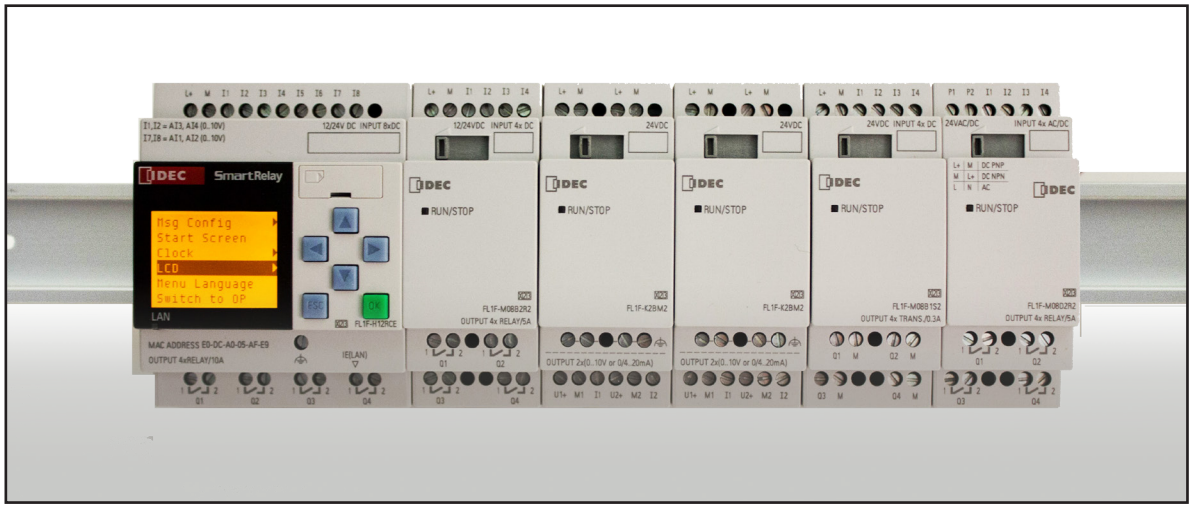
IDEC SmartRelay –The Intelligent Choice



Look around. IDEC SmartRelays are in everything from lighting controls to ice-making machines and grocery store misters. Proving reliable time after time, these intelligent logic modules are the ideal controller for simple automation tasks. A new sixth-generation of SmartRelays offer functions to give you even more flexibility and convenience.

Advances include embedded Ethernet port with web server functions, micro SD port for data logging and program storage, extended memory, a brighter display with higher LCD contrast, improved analog and high-speed inputs, an external text display, and upgraded programming software.

Industrial Facility Systems

- Conveyor systems
- Elevator controls
- Exhaust and filtering systems
- Automatic food dispensing machines
- Water treatment and irrigation systems
- Motor, pump and valve controls

Unique Solutions

- Solar-electric systems
- Marine systems
- Extreme environmental conditions
- Display panels and traffic light controls
- Energy management

Housing and Building Management

- Lighting controls (outside and inside)
- Door and gate controls
- Heating and cooling systems
- Shutter, sun blind and awning controls
- Water and sprinkler systems
- Ventilation systems

Monitoring Systems

- Access controls
- Alarm systems
- Limit level monitoring
- Parking Lot monitoring
- Baggage control

