

**New Advanced Features**

CE Marking: 2012

Terminal Block: P1 P2 I1 I2 I3 I4 I5 I6

|    |    |    |     |
|----|----|----|-----|
| DC | L+ | M  | PNP |
| DC | M  | L+ | NPN |
| AC | L  | N  |     |

24VAC/DC Input 8xAC/DC

**IDEC SmartRelay**

Target Value  
50°C  
Current Value  
26°C

FL1D-H12RCA

Output 4xRelay/10A

Q1 Q2 Q3 Q4

Buttons: ESC OK



## Smart Control - IDEC SmartRelay

Look around you. IDEC SmartRelays are everywhere! You can find them in lighting controls, ice-making machines, grocery store mist systems and more. And there's a good reason: IDEC SmartRelays meet all safety requirements, while at the same time saving you time and money.

Now our new fourth-generation SmartRelays include new advanced features that offer even more versatility and functions! With new features including: an analog output module, 3 new function block types, upgraded software and

available expansion modules, you can get everything you need from one compact module.

When you need a product you can rely on, is easy to use, and meets safety standards, look no further than IDEC. Our SmartRelays meet all industry standard approvals including cULus, CE, C-tick and ABS (American Bureau of Shipping). Plus they are FM approved for Class 1 Div 2 hazardous locations. The bottom line is IDEC SmartRelays provide the right solution for all your control needs!

### Industrial Facility Systems

- Conveyor systems
- Elevator controls
- Liquid level controls
- Motor, pump and valve controls
- Water treatment and irrigation systems



### Unique Solutions

- Solar-electric systems
- Traffic light controls
- Ventilation systems on ships
- Extreme environmental conditions



### Housing and Building Management

- Lighting controls
- HVAC
- Gate and door controls
- Shutter and sun blind controls
- Water and sprinkler systems



### Monitoring Systems

- Access controls
- Alarm systems
- Parking lot control monitoring



## The possibilities are endless

[www.idec.com/smartrelay](http://www.idec.com/smartrelay)

1



Select "Program" from the main menu.

2



Create your control logic.

3

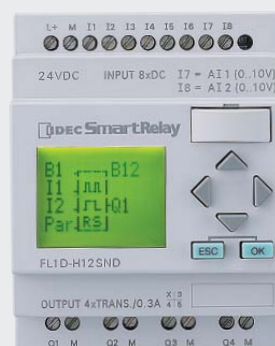
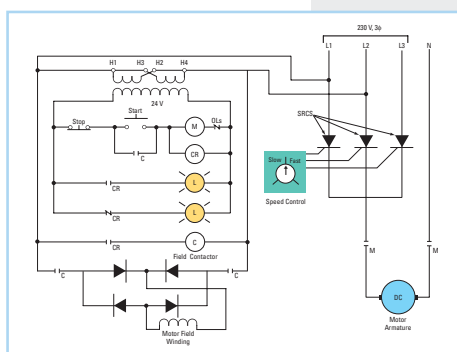


Select "Start," and you're done.

## Why spend all that time wiring when it's as simple as 1, 2, 3?

Your time is valuable and with that in mind, IDEC has created a product that will require very little of it. Using a system smaller than a PLC, with minimal wiring, mounting as simple as a quick snap on to a DIN rail, and programming as easy as one touch of a button, the user-friendly SmartRelay is the perfect solution.

Why wait? Replace your complicated system of relays, timers and counters with just one IDEC SmartRelay! It's safe to say we all want to reduce workloads while saving money, and with IDEC SmartRelays it's easy. These all-in-one controllers require less space in your control cabinet. And as you know, space in your panel is money in your pocket. Combine that with low maintenance and you've got a cost-effective product you can count on for all your control operations!



Your logic circuit can be accomplished ...

by just installing this unit.

### Digital/Analog Inputs

Each SmartRelay is equipped with 8 digital inputs for you to utilize in your applications. On selected models such as FL1D-H12RCE, FL1D-B12RCE and FL1D-H12SND, inputs 5 and 6 can be used as fast inputs up to 2 kHz and inputs 7 and 8 can be configured as 0-10V analog inputs. A maximum of 24 digital inputs can be utilized with this system using digital expansion modules.

### Universal Voltages

SmartRelays are available in 12/24VDC, 24VAC/DC, and 100-240VAC/DC voltages.

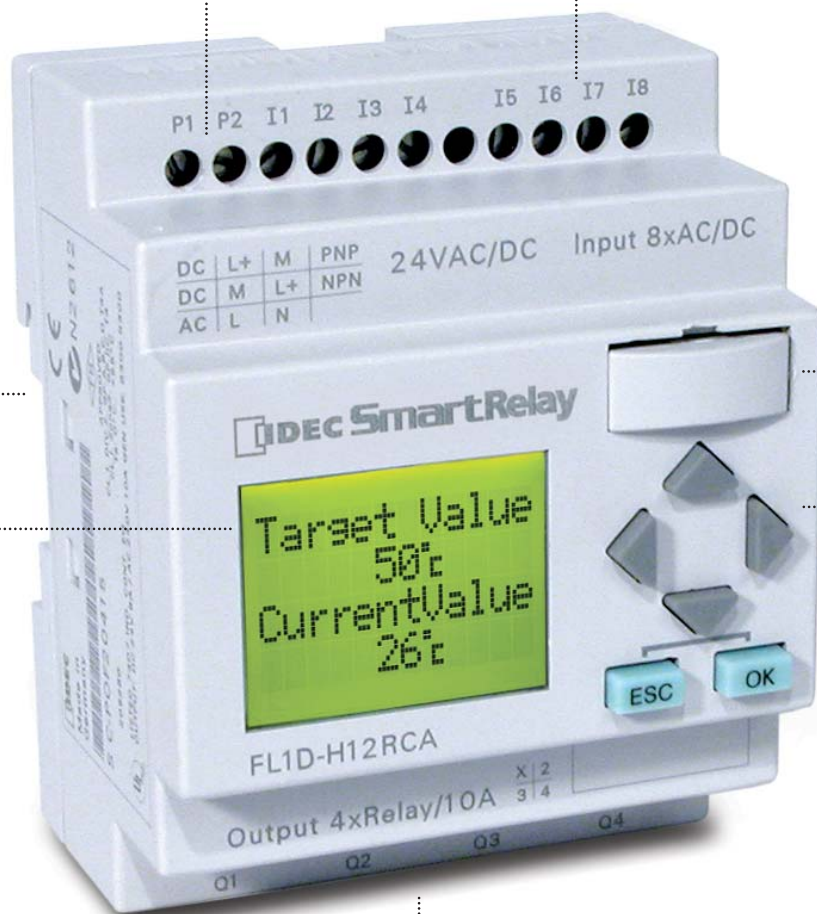
### DIN Rail or Surface Mountable

### Backlit LCD Display

System status — input, output, analog values, timers and counters — can be monitored through an embedded 4x12 LCD on your SmartRelay. This allows you to display a predefined message with up to 48 characters chosen from 103 special character types. **New** You can now adjust the contrast on your display screen to your preference. Non-LCD versions are also available.

