USER MANUAL

FlexiLogics®PLC
FL004 ECO Series

Table of Contents

Introduction

Thank you for purchasing FL004 Product from Renu Electronics. FlexiLogics® Series Products are versatile high-performance programmable controllers with Microsoft® Windows based configuration Software.

An external powered FL series model can be used as a PLC based Automation Solution with optional built-in I/O points. The system can be expanded up to Eight I/O modules (analog and digital modules). It supports IEC61131-3 and Native Ladder programming environment.

These products are compliant to EMC directive 2014/30/EU and LVD directive 2014/35/EU.

Before you start

- FlexiLogics®FL004 series products are Programmable Logic Controller, suitable for a variety of applications across various industries. However, Renu Electronics is not responsible or liable for any indirect or consequential damage resulting from the use of this product.
- The user should check and confirm the suitability of the product before using in any specific application.
- The diagrams and examples in this manual are included for illustration purpose only. Renu Electronics assume no responsibility or liability regarding actual use based on these diagrams or examples.
- Reproduction of the contents of this manual, in any form (in part or in whole), is strictly prohibited.
- Following table shows various symbols that may be used in this manual to provide information regarding safety, precautions and usage of the product:

⚠	**CAUTION**: Indicates specific precautions to be taken by user during installation, operation and maintenance of the product.
ATTENTION	**ATTENTION:** Indicates important information regarding application and functions of the product.

Safety Precautions

This section of the manual provides information which is critical regarding safety and therefore the user is advised to go through the information in detail before installing the product. User may contact Renu Electronics technical support team at support@renuelectronics.com for any specific question(s) related to safety.

CAUTION: GENERAL PRECAUTIONS

- Do not use this product for emergency stop. A separate physical switch, outside the product must be used for any emergency stop operations.
- Do not use the external power supply source that does not comply with the specified power requirements of the product, it may cause malfunction or permanent damage to the product.
- Do not attempt to open, dismantle or modify the product, doing so will void the warranty.
- This product is supplied as open-type equipment and it must be mounted suitably designed for specific environmental conditions.
- If you connect or disconnect the USB cable with power applied to this product or any other device on USB network, and electrical arc can occur, which could cause explosion in hazardous location installations.
- Make sure that connectors are securely tightened to properly seal the connections against leaks.


Product Overview

This section provides an overview of FL004 products ordering part numbers, front view, dimensional details, performance, specifications, operating conditions, environment and approvals.

These products units are compact, easy-handling block style programmable controller. It also has modular expandability.

Product Nomenclature / Ordering Part Number

FL004 series has 3 models, depending on its output type. Detail part number or ordering information is as follows:

FL 004 - 08 06 X

→ Type of Output
→ Number of Outputs
→ Number of Inputs
→ Model Number
→ Series
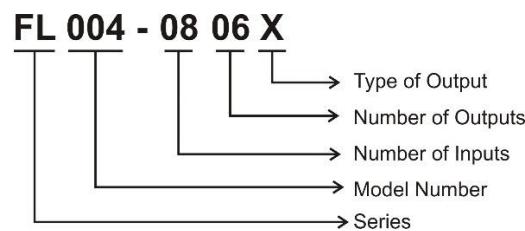
X:
R- Relay type Output
P – PNP type Output
N- NPN type Output

Front View

RS485 Serial Port
1 communication port supports
2 - wire RS485 serial interface.

USB Port
1 micro USB device for upload,
Download and monitor of
application / logic.

Digital Inputs
24VDC inputs includes
8 high speed / 4 quadrature inputs
Up-to 25KHz frequency.

Non-isolated Power Supply 24VDC
Recommended to use Isolated
External power supply.

RS232 Serial Port
1 RJ45 connector for RS232
serial interface with other
devices.

Up-to 8 expansions

Digital Outputs
Digital outputs includes relay,
PNP & NPN transistorized pulse
output of 10KHz frequency.

Product Dimensions

This section of the manual provides dimensional details of FL004 series products. All the dimensions shown below are measured in mm.
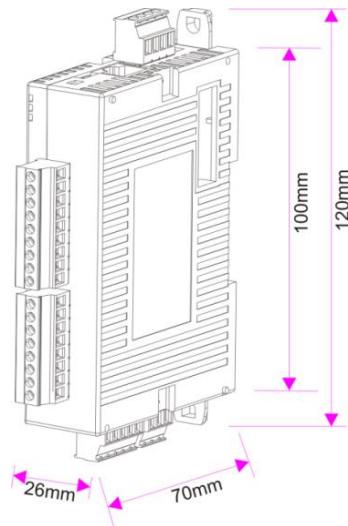
Product Performance

PLC Cycle time is as follows:

PLC Cycle Time = Input response time + Logic Execution time + Output update time

Digital Input Response Time	OFF to ON: 10ms/input
	ON to OFF: 10ms/input
Logic Execution time	85.0ns/contact
	342.85ns/coil
	533.33ns/16bit transfer
	523.80ns/16bit signed addition
Digital Output Update Time	Relay model: about 10ms/output
	NPN/PNP model: OFF to ON60µs
	ON to OFF: 10µs

Product Specifications

Power Supply

Power Supply	24VDC, 250mA
Power Consumption (With Expansions)	5W @24VDC
Permissible range	20.4 to 28.8VDC
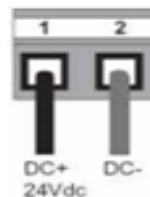
	CAUTION: POWER SUPPLY PRECAUTION
⚠	▪ Keep distance between High and Low voltage line.

