

FlexiPanels® - Keypad Based HMI + Pluggable I/O



FP4020
16 x 2 Multicolor LCD



Back view for HMI with built-in I/O



FP4030
3.1" Multicolor LCD



Back view for HMI with built-in I/O



Back view for HMI with expansion
(Up-to 3 expansions)



Salient Features :-

- 16 x 2 Text and 3.1" Graphical / Multicolor Backlight LCD Display
- Floating point support, Bar graph, Built-in RTC
- Integrated / Pluggable Digital and Analog Inputs and Outputs
- Digital Outputs - OC / Relays
- Analog Inputs for RTD, mV, mA, Thermocouple, 0 to 5 VDC, 0 to 10 VDC, -10 to +10VDC
Analog Outputs are 4-20 mA / 0-10 VDC
- High Speed Counters and Timers
- Support for Quadrature inputs and PWM output
- Ladder editor with powerful instruction set
- Support for Recipes
- Communication Ports:
One serial port to connect PLC at RS232 / 422 / 485 levels / Printer / Programming Port
One USB (Device) port as Programming Port
- User defined Function keys to support various tasks
- Alarms (Real Time & Historical)
- Multilanguage (Unicode) support with true type Windows® fonts for graphical model
- IP66 design. CE, UL approved. RoHS compliant
- Common Programming software for the entire FlexiPanels® family.....FREE!!



Operations :-

The FlexiPanels® support Operator interface features. The user can also implement logic, specific to application using standard Ladder programming. A PLC logic block can be executed at power up, during every scan or upon a timer interrupt. The FlexiPanels® operator interface functions revolve around Screens and Tasks that can be assigned to screens and application.

Integrated Digital I/O

FP4030MR-L1208R model can have up-to 12 digital Inputs integrated to the unit. Digital inputs are high impedance 24 VDC. The unit can also have up-to 08 digital outputs. Outputs are 06 relays + 02 transistor outputs (NPN).

Pluggable I/O (Digital)

FlexiPanels® have facility to support I/O using pluggable I/O modules. The I/O modules can be selected based on the application requirement. Each high speed I/O module can support 4 nos. of high speed inputs of 25KHz. Quadrature input of up-to 20KHz is also supported. Each high speed I/O Module can support 1 quadrature input of 20KHz or 2 quadrature inputs of 5KHz. Each high speed I/O Module can support up-to 2 PWM outputs of 10KHz. Up-to 3 I/O modules can be connected to FP4030MR-E model.

Analog I/O

FP4030MR-E supports pluggable Analog I/O Modules. FlexiPanels® can have up-to 24 Analog inputs and / or 6 Analog outputs. The Analog inputs are 0-5 VDC, 0-10 VDC, 4-20 mA, mV, TC, RTD, - 10 to + 10 VDC and Analog outputs are 4-20mA / 0-10VDC. User can Plug only Analog I/O modules or use them in combination with Digital I/O.

Function Keys

FlexiPanels HMI's are available with function keys and Numerical keypad for easy data entry. The Function keys also have built-in LEDs. These function keys are screen dependent Function Keys. User can assign any application related task / actions to these function keys.

Alarms

Real time and historical Alarms can be defined in FlexiPanels®. User-friendly Alarm object can be defined on the display. Alarms can be real time or historical. Keys can be assigned to acknowledge Alarm, view and scroll.

Recipes

Recipes data is stored in the FlexiPanels® memory. With one button stroke, a set of data can be downloaded to the PLC. Once in the local memory, the recipes data can be edited using simple data entry objects.

Bitmaps / Wizards

Different bitmaps can be embedded on the FlexiPanels® screen (Graphical Model). Bitmaps can be imported into the application and displayed on the FlexiPanels® screens. In addition, several wizards are supported to create commonly used objects such as Analog meters, Lamps, Buttons and Bar graphs.