### Digital Outputs

IDEC SmartRelays are equipped with 4 relay outputs rated at 10A/pt. A maximum of 16 outputs can be configured with this system using digital expansion modules.



## Control at the push of a button

[www.idec.com/smartrelay](http://www.idec.com/smartrelay)

### EEPROM memory

Never worry about your program being lost again! With IDEC SmartRelays, your program is stored in a non-volatile EEPROM.

### Password Protection

Concerned about your program being copied or altered? IDEC SmartRelays keep you safe with a unique password protection scheme allowing end users to access certain parameters without seeing or modifying the actual program.

### Large Program Capacity

Running out of program space is a thing of the past. IDEC SmartRelays can handle up to 130 function blocks (2000 bytes).

### Integrated Functions

8 predefined basic function blocks and 28 special function blocks ensure that almost all your conventional switching devices — timers and counters — can be replaced. Three **New** functions include a PI controller (e.g. for temperature control), a two-stage ramp function (e.g. for the control of frequency converters) and an analog multiplexer (e.g. for light control). See page 9.

### Quality

IDEC means quality and dependability you can trust and our SmartRelays are no exception. Each model is cULus listed, CE certified, EMC compliant, FM approved for Class 1 Div 2 hazardous locations, C-tick compliant, Lloyds Registered, and ABS approved.



### Expansion Modules

Just snap-on and go! No cable required. Each digital expansion module has 4 inputs and 4 outputs available in 12/24VDC, 24VAC/DC and 100-240VAC/DC. Up to 4 expansion modules can be mounted on an IDEC SmartRelay base module. Plus SmartRelay also has the capability to communicate within a LONWORKS<sup>®</sup> network and AS-interface system with its LONWORKS and AS-interface modules.

### Analog Inputs & Outputs

Using the 2-pt analog input and 2-pt analog output expansion modules allows you to easily control and process your analog signal. IDEC SmartRelays can control and process 0-10V and 4-20mA signals with a 10-bit resolution. Up to 4 analog input and 1 analog output modules can be attached to the base module.

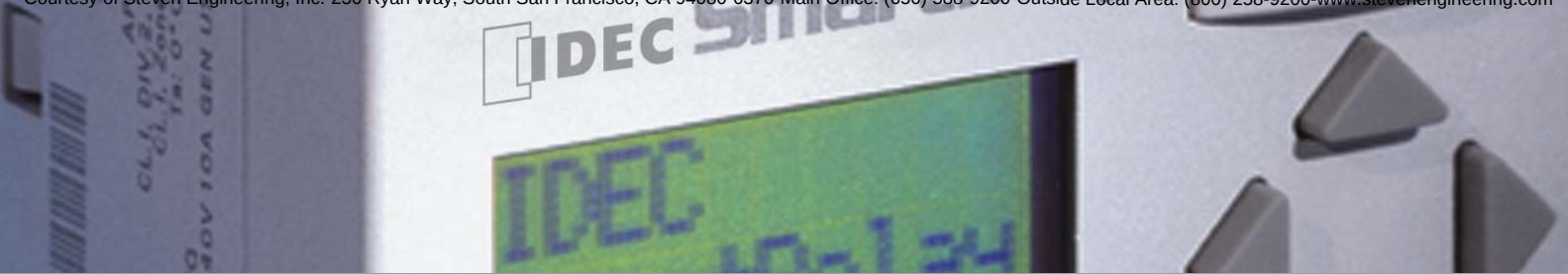


### Multifunction Interface

If you prefer not to program your SmartRelay using the LCD and keypad, simply connect the interface cable to your PC and program with our WindLGC software instead. Or you can plug-in the special memory cartridge (FL1C-PM3) and have your SmartRelay operate the circuit program through the cartridge itself.

### Operational Control Buttons

IDEC SmartRelays can be programmed with just the push of a button! Control buttons can be used to program, modify and change preset parameters. The four cursor keys can also be configured as inputs if needed.



# WindLGC 5.0 Software

WindLGC is the exclusive programming software for the IDEC SmartRelay using Windows®.

## Simplicity

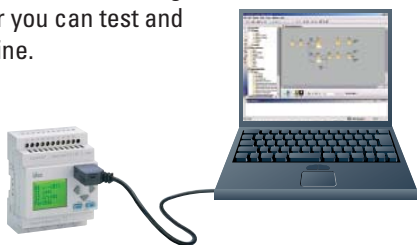
Create, simulate, test and save your program in just a matter of seconds using drag and drop functions.

## Control

Choose either function block or ladder programming, but keep in mind that you can always convert from one to the other with just the click of an icon. Offline program simulation (without the need for an actual unit) enables testing of the entire program from a PC, or you can test and monitor your IDEC SmartRelay online.

## Documentation

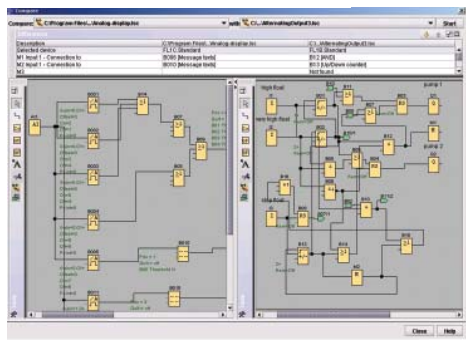
You can create and save your WindLGC program as a .pdf or .jpg file. Professional documentation is included with all necessary configuration information such as comments and program settings.



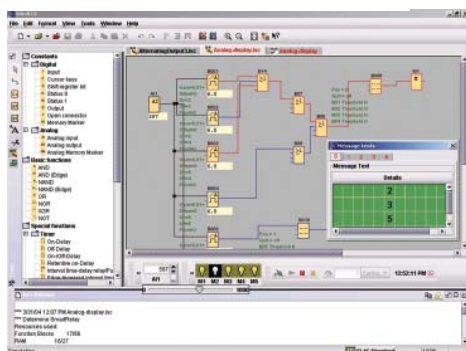
## On the Web

Visit IDEC at [www.idec.com/smartrelay](http://www.idec.com/smartrelay) for additional information on software upgrades, demo software, FAQs, manuals or brochures.

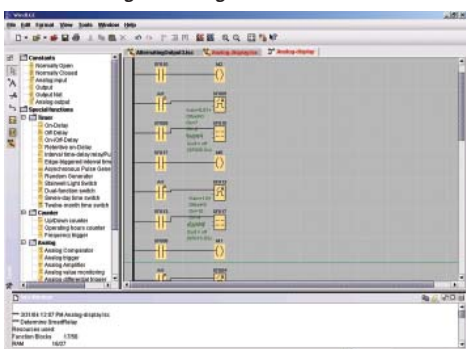
## Program Comparison



## Simulation Mode/Online Monitor



## Ladder Programming



## Special Function Blocks

| ON Delay | OFF Delay | ON/OFF Delay | Retentive ON Delay | Interval Time-Delay Relay/Pulse Output | Current Impulse Relay | Edge-Triggered Interval Time-Delay Relay |
|----------|-----------|--------------|--------------------|----------------------------------------|-----------------------|------------------------------------------|
|          |           |              |                    |                                        |                       |                                          |
|          |           |              |                    |                                        |                       |                                          |