FL004 Memory

Total Memory	190KB (Application Memory 110KB + Logic Memory 80KB)
Program Capacity	13K Steps

Digital Inputs

Input Signal	DC Input Bi-directional
Total Channels	8
High Speed Channels	8
Isolation	3.7KV
High Speed Inputs	2 (25KHz), 8(10KHz)
Quadrature Inputs	2 (10KHz), 4 (5KHz)
Level 0	0 to 5VDC
Level1	15 to 30VDC
Number of Input channels	8(X0, X1……... X7)

Digital Outputs

Total Channels	6		
Output Type	PNP	Relay	NPN
Nominal Load Current	0.5A/channel at 24VDC	2A at 230VAC, 5A/common	0.5A/channel at 24VDC
High Speed Output	Up-to 10KHz each (3 Channels with Dir.)	-	Up-to10KHz each (3 Channels with Dir.)

Native User Data

Retentive Memory (R registers)	1400 words
Keep Memory Registers (Flash)	2000 words
General Purpose Registers (IEC Programming)	2000 words
I/O Configuration Registers	1800 bytes (MW0000 to MW1799) (Depending on IO allocation)
Input Registers	3101 bytes (XW0000 to XW03100)
Output Registers	3101 bytes (YW0000 to YW3100)
Data Registers	4096 bytes (D00000 to D04095)
System Registers	256 bytes (SW0000 to SW0255)
System Coils	100 bits (S00000 to S00099)
Timer Registers	256 bytes (T00000 to T00099)
Timer Coils	256 bits (T0000 to T0255)
Counter Registers	100 bits (C00000 to C00099)
Counter Coils	112 bits (C0000 to C0111)

Communication Ports

Serial	2
Type	One 3.81 pitch PBT RS485 (2-Wire), One RJ45 RS232
USB	1
Type	Micro USB (Device)

General Specifications

Control Method	Stored program, cyclic scan system
I/O Processing Method	Batch I/O (refresh) Direct I/O instruction available
Program Language	IEC61131-3 (LD, SFC, IL, FBD, ST) and Native Ladder programming
I/O Expansion	Up to 8 Slots (Digital and Analog)
Serial Communication	One 3.81 pitch PBT RS485 (2-Wire), One RJ45 RS232
Weight	Approx. 150 gms
Dimensions (H x W x D) (mm)	100mm(H) X 26mm(W) X 70mm(D)

Environmental Specifications and Approvals

Feature	Specifications
Operating Temperature	0 to 55 °C
Storage Temperature	-20 to 85° C
Relative Humidity	10 to 90% non-condensing
Shock	IEC 60068-2-2-6 25g, 11ms, 6 shocks per axis, total 18 shocks (X, Y,Z)
Vibration	IEC 60068-2-6, 5 to 150 Hz, 3g peak (X, Y, Z)
EMC	EN 55011:2009/A1:2010 EN 61131-2:2007 EN 61000-6-2:2005/AC:2005 EN 61000-6-4: 2007/A1:2011
CE	Yes
RoHS	Yes

Wiring

Prior to performing any wiring, always turn the power off. In some special circumstance, if the user needs to perform wiring to input points while power is on, always stop the PLC. Otherwise, output points may be activated and cause accidently damage to the systems.

FL004 series required isolated 24VDC power supply. When wiring DC power, the 'positive' cable should be connected to the '+' terminal and the negative should be connected to the '-' terminal. At no time should the power supply terminals be connected to any other terminal on the PLC.
When DC voltage is supplied to the PLC, make sure the power is at terminals 24VDC and 0V.

Input PLCs have two modes of operation: SINK and SOURCE.
Sinking and Sourcing are terms used to define the control of direct current flow in a load. Sinking digital I/O (input/output) provides a grounded connection to the load. Sourcing digital I/O provides a voltage source to the load.
- **Sink = Current flows into the common terminal S/S**
- **Source = Current flows out of common terminal S/S**

Below are circuit diagrams showing both the sinking and sourcing inputs.

