

# FL1E IDEC SmartRelay

## Features

- **New** Remote text display panel
- **New** Extended retentive data memory
- **New** Arithmetic functions
- **New** Controllable backlit LCD display
- **New** 4 built-in 5kHz fast inputs
- **New** 4 built-in analog inputs
- **New** 3 memory cartridges
- **New** USB programming cable
- **New** Brighter & higher LCD contrast
- **New** 50% more memory
- EEPROM memory
- Password protection
- Universal voltages
- DIN rail or surface mountable
- Max. 50 message blocks



## Specifications

### Base Modules

Base Module Part Number	with LCD Display	FL1E-H12SND	FL1E-H12RCE	FL1E-H12RCA	FL1E-H12RCC	
	without Display	—	FL1E-B12RCE	FL1E-B12RCA	FL1E-B12RCC	
Power Supply	Rated Power Voltage	24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC	
	Allowable Voltage Range	20.4 to 28.8V DC	10.8 to 28.8V DC	20.4 to 26.4V AC, 20.4 to 28.8V DC	85 to 265V AC, 100 to 253V DC	
	Rated Frequency	—	—	47 to 63Hz	47 to 63Hz	
	Current Draw	40 to 75mA (24V DC)	60 to 175mA (12V DC) 40 to 100mA (24V DC)	76 to 182mA (24V AC) 40 to 100mA (24V DC)	25 to 40mA (100V AC), 20 to 30mA (240V AC) 10 to 25mA (100V DC), 6 to 15mA (240V DC)	
	Allowable Momentary Power Interruption	—	2ms (Typ.) (12V DC) 5ms (Typ.) (24V DC)	5ms (Typ.) (24V AC/DC)	10ms (Typ.) (100V AC/DC) 20ms (Typ.) (240V AC/DC)	
	Power Consumption	0.7 to 1.3W (24V DC)	0.3 to 1.7W (12V DC) 0.4 to 1.8W (24V DC)	0.9 to 2.7VA (24V AC) 0.4 to 1.8W (24V DC)	1.1 to 4.6VA (100V AC), 2.4 to 6.0VA (240V AC) 0.5 to 2.9W (100V DC), 1.2 to 3.6W (240V DC)	
	Reverse Polarity Protection	Yes	Yes	—	—	
Clock	Backup Duration	—	80 hours (25°C) <sup>Note 1</sup>	80 hours (25°C) <sup>Note 1</sup>	80 hours (25°C) <sup>Note 1</sup>	
	Clock Accuracy	—	±2 sec/day maximum	±2 sec/day maximum	±2 sec/day maximum	
Input	Input Signal	DC		AC/DC	AC/DC	
	Input Points	8 (I1 to I8)		8 (I1 to I8)	8 (I1 to I8)	
	Analog Input Points	4 (I1, I2, I7, I8)		—	—	
	High-speed Input <sup>Note 2</sup>	4 (I3, I4, I5, I6), 5kHz maximum		—	—	
	Analog	Input Range	0 to 10V DC (max. rated input: 28.8V DC)		—	—
		Input Error	±1.5 (of full scale)		—	—
		Input Resolution	10 bits (0 to 1000)		—	—
		Allowable Voltage Range	0 to 28.8V DC		—	—
	Input Impedance	Digital Input	3.5kΩ		4.8kΩ	840kΩ
		Analog Input	72kΩ		—	—
	Isolation	—	—	—	—	
	Operating Range	OFF Voltage	< 5V DC		< 5V AC/DC	< 40V AC, < 30V DC
		ON Voltage	≥ 12V DC		≥ 12V AC/DC	≥ 79V AC, ≥ 79V DC
		OFF Current	< 0.85mA (I1 to I6), < 0.05mA (I1, I2, I7, I8)		< 1.0mA	< 0.03mA
ON Current		≥ 2mA (I3 to I6) ≥ 0.15mA (I1, I2, I7, I8)	≥ 1.5mA (I3 to I6) ≥ 0.1mA (I1, I2, I7, I8)	≥ 2.5mA	≥ 0.08mA, 100V AC: 50ms (Typ.)	
Turn ON Time	1.5ms (Typ.) ≤ 1.0ms (I3, I6)		1.5ms (Typ.)	100V AC: 50ms (Typ.), 240V AC: 30ms (Typ.) 100V DC: 25ms (Typ.) 240V DC: 15ms (Typ.)		
Turn OFF Time	1.5ms (Typ.) ≤ 1.0ms (I3, I6)		15ms (Typ.)	100V AC: 65ms (Typ.), 240V AC: 105ms (Typ.) 100V DC: 95ms (Typ.), 240V DC: 125ms (Typ.)		
Wire Length	100m <sup>Note 3</sup>		100m <sup>Note 3</sup>	100m		



1. Two year backup duration (typ.) when battery cartridge or memory/battery cartridge used.

2. When selecting frequency trigger function and up/down counter function.

3. 10m when connected to analog input (twisted pair cable).