# Create, test and save your program in seconds

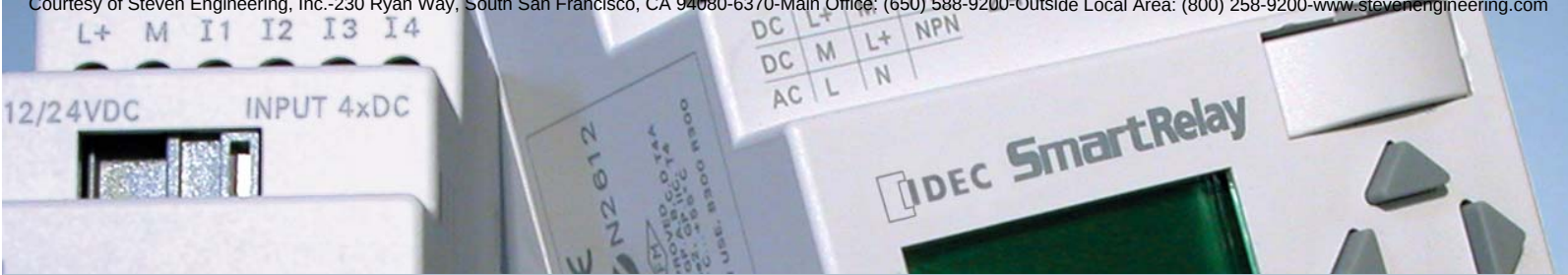
www.idec.com/smarterelay

## Basic Function Blocks

|                                                                    |                                                                              |                                                                        |                                                                               |
|--------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <p><b>OR</b><br/>Parallel connection of normally open contacts</p> | <p><b>NOR</b><br/>Series connection of normally closed contacts</p>          | <p><b>NAND</b><br/>Parallel connection of normally closed contacts</p> | <p><b>NAND (Edge)</b><br/>Edge detection with edge evaluation (neg. edge)</p> |
| <p><b>AND</b><br/>Series connection of normally open contacts</p>  | <p><b>AND (Edge)</b><br/>Edge detection with edge evaluation (pos. edge)</p> | <p><b>XOR</b><br/>Double changeover contact</p>                        | <p><b>NOT</b><br/>Connection of closed contact</p>                            |

## Loaded with functions!

| Latching Relay | Seven-Day Time Switch | Twelve-Month Time Switch | Up/Down Counter | Analog Differential Trigger | Analog Value Monitoring | Operating Hours Counter |
|----------------|-----------------------|--------------------------|-----------------|-----------------------------|-------------------------|-------------------------|
|                |                       |                          |                 |                             |                         |                         |
|                |                       |                          |                 |                             |                         |                         |



### FL1D Base Modules – With LCD

| Part Number | Rated Voltage  | Input Signal                                | Input Type | Output Type              | With Clock |
|-------------|----------------|---------------------------------------------|------------|--------------------------|------------|
| FL1D-H12RCE | 12/24V DC      | DC<br>I7 and I8 are used for digital/analog | PNP        | Relay Output             | Yes        |
| FL1D-H12SND | 24V DC         |                                             |            | Transistor Source Output | —          |
| FL1D-H12RCA | 24V AC/DC      | AC/DC                                       | PNP/NPN    | Relay Output             | Yes        |
| FL1D-H12RCC | 100-240V AC/DC |                                             | PNP        |                          |            |



### FL1D Base Modules – Without LCD

| Part Number | Rated Voltage  | Input Signal                                | Input Type | Output Type  | With Clock |
|-------------|----------------|---------------------------------------------|------------|--------------|------------|
| FL1D-B12RCE | 12/24V DC      | DC<br>I7 and I8 are used for digital/analog | PNP        | Relay Output | Yes        |
| FL1D-B12RCA | 24V AC/DC      |                                             | PNP/NPN    | Relay Output | Yes        |
| FL1D-B12RCC | 100-240V AC/DC | AC/DC                                       | PNP        |              |            |

### Special Function Blocks (Cont.)

| Asynchronous Pulse Generator | Random Generator | Frequency Trigger | Analog Trigger | Analog Comparator | Stairwell Light Switch | Dual-Function Switch |
|------------------------------|------------------|-------------------|----------------|-------------------|------------------------|----------------------|
|                              |                  |                   |                |                   |                        |                      |
|                              |                  |                   |                |                   |                        |                      |

# Modules that expand the possibilities

www.idec.com/smartrelay



## I/O Expansion Modules

| Part Number  | Module                 | Input Power    | Input Type    | Output Type       | Total I/O      |
|--------------|------------------------|----------------|---------------|-------------------|----------------|
| FL1B-M08B2R2 | Combination I/O Module | 12/24V DC      | DC input      | Relay output      | 8 (4 in/4 Out) |
| FL1B-M08B1S2 |                        | 24V DC         | DC input      | Transistor Output | 8 (4 in/4 Out) |
| FL1B-M08C2R2 |                        | 100-240V AC/DC | AC/DC input   | Relay Output      | 8 (4 in/4 Out) |
| FL1B-M08D2R2 |                        | 24V AC/DC      | AC/DC input   | Relay Output      | 8 (4 in/4 Out) |
| FL1B-J2B2    | Analog Input Module    | 12/24V DC      | 0-10V, 4-20mA | —                 | 2 (2 in/0 Out) |
| FL1D-K2B2    | Analog Output Module   | 24V DC         | —             | 0-10V             | 2 (0 in/2 Out) |

New



## LonWorks® Communication Module

- LonWorks® Communication module contains standard network variable type (SNVT) to achieve open network communication for building automation
- Maximum virtual inputs/analog inputs/outputs: 16/8/12 points
- An external interface file (XIF extension) unique to each LonWorks® module is needed to communicate through the LonWorks® network and can be downloaded at [www.idec.com/smartrelay](http://www.idec.com/smartrelay)
- See page 11 for more details



| Part Number | Module                         | Input Power | Total I/O                                                       |
|-------------|--------------------------------|-------------|-----------------------------------------------------------------|
| FL1B-CL1C12 | LonWorks® Communication Module | 24V AC/DC   | Input: 16 points<br>Analog Input: 8 points<br>Output: 12 points |

\*LonWorks® is a registered trademark of Echelon



## AS-Interface Communication Module

- The AS-Interface communication module provides optimum solutions for decentralized controls and savings in installation space and wiring
- Virtual I/O points: 4 inputs, 4 outputs
- See page 11 for more details



| Part Number | Module                            | Input Power | Total I/O                           |
|-------------|-----------------------------------|-------------|-------------------------------------|
| FL1B-CAS2   | AS-Interface Communication Module | 30V DC      | Input: 4 points<br>Output: 4 points |

Message Text

Softkey

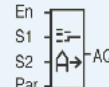
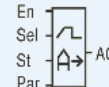
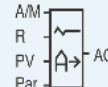
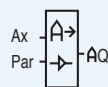
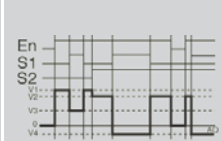
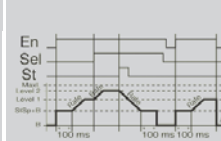
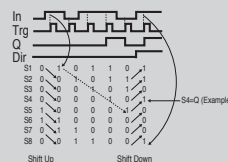
Analog Amplifier