Sourcing Input	Sinking Input
Sourcing Output	Sinking Output
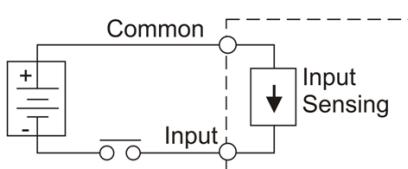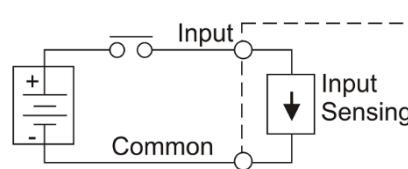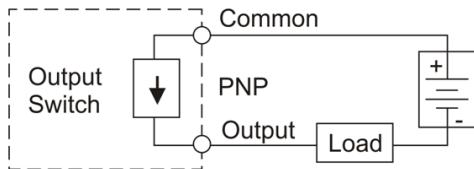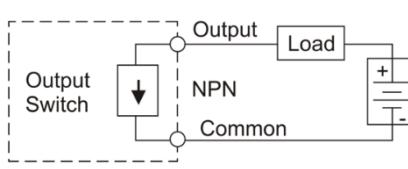
Input Wiring

Digital Inputs
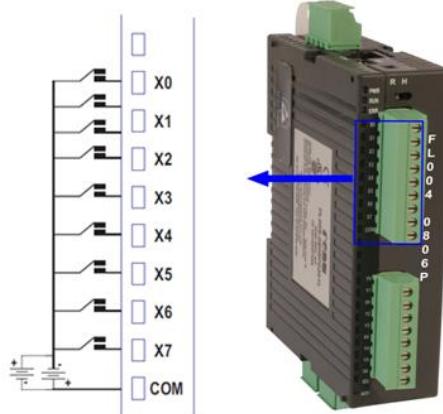
HSC Inputs: Single Phase counter
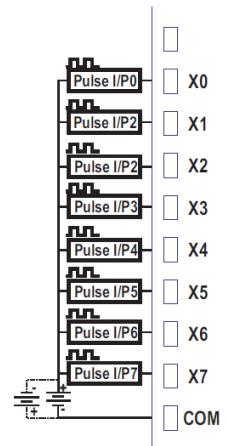
Quadrature
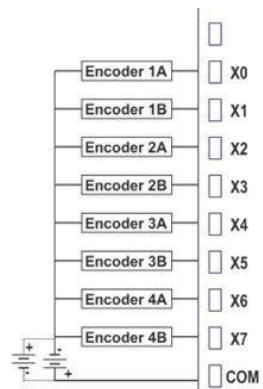
Output Wiring

Digital Outputs: P-Type
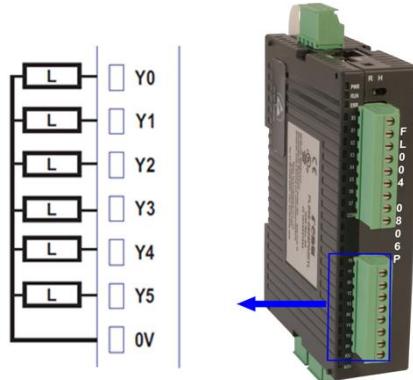
Digital Outputs: N-Type
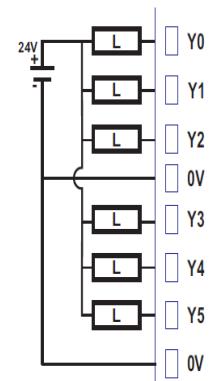
Digital Outputs: R-Type
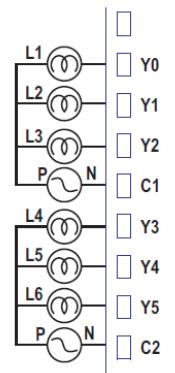
PWM Output: P-Type
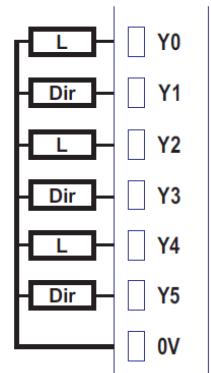
PWM Output: N-Type
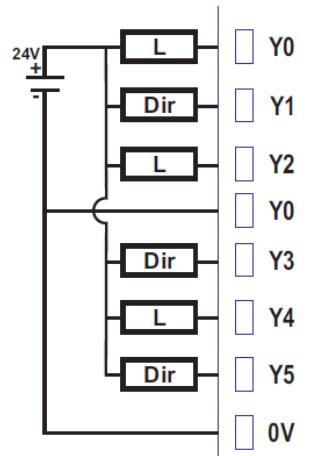
Communication Interfaces

This section of the manual gives detail information regarding various communication interfaces supported by FL4 series products, including communication interfaces between FL4 and other RENU or any third-party device, interfaces for programming and monitoring.
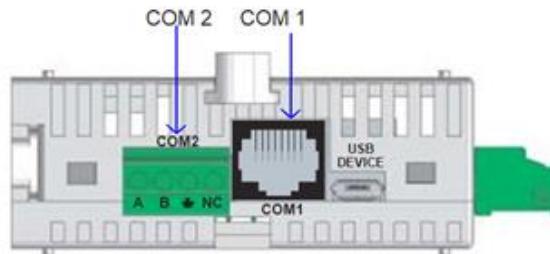
COM1
[RJ45 Type]: RS232