Ladder Support

FlexiPanels® support ladder functionality. User can define logic in the unit using FlexiSoft® software. The execution of ladder could be through communication port or through I/O. Only HMI version of FlexiPanels® also support ladder functionality. It is used for critical applications where data is processed before sending it to controller. The FlexiLogics® support following different types of instructions :

I/O Instructions -

NO contact
Falling Edge
Inverter Coil
Positive pulse coil

NC contact
Rising Edge
Positive Pulse Contact
Negative Pulse Coil

Output
Inverter
Negative Pulse Contact

Data Transfer -

MOV word
Table Initialize
Data Exchange

MOV DWORD
Table Block Transfer
Multiplexer

Invert Transfer
Table Invert Transfer
Demultiplexer

Math-
Addition
Division
Increment

Subtraction
Addition with Carry
Decrement

Multiplication
Subtraction with Carry

Compare -
Greater than
Not Equal

Greater than or equal
Less Than

Equal
Less than or Equal

Logic -
AND
Shift

OR
Rotate

XOR

Data Conversion -
Hex to Ascii
7 segment decode
BCD conversion
2's complement

Ascii to Hex
Ascii conversion
2's complement word
Double word

Absolute Value
Binary Conversion

Timer -
TON

TOFF

TSS

Counter-
Up counter

UP Down Counter

Program Control -
Subroutine CALL
Next
Jump Control Set
Dis Intr
Step sequence Input

Subroutine RET
Master Control Set
Jump Control Reset
DT
Step sequence output

For
Master Control Reset
En Intr
Step sequence Init

Function -
Moving Average
Upper limit
Average Value

Digital Filter
Lower limit
Function generator

PID1,4
Maximum Value
Minimum Value

Special -
Device Set
Register Reset
Encode Decode
Direct I/O

Device Reset
Set Carry
Bit Count
Set Calender

Register Set
Reset Carry
Flip Flop
Calender Operation

The execution of ladder logic is in microseconds. Ladder monitoring for debugging is also supported in FlexiPanels® configuration software.

Multilanguage / Unicode Support

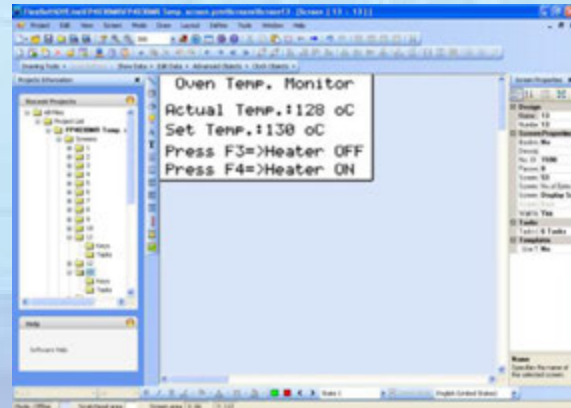
All the languages are supported in the FlexiPanels® (Graphical Model). The user can now display messages, alarms in any regional / local language. All Windows® fonts can also be used for text in an application.

Communication Ports

Function Keys based FlexiPanels® have one serial communication port. The serial port can be used for programming of FlexiPanels®, printing screens (alphanumeric data), connecting to third party serial devices (barcode readers, temp scanners etc.) or to connect to a PLC or drive. User can configure serial port for RS232 or RS485 communication.

Configuration Software

FlexiSoft® is a compact, Windows® based software to configure the FlexiPanels® units. User friendly configuration tools and easy approach, helps user create applications quickly and easily.