www.IDEC.com/smartrelay

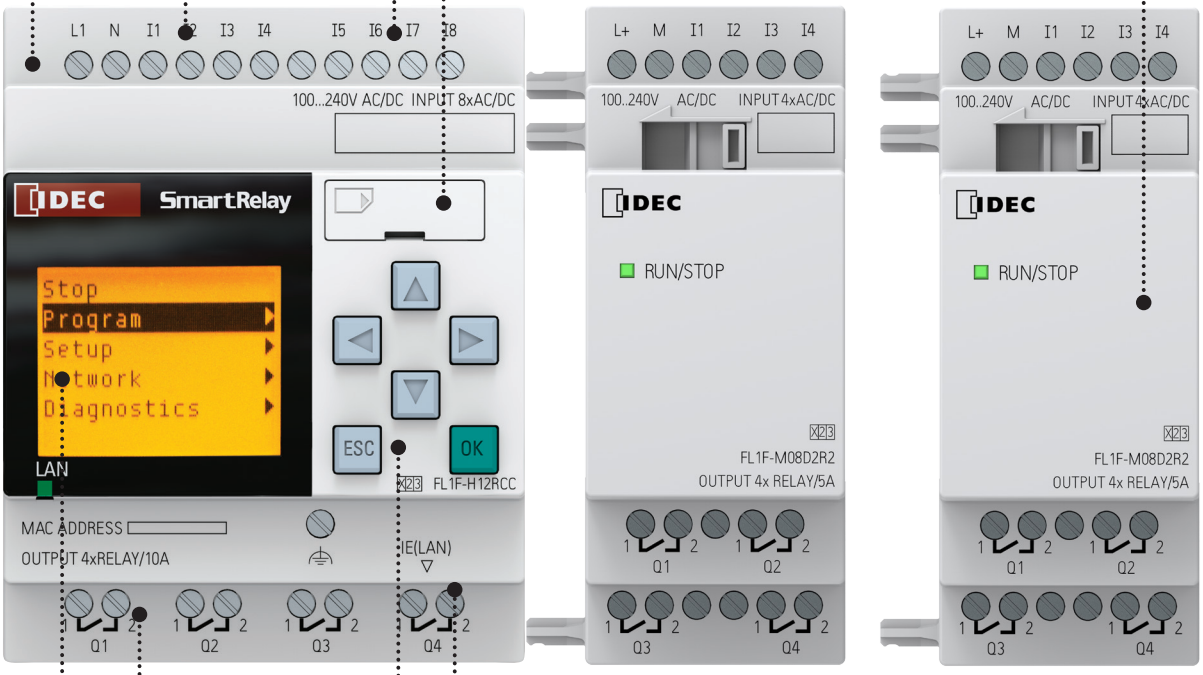
Universal Supply Voltage
- 12-24V DC, 24V DC, 24V AC/DC and 100-240V AC/DC models

Built-in Analog Inputs
- 4 x 0-10V DC, 10-bit resolution

High Speed Inputs
- Up to 4 inputs can be configured as 5 KHz high speed inputs

Micro SD card
- Every IDEC SmartRelay is now equipped with a micro SD slot for program storage, transfer and data logging
- Special memory cartridge is no longer required

Expansion interface
- Add expansion modules for additional I/O
- Up to 12 expansion modules can be added
- Total maximum I/O: 24 digital inputs, 20 digital outputs, 8 analog inputs, 8 analog outputs



Digital Outputs
- 10A relay or transistor outputs

Operational Control Buttons
- Using built-in LCD screen and buttons, simple program can be created without PC and software
- Change preset values such as Timers and Counters

Embedded RJ45 Ethernet Port
- Remote program download, upload and monitor
- Integrated web server for remote monitoring and control
- Easily create, monitor and control web pages with no HTML programing

New and improved LCD display
- 6 lines (16/10 characters per line)
- 3 backlight colors (white, amber, red)

Class 1, Div 2

Part Numbers

Base Modules – with and without LCD

Style	Part Number	Rated Power Voltage	Input Signal	I/O Points	Output	Display	With Clock	Weight
	FL1F-H12SCD	24V DC	DC I1, I2, I7 and I8 are used for digital/analog inputs	8/4 points	Transistor	Yes	Yes	195g
	FL1F-H12RCE	12/24V DC		8/4 points	Relay	Yes		204g
	FL1F-B12RCE					—		200g
	FL1F-H12RCA	24V AC/DC	AC/DC	8/4 points	Relay	Yes		240g
	FL1F-B12RCA					—		200g
	FL1F-H12RCC	100 to 240V AC/DC	AC/DC	8/4 points	Relay	Yes		240g
	FL1F-B12RCC					—		200g

Text Message Display

Style	Part Number	Rated Voltage	Description	Weight
	FL1F-RD1	12 V DC, 24 V AC/DC	FL1F Text Display Panel	220g

Digital and Analog I/O Expansion Modules

- 8-pt expansion module (4 in/4 out)
- Max. 4 digital expansion modules, 4 analog input modules, and 4 analog output modules