For upload/download/communication monitoring

Part Number: IBM-H-005-00

[Note: IBM-H-005-00: 2M cable, IBM-H-005-05: 5cable, IBM-H-005-10: 10M cable]
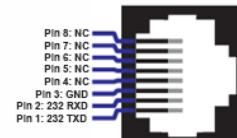
Pin number	Signal
1	232 TXD
2	232RXD
3	GND
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

COM2

2 wire RS485 for communication
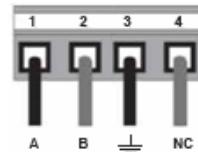
Pin number	Signal
1	TX+/RX+
2	TX-/RX-
3	GND

USB Device

For upload/download/monitoring

Part number: PC-USBAB-00-Micro

[Note: PC-USBAB-00: 2M cable, PC-USBAB-05: 5M cable, PC-USBAB-10: 10M cable]
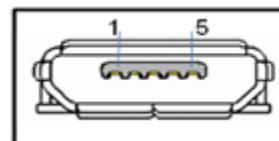
Pin number	Signal
1	VCC
2	D-
3	D+
4	NC
5	GND

PLC and HMI Communication

For communication between PLC and HMI on Port 2, Pin description is as follows:

2-wire RS485 pinout

Signal
A (TX+ / RX+)
B (TX- / RX-)
GND

Pin number	Signal
1	TX+
4	RX+
5	GND and Shield
8	TX-
9	RX-

Supported Protocols

ABB PLCS	Modbus ASCII (Unit as Master)
Allen Bradley DF1	Modbus RTU (Unit as Master)
Baldor	Modbus ASCII (Unit as Slave)
Danfoss Drive	Omron Inverter Memo Bus
Delta PLCs	Omron Host Link
Flexi PLCs	Panasonic FP Series
Flexi Logics Master Driver	Serial Printer
FL Smidth Loadcell	Siemens Micromaster Driver(USS)
GE SNP	Toshiba (Link Port)Series PLCs
GE SNP-X	Toshiba Inverters PLCs
Idec PLCS	Toshiba T series
LG Master K Series PLC	TriPLC
LG Master K 300S	Twido PLCs
Mitsubishi FX	Unitelway PLCs
Mitsubishi Q Series PLCS(Serial)	Universal Serial Driver(ASCII)

Product Modes

These products have three basic operation modes, the RUN mode, the HALT mode and the ERROR mode. It also has the RUN-F modes mainly for system checking.

RUN:

The RUN mode is a normal control-operation mode.

In this mode, the base model reads input signals, executes the user pro- gram, and updates the output devices according to the user program. In the RUN mode, FlexiLogics® unit executes the user's ladder program logic, which is the basic operation of a PLC. In this mode task defined in the application are also executed.

EEPROM write are possible while the FlexiLogics® base is in the RUN mode.

HALT:

The HALT mode is a STOP mode.

In this mode, user program execution is stopped, and all outputs are brought to zero (0).

Program loading into the FlexiLogics® base unit is possible in the HALT mode.

ERROR:

The ERROR mode is a shutdown mode because of self-diagnosis.

The FlexiLogics® base model enters the ERROR mode if internal error is detected by self-diagnosis. In this mode, program execution is stopped, and all outputs are brought to "Error State Output Condition" defined in the application. The cause of the shutdown can be confirmed by connecting the programming tool.

To exit from the ERROR mode, execute the Error Reset command from the programming tool, or cycle power off and then on again.

RUN-F:

The RUN-F mode is a forced RUN mode provided for program checking.

This mode is effective when using the expansion, I/O's. Different from the normal RUN mode, the RUN-F mode allows operation even if the registered I/O modules are not actually mounted. In this mode the physical outputs are not updated, only the registers are updated.

[Note: For more information refer Force Download Mode given below.]

Boot Block:

RUN and ERROR LED blinking in sink 500ms ON/OFF, the system is in Boot Block mode.

The operation modes are switched by the mode control switch provided on the FlexiLogics® base model and the mode control commands issued from the programming tool.

Force Download Mode

In case the PLC is not responding for the firmware download command and when it does not allow the further download in the unit, PLC can be driven in the Force download mode. Follow the following step to enter the force download mode.

We can do it by using 2 ways:

1. Using RS232 Cable

1. Power off the unit.
2. Remove all communication cables. No need to remove USB cable.
3. Short the pin 2 and 8 of Com1 (RJ45). (Prepare the special RJ cable for this).
4. Turn the Run/Halt switch to halt position.
5. Power on the unit.
6. Wait for 10 Seconds.
7. Unit enters the Force download mode. The indication is that
the Run and Error LEDs start blinking at 1 sec interval.
8. Remove the short of pin 2 and 8 of com1 RJ45.
9. Download the firmware first, using USB or Com1 RS232 cable.
10. The device remains in the "Force Download Mode" only for one minute. After one minute
it exits from this mode and executes the firmware if it is valid. This is indicated by turning off
Run and Error LEDs.
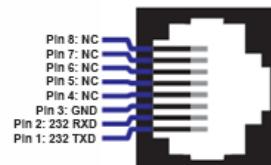
2. Using RS485 Cable

1. Power off the unit
2. Remove all communication cables. No need to remove USB cable.
3. Short the pin A and GND (⏚) of Com2 (4-pin PBT).
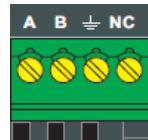
4. Turn the Run/Halt switch to halt position.
5. Power on the unit.
6. Wait for 10 Seconds.
7. Unit enters the Force download mode. The indication is that the Run and Error LEDs start
 blinking at 1sec interval.

