LT4000M Rear Module Datasheet

Model : PFXLM4B01DDK
PFXLM4B01DDC
PFXLM4B01DAK
PFXLM4B01DAC



LT4000M Rear module

Notice to our valued customers who use LT4000M series (analog model) :
You may experience instances when analog signals are output while the LT4000M is starting up.

Measures :
External equipment connected to analog output terminals should be design so powering up occurs only after the LT4000M has started up.
Considering the above, if the LT4000M and external equipment have different power supplies, please design your system with momentary power interruptions in mind.

Model Name Indication

PFXLM4B01D ∗ ∗
(1) (2) (3) (4)

(1)		(2)	
B	Rear module	D	DC24V

(3)		(4)	
D	Digital I/O	K	Sink Output Type
A	Analog I/O and Digital I/O	C	Source Output Type

Display Specifications

			LT-4000M Rear module	
			DIO	AIO and DIO
Models			PFXLM4B01DDK : Sink Output Type PFXLM4B01DDC : Source Output Type	PFXLM4B01DAK : Sink Output Type PFXLM401DAC : Source Output Type
Virtual Resolution (pixels)			320 x 240 (QVGA)	
Language Fonts *1			Japanese, ASCII, Chinese (Simplified), Chinese (Traditional), Korean, Cyrillic, Thai	
Character sizes			8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts	
Font sizes			Width can be expanded 1 to 8 times. Height can be expanded 1/2 and 1 to 8 times.	
8 x 8 pixels			40 characters per row x 30 rows	
8 x 16 pixels			40 characters per row x 15 rows	
16 x 16 pixels			20 characters per row x 15 rows	
32 x 32 pixels			10 characters per row x 7 rows	
Memory	Application memory *2		FLASH EPROM 16 MB (includes screen editing program and extended logic program)	
	Logic program area		FLASH EPROM 132 KB *3 (equivalent to 15,000 steps)	
	Font area		FLASH EPROM 8 MB (when limit exceeded, uses application memory)	
	Data backup		nvSRAM 128 KB (rechargeable lithium battery for data backup)	
	Variable area		nvSRAM 64 KB (rechargeable lithium battery for data backup)	
Touch Panel	Type		Resistive Film (analog)	
	Lifetime		1 million touches or more	
Interface	Serial (COM1)		RS-232C/RS485 x 1 RS-232C (Connector type: RJ45, Isolation: None, Maximum baud rate: 115,200 bps, Cable Type: Shielded, Cable Maximum length: 15 m (49 ft), 5 Vdc power supply for RS-232C: None) RS-485 (Connector type: RJ45, Isolation: None, Maximum baud rate: 115,200 bps, Cable Type: Shielded, Cable Maximum length: 200 m (656 ft), Polarization: Setting is required via software when connecting Multiple LTs. Refer to the "GP-Pro EX Device/ PLC Manual" for the setting. 5 Vdc power supply for RS-485: None) *4	
	CANopen (master)		CAN-CiA (ISO 11898-2:2002 Part 2), Connector: D-sub9 (plug)	
	Ethernet		IEEE802.3 compliant Ethernet x 1 (Connector type: RJ45, Driver: 10 M half duplex (auto negotiation)/ 100 M full duplex (auto negotiation), Cable type: Shielded, Automatic cross-over detection: Yes)	
	USB (Type A)		USB 2.0 (Type A) x 1 (Power Supply Voltage: 5Vdc +/-5%, Maximum Current Supplied: 500mA, Maximum Transmission Distance: 5m (16.4 ft.))	
	USB (mini B)		USB 2.0 (Mini-B) x 1	
	Control	DIO (Sink Type)	20 Points Standard Input (including 2 Points for Fast Input) 10 Points Standard Output, 2 Points for Fast Output	12 Points Standard Input (including 2 Points for Fast Input) 6 Points Standard Output , 2 Points Fast Output
		DIO (Source Type)	20 Points Standard Input (including 2 Points for Fast Input) 10 Points Standard Output and 2 Points Fast Output	12 Points Standard Input (including 2 Points for Fast Input) 6 Points Standard Output and 2 Points Fast Output
		AIO	—	2 ch analog inputs (13-bit) and 2 ch analog inputs (16-bit) for Thermocouple 2 ch analog outputs (12-bit)