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Base Module Part Number	with LCD Display	FL1E-H12SND	FL1E-H12RCE	FL1E-H12RCA	FL1E-H12RCC
	without Display	—	FL1E-B12RCE	FL1E-B12RCA	FL1E-B12RCC
Output	Output	Transistor source	Relay		
	Output Points/ Contact Configuration	4 points (separate)	4NO contacts		
	Isolation	—	Isolated		
	Dielectric Strength (between power/input terminals and output terminals)	—	2500V AC, 1 minute, 500V DC, 1 minute		
	Output Voltage	External power voltage	—		
	Maximum Load Current	0.3A	Resistive load: 10A at 12/24V AC/DC, 10A at 100/120V AC, 10A at 230/240V AC Inductive load: 2A at 12/24V AC/DC, 3A at 100/120V AC, 3A at 230/240V AC		
	Surge Current	—	30A maximum		
	Short-circuit Protection	Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum		
	Minimum Switching Load	—	10mA, 2V DC	10mA, 12V DC	
	Initial Contact Resistance	—	100 mΩ maximum (at 1A, 24V DC)		
	Mechanical Life	—	10 million operations (no load, 10Hz)		
	Electrical Life	—	100,000 operations (rated resistive load) 1800 operations/hour		
Switching Rate	Mechanical Load	—	10Hz		
	Electrical Load	10Hz	—		
	Resistive Load/Lamp Load <sup>1</sup>	10Hz	2Hz		
	Inductive Load	0.5Hz	0.5Hz		



1. For fluorescent lamps, if the inrush current exceeds the allowable value, use an appropriate relay.

## General

Item		Specification	Standard
Operating Temperature	Horizontal Mounting	0 to 55°C	Cold: IEC60068-2-1 Hot: IEC60068-2-2
	Vertical Mounting	0 to 55°C	
Storage/Transportation Temperature		-40 to +70°C (no freezing)	—
Relative Humidity		10 to 95% RH (no condensation)	IEC60068-2-30
Atmospheric Pressure		795 to 1080 hPa	—
Operating Condition		No corrosive gas	—
Degree of Protection		IP20	—
Vibration Resistance		5 to 8.4Hz, amplitude 3.5mm 8.4 to 150Hz, acceleration 9.8m/s <sup>2</sup>	IEC60068-2-6
Shock Resistance		147m/s <sup>2</sup>	IEC60068-2-27
Drop Test		0.3m	IEC60068-2-31
Drop Test (packaged)		1m	IEC60068-2-32
Emission		Class B Group 1 <sup>Note 1</sup>	EN55011
Electrostatic Discharge		8kV air discharge, 6kV contact discharge <sup>Note 2</sup>	IEC61000-4-2
Radiation Field Immunity		Field Strength: 1V/m and 10V/m	IEC61000-4-3
Burst Pulses		2kV (power line), 1kV (I/O signal line) <sup>Note 3</sup>	IEC61000-4-4
Energy Carriers Single Pulse (Surge) <sup>Note 4</sup> (FL1E-H12RCC, FL1E-B12RCC only)		1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable		0.5 to 2.5mm <sup>2</sup> (one wire), 0.5 to 1.5mm <sup>2</sup> (two wires)	—
Terminal Style		Finger-safe type <sup>Note 5</sup>	—



- Class A for AS-Interface communication module.
- 8kV (air discharge), 4kV (contact discharge) for AS-Interface communication module.
- 1kV (criteria A), 2kV (criteria B) for AS-Interface communication module.
- For protection against surge noise on DC power supply types (FL1E-H12RCE/B12RCE, FL1E-H12SND, FL1E-H12RCA/B12RCA), use surge absorbers, noise cut transformers, or noise filters. Use of surge protection device (DEHN + SOHNE GmbH + Co. VVT AD 24 Part No. 918 402) is recommended.
- Tightening torque 0.4 to 0.5 N·m.