8. Remove the short pin A and GND (⏚) of Com2 (4-pin PBT).
9. Download firmware first, using USB or Com1 RS232 cable.
10. The device remains in the "Force Download Mode" only for one minute. After one minute it exits from this mode and executes the firmware if it is valid.

LED Indication for Product

LED	Color	Status
Run	GREEN	ON: Unit is in RUN mode
		OFF: Unit is not in RUN mode (unit may be in HALT, HOLD, ERROR, etc.)
Error	GREEN	ON: Unit is in ERROR mode.
		OFF: Unit is not in ERROR mode.
Power	GREEN	ON: If supply voltage 24VDC is given

System Defined Tag Database

Configuration Registers

Configuration Registers	Tag Name	Tag Type	Type (R /W /RW)	FL004-0806P/N	FL004 -0806R
MW0000	PLC _Mode_Control	WORD	Read/Write	Yes	Yes
MW0003	RUN_STOP_Switch_Control_Retentive	WORD	Read Only	Yes	Yes
MW0054	Trapezoidal_Min_Pulse_Count_Register_CH1	DWORD	Read Only	Yes	No
MW0056	Trapezoidal_Min_Pulse_Count_Register_CH2	DWORD	Read Only	Yes	No
MW0059	PWM_Configuration_Register_CH1	WORD(R)	Read/Write	Yes	No
MW0060	Frequency_Min_Freq_Setting_Register_CH1	DINT(R)	Read/Write	Yes	No
MW0062	ON_Duty_Cycle_Max_Freq_Setting_Register_CH1	DWORD(R)	Read/Write	Yes	No
MW0064	Acceleration_Time_CH1	WORD(R)	Read/Write	Yes	No
MW0065	Deceleration_Time_CH1	WORD(R)	Read/Write	Yes	No
MW0066	Total_Pulses_CH1	DWORD(R)	Read/Write	Yes	No
MW0068	Elapsed_Value_CH1	DWORD	Read/Write	Yes	No
MW0075	PWM_Configuration_Register_CH2	WORD(R)	Read/Write	Yes	No
MW0076	Frequency_Min_Freq_Setting_Register_CH2	DINT(R)	Read/Write	Yes	No
MW0080	Acceleration_Time_CH2	WORD(R)	Read/Write	Yes	No
MW0081	Deceleration_Time_CH2	WORD(R)	Read/Write	Yes	No
MW0082	Total_Pulses_CH2	DWORD(R)	Read/Write	Yes	No
MW0084	Elapsed_Value_CH2	DWORD	Read/Write	Yes	No
MW1700	PWM_Configuration_Register_CH3	WORD(R)	Read/Write	Yes	No
MW1701	Frequency_Min_Freq_Setting_Register_CH3	DINT(R)	Read/Write	Yes	No
MW1703	ON_Duty_Cycle_Max_Freq_Setting_Register_CH3	DWORD(R)	Read/Write	Yes	No
MW1705	Acceleration_Time_CH3	WORD(R)	Read/Write	Yes	No
MW1706	Deceleration_Time_CH3	WORD(R)	Read/Write	Yes	No
MW1782	PWM_Configuration_Register_CH4	WORD(R)	Read/Write	Yes	No
MW1783	Frequency_Min_Freq_Setting_Register_CH4	DINT(R)	Read/Write	Yes	No
MW1785	ON_Duty_Cycle_Max_Freq_Setting_Register_CH4	DWORD(R)	Read/Write	Yes	No
MW1787	Acceleration_Time_CH4	WORD(R)	Read/Write	Yes	No
MW1788	Deceleration_Time_CH4	WORD(R)	Read/Write	Yes	No
MW1789	Total_Pulses_CH4	DWORD(R)	Read/Write	Yes	No
MW1791	Elapsed_Value_CH4	DWORD	Read/Write	Yes	No
MW1793	Trapezoidal_Min_Pulse_Count_Register_CH4	DWORD	Read Only	Yes	No
MW1795	DZRN_Z_Phase_Or_Displacement	DINT(R)	Read/Write	Yes	No

