zero Adjustment	E1: ZERO ADJUST. 01.0 % (SET) key (Keep pushing more than 2 seconds.)
F Measurement Mode		
1	D01 Function	F1: D01 FUNCT. 1: H ALM 0: NO USE, 1: H ALM, 2: L ALM, 3: EMPTY ALM, 4: RING SIG1
2	D02 Function	F2: D02 FUNCT. 3: RES/STA 0: RING SIG2, 6: PRESET, 7: CONW ALM, 8: PULSE OUT
3	Dl Function	F3: DI FUNCT. 2: C REPLY/STA 0: NO USE, 1: C STA/STP, 2: C RES/STA, 3: RANGE SW, 4: ZERO ADJ, 5: FIXED OUT
G Measurement Mode		
1	Counting Rate	G1: COUNT RATE 1.00E-2m ³ Units: m ³ /l, ml, (gal) Value: within the range 3.6 - 3600000 outse/h

●1: (1) Must be set in English units to show Gallons.
 (2) This value is factory adjusted when shipped. Please do not change this function in usual.
 (3) In case of choosing "H", "L" and "F" must be used.

●2: When the meter size is selected in inch, "I" appears.
 ●3: In case of choosing COUNT or RANGE, COUNT displays limited flow count (5 digits) without a unit. RANGE displays the range number (1 to 4).

Range type	Description
1 SINGLE	Single range
2 4F-OR	Unidirectional flow, automatic selection of multiple ranges
3 2F-2R	Bidirectional flow, automatic selection of multiple ranges
4 EXT.2F-OR	Unidirectional flow, multiple ranges selected by external signal
5 EXT.2F-2R	Bidirectional flow, multiple ranges selected by external signal

Item	Description
D01, D02 ALM	Digital output functions
CON USE	Not used
1H ALM	High limit alarm output
2L ALM	Low limit alarm output
3 EMPTY ALM	Empty pipe alarm output
4 RING SIG 1	Multi-range output No.1
5 RING SIG 2	Multi-range output No.2
6 PRESET	Pre-set point output
7 CONW ALM	Converter failure alarm output
8 PULSE OUT	Pulse output (DO1 only)

Item	Description
DI function	Digital input function
CON USE	Not used
1 C STA/STP	Totalizer Start/Stop
2 C RES/STA	Totalizer Reset/Start
3 RANGE SW	Remote selection of multi-range
4 ZERO ADJ	Remote zero adjustment
5 FIXED OUT	Remote fixed output control

●7: EQUIPMENT Use E3-1000, E-3-001

H	Items	Display sample	Setting or selecting value
0	Measurement Mode		
1	Preset Count	H1: PRESET COUNT 00003000	0 - 99,999,999 (counts) (1 count each)
0	Measurement Mode		
1	High Alarm Set	H1: H. ALARM SET ON	ON, OFF
2	High Alarm Value	H2: H. ALARM VAL. 005.5 %	10 - 199.5 (%) of the span of the RANGE1 (menu number C2) (0.5% each)
3	Low Alarm Set	L1: L. ALARM SET ON	ON, OFF
4	Low Alarm Value	L4: L. ALARM VAL. 005.5 %	10 - 199.5 (%) of the span of the RANGE1 (menu number C2) (0.5% each)
0	Measurement Mode		
1	Empty Pipe Alarm	J1: EMPTY ALM ON	ON, OFF
0	Measurement Mode		
1	Rate-of-change Limit	K1: LIMIT RATE 05.0 %	0 - 30 (%) (0.5% each)
2	Control Limit Time	K2: LIMIT TIME 00 s	0 - 20 (sec) (each 1 second)
0	Measurement Mode		
1	Fixed-value Output	L1: FIXED OUT ON	ON, OFF
2	Fixed-current Output	L2: FIX. CURR 10.0 mA	3 - 24 (mA) (0.1mA each)
3	Fixed-pulse Output	L3: FIX. PULSE 0100 pps	0 - 1000 (pps) (1pps each)
0	Measurement Mode		
1	Zero Offset Adjustment	M1: MANUAL ZERO +002.5 %	+/-1.25% of 10m/s ² - maximum range (+/-1.25m/s ²) (0.1% each)
0	Measurement Mode		
1	Flow Rate Cal 0%	N1: FLOW CAL 0% 0.0 %	[SET] key (Keep pushing more than 2 seconds.)
2	Flow Rate Cal 50%	N2: FLOW SG. 50% 50.0 %	[SET] key (Keep pushing more than 2 seconds.)
3	Flow Rate Cal 100%	N3: FLOW CAL 100% 100.0 %	[SET] key (Keep pushing more than 2 seconds.)
4	Excite Current Value	N4: EX. CURR. DSP 0.2100 A	None (Display)

*8: When this function is set to ON, the conditions are following:
 Current output: All set current output
 Pulse output: Pulse output with a user set counting rate
 Data recording: Previous status is retained (including pulse output)
 *9: (1) In case of the zero adjustment (Menu No. E1), Zero offset is automatically cleared to Zero.
 (2) Calculate the zero offset value with the following equation:
 Zero offset value(%) = (Actual flow rate - L1400 measured value) / (Sample)
 Measured condition: Flow rate: % in measuring span
 Actual flow rate obtained from other instrument: 10.0m³/min 50%
 L1400 measured value: 10.5m³/min 52.5%
 Zero offset: - 2.5%
 If zero offset is set to -2.5%, L1400 will output 50.0% flow rate instead of 52.5%.

