# FlexiLogics®

# FL050


Flexible PLC Salient Features :-

- DIN rail / Back panel mounted compact PLC
- Up-to 2 Serial Ports , 1 USB Device Port
- One Ethernet port to connect PLC / Programming port / remote monitoring over Modbus TCP/IP
- Expandable up to 8 expansions
- 32 Bit RISC processor
- Strong Communication capabilities. PLC can be configured as Modbus RTU Master or Slave
- Simple Ladder programming using Windows® based software
- DC powered units (24 V DC)
- CE, UL approved

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# Key Features :-

The FL050 support standard Programmable Logic Controller features.
The user can implement logic, specific to application using standard Ladder programming.
A PLC logic block can be executed at power up, during every scan, upon a timer interrupt.

Supported Tasks include:

- Write value to Tag
- Subtract a constant value form Tag
- Subtract Tag B to Tag A
- Turn Bit Off
- Copy Tag B to Tag A
- Add a constant value to Tag
- Add Tag B to Tag A
- Turn Bit On
- Toggle Bit
- Swap Tag A and Tag B

This PLC possess powerful programmable logic features. User can implement logic, specific to application using standard Ladder programming. Some of the Key features are as mentioned below :

## Expansion module (Digital and Analog)

FL050 I/O can be expanded using modular I/O modules. These modular I/O are Digital and Analog type. User can use Digital / Analog or combination of both. Various combination of Digital expansion modules are available. User can have up to 4 universal analog inputs and 2 analog outputs or 8 analog inputs. Analog inputs are mA, mV, 0-10 VDC, RTD and TC. The Analog outputs are 4-20 mA or 0-10 VDC. User can select appropriate I/O module depending on the application.

## Communication

The PLC is designed to have up-to 2 serial and 1 USB communication ports. Serial ports can be defined as Modbus RTU (Master or Slave) or can be connected to various third party devices such as PLCs, Drives, PID Controllers, SCADA etc. Most industry standard protocols are supported. The USB port is used for programming and monitoring the PLC.

## Ethernet Port

The FL050 supports Ethernet port. It can be used to connect to a PLC and monitor machine / process status from remote location. The Ethernet port can also be used for remote programming of FL050.

## USB Ports

It has one USB (Device) port. The USB port can be used as a programming port or for logic monitoring.

## Ladder Support

FL050 supports ladder functionality, which are listed below :

1. Math

Instructions such as ADD, Subtract, Multiply and Divide. These instructions could be Single word or Double word, signed or unsigned format.

2. Data compare

Instructions such as Less than, Greater than, Equal to, Less than or Equal to, Greater than or Equal to etc. are supported.

3. Data Transfer Instructions

Data transfer instruction supports word and double word operands, Multiplexer / demultiplexer instructions.

4. Data conversion

Data conversion such as hex to ASCII, ASCII to hex, Binary, BCD, 2's Compliment, 7 segment etc. are possible.

5. Shift / Rotate

Rotate left, Rotate Right, Shift Left, Shift Right for word / double word.

6. I/O Instructions

Normally Open / Normally Closed contacts, positive pulse contact, negative pulse contact, Leading / Falling edge etc. are implemented.

7. Immediate I/O instruction

This instruction can be used to sample instantaneous physical inputs and outputs in PLC ladder.

8. Set / Reset

Coil / Bit / Register Set / Reset Instructions are supported.

9. Program Control

FL050 also support subroutine call, MCS / MCR, JCS / JCR, Enable / Disable Interrupts and step sequence instructions.

10. Functions

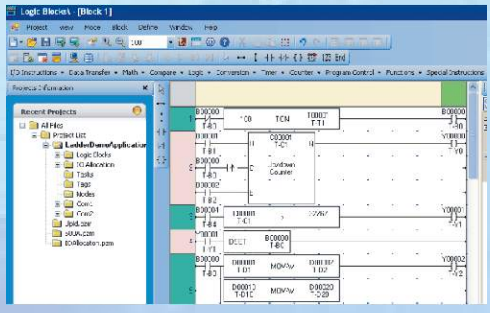
The function instructions like Moving average, Digital filter, Function generator, PID , Encode / Decode, Min / Max / Average Value, Lower / Upper Limit, Flip Flop are also supported.