Style	Part Number	Total I/O	Input Power	Input Signal	Output Signal	Weight
	FL1F-M08B1S2	4/4 points	24V DC	DC	Transistor	95g
	FL1F-M08B2R2	4/4 points	12/24V DC	DC	Relay	130g
	FL1F-M08D2R2	4/4 points	24V AC/DC[2]	AC/DC[2]	Relay	130g
	FL1F-M08C2R2	4/4 points	100 to 240V AC/DC	AC/DC	Relay	130g
	FL1F-J2B2	2/0 points	12/24V DC	Analog	—	95g
	FL1F-K2BM2	0/2 points	24V DC	—	Analog	95g

Starter Kits

IDEC SmartRelay Starter Kit is an economical and ideal solution for first time IDEC SmartRelay users

- Package includes a base module, WindLGC programming software, simulator switch (DC models only) and a 15W power supply (DC models only).

CPU		LCD Screen	Software	Part Number
	12 I/O, 24V AC/DC, FL1F-B12RCA CPU	–	√	KIT-SMARTRELAY-BAF
	12 I/O, 100-240V AC/DC, FL1F-B12RCC CPU	–	√	KIT-SMARTRELAY-BCF
	12 I/O, 12-24V AC/DC, FL1F-B12RCE CPU	–	√	KIT-SMARTRELAY-BEF
	12 I/O, 24V AC/DC FL1F-H12RCA CPU	√	√	KIT-SMARTRELAY-HAF
	12 I/O, 100-240V AC/DC, FL1F-H12RCC CPU	√	√	KIT-SMARTRELAY-HCF
	12 I/O, 12/24V DC, FL1F-H12RCE CPU	√	√	KIT-SMARTRELAY-HEF
	12 I/O, 24V DC, FL1F-H12SCD CPU	√	√	KIT-SMARTRELAY-HDF

Accessories

Description	Part Number	Package Quantity	Remarks
Application Software: WindLGC	FL9Y-LP1CDW	1	DVD-ROM (incl. online help manual)
Mounting Clip for Base Module	FL1F-PSP1PN05	5	Supplied with a module[3]
Mounting Clip and Waterproof Gasket for Text Display	FL1F-KW1	1	Supplied with text display[4]
IDEC SmartRelay User's Manual (English)			Downloadable from: http://www.idec.com/download

3 Supplied with a base module and an expansion module.
4 Supplied with a text display, it includes a gasket, four mounting clips, and a power supply connector.

WindLGC

Programming Software

WindLGC is the exclusive programming software for the IDEC SmartRelay using Windows®. Edit, save, and print out your programs.

Key features:

- Ladder programming
- Online Monitor
- Program Comparison
- Time Simulation
- Simplified connection of the functions
- Programs can be saved in PDF or JPG format

Just click the function blocks you need and link function blocks for easy wiring. Devise complicated circuits using the convenient functions of WindLGC.

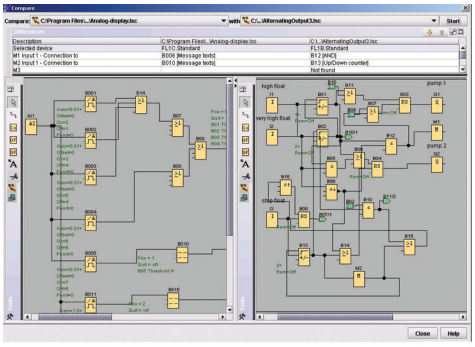
Part Number

Part Number	Description
FL9Y-LP1CDW	WindLGC programming software for IDEC SmartRelay

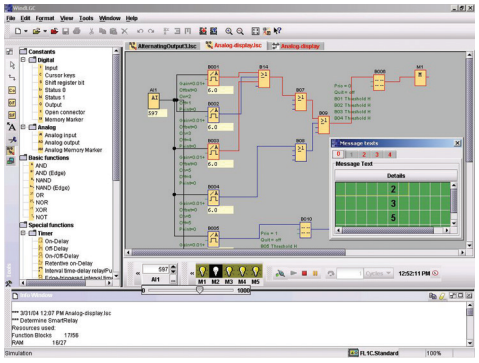
WindLGC system requirements:

- OS: Windows XP, Vista, 7 and 8.
- CPU recommendation: Pentium 266MHz or higher
- Memory: 64MB or more
- RAM recommendation: 128MB
- Hard disk space: 90MB or more for installing WindLGC software.
- Monitor Recommendation: Display more than 800 x 600 dots and 256 colors

