6th-Generation IDEC SmartRelay

BASE MODULE GENERAL SPECIFICATIONS

Item		Specifications	Standard
Operating Temperature	Horizontal Mounting	-20 to 55°C (no freezing)	Cold: IEC60068-2-1 Hot: IEC60068-2-2
	Vertical Mounting	-20 to 55°C (no freezing)	
Storage/Transportation Temp.		–40 to +70°C (no freezing)	—
Relative Humidity		10 to 95% (no condensation)	IEC60068-2-30
Atmospheric Pressure		795 to 1080hPa	—
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/s²	IEC60068-2-6
Shock Resistance		147m/s²	IEC60068-2-27
Drop Test (packaged)		0.3m	IEC60068-2-32
Emissions		Limit class B Group 1	EN55011/A EN55022/B EN50081-1
Electrostatic Discharge Immunity		8kV air discharge 6kV contact discharge	IEC61000-4-2
Radiation Field Immunity		Field Strength: 1V/m and 10V/m	IEC61000-4-3
Fast Transient Burst		2kV (power line) 2kV (I/O signal line)	IEC61000-4-4
Surge Immunity[1] (FL1F-H12RCC, FL1F-B12RCC only)		1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable		2.5mm² (one wire) 1.5mm² (two wires)	—
Terminal Style		Finger-safe type [2]	—

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

PRODUCT DESCRIPTION

In an ever-changing market with tough competition, you need an edge to stay ahead. The upgraded FL1F SmartRelay meets the demands of small-scale applications by offering advanced features that enhance performance, security, and efficiency.

BASE MODULE HIGHLIGHTS

- MQTT: Real-time cloud communication.
- HTTPS Support: Secure web communication.
- Email/Web Server: Remote alerts and monitoring via browser.
- Web Page Editor: Customize web interface easily.
- Modbus TCP: Client/Server communication with devices.
- Batch Download: Program multiple devices at once.
- Excel Comm.: Direct data exchange with Excel.
- -20 to 55°C: Wide operating temperature range.

BASE MODULE SPECIFICATIONS

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	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	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 SPECIFICATIONS

	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	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	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)

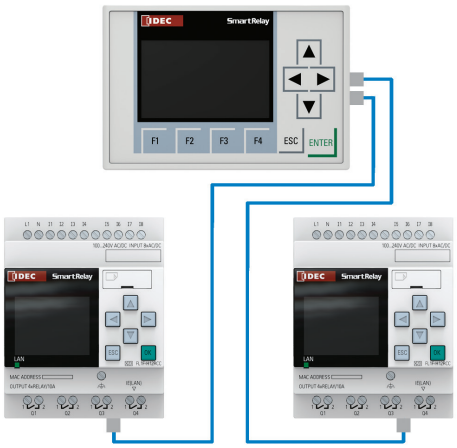
TEXT DISPLAY PANEL HIGHLIGHTS:

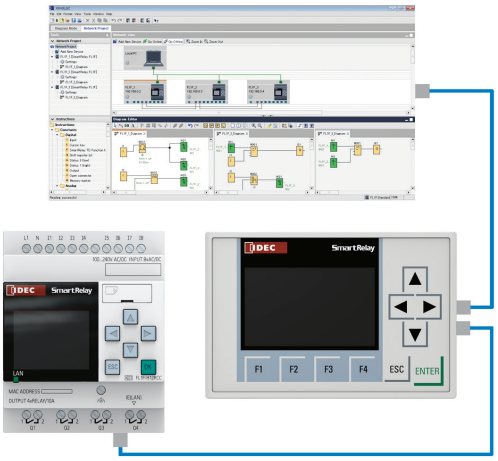
New and improved LCD display

- Improved display with 6 lines and 20 characters per line, more than twice as many characters as before
- Selectable white, amber or red backlighting for optical emphasis on alarms and events

Two RJ45 Ethernet ports

- Use a standard Ethernet cable to the connect FL1F base module to the Text Display Panel. A special cable is not required.
- Provide different ways to connect