Configuration Coils

Configuration Coil	Name	Tag	Type (R/W/RW)	FL004 0806P/N	FL004 0806R
M00016	CPU_error	BOOL	R	Yes	Yes
M00017	IO_error	BOOL	R	Yes	Yes
M00018	Program_error	BOOL	R	Yes	Yes
M00021	Clock_calendar_illegal_value_warning	BOOL	R	No	No
M00022	Retentive_data-invalid_warning	BOOL	R	Yes	Yes
M00027	Watchdog_timer_error	BOOL	R	Yes	Yes
M00028	IO_Bus_error	BOOL	R	Yes	Yes
M00029	IO_Mismatch_error	BOOL	R	Yes	Yes
M00031	IO_Communication_error	BOOL	R	Yes	Yes
M00033	Ladder_scan_time_error	BOOL	R	Yes	Yes
M00480	System_timer_coil_for_100_millisecond_interval	BOOL	R	Yes	Yes
M00481	System_timer_coil_for_200_millisecond_interval	BOOL	R	Yes	Yes
M00482	System_timer_coil_for_400_millisecond_interval	BOOL	R	Yes	Yes
M00483	System_timer_coil_for_800_millisecond_interval	BOOL	R	Yes	Yes
M00484	System_timer_coil_for_1_sec_interval	BOOL	R	Yes	Yes
M00485	System_timer_coil_for_2_sec_interval	BOOL	R	Yes	Yes
M00486	System_timer_coil_for_4_sec_interval	BOOL	R	Yes	Yes
M00487	System_timer_coil_for_8_sec_interval	BOOL	R	Yes	Yes
M00496	Timer_interrupt_ladder_execution_status	BOOL	R	Yes	Yes
M00497	IO1_interrupt_execution_status	BOOL	R	No	No
M00498	IO2_interrupt_execution_status	BOOL	R	No	No

Single Phase Single Input Mode Setting

Channels	CH-1	CH-2	CH-3	CH-4	CH-5	CH-6	CH-7	CH-8
Physical Input	X0	X1	X2	X3	X4	X5	X6	X7
Config. Reg	MW0010	MW0020	MW0040	MW0046	MW1713	MW1718	MW1724	MW1729
Counter Reg	MW0011	MW0021	MW0041	MW0047	MW1714	MW1719	MW1725	MW1730
Preset Reg	MW0013	MW0023	MW0043	MW0049	MW1716	MW1721	MW1727	MW1732
Rate Reg	MW1734	MW1740	MW1746	MW1752	MW1758	MW1764	MW1770	MW1776
Rate Span Reg	MW1736	MW1742	MW1748	MW1754	MW1760	MW1766	MW1772	MW1778
Pulses Per Scan Reg	MW1738	MW1744	MW1750	MW756	MW1762	MW1768	MW1774	MW1780
HSC Enable Bit	M00240	M00400	M00720	M00723	M00246	M00406	M00252	M00412
HSC Reset Bit	M00241	M00401	M00721	M00724	M00247	M00407	M00253	M00413
HSC Preset Reach Bit	M00242	M00402	M00722	M00725	M00248	M00408	M00254	M00414
Rate Span Error Bit	M00244	M00404	M00727	M00730	M00250	M00410	M00733	M00415
HSC Physical Reset	X1	X0	X3	X2	X5	X4	X7	X6
Force Output	Y0	Y1	Y2	Y3	Y4	Y5	NA	NA
HSC Dir Control Bit	M00096	M00097	M00098	M00099	M00100	M00101	M00102	M00103

Single Phase Two Input Mode Setting

MODE	1.UP-DOWN DIRECTION MODE				2.UP-DOWN MODE			
Channels	**CH-1**	**CH-3**	**CH-5**	**CH-7**	**CH-1**	**CH-3**	**CH-5**	**CH-7**
Physical Input	X0: Pulses	X2: Pulses	X4: Pulses	X6: Pulses	X0: Up Count	X2: Up Count	X4: Up Count	X6: Up Count
Direction Input	X1: Direction	X3: Direction	X5: Direction	X7: Direction	X1: Down Count	X3: Down Count	X5: Down Count	X7: Down Count
Config. Reg	MW0010	MW0040	MW1713	MW1724	MW0010	MW0040	MW1713	MW1724
Counter Reg	MW0011	MW0041	MW1714	MW1725	MW0011	MW0041	MW1714	MW1725
Preset Reg	MW0013	MW0043	MW1716	MW1727	MW0013	MW0043	MW1716	MW1727
Rate Reg	MW1734	MW1746	MW1758	MW1770	MW1734	MW1746	MW1758	MW1770
Rate Span Reg	MW1736	MW1748	MW1760	MW1772	MW1736	MW1748	MW1760	MW1772
Pulses Per Scan Reg	MW1738	MW1750	MW1762	MW1774	MW1738	MW1750	MW1762	MW1774
HSC Enable Bit	M00240	M00720	M00246	M00252	M00240	M00720	M00246	M00252
HSC Reset Bit	M00241	M00721	M00247	M00253	M00241	M00721	M00247	M00253
HSC Preset Reach Bit	M00242	M00722	M00248	M00254	M00242	M00722	M00248	M00254
Rate Span Error Bit	M00244	M00727	M00250	M00733	M00244	M00727	M00250	M00733
HSC Physical Reset	X4	X6	X0	X2	X4	X6	X0	X2
Force Output	Y0	Y2	Y4	NA	Y0	Y2	Y4	NA
HSC Dir Control Bit	NA	NA	NA	NA	NA	NA	NA	NA

