# LT4000M Rear Module Datasheet

LT4000M Rear module

Model：PFXLM4B01DDK
PFXLM4B01DDC
PFXLM4B01DAK
PFXLM4B01DAC

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<br>PFXLM4B01DDC : Source Output Type | PFXLM4B01DAK : Sink Output Type<br>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<br>(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<br><br>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)<br><br>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<br><br>(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<br>(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)<br>10 Points Standard Output,<br>2 Points for Fast Output | 12 Points Standard Input (including 2 Points for Fast Input ) 6 Points Standard Output ,<br>2 Points Fast Output |
| | | DIO (Source Type) | 20 Points Standard Input<br>(including 2 Points for Fast Input )<br>10 Points Standard Output and 2 Points Fast Output | 12 Points Standard Input<br>(including 2 Points for Fast Input )<br>6 Points Standard Output and 2 Points Fast Output |
| | | AIO | — | 2 ch analog inputs (13-bit)<br>and 2 ch analog inputs (16-bit) for Thermocouple<br>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 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 | 10 W or less | 13 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 | |

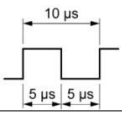
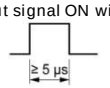
## Environmental Specifications

| | | 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 Storage 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/m³ ($10^{-7}$ oz/ft³) (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<br>9.8 m/s² (1 gn) fixed acceleration from 8.4 to 150 Hz | |
| Mechanical shock resistance | Mounted on a DIN rail | 147 m/s² (15 gn) for a duration of 11 ms | |
| Electrostatic discharge | IEC/EN61000-4-2 | 8 kV (air discharge)<br>6 kV (contact discharge) | |
| Radiated 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<br>Digital I/O: 1 kV<br>Relay outputs: 2 kV<br>Ethernet line: 1 kV<br>COM line: 1 kV<br>CAN line: 1 kV | |
| Surge immunity | IEC/EN61000-4-5 | Power supply: CM: 1 kV; DM: 0.5 kV<br>Digital I/O: CM: 1 kV; DM: 0.5 kV<br>Shielded cable: 1 kV<br>CM = line-earth<br>DM = line-line | |
| Conducted disturbances induced by radio-frequency fields | IEC/EN61000-4-6 | 10 Veff (0.15 to 80 MHz) | |
| Mains terminal disturbance 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)<br>/ only Rear module :353g (12.46 oz) | include Rear module installation adapter : 544g (19.19 oz)<br>/ 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 x N (N is 0 to 63) |
| 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)<br>Non-shielded: 50 m (164 ft) |
| Terminal blocks | | Type: 3.5 mm (0.137 in.) pitch<br>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<br>Terminal blocks are removable | |
| Maximum frequency | | · 100 kHz is the maximum frequency for Single-phase<br>· 50 kHz is the maximum frequency for 2-phase<br>· Duty Rate: 45 to 55% | |
| Phase Counting Mode | | · Single phase<br>· 2 Phase x2<br>· 2 Phase x4<br>· 2 Phase x2 Reverse<br>· 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:<br>  <br> | Pulse Catch<br>Input signal ON width<br>  <br> |
| 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<br>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<br>On to off (0.3 A load): 2ms<br>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<br>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<br>On to off (50 mA load): 1.1ms<br>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 |
| | 10～100Hz | 0.1% | 0 to 100% |
| | 101～1000Hz | 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<br>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)<br>± 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<br>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)<br>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)<br>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<br>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)<br>K (-240 to 1370°C) (-400 to 2498°F)<br>R (0 to 1600°C) (32 to 2912°F)<br>B (200 to 1800°C) (392 to 3272°F)<br>S (0°C to 1600°C) (32 to 2912°F)<br>T (-200 to 400°C) (-328 to 752°F)<br>E (-200 to 900°C) (-328 to 1652°F)<br>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)<br>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<br>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<br>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<br>Terminal blocks are removable | |
| Isolation | External input | Photo-coupler isolation | |
| | Between channels | Non-isolated | |

## External Dimensions