## Comprehensive Instructions supported in FL050 :

| | | |
|---|---|---|
| **I/O Instructions -** | | |
| NO contact | NC contact | Output |
| Falling Edge | Rising Edge | Inverter |
| Inverter Coil | Positive Pulse Contact | Negative Pulse Contact |
| Positive pulse coil | Negative Pulse Coil | |
| **Data Transfer -** | | |
| MOV word | MOV DWORD | Invert Transfer |
| Table Initialize | Table Block Transfer | Table Invert Transfer |
| Data Exchange | Multiplexer | Demultiplexer |
| **Math-** | | |
| Addition | Subtraction | Multiplication |
| Division | Addition with Carry | Subtraction with Carry |
| Increment | Decrement | |
| **Compare -** | | |
| Greater than | Greater than or equal | Equal |
| Not Equal | Less Than | Less than or Equal |
| **Logic -** | | |
| AND | OR | XOR |
| Shift | Rotate | |
| **Data Conversion -** | | |
| Hex to Ascii | Ascii to Hex | Absolute Value |
| 7 segment decode | Ascii conversion | Binary Conversion |
| BCD conversion | 2's complement word | 2's complement Double word |
| **Timer -** | | |
| TON | TOFF | TSS |
| **Counter-** | | |
| Up counter | UP Down Counter | |
| **Program Control -** | | |
| Subroutine CALL | Subroutine RET | For |
| Next | Master Control Set | Master Control Reset |
| Jump Control Set | Jump Control Reset | En Intr |
| Dis Intr | WTR | Step sequence Init |
| Step sequence Input | Step sequence output | |
| **Function -** | | |
| Moving Average | Digital Filter | PID1,4 |
| Upper limit | Lower limit | Maximum Value |
| Minimum Value | Average Value | Function generator |
| **Special -** | | |
| Device Set | Device Reset | Register Set |
| Register Reset | Set Carry | Reset Carry |
| Encode Decode | Bit Count | Flip Flop |
| Direct I/O | Set Calender | Calender Operation |

## Configuration Software

FlexiSoft® is a compact, Windows® based software to configure the PLC. Following image from FlexiSoft® shows the snap shot of ladder configuration window:



System requirements for FlexiSoft® Software are -

| | | |
|---|---|---|
| Windows Version | : | Microsoft Windows® 2000 or above |
| Processor | : | 266 MHz PENTIUM or higher |
| Mouse | : | Required |
| RAM | : | 64 MB or more |
| Display resolution | : | 800 x 600 (VGA) or better |
| Display colors | : | 256 colors minimum |
| Serial Port | : | 1 serial port for FlexiPanels® programming |
| USB Port | : | 1 USB port (Host) for FlexiPanels® programming |
| Keyboard | : | Required |

# Protocols Supported for :-

| Driver | FL050 |
|---|---|
| ABB | ✓ |
| Allen Bradley DF1 | ✓ |
| Aromat FP Series | ✓ |
| Baldor | ✓ |
| Danfoss Drive | ✓ |
| Delta | ✓ |
| Fatek | ✓ |
| GE SNP | ✓ |
| GE SNP-X | ✓ |
| Idec | ✓ |
| LG Master K series PLC | ✓ |
| LG Master-K 300S | ✓ |
| Mitsubishi FX | ✓ |

| Driver | FL050 |
|---|---|
| Mitsubishi Q Series PLC | ✓ |
| Modbus Master | ✓ |
| Modbus Slave | ✓ |
| Omron Host Link | ✓ |
| Omron Inverter Memobus | ✓ |
| Serial Monitor | ✓ |
| Toshiba (Link Port) Series | ✓ |
| Toshiba Inverters | ✓ |
| Toshiba T Series | ✓ |
| TriPLC | ✓ |
| Twido | ✓ |
| Unitelway | ✓ |
| Universal Serial (ASCII) | ✓ |