To get started with FlexiPanels®, user needs:

1. FlexiPanels® unit
2. FlexiSoft® Software
3. USB Programming cable (Part no. PC-USBAB-00)

OS requirements for FlexiSoft® are:

Windows Version : Microsoft Windows® 2000 or above

Operations :-

Supported Task in FlexiPanels® are :

Task	Type	Power up	Global	Screen			Key/button		
				Before showing	While showing	After hiding	Press	While Pressed	Release
Go to screen		✓	✗	✓	✗	✓	✓	✗	✓
Go to next screen		✗	✗	✓	✗	✓	✓	✗	✓
Go to previous screen		✗	✗	✓	✗	✓	✓	✗	✓
Write value to tag		✓	✓	✓	✓	✓	✓	✓	✓
Add constant to tag		✓	✓	✓	✓	✓	✓	✓	✓
Subtract constant from tag		✓	✓	✓	✓	✓	✓	✓	✓
Add tag B to Tag A		✓	✓	✓	✓	✓	✓	✓	✓
Subtract tag B from Tag A		✓	✓	✓	✓	✓	✓	✓	✓
Turn bit ON		✓	✓	✓	✓	✓	✓	✗	✓
Turn bit OFF		✓	✓	✓	✓	✓	✓	✗	✓
Toggle bit		✓	✓	✓	✓	✓	✓	✗	✓
Copy Tag B to Tag A		✓	✓	✓	✓	✓	✓	✓	✓
Swap Tag A and tag B		✓	✓	✓	✓	✓	✓	✗	✓
Print Data		✗	✗	✗	✗	✗	✓	✗	✓
Set RTC		✗	✗	✗	✗	✗	✓	✗	✓
Copy tag to STR		✓	✓	✓	✗	✓	✓	✗	✓
Copy tag To LED		✓	✓	✓	✓	✓	✗	✗	✗
Delay		✗	✗	✗	✓	✗	✗	✗	✗
Wait		✗	✗	✗	✓	✗	✗	✗	✗
Copy HMI block to HMI/PLC block		✓	✓	✓	✓	✓	✓	✓	✓
Copy HMI/PLC block to HMI block		✓	✓	✓	✓	✓	✓	✓	✓
Copy RTC to PLC block		✗	✓	✗	✗	✗	✓	✗	✓
GoTo Popup screen*		✗	✗	✗	✗	✗	✗	✗	✗
Keys Specific Tasks		✗	✗	✗	✗	✗	✓	✓	✓
USB Data Log Upload		✗	✗	✗	✗	✗	✗	✗	✗

* Available only in Touch Screen Models.

Protocols Supported for :-

Driver	FP4020	FP4030
ABB	✓	✓
Allen Bradley DF1	✓	✓
Aromat FP Series	✓	✓
Baldor	✓	✓
Danfoss Drive	✓	✓
Delta	✓	✓
Fatek	✓	✓
FlexiLogics***	✓	✓
GE Fanuc	✓	✓
GE SNP-X	✓	✓
Idec	✓	✓
LG Master K series	✓	✓
LG Master-K 300S	✓	✓
Mitsubishi FX	✓	✓
Mitsubishi Q series (Serial)	✗	✓
Modbus master	✓	✓
Modbus slave	✓	✓
Serial Monitor	✓	✓
Toshiba Inverters	✓	✓
Toshiba T1	✓	✓
Toshiba T2 Link port	✓	✓
Twido	✓	✓
Unitelway	✓	✓
Universal Serial (ASCII)	✓	✓

***Supported with native programming environment.

Specifications :-

Power	: + 24V DC ±15%
	FP4020 - 2 W Max
	FP4030 - 3 W Max
Bezel	: IP66 rated Keypad
Operating Temperature	: 0° to 50°C
Storage Temperature	: -20° to 80°C
Humidity	: 10% to 85% (Non condensing)
Communication Ports	: One serial port (RS232 / RS422 / RS485 levels supported)
USB Device Port	: As programming and monitoring port
Type of LCD	: Multicolor Backlight LCD
Isolation	: Isolation between communication and power ports is 500 V DC for 1 Min.
Immunity to ESD	: as per IEC61000-4-2
Immunity to Fast Transients	: as per IEC61000-4-4
Immunity to Radiated electromagnetic field	: as per IEC61000-4-3
Immunity to Conducted disturbances	: as per IEC61000-4-6
Surge	: as per IEC61000-4-5
Radiated emission	: as per EN55011