■ Entering value
 ■ Selecting value
 ■ Entering and selecting value

Factory default setting value table

Code	Item	SI unit	Default value	English unit	Changed value
A3	Excitation Frequency	Value (*1)		Value (*1)	
B1	Indicating Unit 1	m ³ /h		gal/min	
B2	Indicating Unit 2	%		COUNT	
C1	Range Type	SINGLE		SINGLE	
C2	Range 1	Value (*2)		Value (*2)	
D1	Damping Constant	1sec		5sec	
D2	Low Outoff	1%		1%	
F1	DO1 Function	NO USE		PULSE OUT	
F2	DO2 Function	Option (*4) (NO USE)		Option (*4) (Empty Altm.)	
F3	DI Function	Option (*4) (RES/STA)		Option (*4) (C RES./STA)	
G1	Counting Rate	0		Value (*3)	
G2	Pulse Width	0mS		5mS	
H1	High Alarm Set	OFF		OFF	
H3	Low Alarm Set	OFF		OFF	
J1	Empty Pipe Alarm	ON		ON	
K1	Rate-of-change Limit	0%		5%	
K2	Control Limit Time	0sec		5sec	

*Above values are set by standard range at TOSHIBA's calibration facility.

*1,*2,*3: Setting value in each size

Meter Size	*1:ExFres	*2: Range 1	*3: Counting Rate
	m ³ /h	m ³ /s	GPM
15mm(1/2inch)	24-tz	2 3.145	25 1.00E+0 gal
20mm(1inch)	24-tz	6 3.395	75 1.00E+0 gal
40mm(1-1/2inch)	24-tz	15 3.315	175 1.00E+0 gal
50mm(2inch)	24-tz	25 3.535	300 1.00E+1 gal
80mm(3inch)	24-tz	60 3.315	650 1.00E+1 gal
100mm(4inch)	24-tz	100 3.535	1000 1.00E+1 gal
150mm(6inch)	24-tz	200 3.145	2500 1.00E+2 gal
200mm(8inch)	24-tz	300 3.095	4500 1.00E+2 gal
250mm(10inch)	12-tz	600 3.395	7000 1.00E+2 gal
300mm(12inch)	12-tz	900 3.537	10000 1.00E+2 gal
350mm(14inch)	12-tz	1200 3.465	12000 1.00E+2 gal
400mm(16inch)	12-tz	1600 3.537	16000 1.00E+2 gal
			GPM/gal/min

*4: These functions are option.

ERROR/ALARM

Error / Alarm type	Indicating message	Error contents
Self-diagnostics error	■ROM ERROR■	ROM error
	■RAM ERROR■	RAM error
	PARAMETER FAIL	System parameter error
	EX. CURR. OPEN	Excitation circuit error
	EX. CURR. ERROR	Excitation current error
	ADC. ERROR	ADC error
	INVALID TOTAL	Invalid totalizer counts
Setting error	■H. OVER SPEC.	Setting value exceeds the allowable high limit.
	■L. OVER SPEC.	Setting value exceeds the allowable low limit.
	■H. OVER C RATE	Counting rate exceeds the allowable high limit.
	■L. OVER C RATE	Counting rate exceeds the allowable low limit.
	■MULTI RING ERR	Span is not appropriate for multi-range configuration.
Limit alarms	H. ALARM	Flow rate reading exceeds the high limit.
	L. ALARM	Flow rate reading goes below the low limit.
Empty pipe alarm	EMPTY	Detector pipe is not filled with fluid.

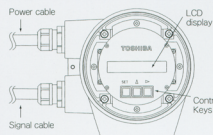
Accuracy

Flow rate as a percentage of range	Accuracy		
	0.1 - 0.3m ³ /s (0.328-0.984ft ³ /s)	0.3 - 1.0m ³ /s (0.984-3.28ft ³ /s)	1.0 - 10m ³ /s (3.28-32.8ft ³ /s)
0 - 20%	—	—	+/- 0.1% FS
20 - 100%	—	—	+/- 0.5% of rate
0 - 50%	+/- 0.25% FS	—	—
50 - 100%	+/- 0.5% of rate	—	—

Meter Size vs. Velocity/Rate

Size (mm)	Flow rate unit:m ³ /h			Size (inch)	Flow rate unit:gal/min		
	0.1 m/s	0.3 m/s	10 m/s		0.33ft/s	0.98ft/s	32.8ft/s
15	0.06361	0.1908	6.361	1/2"	0.01446	0.04336	1.446
25	0.1767	0.5301	17.67	1"	0.04016	0.1205	4.016
40	0.4523	1.357	45.23	1-1/2"	0.1028	0.3084	10.28
50	0.7067	2.120	70.67	2"	0.1606	0.4818	16.06
80	1.809	5.428	180.9	3"	0.4111	1.234	41.11
100	2.827	8.482	282.7	4"	0.6425	1.928	64.25
150	6.361	19.08	636.1	6"	1.446	4.336	144.6
200	11.31	33.93	1131	8"	2.570	7.711	257.0
250	17.67	53.01	1767	10"	4.016	12.05	401.6
300	25.45	76.34	2545	12"	5.784	17.35	578.4
350	34.63	103.9	3464	14"	7.870	23.61	787.3
400	45.23	135.7	4523	16"	10.28	30.84	1028

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