# Specifications :-

| Functional | |
|---|---|
| Control Method | Stored program cyclic scan system |
| I/O Processing | Batch I/O update(refresh)<br>and Direct I/O access |
| Expansion I/O Capacity | Up to 8 I/O modules |
| Programming Language | Ladder |
| Program Capacity | 8K Steps |
| Memory | Program: Flash Type<br>Data: SRAM and EEPROM |
| Execution Speed | 1.03 ms / contact<br>1.08 ms / coil<br>1.85 ms / 16-bit transfer<br>3.28 ms /16-bit signed addition |
| User Data | |
| Timer Registers | 256 Words (R/W) |
| Counter Registers | 256 Words (R/W) |
| System Registers | 256 Words (R/W) |
| Data Registers | 4096 Words (R/W) |
| Input Registers | 400 Words (Max) (R) |
| Output Registers | 400 Words (Max) |
| Configuration Regs. | 1600 Words (Max) |
| System Coils | 100 Points (R/W) |
| Timer Coils | 256 Points |
| Counter Coils | 256 Points |
| Retentive Registers | 1400 Words |

| | |
|---|---|
| Clock-Calendar | Year, month, day, hour, minute, second, &<br>day of the week |
| Timer | 256 timers T0000 to T0255<br>T0000 to T0060: 10ms<br>T0061 to T0190: 100ms<br>T0191 to T0255: 1s |
| Communication Interface | 1 Port of RS232/RS485 on RJ45<br>1 Port with 2-wire RS 485 on Terminal Block<br>1 USB Port for Programming and monitoring (Device)<br>1 Ethernet port to connect PLC / Programming Port |
| Electrical | |
| Power Supply | DC powered units - 24VDC (+/-15%) |

| Environmental | |
|---|---|
| Temperature | 0 to 55° C (operating), -20 to 85° C (storage) |
| Humidity | 10 to 90 % non condensing |
| Vibration immunity | IEC60068-2-6 |
| Shock immunity | IEC60068-2-27 |
| Dimensions (mm) | 100mm(H) X 36mm(W) X 70mm(D) |
| Isolation | Isolation between communication ports,<br>power and I/O is 500 V DC for 1 Min. |
| EMI/EMC | |
| Immunity to ESD | as per IEC61000-4-2 |
| Immunity to Fast Transients | as per IEC61000-4-4 |
| Immunity to Radiated<br>Electromagnetic field | as per IEC61000-4-3 |
| Immunity to<br>Conducted disturbances | as per IEC61000-4-6 |
| Surge | as per IEC61000-4-5 |
| Radiated emission | as per EN55011 |

Continue

# Specifications :-

| Hardware Specifications | | |
|---|---|---|
| Processor | 32 bit RISC Processor | |
| Power Supply | Input Voltage | 24VDC |
| | Tolerance | ±15% |
| | Reverse polarity protection | YES |
| Communication ports | 2 Serial ports | COM1 : RS232/ RS422/RS485 2 and 4 wire. RJ45 Connector<br>COM2 : 2 Wire RS485. 4 pin PBT connector |
| | 1 Ethernet port | 10/100 Mbps |
| | 1 USB Device port | For Upload, Download and monitoring |
| | 1 Expansion Connection Slot | 8 expansion modules / 64 I/O points |
| Switches | PLC mode Control Switch | RUN/HALT |
| Memory | User Application | 96KB |
| | Ladder | 48KB |
| | Retentive | 1400 words |
| | Keep memory Area | 1000 words |
| RTC | Type | External |
| Operating temperature | 0 to 55° C | |
| Storage temperature | -20 to 85° C | |
| Humidity | 10% to 90% (non condensing) | |
| Approvals | CE, UL (Class 1 Div 2), RoHS | |

| Functional Specifications | | | |
|---|---|---|---|
| Communication | 2 serial ports | COM1 : RS232/ RS422/RS485 2 and 4 wire. | Upload, Download, Monitoring and Serial communication |
| | | COM2 : 2 Wire RS485 | 2 Wire RS485 Communication |
| | 1 Ethernet | 10/100 Mbps | Upload, Download, Monitoring and Ethernet communication |
| | 1 USB Device | | Upload, Download and Monitoring |
| | Expansion | SPI | 8 Slots (All FL Expansions) |
| | Multinode | Serial : 32 nodes | |