Two Phase Two Input Mode Setting

Channels	CH-1	CH-3	CH-5	CH-7
Physical Input	X0: A-Phase	X2: A-Phase	X4: A-Phase	X6: A-Phase
Direction Input	X1: B-Phase	X3: B-Phase	X5: B-Phase	X7: B-Phase
Config. Reg	MW0010	MW0040	MW1713	MW1724
Counter Reg	MW0011	MW0041	MW1714	MW1725
Preset Reg	MW0013	MW0043	MW1716	MW1727
Rate Reg	MW1734	MW1746	MW1758	MW1770
Rate Span Reg	MW1736	MW1748	MW1760	MW1772
Pulses Per Scan Reg	MW1738	MW1750	MW1762	MW1774
HSC Enable Bit	M00240	M00720	M00246	M00252
HSC Reset Bit	M00241	M00721	M00247	M00253
HSC Preset Reach Bit	M00242	M00722	M00248	M00254
Rate Span Error Bit	M00244	M00727	M00250	M00733
HSC Physical Reset	X4	X6	X0	X2
Force Output	Y0	Y2	Y4	NA
HSC Dir Control Bit	NA	NA	NA	NA

Register Configuration Description

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Both Edge selection	Preset Selection	Rate Enable Selection	Execute Logic Selection	Frequency Mode	Reset Output	Force Output Configuration	Force Mode Selection	Quadrature Mode		Enable Selection	Direction Control	Edge Selection	Mode Selection		

Bit No.	Function	Description
15	Both Edge Selection	If Single Phase Input 0: Rising/Falling Control by Bit-3 (1 - Time Frequency Mode) 1: Both Edges Rising & Falling (2 - Time Frequency Mode)
14	Preset Selection	0: Preset Value in MW Preset Register 1: Constant Preset Value
13	Rate Enable Selection	0: Rate Functionality Disable 1: Rate Functionality Enable
12	Execute Logic Selection	Preset Reached Action 0: Execute Logic Disable 1: Execute Logic Enable
10	Reset Selection	0: Reset by Bit 1: Reset by Hardware Pin
9	Force Output Configuration	If Force output Enable 0: Force Output ON When Preset Reach 1: Force Output OFF When Preset Reach
8	Force control Selection	Preset Reached Action 0: Force Output Disable 1: Force Output Enable if Execute Logic Enable Force Output Don't care
7 & 6	Quadrature Mode	If Two Phase Two Input Mode, Select 00: 1X Mode 01: 2X Mode 10: 4X Mode
5	Enable Selection	0: Enable by Bit 1: Enable at Power ON
4	Direction Control	0: Up Counting 1: Down Counting
3	Edge Selection	0: Falling Edge 1: Rising Edge
2 to 0	Mode Selection	000: Normal Mode 010: Single Phase Single Input Mode 011: Two Phase Two Input Mode (Quadrature) 100: Single Phase Two Input Up Down Direction Mode 101: Single Phase Two Input Up Down Mode