Shift Register

PI Controller

Analog Ramp Control

Analog Multiplexer





### Starter Kit

- IDEC SmartRelay Starter Kit is an economical and ideal solution for first time IDEC SmartRelay users
- Package includes a base module, WindLGC programming software, programming cable, simulator switch (DC models only) and a user's manual

| Part Number      | Description                                                            |
|------------------|------------------------------------------------------------------------|
| SMARTSTART-BAC-D | FL1D-B12RCC, WindLGC software and programming cable                    |
| SMARTSTART-BDC-D | FL1D-B12RCE, WindLGC software, programming cable, and simulator switch |
| SMARTSTART-HAC-D | FL1D-H12RCC, WindLGC software and programming cable                    |
| SMARTSTART-HDC-D | FL1D-H12RCE, WindLGC software, programming cable, and simulator switch |

### Accessories



User's Manual  
FL9Y-B966-0



WindLGC 5.0 Software  
FL9Y-LP1CDW

| Part Number    | Description                                                                                                         |
|----------------|---------------------------------------------------------------------------------------------------------------------|
| FL1C-PM3       | Memory cartridge, with user defined protection feature                                                              |
| FL9Y-LP1CDW    | Programming Software: WindLGC Ver. 5CD w/Online Manual                                                              |
| FL1A-PC1       | Programming Cable                                                                                                   |
| BNDN1000       | 35mm Aluminum DIN Rail, 1m/3.28ft                                                                                   |
| BNL6           | End Clips, Prevents modules from sliding off DIN Rail                                                               |
| MT-101         | Memory Cartridge Removal Tool                                                                                       |
| FL1B-PSP1      | Mounts Module Directly to Panel                                                                                     |
| FL1B-Y1371-SW8 | 8pt Input Simulator Switch, Used with 12, 24V DC Base Module Only                                                   |
| FL9Y-B966-0    | FL1D User's Manual, Available for download at: <a href="http://www.idec.com/smartrelay">www.idec.com/smartrelay</a> |
| FC4A-USB       | USB to RS232 Converter, For use with "USB Only" PC's                                                                |



Memory Cartridge  
FL1C-PM3

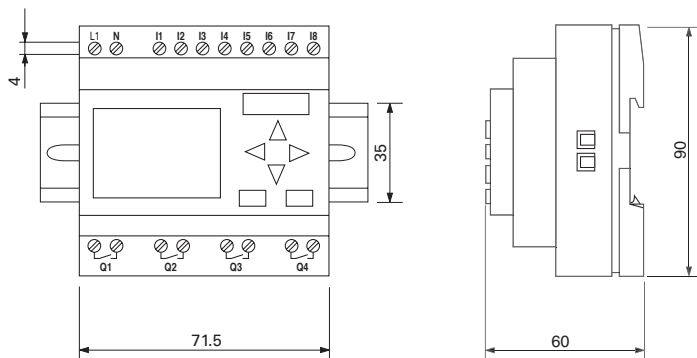


Simulator Switch  
FL1B-Y1371-SW8

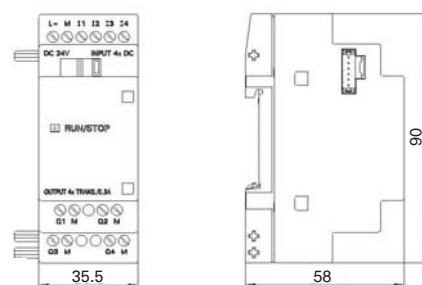


Programming Cable  
FL1A-PC1

### Base Module Dimensions



### I/O Expansion Module Dimensions

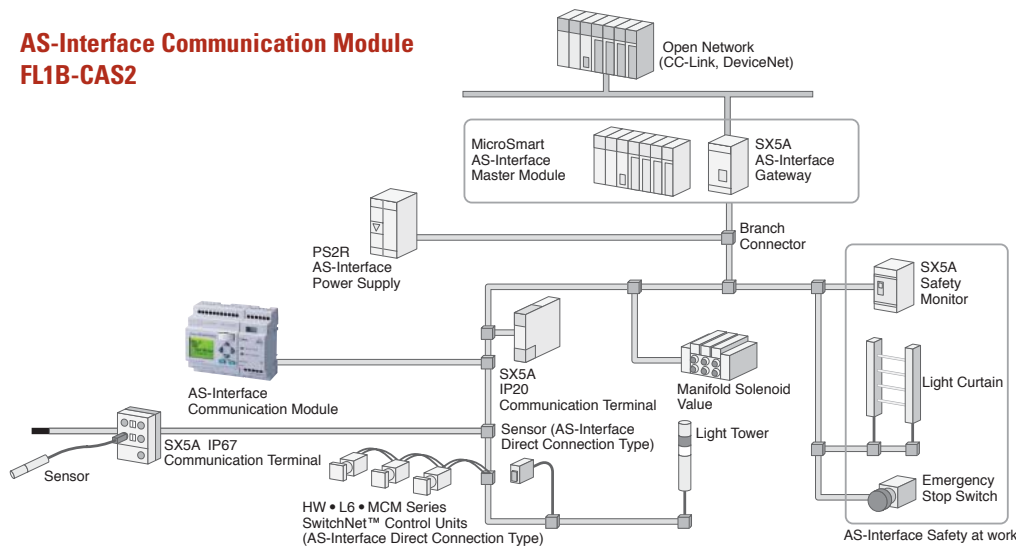


All dimensions in mm.

Detailed CAD drawings are available on our website at: [www.idec.com/smartrelay](http://www.idec.com/smartrelay).

## AS-Interface Communication Module FL1B-CAS2

www.iedec.com/smartrelay



The AS-Interface communication module provides the optimum solution for savings in cables, installation space, and wiring costs, and offers the possibility of decentralized control.



### Module Combination and Allocation Numbers

Using expansion I/O modules

|                   | FL1D-H12RCE |   |   |   |   |   |   |   | FL1B-M08B2R2 |    |    |    |  |  |  |  | FL1B-CAS2 |    |    |    |  |  |  |  |
|-------------------|-------------|---|---|---|---|---|---|---|--------------|----|----|----|--|--|--|--|-----------|----|----|----|--|--|--|--|
| Digital Input: I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | 11 | 12 |  |  |  |  | 13        | 14 | 15 | 16 |  |  |  |  |
| Analog Input: AI  | 1           | 2 |   |   |   |   |   |   |              |    |    |    |  |  |  |  | 3         | 4  |    |    |  |  |  |  |
| Digital Output: Q | 1           | 2 | 3 | 4 |   |   |   |   | 5            | 6  | 7  | 8  |  |  |  |  | 9         | 10 | 11 | 12 |  |  |  |  |

