Digital Mass Flow Controller / Mass Flow Meter
MC-3000L / MM-3000L Series Command List

LINTEC CO., LTD.

1. Introduction

This manual contains tables for each command of the MC-3000L mass flow controller's (Hereinafter, referred as "MFC") /MM-3000L mass flow meter's digital communications. Please refer to the general manual for basic handling instructions. Please refer to the digital interface manual for details of digital communications.

2. Types of command

There are three kinds of commands from Type1 to Type3 as shown in the following table. The ASCII code must used as the transmission code. Two codes (CR and LF) must be used as the delimiter. For Type 2 and Type 3 command, please make sure to transmit the next command after the reception of return data. For Type 1 commands, as there is no return data, except for RE, please wait for 100ms before transmitting the next command. With RE, wait for 1s before transmitting the next command. In "Mass Flow Meter mode", "M" is written in the content column about these commands to disable the functioning of the valve and to change the valve are installed.

Type of command

Type	Contents	Transmitting and receiving example
Type 1	The command that there is no answer from MFC.	**,##[CR][LF] (HOST → MFC)
Type 2	The command that there is an answer from MFC.	**,##[CR][LF] (HOST → MFC) **, ○○○○○[CR][LF] (HOST ← MFC)
Type 3	ACK answer from MFC is expected, and the command which transmits data afterward.	**,##[CR][LF] (HOST → MFC) **,AK[CR][LF] (HOST ← MFC) **, ○○○○○[CR][LF] (HOST → MFC) **, ○○○○○[CR][LF] (HOST ← MFC)

**:Device number of MFC 00 to 99   ##:Command   ○○○○○:Data

Type 1 is used to change in the operation mode. And, it can direct the plural at the same time by using AL for the device number.
Type 2 is used for the data readout from MFC.
Type 3 is used for writing data in MFC.

3. "Read-out" Commands (Type2)

No.	Transmission Command	Transmission Contents	Reply data	Reply Contents (ex.)
1	**,OR	Actual flow rate read out	**,±○○○○○	10000 = Actual flow rate 100.00%
2	**,SR	Flow rate setting read out (M: Flow rate monitoring setting)	**,+○○○○○	10000 = Flow rate setting 100.00%
3	**,SA	Analog flow rate setting read out (M: Analog flow rate monitoring)	**,±○○○○○	10000 = Analog flow rate setting 100.00%
4	**,SD	Digital flow rate setting read out (M: Digital flow rate monitoring)	**,+○○○○○	10000 = Digital flow rate setting 100.00%
5	**,FR	Conversion factor read out	**,○○○○○	10000 = Conversion factor 1.0000
6	**,VR	Valve voltage read out (M: Disable)	**,○○○○○	10000 = Valve voltage 100.00% (100%=120V)
8	**,ST	Status read out	**,○○○○○○	EDASFN = (Ref. ST code table)
9	**,AR	Alarm A range read out	**,○○	10 = ±10%SP
10	**,BR	Alarm B range read out	**,○○	10 = ±10%SP
11	**,RA	Alarm code read out	**,○○	C0 = (Ref. Alarm code table)
12	**,TR	Alarm timer read out	**,○○	10 = 10sec.
13	AL,DR	Device number read out	**,**	01 = Device No.01 (00 to 99)
14	**,GR	Group number read out	**,G○	G○ = (0 to 9, A to Z, Any 1 character)
15	**,LR	Ramping time read out (M: Disable)	**,○○○○	0060 = 60sec. (max. 1310sec.)
16	**,R0 to 9	Preset flow rate setting read out (M : Flow rate monitoring setting)	**,+○○○○○	10000 = Flow rate setting value 100.00%
17	**,M0 to 3	Memory read out	**,○○○○○	○○○○○ = Any 5 ASCII code characters
18	**,IR	Totalized value read out	**,+○○○○○	00150 = 3000L
19	**,1R or 2R	Totalizer alarm level read out	**,+○○○○○	(ex. Flow into MFC of 2SLM by 100% 2×10×150=3000 max.65535) (Note1)
20	**,**,RI	Totalizer mode status read out	**,○○○	DEG = (Refer to flow totalizer mode status code table)

ST code table

Digit	code	Contents
1	D	Alarm A disable
	E	Alarm A enable
2	D	Alarm B disable
	E	Alarm B enable
3	A	Analog control mode
	D	Digital control mode
4	H	Valve hold
	S	Valve servo
	1	Valve voltage max.
	0	Valve voltage min.
5	F	Fast response speed
	S	Slow response speed
6	C	2% close
	H	2% hold
	N	Control normal

Alarm code

Digit	Code	Condition	Alarm timer	LED indicator
1	0	Alarm A none	-	Green (every 1sec flashing)
	P	Power supply voltage (+15VDC) drop	Disable	Off
	2	Flow totalizer alarm level 2	Disable	Continuous Red
	C	Setting value≠ flow rate output (M: Monitoring value ≠Actual flow value)	Enable	Continuous Red
2	0	Alarm B none	-	Green (every 1sec flashing)
	Z	Abnormal zero offset	Disable	Red (Note2) (every 0.5sec flashing)
	V	Voltage of valve control change (M: Disable)	Disable	Red (every 0.5sec flashing)
	1	Flow totalizer alarm level 1	Disable	Red (every 0.5sec flashing)

Note2) Zero adjustment error alarms regardless of the "Enable" / "Disable" of the alarm.