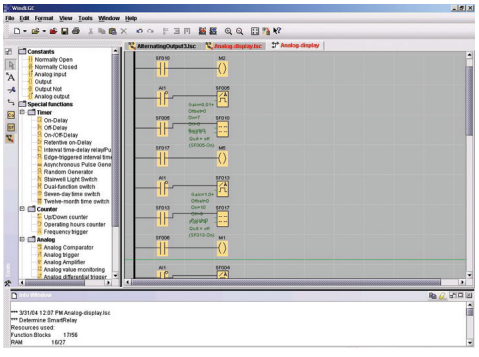
Program Comparison



Simulation Mode/Online Monitor



Ladder Programming



For more information, see the Automation Software section.

Visit **www.IDEC.com/downloads** for free upgrades or a free demo version.

Specifications

Base Modules

Base Module Type No.			FL1F-H12SCD	FL1F-H12RCE FL1F-B12RCE	FL1F-H12RCA FL1F-B12RCA	FL1F-H12RCC FL1F-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		15 to 50 mA (24V DC) 1.2A (with max. load on digital output)	30 to 140 mA (12V DC) 15 to 90 mA (24V DC)	15 to 150mA (12V DC) 15 to 130mA (24V DC)	15 to 40mA (100V AC) 5 to 10mA (100V DC) 15 to 25mA (240V AC) 2 to 8mA (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		1.2 W (24V DC)	1.7W (12V DC) 2.2W (24V DC)	3.6 W (24V AC) 3.2 W (24V DC)	4.6W (100V AC) 1.2W (100V DC) 6.0W (240V AC) 2.0W (240V DC)
	Reverse Polarity Protection		Yes	Yes	—	—
Clock	Backup Duration		20 days	20 days	20 days	20 days
	Clock Accuracy		±2 sec/day (Typ.)	±2 sec/day (Typ.)	±2 sec/day (Typ.)	±2 sec/day (Typ.)
Input	Input Signal		DC	DC	AC/DC	AC/DC
	Input Points		8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)	8 (I1 to I8)
	High-speed Input[1]		4 (I3, I4, I5, I6), 5kHz maximum	4 (I3, I4, I5, I6), 5kHz maximum	—	—
	Analog Input Points		4 (I1, I2, I7, I8)	4 (I1, I2, I7, I8)	—	—
	Analog Input Range		0 to 10V DC (max. rated input: 28.8V DC)	0 to 10V DC (max. rated input: 28.8V DC)	—	—
	Analog Input Error		±1.5 (of full scale)	±1.5 (of full scale)	—	—
	Analog Input Resolution		10 bits (0 to 1000)	10 bits (0 to 1000)	—	—
	Cycle time		300ms	300ms	300ms	300ms
	Allowable Voltage Range		0 to 28.8V DC	0 to 28.8V DC	0 to 26.4V AC 0 to 28.8V DC	0 to 265V AC 0 to 253V DC
	Input Impedance	Digital Input	5.8kΩ	5.8kΩ	4.8kΩ	610kΩ
		Analog Input	72kΩ	72kΩ	—	—
	Isolation		—	—	—	—
	Operating Range	OFF Voltage	< 5V DC	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC
		ON Voltage	≥ 12V DC	≥ 8.5 V DC	≥ 12V AC/DC	≥ 79V AC ≥ 79V DC
		OFF Current	< 0.9mA (I3 to I6) < 0.07mA (I1, I2, I7, I8)	< 0.88mA (I3 to I6) < 0.07mA (I1, I2, I7, I8)	< 1.2mA	< 0.05mA (AC) < 0.06mA (DC)
		ON Current	≥ 2.1mA (I3 to I6) ≥ 0.18mA (I1, I2, I7, I8)	≥ 1.5mA (I3 to I6) ≥ 0.12mA (I1, I2, I7, I8)	≥ 2.6mA	≥ 0.08mA (AC) ≥ 0.13mA (DC)
	Turn ON Time		1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.)	100V AC: 40ms (Typ.), 240V AC: 30ms (Typ.) 100V DC: 25ms (Typ.), 240V DC: 20ms (Typ.)
	Turn OFF Time		1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	1.5ms (Typ.) ≤ 1.0ms (I3 to I6)	15ms (Typ.)	100V AC: 45ms (Typ.), 240V AC: 70ms (Typ.) 100V DC: 60ms (Typ.), 240V DC: 75ms (Typ.)
	Wire Length[2]		100m	100m	100m	100m
Output	Output Signal		Transistor source output	Relay output	Relay output	Relay output
	Output Points/ Contact Configuration		4 points (separate)	4NO contacts	4NO contacts	4NO contacts
	Isolation		—	Isolated	Isolated	Isolated
	Dielectric Strength (between power/input terminals and output terminals)		—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute
	Output Voltage		External power voltage	—	—	—
	Maximum Load Current		0.3A maximum	Resistive load 10A at 12/24V AC/DC, 10A at 100/120V AC, 10A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC Inductive load 2A at 12/24V AC/DC, 3A at 100/120V AC, 3A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC	
	Surge Current		—	30A maximum	30A maximum	30A maximum
	Short-circuit Protection		Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum
	Minimum Switching Load		—	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)
	Initial Contact Resistance		—	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)
	Mechanical Life		—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)
	Electrical Life		—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour

1 When selecting frequency trigger function and up/down counter function.
2 10m when connected to analog input (twisted pair cable)
Initialization Time: After power-up, the FL1F takes a maximum of 9 seconds (when using a micro SD card) for initialization. When initialization is complete, the FL1F is automatically set to RUN mode.

Expansion I/O Module

Expansion I/O Module Type No.			FL1F-M08B1S2	FL1F-M08B2R2	FL1F-M08D2R2	FL1F-M08C2R2	FL1F-J2B2	FL1F-K2BM2
Power Supply	Rated Power Voltage		24V DC	12/24V DC	24V AC/DC	100 to 240V AC/DC	12/24V DC	24V 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	10.8 to 28.8V DC	20.4 to 28.8V DC
	Rated Frequency		—	—	50/60Hz (47 to 63Hz)	50/60Hz (47 to 63Hz)	—	—
	Current Draw		15 to 40mA	10 to 80mA (12V DC) 10 to 40mA (24V DC)	20 to 100mA (24V AC) 8 to 50mA (24V DC)	10 to 30mA (100V AC) 10 to 20mA (240V AC) 5 to 15mA (100V DC) 5 to 10mA (240V DC)	15 to 30mA	15 to 82mA
	Allowable Momentary Power Interruption		—	2 ms (typ.) (12V DC) 5 ms (typ.) (24V DC)	5 ms (typ.) (24V AC/DC)	10ms (typ) (100V AC/DC) 20ms (typ.) (240V AC/DC)	10ms (typ.) (12/24V DC)	10ms (typ.)
	Power Consumption		1.0W	1.0W (12V DC) 1.0W (24V DC)	2.4W (24V AC) 1.2W (24V DC)	3.5W (100V AC) 1.8W (100V DC) 4.8W (240V AC) 2.4W (240V DC)	0.4W (12V DC) 0.8W (24V DC)	2.0W
	Reverse Polarity Protection		Yes	Yes	—	—	Yes	Yes
Input	Input Signal		DC input	DC input	AC/DC input	AC/DC input	Analog input	—
	Input Points		4	4	4	4	—	—
	Isolation		—	—	—	—	—	—
	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	—	—
	Operating Range	OFF Voltage	< 5V DC	< 5V DC	< 5V AC/DC	< 40V AC < 30V DC	—	—
		ON Voltage	≥ 12V DC	≥ 8.5V DC	≥ 12V AC/DC	≥ 79V AC ≥ 79V DC	—	—
		OFF Current	< 0.88mA	< 0.88mA	< 1.1mA	< 0.05mA (AC) < 0.06mA (DC)	—	—
		ON Current	≥ 2.1mA	≥ 1.5mA	≥ 2.63mA	≥ 0.08mA (AC) ≥ 0.13mA (DC)	—	—
	Turn ON Time		1.5ms (Typ.)	1.5ms (typ.)	1.5ms (typ.)	100V AC: 40 ms (typ.) 240V AC: 30 ms (typ.) 100V DC: 25 ms (typ.) 240V DC: 20 ms (typ.)	—	—
	Turn OFF Time		1.5ms (Typ.)	1.5ms (typ.)	15ms (typ.)	100V AC: 45 ms (typ.) 240V AC: 70 ms (typ.) 100V DC: 60 ms (typ.) 240V DC: 75 ms (typ.)	—	—
	Analog Input Points		—	—	—	—	2	—
	Analog Input Range		—	—	—	—	0 to 10V (max. rated input: 28.8V) 0 to 20mA (max. rated input: 40mA)	—
	Digital Resolution		—	—	—	—	10 bits (0 to 1000)	—
	Input Error		—	—	—	—	±1.5% (of full scale)	—
	Input Impedance		—	—	—	—	76kΩ (0 to 10V) 250Ω (0 to 20mA)	—
	Sampling Cycle		—	—	—	—	50ms	—
Output	Wire Length		100m	100m	100m	100m	10m (twisted-pair shielded cable)	—
	Output Signal		Transistor source output	Relay output	Relay output	Relay output	—	—
	Output Points/ Contact Configuration		4 points (separate)	4NO contacts	4NO contacts	4NO contacts	—	—