FL1B-J2B2

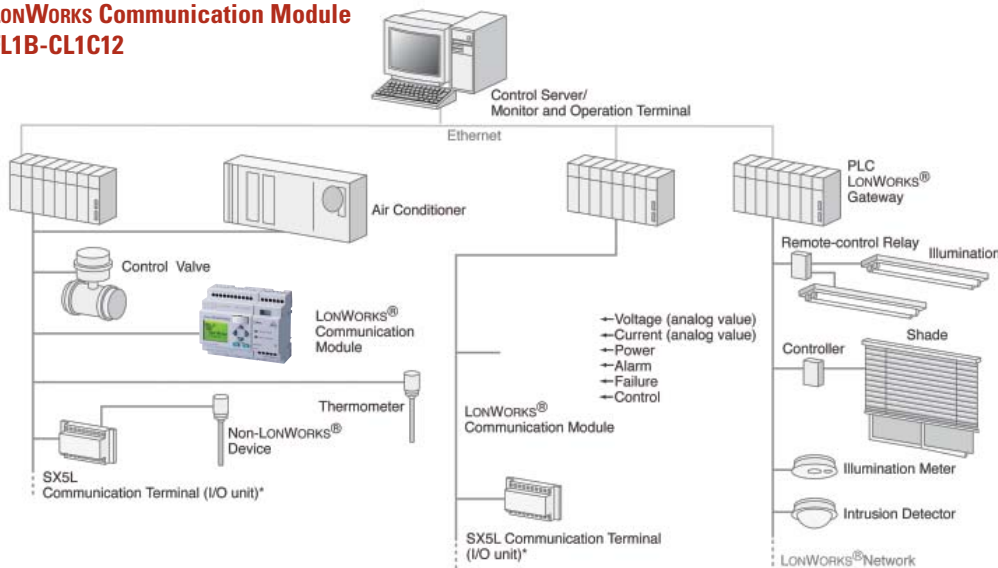
Base module

Analog input module

Combination I/O module

AS-interface communication module

## LonWorks Communication Module FL1B-CL1C12



Combination of easy-to-program IDEC SmartRelay and LONWORKS communication module achieves remote control and monitoring on a LonWorks network.

### Module Combination and Allocation Numbers

1. Maximum number of I/O points when using LONWORKS communication module

| FL1D-H12RCC     |    |   |   |   |   |   |   |   | FL1B-CL1C12 |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-----------------|----|---|---|---|---|---|---|---|-------------|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Digital Input:  | I  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8           | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Analog Input:   | AI |   |   |   |   |   |   |   |             | 1 | 2  | 3  | 4  | 5  | 6  | 7  | 8  |    |    |    |    |    |    |    |    |
| Digital Output: | Q  | 1 | 2 | 3 | 4 |   |   |   |             | 5 | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |    |    |

Base module

Combination I/O module

LONWORKS communication module

Analog input module

Analog output module

2. Using analog inputs on the base module

|                   | FL1D-H12RCE |   |   |   |   |   |   |   | FL1B-CL1C12 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------------------|-------------|---|---|---|---|---|---|---|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Digital Input: I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9           | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Analog Input: AI  | 1           | 2 |   |   |   |   |   |   | 3           | 4  | 5  | 6  | 7  | 8  |    |    |    |    |    |    |    |    |    |    |
| Digital Output: Q | 1           | 2 | 3 | 4 |   |   |   |   | 5           | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |    |    |

3. Using I/O expansion module

|                   | FL1D-H12RCE |   |   |   |   |   |   |   |   |    |    |    | FL1B-M08B2R2 |   |   |   |    |    |    |    |    |    |    |    | FL1B-CL1C12 |    |    |    |  |  |  |  |  |  |  |  |
|-------------------|-------------|---|---|---|---|---|---|---|---|----|----|----|--------------|---|---|---|----|----|----|----|----|----|----|----|-------------|----|----|----|--|--|--|--|--|--|--|--|
| Digital Input: I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |              |   |   |   | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21          | 22 | 23 | 24 |  |  |  |  |  |  |  |  |
| Analog Input: AI  | 1           | 2 |   |   |   |   |   |   |   |    |    |    |              | 3 | 4 |   | 5  | 6  | 7  | 8  |    |    |    |    |             |    |    |    |  |  |  |  |  |  |  |  |
| Analog Output: AO |             |   |   |   |   |   |   |   |   |    |    |    |              |   |   | 1 | 2  |    |    |    |    |    |    |    |             |    |    |    |  |  |  |  |  |  |  |  |
| Digital Output: Q | 1           | 2 | 3 | 4 |   |   |   |   | 5 | 6  | 7  | 8  |              |   |   |   | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |             |    |    |    |  |  |  |  |  |  |  |  |

FL1B-J2B2 FL1D-K2B2

Note 1: One LONWORKS communication module can be used with a base module and must be mounted at the right-most position of the row.

Note 2: I/O numbers are automatically allocated starting with the base module.

Note 3: When the base module with analog inputs is used, I1 to I8, AI1, and AO1 are occupied whether the analog inputs are used or not.



LonMark, LONWORKS, LON, Lon Builder, Neuron, 3120, 3150, and Echelon are registered trademarks of Echelon, USA.



### **PS5R Slim Line Power Supplies**

IDEC PS5R Slim Line power supplies have all the features, all the power, and only half the size of traditional power supplies. Save valuable DIN Rail space with the 30W, 60W, 90W, 120W, or 240W models which can fit any of your power needs. The PS5R Slim Line models are UL508 and UL1604 listed for hazardous locations. The 30W and 60W models are also NEC Class 2 rated. The 120W and 240W models comply with SEMI F47 sag immunity requirements.



### **SA1E Sensors**

Choose your sensing method, operation mode, control output and connection method with the simple and affordable SA1E sensors, and get exactly what you need in a very small package. There are 32 models available, all rated IP67 for water resistance, with a response time of 1 msec (maximum). Special interference prevention allows close mounting of two sensors (except for through-beam type), and the quick connect and disconnect option make installation a breeze.

### **Support Information**

#### **IDEC SmartRelay**

[www.idec.com/smartrelay](http://www.idec.com/smartrelay)

**Technical support:**  
[support@idec.com](mailto:support@idec.com)

**800-262-IDEC**  
[www.idec.com](http://www.idec.com)



### **HW Switches**

In basic black or stylish metal, the HW series of 22mm switches from IDEC are available in several styles to dress up any panel. HW pushbuttons and pilot devices are internationally-rated, designed for use almost anywhere in the world, and have removable contact blocks, finger-safe terminals, and tamperproof construction. Choose simple black plastic bezels for clean uniformity or chrome-plated metallic bezels for a rugged industrial look.



*Think Automation and beyond...*

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Catalog No. FL9Y-B100-0 2/06 15K

Specifications and other descriptions in this catalog are subject to change without notice.