### Text Display

<b>Part Number</b>	<b>FL1E-RD1</b>	
<b>Keyboard Display</b>	Membrane keypad with 10 keys, FSTN-Graphic Display with 128 x 64 (columns x rows), LED backlight	
<b>Power Supply</b>	<b>Input Voltage</b>	24V AC/DC, 12V DC
	<b>Allowable Voltage Range</b>	20.4 to 26.4V AC, 10.2 to 28.8V DC
	<b>Rated Frequency</b>	47 to 63Hz
	<b>Current Draw</b>	30 to 55mA (24V DC)
	<b>Power Consumption</b>	<b>12V DC</b>
<b>24V DC</b>		40mA
<b>24V AC</b>		90mA
<b>Data Transmission Rate</b>	19200 baud	
<b>LCD Display</b>	<b>Backlight lifetime</b> <small>Note 1</small>	20,000 hours
	<b>Display lifetime</b> <small>Note 2</small>	50,000 hours
<b>Weight</b>	220g	

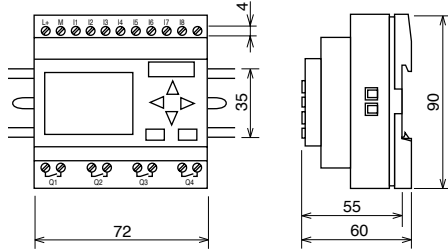


Connect the text display and the base module using the text display cable (2.5m). The text display cable can be extended up to 10m using an extension cable (D-sub 9-pin).

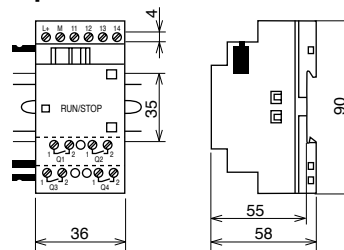
1. Backlight durability is the number of hours it takes for the light to become 50% of the original brightness.
2. Display durability is calculated under ordinary operating and storage conditions: room temperature, normal humidity below 65% RH, and not subjected to direct sunlight.

### Dimensions (mm)

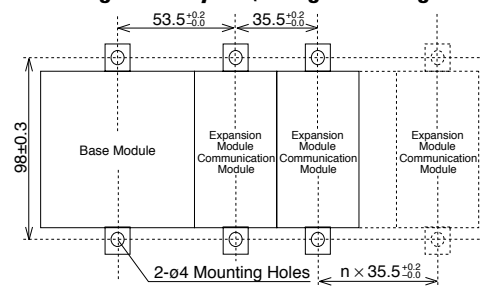
#### Base Module



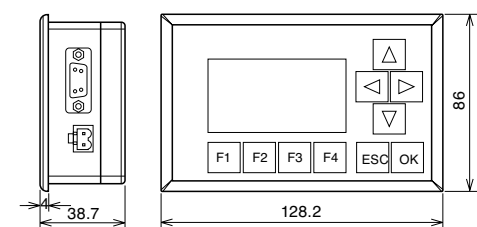
#### Expansion I/O Module, Communication Module



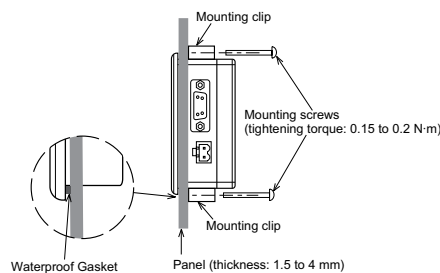
### Mounting Hole Layout (Using Mounting Slides)



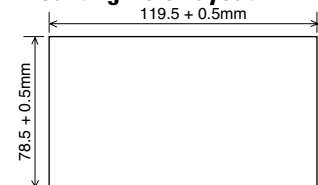
### Text Display



### Installation



### Mounting Hole Layout



# Function Blocks

## General

AND		
AND (Edge)		
NAND		

NAND (Edge)		
OR		
NOR		

XOR		
NOT		

## Special

On-delay		
Off-delay		
On-/Off-delay		
Retentive on-delay		
Latching Relay		
Current impulse relay		
Interval time-delay relay/Pulse output		
Edge-triggered interval time-delay relay		
Seven-day time switch		
Twelve-month time switch		
Up/down counter		

Analog differential trigger		
Analog value monitor		
Operating hours counter		
Asynchronous pulse generator		
Random generator		
Frequency trigger		
Analog trigger		
Analog comparator		
Stairwell light switch		
Dual-function switch		

Message texts	
Softkey	
Analog amplifier	
Shift register	
PI control	
Analog ramp control	
Analog multiplexer	
Pulse width modulator (PWM)	
Analog math	
Analog math error detection	