Analog Inputs	
Resolution	12-bit
Voltage Mode	Y
Input Range	-10V to +10V
Value of LSB	For 0-10V : 2.44mV For +/- 10V : 4.88mV
Input Impedance	200KΩ
Accuracy at 25°C	0.1% of full scale
Overall accuracy (-25°C to 55°C) % Full Scale	0.3% of full scale
Frequency Limit (-3db)	3.5KHz
Behavior upon sensor failure	Input goes to 0, as if no input is connected
Current Mode	Y
Input Range	4mA – 20mA, 0mA - 20mA
Value of LSB	3.906uA
Input Impedance	120Ω
Accuracy at 25°C	0.2% of full scale
Overall accuracy (-25°C to 55°C) Full scale	0.8% of full scale
Frequency Limit (-3db)	15KHz
Behavior upon sensor failure	Input goes to 0, as if no input is connected
Maximum permissible voltage (surge voltage) between analog inputs	500V
between analog inputs and reference	1000V
Reverse Connection Protection	No

Digital Inputs		
Rated Input Voltage		
Rated Input Voltage	For Normal Input 24 VDC (Max is 28 VDC)	For High Speed 24 VDC (Max is 28 VDC)
Impedance	4.7 k	2.3 k
Logic '0' Voltage : 0 to 5 V Logic '1' Voltage : 14 to 28 V		
Rated Input Current at (24 VDC)		
Rated Input Current	For Normal Input 4.89 mA	For High Speed 10 mA
Digital Outputs (Open Collector)		
Maximum Load current :	500 mA NPN or PNP. Short circuit protected	
Voltage drop at ON :	0.4 V or less	
Digital Outputs (Relay)		
Relay Rating :	230 V AC, 2 Amp. (Max) 5 Amp per common	

Analog Outputs	
Resolution	12bit
Voltage Mode	Y
Output Range	0 to +10V
Value of LSB	2.44mV/step
Output Load minimum	1000Ω
Accuracy at 25°C	0.05% of full scale
Overall accuracy (-25°C to 55°C) % Full Scale	±10ppm/°C
Current Mode	
Output Range	4mA to 20mA
Value of LSB	3.9uA
Output Load maximum	500Ω
Accuracy at 25°C	0.13% of full scale
Overall accuracy (-25°C to 55°C) % Full Scale	±10ppm/°C
Current Mode	
Output Range	0mA to 20mA
Value of LSB	4.8uA
Output Load	500Ω
Accuracy at 25°C	0.13% of full scale
Overall accuracy (-25°C to 55°C) % Full Scale	±10ppm/°C

Specifications :-

High Speed Digital inputs and PWM output -
 FPED-HS-0808N (NPN Type transistor output)
 FPED-HS-0808P (PNP Type transistor output)

24V DC Digital Inputs	
Number of Inputs	8 Inputs Bi-directional Type (Within which 4 are high speed)
Isolation	Optically isolated from internal circuit. High isolation voltage(BV=3750Vr.m.s.)
Input Impedance	4.9K Ω
Turn OFF time	10msec
Turn ON time	10msec
High Speed Inputs	
Number of HS Inputs	4
High Speed Channels	X0, X5, X2, X7
Max. input frequency	25KHz
Max. input count	4294967295
24V DC Digital Outputs PNP / NPN Transistor type	
Number of Outputs	8 PNP / NPN type (Within which 2 are high speed outputs)
Nominal Output current per channel	500mA Typical [For HS: FPED-HS-0808N: 300mA and FPED-HS-0808P: 250mA]
Isolation	Optically isolated from internal circuit. High isolation voltage(BV=3750Vr.m.s.)
Short Circuit protection	Auto Protection for 6 normal digital output PNP / NPN type channels.
Nominal load	
- Ohmic	48 Ω / 12 W
- Lamp	12 W
- Inductive	12 VA (1.2 H, 50 W)
Switching frequency with	
- Inductive nominal load	0.5 Hz (1.2 H, 50 W), maximum
24V DC Auxiliary Power Supply	
Nominal value	24 V DC
Tolerance	-15% / +20% according to EN 61131-2
Safety equipment	Surge voltage, protection against Reversal polarity