TEXT DISPLAY SPECIFICATIONS

Text Display General Specifications

Item		Specifications	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 Temp.		–40 to +70°C (no freezing)	—
Relative Humidity		10 to 95% (no condensation)	IEC60068-2-30
Atmospheric Pressure		795 to 1080hPa	—
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 (packaged)		0.3m	IEC60068-2-32
Emissions		Limit class B Group 1	EN55011/A EN55022/B EN50081-1
Electrostatic Discharge Immunity		8kV air discharge 6kV contact discharge	IEC61000-4-2
Radiation Field Immunity		Field Strength: 1V/m and 10V/m	IEC61000-4-3
Fast Transient Burst		2kV (power line) 2kV (I/O signal line)	IEC61000-4-4
Surge Immunity[1] (FL1F-H12RCC, FL1F-B12RCC only)		1kV (power line) normal 2kV (power line) common	IEC61000-4-5
Communication Cable		2.5mm^2 (one wire) 1.5mm^2 (two wires)	—
Terminal Style		Finger-safe type[2]	—

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 General Specifications Cont.

Dimensions (W × H × D)	128.2 × 86 × 38.7 mm
Weight (approx.)	220g
Installation	Panel cut-out using mounting clips
Keyboard	Membrane keypad
Display	FSTN graphic display (W × H: 160 × 96 dots) LED backlight (White, Amber, Red)
Font type	English, Spanish, Russian, Chinese, Italian, Turkish, German, Dutch, French, Japanese
Displayable string	1 screen 6 lines × 20 columns

Power Supply Specifications

Power Voltage	24V AC/DC 12V DC
Allowable Voltage Range	20.4 to 26.4V AC 10.2 to 28.8V DC
Allowable Voltage Frequency	47 to 63Hz
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 Specifications

LCD Display Durability[3]	50,000 hours
Backlight Durability[4]	20,000 hours

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

PART NUMBERS

Base Module

Rated Power Voltage	Input Signal	Output Signal	Display	Clock	I/O Points	Weight (approx.)	Part No.
24V DC	DC I1, I2, I7 and I8 are used for digital/ analog inputs	Transistor	Yes	Yes	8/4 points	195g	FL1F-H12SCD
12/24V DC		Relay	Yes	Yes	8/4 points	240g	FL1F-H12RCE
			—			200g	FL1F-B12RCE
24V AC/DC	AC/DC[1]	Relay	Yes	Yes	8/4 points	240g	FL1F-H12RCA
			—			200g	FL1F-B12RCA
100 to 240V AC/DC	AC/DC	Relay	Yes	Yes	8/4 points	240g	FL1F-H12RCC
			—			200g	FL1F-B12RCC

1 With NPN/PNP sensor input. For details, see Input Internal Circuits in the Specifications table.

Expansion I/O Module

Type	Rated Power Voltage	Input Signal	Output Signal	I/O Points	Weight (approx.)	Part No.
Input/Output	24V DC	DC	Transistor	4/4 points	95g	FL1F-M08B1S2
	12/24VDC	DC	Relay	4/4 points	130g	FL1F-M08B2R2
	24V AC/DC[2]	AC/DC[2]	Relay	4/4 points	130g	FL1F-M08D2R2
	100 to 240V AC/DC	AC/DC	Relay	4/4 points	130g	FL1F-M08C2R2
Analog Input	12/24V DC	Analog	—	2/0 points	95g	FL1F-J2B2
Analog Output	24V DC	—	Analog	0/2 points	95g	FL1F-K2BM2

2 With NPN/PNP sensor input. For details, see Input Internal Circuits in the Specifications table.
I/O points within the maximum number of expandable I/O points can be used.
When using modules of the same power voltage, supply power to the base module and expansion I/O modules using one power supply.
When power is supplied to the modules from different power supplies, the fast transient burst is 1 kV (IEC61000-4-4).

Text Display

Rated Power Voltage	Weight (approx.)	Part Number	Remarks
24V AC/DC 12V DC	220g	FL1F-RD1	Supplied with mounting clip and gasket

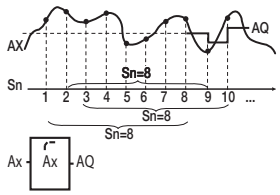
Options

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)	FL9Y-B1789	1	Downloadable from: http://www.idec.com/download

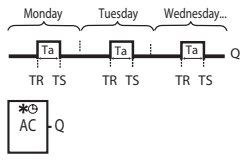
3 Supplied with a base module and an expansion module.
4 Supplied with a text display, it includes a gasket, four mounting clips, and a power supply connector.