# Section

# H

|                           |      |
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| Selection Guide .....     | H-3  |
| Function Blocks .....     | H-4  |
| Specifications .....      | H-5  |
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## IDEC SmartRelay

for more information on this product family visit  
**[www.idec.com/smartrelay](http://www.idec.com/smartrelay)**

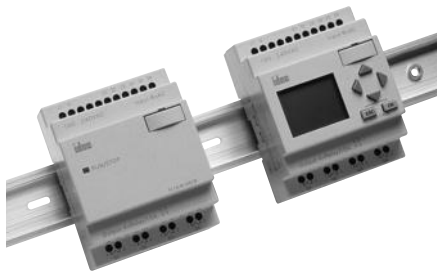
### Additional Web Resources

- New and updated product information
- Downloadable software demos & upgrades
- Part configuration tool & cross reference
- Online stock check & ordering
- IDEC field sales & distributor search
- Online literature request
- Downloadable manuals & CAD drawings
- Manufacturer's suggested retail price list
- Product training schedule & locations
- Advertising & trade show schedules
- Press releases & FAQs

**[www.idec.com/smartrelay](http://www.idec.com/smartrelay)**

## **IDEC SmartRelay**

### **IDEC SmartRelay –the smart and expandable solution**



Get smart with the fully programmable IDEC SmartRelay, a compact, expandable CPU that can replace multiple timers, relays and counters. Each CPU houses a real-time clock and calendar, and supports optional expansion I/O modules to enhance your control and monitoring applications. Program and edit using either the "smart" on-board selection buttons and display interface, or our even "smarter" software, WindLGC. The IDEC SmartRelay is the ideal solution for managing automatic lighting, access control, watering systems, pump control, or ventilation systems in factory or home automation.

#### **Highlights of the FL1C series**

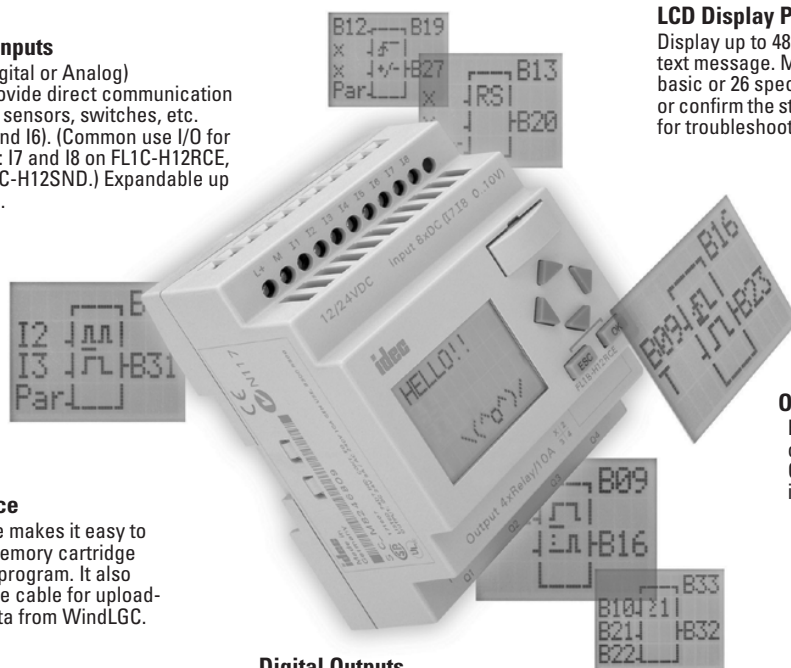
- 32-bit processor
- 130 connectable blocks
- 4 new function blocks
- 4 x12 backlight display
- Timer and counter frequency up to 2KHz
- Online monitor
- Ladder programming
- Invert of inputs saves NOT function blocks

#### **Digital/Analog Inputs**

(6 Digital plus 2 Digital or Analog)  
Multiple inputs provide direct communication with pushbuttons, sensors, switches, etc. (2kHz max. on I5 and I6). (Common use I/O for digital and analog: I7 and I8 on FL1C-H12RCE, FL1C-B12RCE, FL1C-H12SND.) Expandable up to 24 digital inputs.

#### **LCD Display Panel**

Display up to 48 characters as a text message. Monitor any of the 8 basic or 26 special function blocks, or confirm the status of the program for troubleshooting.



#### **Multifunction Interface**

A multifunction interface makes it easy to insert and remove the memory cartridge that controls the circuit program. It also supports the PC interface cable for uploading and downloading data from WindLGC.

#### **Operational Control Buttons**

Easy programming interface uses only six buttons. No tools necessary. Cursor keys can also be configured as inputs.

#### **Digital Outputs**

Use the outputs to control lights, small-sized motors and solenoid valves up to 10A. Expandable up to 16 digital outputs.

#### **Other Key Features**

- Password protection
- Daylight savings time
- UL/c-UL listed, IEC61131/VDE0631, EMC Compliant, C-tick listed
- FM approved for Class 1, Div 2 Class 1, Zone 2 hazardous locations.

### **Other Characteristics**



#### **Text Display**

It can display messages with background lighting up to 48 characters long from a selection of 97 character types.



#### **Operational Buttons**

Use the selection buttons for easy confirmation or modification of the circuit being displayed. The cursor keys can be configured as inputs.



#### **Memory Cartridge**

FL1C-PM3 is a memory cartridge with know-how protection. Not only is it possible to save your program, but also to protect it from unintended modification, copying or deletion.

Not required for operation.



#### **Expansion Modules**

Optional expansion I/O modules allow you to add digital input, output and LONWORKS®/AS-Interface communication modules as well as analog inputs to your system. Just snap-on and go – no special software or cables required.

**Part Numbers**
**Base Module Part Number**

| Part Number | Rated Voltage  | Input Signal                         | Input Type | Output Signal            | With Display | With Clock | Input/Output |
|-------------|----------------|--------------------------------------|------------|--------------------------|--------------|------------|--------------|
| FL1C-H12RCE | 12/24V DC      | DC                                   | PNP        | Relay Output             | Yes          | Yes        | 8/4          |
| FL1C-B12RCE |                | I7and I8 are used for digital/analog |            | —                        |              |            |              |
| FL1C-H12SND | 24V DC         |                                      |            | Transistor Source Output | Yes          | —          |              |
| FL1C-H12RCA | 24V AC/DC      | AC/DC                                | PNP/NPN    | Relay Output             | Yes          | Yes        |              |
| FL1C-B12RCA |                |                                      |            |                          | —            |            |              |
| FL1C-H12RCC | 100-240V AC/DC |                                      | PNP        |                          | Yes          |            |              |
| FL1C-B12RCC |                |                                      |            |                          | —            |            |              |

**Expansion Module Part Number**

| Part No.     | Module                             | Power Voltage  | Input        | Output            | Total I/O      |
|--------------|------------------------------------|----------------|--------------|-------------------|----------------|
| FL1B-M08B2R2 | Combination I/O Module             | 12/24V DC      | DC input     | Relay output      | 8 (4 in/4 out) |
| FL1B-M08B1S2 |                                    | 24V DC         | DC input     | Transistor output | 8 (4 in/4 out) |
| FL1B-M08C2R2 |                                    | 100-240V AC/DC | AC/DC input  | Relay output      | 8 (4 in/4 out) |
| FL1B-M08D2R2 |                                    | 24V AC/DC      | AC/DC input  | Relay output      | 8 (4 in/4 out) |
| FL1B-J2B2    | Analog Input Module                | 12/24V DC      | Analog input | —                 | 2 (2 in/0 out) |
| FL1B-CL1C12  | LONWORKS® Communication Module*    | 24V AC/DC      | —            | —                 | —              |
| FL1B-CAS2    | AS-Interface Communication Module* | 30V DC         | —            | —                 | —              |



\* For more information see Section M, Communications & Networking.