FPEA0800LV

Analog Inputs	
Number of inputs	8
Resolution	12 Bit
Voltage Mode:	
Input Range	-10V to +10V, 0V to 10V
Value of LSB	For 0-10V : 2.44mV For +/- 10V : 4.88mV
Input Impedance	200 K Ω
Accuracy	At 25°C: 0.1% of full scale. Overall accuracy (-25°C to 55°C) : 1% of full scale Max.
Behavior upon sensor failure	Input goes to 0, as if no input is connected

Universal Analog Inputs -
 FPEA-0402U-16

Analog Inputs	
Number of inputs	4
Resolution	16 Bit
Input range:	
Voltage	0 to 10VDC and 0 to 5VDC
Current	0 to 20mA and 4 to 20mA
Thermocouple	
	J type -210 to 1200°C K type -200 to 1373°C
mV	0 to 50mV and 0 to 100mV
RTD	
	α (PT100): -200 to 850°C α (PT100): -100 to 457°C and PT1000: -200 to 850°C
Overall accuracy	1 % of full scale (Max)
Input Impedance	1M Ω for voltage, thermocouple, mV and RTD input 100 Ω for current input (with fuse)
Absolute maximum input	\pm 30VDC, 30mA
Output Type	
Analog (voltage and current), non-isolated	
Number	2
Resolution	16 bit
Output range:	
Voltage	0 to 10VDC and 0 to 5VDC
Current	0 to 20mA and 4 to 20mA
Overall accuracy	1% of full scale (Max)
Load	1K Ω (Min) for Voltage and 500 Ω (Max) for current
24V DC Auxiliary Power Supply	
Nominal value	24 V DC
Tolerance	-15% / +20% according to EN 61131-2
Safety equipment	Surge voltage, protection against Reversal polarity

FPEA0800LC

Analog Inputs	
Number of inputs	8
Resolution	12 Bit
Current Mode:	
Input Range:	4 - 20mA and 0 - 20mA
Value of LSB:	3.906 μ A
Input Impedance	120 Ω
Accuracy	At 25°C: 0.1% of full scale. Overall accuracy (-25°C to 55°C) : 1% of full scale Max.
Behavior upon sensor failure	Input goes to 0, as if no input is connected

Supported Printers :-

FlexiPanels® support following Dot matrix serial printers:

- > EPSON
- > SAMSUNG
- > TVS



Model Comparison :-

Product	Model	Display	LCD Life at 25°C	Keys	Memory	PLC Steps	Screen Memory	Local I/O	Expansion	Serial Ports**	USB	RTC	Power Consumption	Weight	Bezel Dimensions (mm)	Panel Cutout (mm)
FP4020	FP4020MR-L0808N	16x2 Text Multicolor backlight	40000 hrs	18	Up-to 512 k	10 k	Up-to 84 kB	8 DC in 8 NPN 0.5A	NA	1	Device	Yes	2 W	215 gms.	109 W x 71 H x 53 D (Drawing A)	99.5 W x 62.5 H
	FP4020MR-L0808P	16x2 Text Multicolor backlight	40000 hrs	18	Up-to 512 k	10 k	Up-to 84 kB	8 DC in 8 PNP 0.5A	NA	1	Device	Yes	2 W	215 gms.	109 W x 71 H x 53 D (Drawing A)	99.5 W x 62.5 H
	FP4020MR-L0808R	16x2 Text Multicolor backlight	40000 hrs	18	Up-to 512 k	10 k	Up-to 84 kB	8 DC in 6 Relays 2A 2 NPN 0.5A	NA	1	Device	Yes	2 W	220 gms.	109 W x 71 H x 53 D (Drawing A)	99.5 W x 62.5 H
FP4030	FP4030MR-L1208R	128x64 Graphical Multicolor backlight	30000 hrs	18	Up-to 1.5 MB	10 k	Up-to 1 MB	12 DC in 6 Relays 2A 2 NPN 0.5A	NA	1	Device	Yes	3W	320 gms.	128 W x 110 H x 60 D (Drawing C)	119 W x 93 H
	FP4030MR-E	128x64 Graphical Multicolor backlight	30000 hrs	18	Up-to 1.5 MB	10 k	Up-to 1 MB	NA	3	1	Device	Yes	3W	265 gms.	128 W x 110 H x 45 D (Drawing D)	119 W x 93 H