# Expansion Modules :-

## Digital Expansion Modules

| Model | Digital I/P | Digital O/P | Details |
|---|---|---|---|
| FLD1600 | 16 | 0 | 16 Digital Inputs |
| FLD0016P | 0 | 16 | 16 Digital Outputs (PNP) |
| FLD0016N | 0 | 16 | 16 Digital Outputs (NPN) |
| FLD0016R | 0 | 16 | 16 Digital Outputs (Relay) |
| FLD0808P | 8 | 8 | 8 Digital Inputs, 8 PNP type Transistor Outputs Digital module |
| FLD0808N | 8 | 8 | 8 Digital Inputs, 8 NPN type Transistor Outputs Digital module |
| FLD0808R | 8 | 8 | 8 Digital Inputs, 8 Relay type Outputs Digital module |
| FLD-HS-0808P | 8 | 8 | 8 Digital Inputs, 8 Digital Outputs (PNP), 4 High Speed Inputs (Single phase & Quadrature counter), 2 PWM Outputs |
| FLD-HS-0808N | 8 | 8 | 8 Digital Inputs, 8 Digital Outputs (NPN), 4 High Speed Inputs (Single phase & Quadrature counter), 2 PWM Outputs |

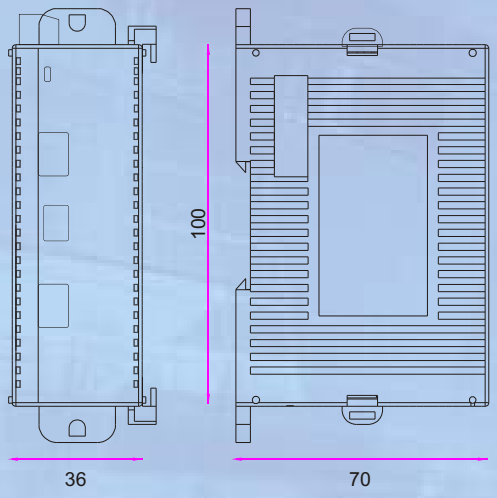
# Expansion Modules :-

## Analog Expansion Modules

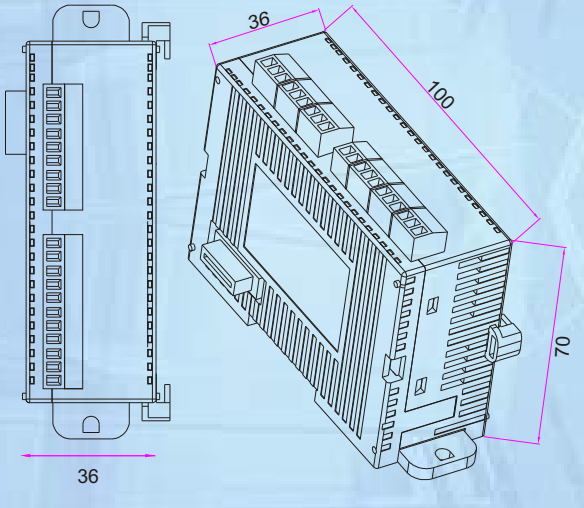
| Model | Analog I/P | Analog O/P | Details |
|---|---|---|---|
| FLA0800L | 8 | 0 | 8 Analog Inputs (0-10 VDC / 4-20 mA), 16 Bits |
| FLA0402U | 4 | 2 | 4 Universal Inputs (0-10 V / 0-100 mV / 0-50 mV / 0-20 mA / 4-20 mA / RTD PT-100 / Thermocouple - B, R, S, E, J, K, N, T)<br>2 Analog Outputs (0-10 V / 4-20mA), 16 Bits |
| FLA0004 | 0 | 4 | 4 Analog Outputs (0-10 VDC / 4-20 mA), 16 Bits |

N: Transistor output (NPN 500mA), R: Relay O/P, (6 Relay + 2 OC) P: PNP output (500mA)

# Dimensions :-




FL050 controller module




FlexiLogics® expansion module

All dimensions are in mm.

Please contact factory for more information. We welcome an opportunity to develop new, custom drivers and customized units.

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