**Starter Kit Part Number**

| Part Number      | Description                                                            |
|------------------|------------------------------------------------------------------------|
| SMARTSTART-BAC-C | FL1C-B12RCC, WindLGC software, and programming cable                   |
| SMARTSTART-BDC-C | FL1C-B12RCE, WindLGC software, programming cable, and simulator switch |
| SMARTSTART-HAC-C | FL1C-H12RCC, WindLGC software, and programming cable                   |
| SMARTSTART-HDC-C | FL1C-H12RCE, WindLGC software, programming cable, and simulator switch |

**Accessories**

| Part Number         | Description                          | Note                                      |
|---------------------|--------------------------------------|-------------------------------------------|
| FL1C-PM3            | Memory Cartridge                     | Memory cartridge with know-how protection |
| FL9Y-LP1CDW         | Programming Software: WindLGC Ver. 4 | CD w/Online Manual                        |
| FL1A-PC1            | PC Interface Cable                   | Connection of SmartRelay to PC            |
| BAA1000<br>BNDN1000 | 35MM DIN Rail                        | Aluminum, 1m/3.28ft                       |
| BNL6                | Mounting Clips                       |                                           |
| MT-101              | Memory Cartridge Removal Tool        |                                           |
| FL1B-PSP1           | Direct Mounting Slides               |                                           |
| FL1B-Y1371-SW8      | 8pt simulator switch                 | used with 12, 24V DC base module only     |
| FL9Y-B827           | FL1C user's manual                   |                                           |
| FC4A-USB            | USB/RS232 converter                  |                                           |

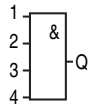


## Function Blocks

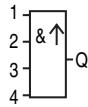
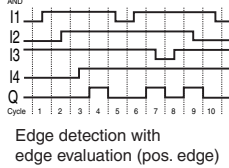
## General Function Blocks

## • AND

Series connection of normally open contacts

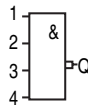


## • AND (Edge)

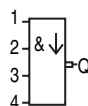
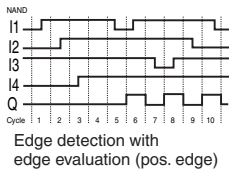


## • NAND

Parallel connection of normally closed contacts

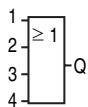


## • NAND (Edge)



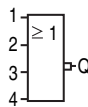
## • OR

Parallel connection of normally open contacts



## • NOR

Series connection of normally closed contacts



## • XOR

Double changeover contact



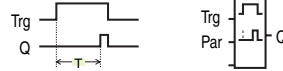
## • NOT

Connection of closed contact

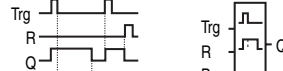


## Special Function Blocks

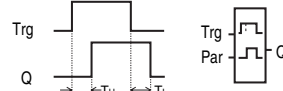
## • On-delay



## • Off-delay



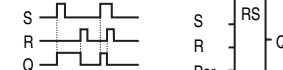
## • On-/Off-delay



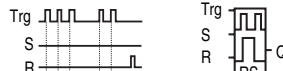
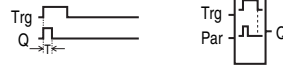
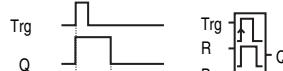
## • Retentive on-delay



## • Latching relay



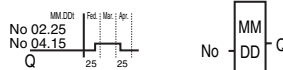
## • Current impulse relay

• Interval time-delay relay/  
Pulse output• Edge-triggered interval  
time-delay relay

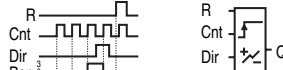
## • Seven-day time switch



## • Twelve-month time switch



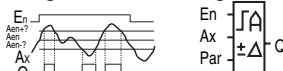
## • Up/down counter



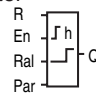
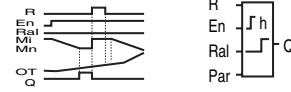
## • Analog differential trigger



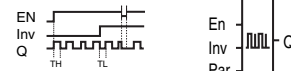
## • Analog value monitoring



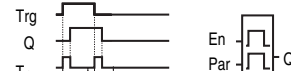
## • Operating hours counter



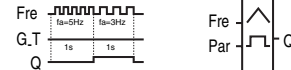
## • Asynchronous pulse generator



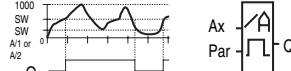
## • Random generator



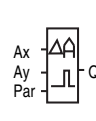
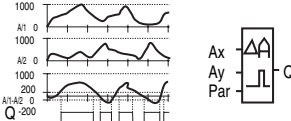
## • Frequency trigger



## • Analog trigger



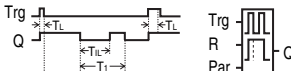
## • Analog comparator



## • Stairwell light switch



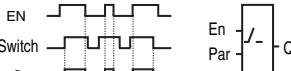
## • Dual-function switch



## • Message texts



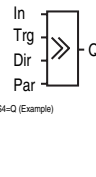
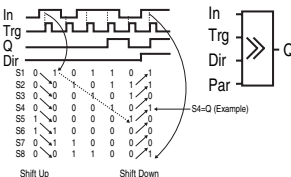
## • Softkey



## • Analog amplifier



## • Shift register



**Specifications**

| Item                   |                        | Specifications                                                                | Compliant Standards                                                |
|------------------------|------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------|
| General Specifications | Dimensions (W x H x D) | 72 x 90 x 55 mm                                                               | —                                                                  |
|                        | Weight                 | Approx. 190g                                                                  | —                                                                  |
|                        | Operating temperature  | Horizontal                                                                    | 0 to +55°C                                                         |
|                        |                        | Vertical                                                                      | 0 to +55°C                                                         |
|                        | Storage temperature    | -40 to +70°C                                                                  | —                                                                  |
|                        | Relative humidity      | 10 to 85%                                                                     | IEC60068-2-30                                                      |
|                        | Pressure               | 795 to 1080 hPa                                                               | —                                                                  |
|                        | Corrosion immunity     | Free from corrosive gases                                                     | —                                                                  |
|                        | Degree of protection   | IP20                                                                          | —                                                                  |
|                        | Vibration resistance   | 5 to 9Hz (amplitude: 3.2mm)<br>9 to 150Hz (acceleration: 10m/s <sup>2</sup> ) | IEC60068-2-6                                                       |
|                        | Shock resistance       | 150 m/s <sup>2</sup>                                                          | IEC60068-2-27                                                      |
|                        | Dropping               | 50 mm (Drop height)                                                           | IEC60068-2-31                                                      |
|                        | Free fall (packaged)   | 1 m                                                                           | IEC60068-2-32                                                      |
|                        | Emission               | Class B Group 1                                                               | EN55011                                                            |
|                        | EMC                    | Emitted interference                                                          | —                                                                  |
|                        |                        | Electrostatic discharge                                                       | 8kV Air Discharge<br>6kV Contact Discharge                         |
|                        |                        | Electromagnetic fields                                                        | 10V/m                                                              |
|                        |                        | Burst pulses                                                                  | 2KV (Supply and Signal Lines)                                      |
|                        |                        | Energy carriers single pulse (surge)                                          | 0.5kV(Power Lines): Symmetrical<br>1kV (Power Lines): Asymmetrical |
|                        | Communication cable    |                                                                               | 2 x 1.5 mm <sup>2</sup> ,<br>1 x 0.5 to 2.5 mm <sup>2</sup>        |