Flow totalizer mode status code

Digit	Code	Contents
1	D	Flow totalizer alarm level 1 Disabled
	E	Flow totalizer alarm level 1 Enabled
2	D	Flow totalizer alarm level 2 Disabled
	E	Flow totalizer alarm level 2 Enabled
3	G	Flow totalizer functioning
	S	Flow totalizer stopped

4. "Write" Commands (Type 3)

No.	Transmission (Level 1) Command	Contents	Reply data	Transmission (Level 2) Command	Contents (ex.)	Reply data
1	**,SW	Write digital flow rate value (Default =10000) (M: Flow rate monitoring setting)		**,○○○○○	10000 = Flow rate setting value 100.00% (00000 to 10000)	**,+○○○○○
2	**,FW	Write conversion factor (Default=10000)		**,○○○○○	10000 = Conversion Factor 1.0000 (06600 to 15000)	**,○○○○○
3	**,DW	Write device number setting (Default=00)		**,○○	01 = Device No. 01 (00 to 99)	○○,○○
4	**,TS	Write baud rate setting (Default=04)		**,○○	04 = 9600bps (Refer to: Baud-rate code table)	**,○○
5	**,TP	Write communication protocol setting (Default=01)		**,○○	01 = (Refer to: Communication protocol table)	**,○○
6	**,AW	Write alarm A range (Default=05)		**,○○	10 = ±10%SP (01 to 99)	**,○○
7	**,BW	Write alarm B range (Default=20)		**,○○	10 = ±10%SP (01 to 99)	**,○○
8	**,TW	Write alarm timer (Default=05)	**,AK	**,○○	10 = 10sec (00 to 99)	**,○○
9	**,Wn (n=0 to 9)	Write preset flow rate setting value (Default=00000) (M: Flow rate monitoring setting)		**,○○○○○	10000 = Flow rate setting value 100.00%	**,+○○○○○
10	**,LW	Write ramping time (M: Disable) (Default=00000) (Note 3)		**,○○○○○	00010=Ramping time10sec. (max.1310sec.)	**,○○○○○
11	**,Un (n=0 to 3)	Write memory (Default=…..)		**,○○○○○	○○○○○ = Any 5 ASCII code characters	**,AK
12	**,GW	Write group number (Default=G0)		**,G○	G○ = (0 to 9, A to Z : Any 1 character)	**,G○
13	**,1W **,2W	Write totalizer alarm level (Default=65535)		**,○○○○○	00150 = 3000L (ex. Flow into MFC of 2SLM by 100% 2×10×150=3000 max.65535) (Note1)	**,○○○○○

5. "Operation Change" Commands (Type1)

**=AL: Changed simultaneously

No.	Transmission (Level 1) Command	Contents
1	**,CD	Digital control mode
	**,CA	Analog control mode
2	**,ZS	Zero reset switch
3	**,**,RE	Software reset
4	**,VC	Valve close (M: Disables Alarm A)
	**,VO	Valve open (M: Disables Alarm A)
	,,VH	Valve hold (M: Disable)
	**,VS	Valve servo (M: Disable)
5	**,CS	Slow response mode (M: Disable)
	**,CF	Fast response mode (M: Disable)
6	**,C3	2% Close mode (M: Disable) (Note 3)
	**,C4	2% Hold mode (M: Disable) (Note 4)
	**,CN	Normal control mode (M : Disable)
7	**,DA	Disables Alarm A LED indicate
	**,EA	Enables Alarm A LED indicate
8	**,DB	Disables Alarm B LED indicate
	**,EB	Enables Alarm B LED indicate
9	**,BS	Alarm B preset (M: Disable)
10	**,CL	Alarm code clear
11	**,S○	Change to preset value 0 to 9
12	**,IG	Flow totalizer start
13	**,IS	Flow totalizer stop
14	**,I I	Flow totalized value clear
15	**,IM	Flow totalized value store (EEPROM)
16	**,D1 or 2	Flow totalizer alarm disable [1 or 2]
	**,E1 or 2	Flow totalizer alarm enable [1 or 2]
17	G○,##	Group control ○:Group No. ##:Command
18	**,PA	Analog control mode in power on
	**,PS	Mode at last time power supply off in power on

Baud rate code table

Code	Baud Rate
01	1200bps
02	2400bps
03	4800bps
04	9600bps
05	19200bps
06	38400bps

Communication protocol table

Code	Parity	Character length	Stop Bit
01	None	7	2
02	None	7	1
03	None	8	2
04	None	8	1
05	Odd	7	2
06	Odd	7	1
07	Odd	8	2
08	Odd	8	1
09	Even	7	2
0A	Even	7	1
0B	Even	8	2
0C	Even	8	1

Note1) Please refer to Additional Digital Function Manual.
Note3) Ramping function and 2% Close mode cannot be used simultaneously.
    Please turn mode into Control Normal (CN) or 2% Hold (C4) when using ramping function.
    Ramping function is available only under digital control. Flow rate controlling is normally working under analog control even if ramping time is set.
Note4) On 2% Hold mode, if the flow rate was set to 1.6%F.S. (80mV) or less, flow rate is automatically altered to 1.8%F.S. and Alarm A will be triggered (set ≠ output).
    Therefore, to avoid alarm A, please set the flow rate above 1.6%F.S. (80mV).