*1: Please refer to the GP-Pro EX Reference Manual for details on font types and character codes.
*2: Capacity available for user application.
*3: Up to 60,000 steps can be converted in software. However, this reduces application memory capacity (for screen data) by 1 MB.
*4: 2-wire connection is available for RS-485. When a Device/PLC supports 2-wire connection, 4 wires (RXD+, TXD+, RXD-, and TXD-) can be short-circuited to be 2 wires (RXD+ and TXD + = D1, RXD- and TXD- = D0). For details on the connection, refer to the connection manual.

General Specifications

	LT-4000M Rear module	
	DIO	AIO and DIO
Supported Standards and Regulations	UL508 UL508 ANSI/ISA 12.12.01	
Rated Input Voltage	24 Vdc	
Input Voltage Limits	20 to 28.8 Vd	
Acceptable Voltage Drop	10 ms or less at 20.4 Vdc	
Power Consumption	9 W or less	12 W or less
In-Rush Current	30 A or less at 28.8 Vdc	
Voltage Endurance between power terminal and frame ground (FG)	500 Vdc for 1 minute	
Insulation Resistance between power terminal and FG	10 MΩ or higher at 500 Vdc	

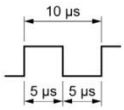
Environmental Specifications

		LT-4000M Rear module	
		DIO	AIO and DIO
Standard compliance		IEC61131-2	
Ambient operating temperature	Horizontal installation	0 to 50°C (32 to 122°F)	
	Vertical installation	0 to 40°C (32 to 104°F)	
Storage temperature		- 20 to 60°C (- 4 to 140°F)	
Storage altitude		0 to 10,000 m (0 to 32,808 ft)	
Operating altitude		0 to 2,000 m (0 to 6,560 ft)	
Surrounding Air and Strage Humidity		5 to 85% w/o condensation (non-condensing, wet bulb temperature 39°C (102.2°F) or less)	
Degree of pollution	IEC60664	2	
Degree of protection	IEC61131-2	IP20 with protective covers in place	
Corrosive gases		Free of corrosive gases	
Dust		≤0.1 mg/m^3 (10^{-7} oz/ft^3) (non-conductive levels)	
Atmospheric pressure (Operating Altitude)		800 to 1,114 hPa (2000 m (6,561 ft) or lower)	
Vibration resistance	Mounted on a DIN rail	3.5 mm (0.138 in.) fixed amplitude from 5 to 8.4 Hz 9.8 m/s^2 (1 gn) fixed acceleration from 8.4 to 150 Hz	
	Mounted on a panel	3.5 mm (0.138 in.) fixed amplitude from 5 to 8.6 Hz 9.8 m/s^2 (1 gn) fixed acceleration from 8.6 to 150 Hz	
Mechanical shock resistance	Mounted on a DIN rail	147 m/s^2 (15 gn) for a duration of 11 ms	
	Mounted on a panel	147 m/s^2 (15 gn) for a duration of 6 ms	
Electrostatic discharge	IEC/EN61000-4-2	8 kV (air discharge) 6 kV (contact discharge)	
Rediated radio frequency electromagnetic fields	IEC/EN61000-4-3	10 V/m (80 MHz to 3 GHz)	
Fast transients / Burst noise	IEC/EN61000-4-4	Power lines: 2 kV Digital I/O: 1 kV Relay outputs: 2 kV Ethernet line: 1 kV COM line: 1 kV CAN line: 1 kV	
Surge immunity	IEC/EN61000-4-5	Power supply: CM: 1 kV; DM: 0.5 kV Digital I/O: CM: 1 kV; DM: 0.5 kV Shielded cable: 1 kV CM = line-earth DM = line-line	
Conducted disturbances induced by radio-frequency fields	IEC/EN61000-4-6	10 Veff (0.15 to 80 MHz)	
Mains terminal dusturbance voltage	EN55011 (IEC/CISPR11)	150 to 500 kHz, quasi peak 79 dBµV	
		500 kHz to 30 MHz, quasi peak 73 dBµV	
Electric field strength	EN55011 (IEC/CISPR11)	30 to 230 MHz, quasi peak 10 m @40 dBµV/m	
		230 MHz to 1 GHz, quasi peak 10 m @47 dBµV/m	
Vibration immunity (operating)		IEC61131-2	
Protection structure		NEMA TYPE 4X (indoors, with panel embedded)	
Protection		IP20 - (IEC60529)	
Shock immunity (operating)		IEC61131-2 15gn 11ms	
Cooling method		Natural air circulation	
Weight		include Rear module installation adapter : 509g (17.96 oz) / only Rear module :353g (12.46 oz)	include Rear module installation adapter : 544g (19.19 oz) / only Rear module : 388g (13.69 oz)
Color		Rear module: RAL 7032	
Material		Rear module: PC/PBT	