	Isolation		—	Isolated	Isolated	Isolated	—	—
	Dielectric Strength **(between power/input terminals and output terminals)**		—	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	2500V AC, 1 minute 500V DC, 1 minute	—	—
	Output Voltage		External power voltage (20.4 to 28.8V DC)	—	—	—	—	—
	Maximum Load Current		0.3A maximum	Resistive load 5A at 12/24V AC/DC, 5A at 100/120V AC, 5A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC Inductive load 2A at 12/24V AC/DC, 3A at 100/120V AC, 3A at 230/240V AC, 0.2A at 120V DC, 0.1A at 240V DC		—	—
	Short-circuit Protection		Built-in current limiting resistor: Approx. 1A	External fuse required: 16A maximum	External fuse required: 16A maximum	External fuse required: 16A maximum	—	Yes
	Minimum Switching Load		—	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	10mA, 12V DC (reference value)	—	—
	Initial Contact Resistance		—	100mΩ maximum (at 1A, 24V DC)	100mΩ maximum (at 1A, 24V DC)	100 mΩ maximum (at 1A, 24V DC)	—	—
	Mechanical Life		—	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	10 million operations (no load, 10Hz)	—	—
	Electrical Life		—	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	100,000 operations (rated resistive load) 1800 operations/hour	—	—
	Analog Output Points		—	—	—	—	—	2
	Analog Output Range		—	—	—	—	—	Voltage: 0-10V DC Current: 0-20, 4-20 mA
	Digital Resolution		—	—	—	—	—	10 bits (0 to 1000)
	Output Error (of full scale)		—	—	—	—	—	Voltage output: ±2.5% Current output: ±3%
	Output Impedance		—	—	—	—	—	Voltage: 5kΩ min Current: 250Ω max
	Analog Value Conversion Interval		—	—	—	—	—	50ms (typ.)
	Wire Length		—	—	—	—	—	10m (twisted-pair shielded cable)

General

Style		Specification	Standard
Operating Temperature	Horizontal Mounting	0 to 55°C (no freezing)	Cold: IEC60068-2-1 Hot: IEC60068-2-2
	Vertical Mounting	0 to 55°C (no freezing)	
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^2	IEC60068-2-6
Shock Resistance		147m/s^2	IEC60068-2-27
Drop Test		0.3m	IEC60068-2-31
Drop Test (packaged)		1m	IEC60068-2-32
Emission		Class B Group 1[1]	EN55011
Electrostatic Discharge		8kV air discharge, 6kV contact discharge [2]	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) [3]	IEC61000-4-4
Surge Immunity1 (FL1F-H12RCC, FL1F-B12RCC only)		1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable		0.5 to 2.5mm^2 (one wire), 0.5 to 1.5mm^2 (two wires)	—
Terminal Style		Finger-safe type [5]	—

1: For protection against surge noise on DC power supply types (FL1F-H12RCE/B12RCE, FL1F-H12SCD, FL1F-H12RCA/B12RCA), use surge absorbers, noise cut transformers or noise filters. Use of a surge protection device (DEHN + SÖHNE GmbH + Co, BVT AD 24 Part No. 918 402) is recommended.
2: Tightening torque 0.5 to 0.6N·m