NEW FUNCTION BLOCKS

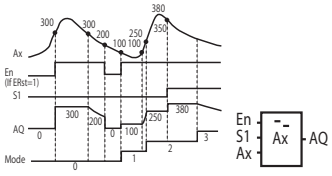
NEW Analog filter



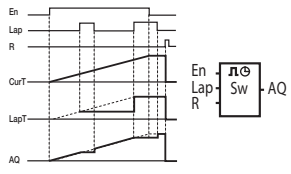
NEW Astronomical clock



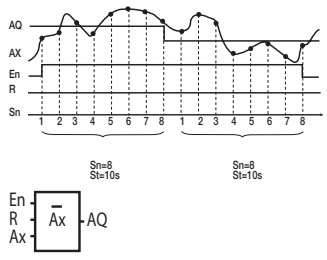
NEW Max/Min



NEW Stopwatch

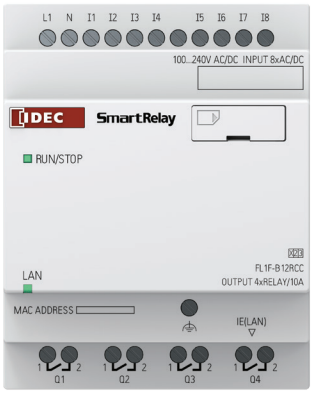


NEW Average value



DIMENSIONS (All dimensions in mm)

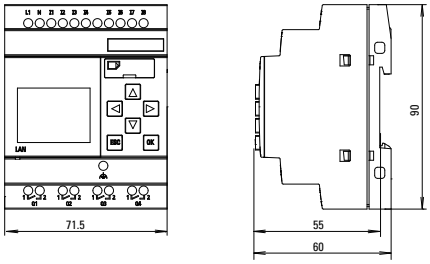
Base Module (with Display)



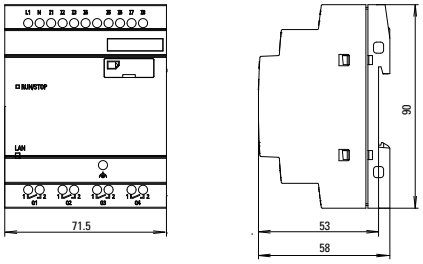
Base Module (without Display)

Expansion I/O Module

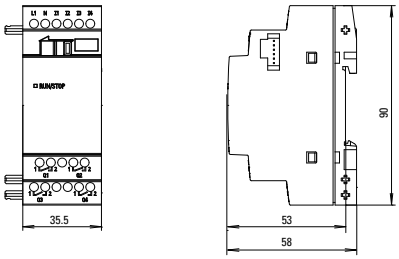
Base Module (with Display)



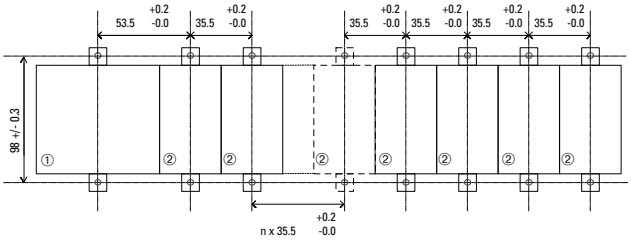
Base Module (without Display)



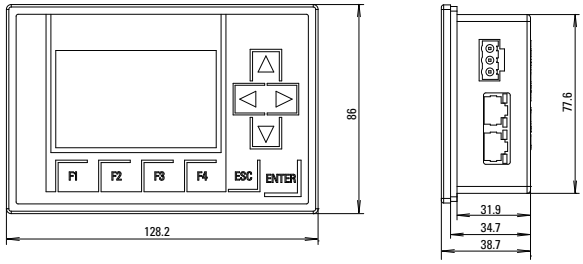
Expansion I/O Module



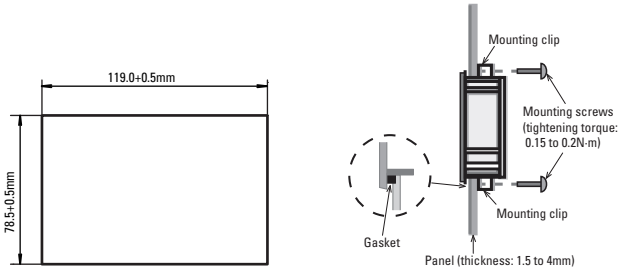
Mounting Hole Layout (Using Mounting Slides)



Text Display



(Panel Cutout)



Note: Drawings are not to scale

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