Digital Input Characteristics

		LT-4000M Rear module
Rated Current		5 mA
Inrush Values	Voltage	30 Vdc
	Current	6.29 mA max.
Input impedance		4.9 kΩ
Input type		Sink/Source
Rated voltage		24 Vdc
Maximum Allowable Voltage		28.8 Vdc
Input limit values	ON Voltage	15 Vdc or more (15 to 28.8 Vdc)
	OFF Voltage	5 Vdc or less (0 to 5 Vdc)
	ON Current	2.5 mA or more
	OFF Current	1.0 mA or less
Isolation	Method	Photocoupler Isolation
	Between internal logic	500 Vdc
Filtering		0.5 ms to 30.0 ms
IEC61131-2 edition 3 type		Type 1
Compatibility		Supports 2 wire and 3 wire sensors
Cable type and length		Shielded: Maximum 100 m (328 ft) Non-shielded: 50 m (164 ft)
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable
Input paralleling		No

High Speed Counter Input Characteristics

		LT-4000M Rear module	
Rated Current	Voltage	24 Vdc	
	Current	7.83 mA	
Inrush values	Voltage	30 Vdc	
	Current	9.99 mA	
Input impedance		3.2 kΩ	
Input type		Sink/Source	
Rated voltage		24 Vdc	
Maximum Allowable Voltage		28.8 Vdc	
Input limit values	ON Voltage	15 Vdc or more	
	OFF Voltage	5 Vdc or less	
	ON Current	5 mA or more	
	OFF Current	1.5 mA or less	
Isolation	Method	Photo coupler Isolation	
	Between channels logic	500 Vdc	
Filtering		None, 4 µs, 40 µs	
IEC61131-2 edition 3 type		Type 1	
Compatibility		Supports 2 wire and 3 wire sensors	
Cable	Type	Shielded	
	Length	Maximum 10 m (33 ft)	
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable	
Maximum frequency		· 100 kHz is the maximum frequency for Single-phase · 50 kHz is the maximum frequency for 2-phase · Duty Rate: 45 to 55%	
Phase Counting Mode		· Single phase · 2 Phase x2 · 2 Phase x4 · 2 Phase x2 Reverse · 2 Phase x4 Reverse	
Response time	Marker	1 ms	
	Preload	1 ms	
	Prestrobet	1 ms	
	Synchronize output	2 ms	
Min. Pulse Width(Pulse input)		Counter:  	Pulse Catch Input signal ON width 
Input paralleling		No	

Transistor Output Characteristics

		LT-4000M Rear module
Rated Voltage		24Vdc
Output range		19.2 to 28.8 Vdc
Output type		Sink/Source
Rated current		DIO: 0.3 A/point, 3.0 A/common AIO and DIO: 0.3 A/point, 1.8 A/common
Residual voltage		1.5 Vdc or less for I= 0.1A
Delay		Off to on (0.3 A load): 1.1ms On to off (0.3 A load): 2ms NOTE: The delay is not including the cable delay.
Isolation	Method	Photocoupler Isolation
	Between internal logic	500 Vdc
Minimum resistor load		80 Ω at 24 Vdc
Cable length		Non-shielded: 150 m (492 ft)
Protection against short circuit		No
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable

NOTE: Refer to LT4201TM/4301TM Hardware Manual about Protecting Outputs from Inductive Load Damage for additional information on this topic.