Wizard Configuration
HSC

Wizards are used to set some parameters as follows:
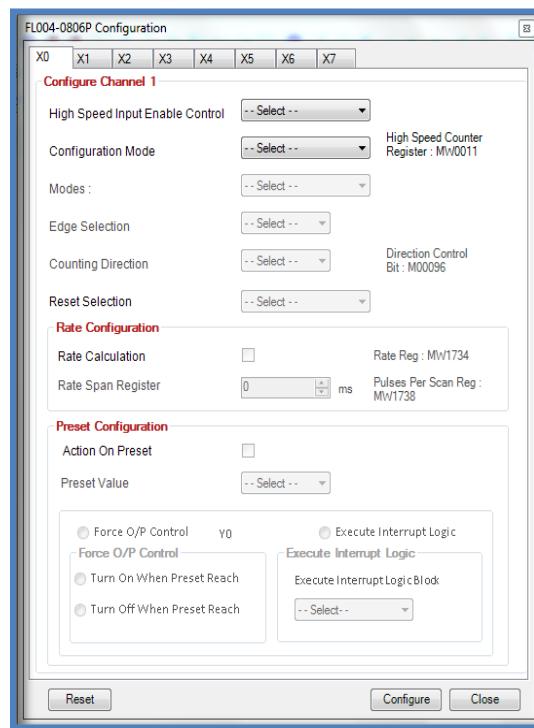
Configurations	Descriptions
High Speed Input Enable Control	There are Two Selections under this option: 1. At Power On: No need to Enable Counter Bit, it counts when Pulses at Inputs Pin. 2. Bit Control: Dedicated Bit Provided to Enable or Disable Counting.
Configuration Mode	There are Three Selection under this option used to select mode of HSC: 1. Single Phase Input 2. Single Phase Two Input 3. Quadrature for Description of this mode, refer FL Manual. for New modes refer New mode Description tab of this sheet.
Modes	This Option is used to select sub modes of above configurations modes. This is applicable for Single Phase Two Inputs & Quadrature Modes.
Edge Selection	There is Three Selection under this option: 1. Rising 2.Falling 3.Rising & falling Previously in HSC there are only two edge selections modes, Now we are included new Edge Selection mode is Rising & Falling. Rising & Falling is like a two times Freq Modes. Counter Counts on both Rising & Falling Edges of Input Pulses. Edge Selection Option is available for Single Phase Input & Single Phase Two Inputs modes, Not Available for Quadrature mode.
Counting Direction	This option is used to select Up counting & Down Counting modes this selection is available only for Single Phase Input Mode. New modification has done in the Counting Direction is, Dedicated Bit is assigned to change Counting Direction at runtime, When Bit is '0': up Counting & '1': Down counting.
Reset Selection	There are two Options to reset counter: 1. Internal Reset Bit: Dedicated coil is assigned for channels to reset counter if it is '1 ' then counter gets reset. 2. External Physical Reset: Dedicated Hardware Input Pin is assigned for channels to reset counter for channels in different modes (Refer HSC Details tab).
Rate Configuration	Configure settings related to the Rate Functionality.
Rate Calculation	If this is select, then Rate Functionality is Enable otherwise it is Disable.
Rate Span Register	This Register is used to give Span in ms to calculate Rate. Refer Span calculation tab to calculate Span Value
Preset Configuration	Configure Settings related to the Preset Functionality.
Preset Value	There are Two ways to Give Preset Value. 1. Constant Value 'K'. Does not change Runtime 2. MWxxx - We provides Tag for Preset Value

Action to Be Performed after Preset reach	There are Two actions, one of which needs to be performed on preset reach: 1. Force Output Control: Dedicated Force Output is assigned for HSC channels. 2. Execute Logic: You need to create blocks in Hardware Interrupt under logic block. Created blocks appears in the selection window for execute block on Preset reach. Select block will executed only once after Preset reach. Logic Execution Time should not be large than Input Pulses.

PWM

PWM are used to set some parameters as follows:
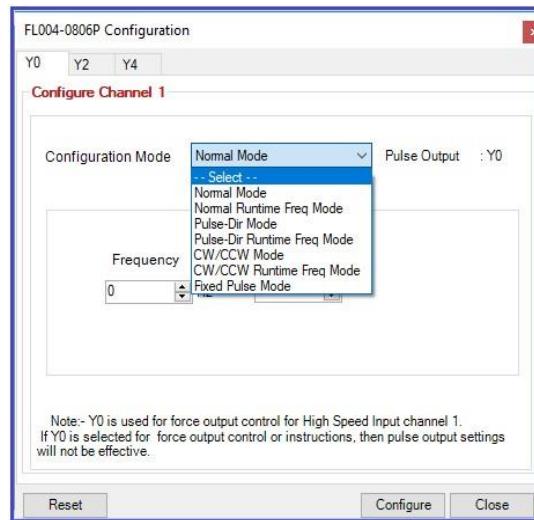
PWM TAG INFORMATION

Channels	CH-1	CH-2	CH-3
Pulse Output	Y0	Y2	Y4
Direction Output	Y1	Y3	Y5
Config. Reg	MW0059	MW0075	MW1700
Frequency Reg	MW0060	MW0076	MW1701
Duty Reg	MW0062	MW0078	MW1703
Acceleration Time Reg	MW0064	MW0080	MW1705
Deceleration Time Reg	MW0065	MW0081	MW1706
Total Pulses Reg	MW0066	MW0082	MW1707
Elapsed Value Reg	MW0068	MW0084	MW1709
Trapezoidal Min Pulse Count	MW0054	MW0056	MW1711
Pulse Enable Flag	M00816	M00832	M00848
Duty Setting Error Flag	M00818	M00834	M00850
Frequency Setting Error Flag	M00819	M00835	M00851
Acc Time Setting Error Flag	M00820	M00836	M00852
Dec Time setting Error Flag	M00821	M00837	M00853
Number of Pulses Setting Error Flag	M00822	M00838	M00854
End of Total Pulses Flag	M00823	M00839	M00855
Pulse Output Pause	M00112	M00113	M00114
Pulse Output Pause Status	M00116	M00117	M00118
Auto Reset After Pulse Completed	M00120	M00121	M00122
Direction Coordinate change	M00104	M00105	M00106
Decel Condition	M00108	M00109	M00110
Target Freq Setting Err Flag	M00124	M00125	M00126

Revision History

Revision	Description	Date	Prepared by	Approved by
1.0	First Draft	19/07/2018	PM	AR

Renu Electronics reserves the right to change or discontinue specifications and features without prior notice.

NOTES