Pluggable Expansion Modules (Digital I/O)									Power Consumption	Weight (Approx.)	Dimensions (mm)
FPED0808P	8 Digital inputs (PNP or NPN) and 8 outputs (0.5A PNP transistor)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
FPED-HS-0808P#	8 Digital inputs and 8 Digital Outputs (PNP Type)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
FPED0808N	8 Digital inputs (PNP or NPN) and 8 outputs (0.5A NPN transistor)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
FPED-HS-0808N#	8 Digital inputs and 8 Digital Outputs (NPN Type)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
FPED0012R	12 Digital outputs (Relay)								0.3 W	90 gms.	36 W x 79 H x 45 D (Drawing G)
FPED1600	16 Digital inputs								0.3 W	65 gms.	36 W x 79 H x 45 D (Drawing G)
FPED0016N	16 Digital outputs (0.5A NPN transistor)								0.3 W	65 gms.	36 W x 79 H x 45 D (Drawing G)
FPED0016P	16 Digital outputs (0.5A PNP transistor)								0.3 W	75 gms.	36 W x 79 H x 45 D (Drawing G)
FPED-HS-0808RP	8 Digital inputs (PNP or NPN) and 8 outputs (6 Relay, 2 PNP)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
FPED-HS-0808RN	8 Digital inputs (PNP or NPN) and 8 outputs (6 Relay, 2 NPN)								0.3 W	70 gms.	36 W x 79 H x 45 D (Drawing G)
Pluggable Expansion Modules (Analog I/O)									Power Consumption	Weight (Approx.)	Dimensions (mm)
FPEA0202L	2 Analog inputs (4-20mA, 0 – 20mA, 0 – 10 V, -10 to + 10V ranges) 2 Analog Outputs (4-20mA, 0 – 20mA, 0 – 10 V)								0.3 W	85 gms.	36 W x 79 H x 45 D (Drawing G)
FPEA0400L	4 Analog inputs (4-20mA, 0 – 20mA, 0 – 10 V, -10 to + 10V ranges)								0.3 W	80 gms.	36 W x 79 H x 45 D (Drawing G)
FPEA-0402U-16	4 Universal Analog Inputs (4-20mA, 0 – 20mA, TC , RTD, 0-5V, 0 – 10 V, 0-50mV, 0 - 100mv ranges) 2 Analog Outputs (4-20mA, 0 – 20mA, 0 – 10 V). All A/I/O 16 bit resolution								0.3 W	90 gms.	36 W x 79 H x 45 D (Drawing G)
FPEA0800LC	8 Analog inputs (4-20mA)								0.3 W	90 gms.	36 W x 79 H x 45 D (Drawing G)
FPEA0800LV	8 Analog inputs (0-10VDC)								0.3 W	90 gms.	36 W x 79 H x 45 D (Drawing G)

4 inputs can be configured as high speed inputs (25KHz) and 2 outputs can be configured for PWM (10 KHz) or 1 quadrature input of 20KHz or 2 quadrature inputs of 5 KHz.
 ** One "D" type port that supports RS232 and RS485 levels on different pins. "Y" type cable can be used for separate RS232 and RS485 levels simultaneously.

Dimensions :-