Pulse Output/PWM Output/High-speed Counter (Synchronize Output) Characteristics

		LT-4000M Rear module	
Output type		Sink/Source	
Rated voltage		24 Vdc	
Power supply input range		19.2 to 28.8 Vdc	
Power supply reverse protection		Yes	
Pulse Output/PWM output current		50 mA/point, 100 mA/common	
Response time for original input		2 ms	
Isolation resistance	Between fast outputs and internal logic	10 MΩ or more	
	Between power supply port and protective earth ground (PE) = 500 Vdc	10 MΩ or more	
Residual voltage	for I = 0, 1 A	1.5 Vdc or less	
Delay		Off to on (50 mA load): 1.1ms On to off (50 mA load): 1.1ms NOTE: The delay is not including the cable delay.	
Minimum load impedance		80 Ω	
Maximum Pulse output frequency		50 KHz	
Maximum Pulse output frequency		65 kHz	
Accuracy Pulse Output/ PWM Output	Frequency	Accuracy	Duty
	10～1000Hz	1%	1 to 99%
	1.001～20kHz	5%	5 to 95%
	20.001～45kHz	10%	10 to 90%
	45.001～65kHz	15%	15 to 85%
Duty rate range		1 to 99%	
Cable	Type	Shielded, including 24 Vdc power supply	
	Length	Maximum 5 m (16 ft)	
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable	

NOTE: When using the acceleration/deceleration pulse output, there is a 1% maximum error for the frequency.

Analog Input Characteristics

		LT-4000M Rear module	
		AIO and DIO	
Characteristics		Voltage input	Current input
Number of maximum input		2	
Input type		Single-ended	
Input range		-10 to 10 Vdc/0 to 10 Vdc	0 to 20 mA/4 to 20 mA
Input impedance		1 MΩ or more	250 ± 0.11% Ω
Sample duration time		10 ms per channel + 1 scan time	
Total input system transfer time		20 ms + 1 scan time	
Input tolerance	Maximum deviation at 25°C (77°F) without electromagnetic disturbance	± 1% of the full scale	
	Maximum deviation	± 2.5% of the full scale	
Digital resolution		13 bits	
Temperature drift		± 0.06% of the full scale	
Common mode characteristics		80 db	
Cross talk		60 db	
Non-linearity		± 0.4% of full scale	
Input value of LSB		5 mV	10 µA
Maximum allowed overload (no damages)		± 30 Vdc (less than 5 minutes) ± 15 Vdc (No damage)	± 30 mA dc
Protection type		Photo coupler between input and internal circuit	
Cable	Type	Shielded	
	Length	Must be less than 3 m for IEC61131-2 conformance. Maximum transmission distance is 10m.	
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable	
Isolation	External input	Photo-coupler isolation	
	Between channels	Non-isolated	