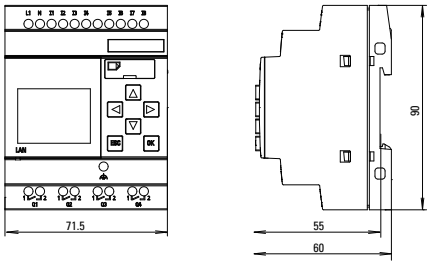
Text Display

Part Number			FL1F-RD1
Keyboard Display			FSTN graphic display (W × H: 160 × 96 dots) LED backlight (White, Amber, Red)
Dimensions (W × H × D)			128.2 × 86 × 38.7 mm
Installation			Panel cut-out using mounting clips
Font Type			English, Spanish, Russian, Chinese, Italian, Turkish, German, Dutch, French, Japanese
Keyboard			Membrane keypad with 10 keys
Power Supply	Input Voltage		24V AC/DC, 12V DC
	Allowable Voltage Range		20.4 to 26.4V AC 10.2 to 28.8V DC
	Rated Frequency		47 to 63Hz
	Current Draw		30 to 55mA (24V DC)
	Power Consumption	12V DC	145mA (Typ.)
		24V DC	70mA (Typ.)
		24V AC	75mA (Typ.)
	Data Transmission Rate		10/100M full/half duplex data transmission rate
LCD Display	Backlight lifetime [1]		20,000 hours
	Display lifetime [2]		50,000 hours
Weight			220g

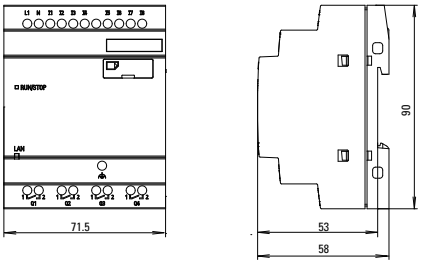
1 For protection against surge noise on DC power supply types (FL1F-H12RCE/B12RCE, FL1F-H12SCD, FL1F-H12RCA/B12RCA), use surge absorbers, noise cut transformers, or noise filters. Use of a surge protection device (DEHN + SÖHNE GmbH + Co, BVT AD 24 Part No. 918 402) is recommended.
2 Tightening torque 0.5 to 0.6N·m

Dimensions (mm)

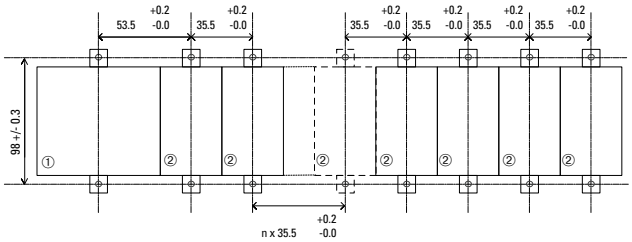
Base Module (with Display)



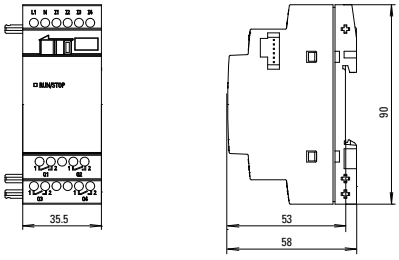
Base Module (without Display)



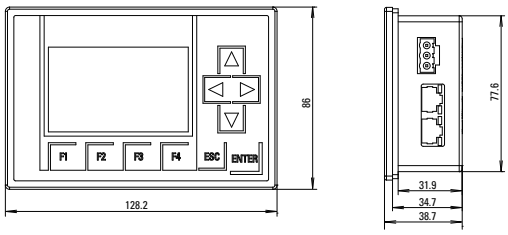
Mounting Hole Layout (Using Mounting Slides)



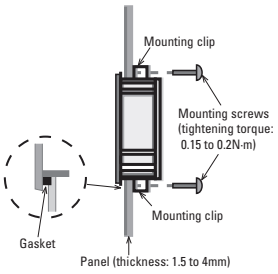
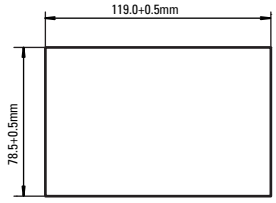
Expansion I/O Module



Text Display



Installation



Mounting Hole Layout