Temperature Input (Temperature Probes) Characteristics

		LT-4000M Rear module
		AIO and DIO
Input sensor type		Pt100/Pt1000/Ni100/Ni1000
Input temperature range		Pt100/Pt1000: -200 to 600°C (-328 to 1112°F) Ni100/Ni1000: -20 to 200°C (-4 to 392°F)
Measuring current	Pt100/Ni100	1.12 mA ± 3.5%
	Pt1000/Ni1000	0.242 µA ± 3.5%.
Input impedance		Typically 10 MΩ
Sample duration time		10 ms+1 cycle time
Wiring type		2-wire or 3-wire connection configured by software for all inputs
Conversion mode		Sigma delta type
Input filter		Low pass
Resolution temperature value		0.1°C (0.18°F)
Detection type		Open circuit (detection on each channel)
Input tolerance *1	Maximum deviation at 25°C (77°F) without electromagnetic disturbance	± 5°C (41°F)
	Maximum deviation at 25 to 50°C (77 to 122°F)	Pt type: ± 5.6°C (42.08°F) Ni type: ± 5.2°C (41.36°F)
Temperature drift		30 ppm/°C
Digital resolution		16 bits
Rejection in differential mode	50/60 Hz	Typically 60 dB
Common mode rejection		Typically 80 dB
Isolation Method		Photocoupler Isolation
Permitted input signal		± 5 Vdc max.
Cable length	Pt100/Ni100	20Ω以下
	Pt1000/Ni1000	200Ω以下
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable
Noise resistance - cable		Shielded cable is necessary

* 1: Excluding errors caused by the wiring

Temperature Input (Thermocouple) Characteristics

		LT-4000M Rear module
		AIO and DIO
Input sensor type		Thermocouple
Input type range *1		J (-200 to 760°C) (-328 to 1400°F) K (-240 to 1370°C) (-400 to 2498°F) R (0 to 1600°C) (32 to 2912°F) B (200 to 1800°C) (392 to 3272°F) S (0°C to 1600°C) (32 to 2912°F) T (-200 to 400°C) (-328 to 752°F) E (-200 to 900°C) (-328 to 1652°F) N (-200 to 1300°C) (-328 to 2372°F)
Input impedance		Typically 10 MΩ
Sample duration time		10 ms+1 cycle time
Conversion mode		Sigma delta type
Digital resolution		16 bits
Input filter		Low pass
Resolution temperature value		0.1°C (0.18°F) (Type J)
Detection type		Open circuit (detection on each channel)
Input tolerance	Maximum deviation at 25°C (77°F) without electromagnetic disturbance	0.2 % of the full scale, plus standard point of compensation precision at +/- 6°C.
	Maximum deviation	0.28 % of full scale range
Temperature drift		30 ppm/°C
Input tolerance - terminal temperature compensation		± 5°C (41°F) after 10 min.
Cold junction compensation in the temperature range (0 to 50°C (122°F))		Internal cold junction error: +/- 6°C (42.8°F) after operating 45 minutes.
Rejection in differential mode	50/60Hz	Typically 60 dB
Common mode rejection		Typically 80 dB
Isolation Method		Photocoupler Isolation
Permitted input signal		± 5 Vdc max.
Warm up time		45 minutes
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable
Noise resistance - cable		Shielded cable is necessary

*1: Temperature measurement on PCB at terminal block for cold junction compensation.

Analog Output Characteristics

		LT-4000M Rear module	
		AIO and DIO	
Characteristics		Voltage Output	Current Output
Maximum number of outputs		2	
Output range		-10 to 10 Vdc/0 to 10 Vdc	0 to 20 mA / 4 to 20 mA
Load impedance		2 kΩ or more	300 Ω or more
Application load type		Resistive load	
Setting time		10 ms	
Total output system transfer time		10 ms + 1 scan time	
Input tolerance	Maximum deviation at 25°C (77°F) without electromagnetic disturbance	± 1% of the full scale	
	Maximum deviation	± 2.5% of the full scale	
Digital resolution		12 bits	
Temperature drift		± 0.06% of the full scale	
Output ripple		±50mV	
Cross talk		60 db	
Non-linearity		± 0.5% of full scale	
Output value of LSB		6 mV	12 µA
Protection type		Photo coupler between input and internal circuit	
Output protection		Short circuit protection: Yes Open circuit protection: Yes	
Output behavior if input power supply is less than the power failed threshold		Set to 0	
Cable	Type	Shielded	
	Length	Must be less than 3 m for IEC61131-2 conformance. Maximum transmission distance is 10m.	
Terminal blocks		Type: 3.5 mm (0.137 in.) pitch Terminal blocks are removable	
Isolation	External input	Photo-coupler isolation	
	Between channels	Non-isolated	

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