| Base Module Part Number              |                 | FL1C-H12RCE                            | FL1C-H12SND                             | FL1C-H12RCA       | FL1C-H12RCC                               |
|--------------------------------------|-----------------|----------------------------------------|-----------------------------------------|-------------------|-------------------------------------------|
|                                      |                 | FL1C-B12RCE                            | —                                       | FL1C-B12RCA       | FL1C-B12RCC                               |
| Base Module Operating Specifications | Power Supply    | Rated voltage                          | 12/24V DC                               | 24V DC            | 24V AC/DC                                 |
|                                      |                 | Allowable Voltage Range                | 10.8-28.8V DC                           | 20.4-28.8V DC     | 20.4V-26.4V AC<br>20.4V-28.8V DC          |
|                                      |                 | Rated Frequency                        | —                                       | —                 | 47-63Hz                                   |
|                                      |                 | Input Current                          | 30-140 mA (12V DC)<br>20-75 mA (24V DC) | 30-55 mA (24V DC) | 40-110 mA (24V AC)<br>20-75 mA (24V DC)   |
|                                      |                 | Allowable Momentary Power Interruption | 2 ms (12V DC)<br>5 ms (24V DC)          | —                 | 5 ms                                      |
|                                      |                 | Power Consumption                      | 0.3-1.7W (12V DC)<br>0.4-1.8W (24V DC)  | 0.7-1.3W (24V DC) | 0.9-2.7W (24V AC)<br>0.4 to 1.8W (24V DC) |
|                                      |                 | Reverse Polarity Protection            | Yes                                     | Yes               | —                                         |
| Clock                                | Backup Duration | 80h at 25°C                            | —                                       | 80h at 25°C       | 80h at 25°C                               |
|                                      | Clock Accuracy  | ±2s / day maximum                      | —                                       | ±2s / day maximum | ±2s / day maximum                         |

## Specifications con't

| Base Module Part Number |                                                                          | FL1C-H12RCE                                                                                                                                                      | FL1C-H12SND                                                    | FL1C-H12RCA                                                                                                                                                                     | FL1C-H12RCC                                                                                                                                                         |
|-------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         |                                                                          | FL1C-B12RCE                                                                                                                                                      | —                                                              | FL1C-B12RCA                                                                                                                                                                     | FL1C-B12RCC                                                                                                                                                         |
| Input                   | Input Signal                                                             | DC                                                                                                                                                               | DC                                                             | AC/DC                                                                                                                                                                           | AC/DC                                                                                                                                                               |
|                         | Input Points                                                             | 8 (I1-I8)                                                                                                                                                        | 8 (I1-I8)                                                      | 8 (I1 - I8)                                                                                                                                                                     | 8 (I1-I8)                                                                                                                                                           |
|                         | Analog Input Points                                                      | 2 (I7, I8)*                                                                                                                                                      | 2 (I7, I8)*                                                    | —                                                                                                                                                                               | —                                                                                                                                                                   |
|                         | Fast Inputs                                                              | 2 (I5, I6) Max 2KHz**                                                                                                                                            | 2 (I5, I6) Max 2 KHz**                                         | —                                                                                                                                                                               | —                                                                                                                                                                   |
|                         | Analog Input Voltage Range                                               | 0 to 10V DC (maximum rated voltage: 28.8V DC)                                                                                                                    | 0 to 10V DC (maximum rated voltage: 28.8V DC)                  | —                                                                                                                                                                               | —                                                                                                                                                                   |
|                         | Rated Input Voltage                                                      | 12/24V DC                                                                                                                                                        | 24V DC                                                         | 24V AC/DC                                                                                                                                                                       | 100-240V AC/DC                                                                                                                                                      |
|                         | Allowable Voltage Range                                                  | 10.8-28.8V DC                                                                                                                                                    | 20.4-28.8V DC                                                  | 0-26.4V AC<br>0-28.8V DC                                                                                                                                                        | 85-253V AC, 100-253 VDC                                                                                                                                             |
|                         | Isolation                                                                | Not Isolated                                                                                                                                                     | Not Isolated                                                   | Not Isolated                                                                                                                                                                    | Not Isolated                                                                                                                                                        |
|                         | Operating Range                                                          | Turn OFF Voltage                                                                                                                                                 | < 5V DC                                                        | < 5V AC/DC                                                                                                                                                                      | < 40V AC, < 30 VDC                                                                                                                                                  |
|                         |                                                                          | Turn ON Voltage                                                                                                                                                  | > 8V DC                                                        | > 12V AC/DC                                                                                                                                                                     | > 79V AC, > 79VDC                                                                                                                                                   |
|                         |                                                                          | Turn OFF Current                                                                                                                                                 | < 1.0 mA (I1-I6)<br>< 0.05 mA (I7-I8)                          | < 1.0 mA                                                                                                                                                                        | < 0.03 mA                                                                                                                                                           |
|                         |                                                                          | Turn ON Current                                                                                                                                                  | > 1.5 mA (I1-I6)<br>> 0.1 mA (I7-I8)                           | > 2.5 mA                                                                                                                                                                        | > 0.08 mA                                                                                                                                                           |
|                         | Turn ON Time                                                             | 1.5ms (Typ.) (I1-14)<br><1.0ms (I5, I6)<br>300ms Typ. (I7, I8)                                                                                                   | 1.5ms (Typ.) (I1-14)<br><1.0ms (I5, I6)<br>300ms Typ. (I7, I8) | 1.5 ms (Typ.)                                                                                                                                                                   | 50 ms (Typ.)                                                                                                                                                        |
|                         | Turn OFF Time                                                            | 1.5ms (Typ.)                                                                                                                                                     | 1.5 ms (Typ.)                                                  | 15 ms (Typ.)                                                                                                                                                                    | 50 ms (Typ.)                                                                                                                                                        |
|                         | Wire Length                                                              | 100m                                                                                                                                                             | 100m                                                           | 100m                                                                                                                                                                            | 100m                                                                                                                                                                |
| Output                  | Output Signal                                                            | Relay Output                                                                                                                                                     | Transistor Source Out-put                                      | Relay Output                                                                                                                                                                    | Relay Output                                                                                                                                                        |
|                         | Output Type                                                              | 4NO contacts                                                                                                                                                     | 4 points                                                       | 4NO contacts                                                                                                                                                                    | 4NO contacts                                                                                                                                                        |
|                         | Isolation                                                                | Isolated                                                                                                                                                         | Not Isolated                                                   | Isolated                                                                                                                                                                        | Isolated                                                                                                                                                            |
|                         | Dielectric Strength (between power/ input terminal and output terminals) | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                           | —                                                              | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                                          | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                              |
|                         | Output Voltage                                                           | —                                                                                                                                                                | Ext. power supply<br>20.4-28.8V DC                             | —                                                                                                                                                                               | —                                                                                                                                                                   |
|                         | Maximum Load Current                                                     | Resistive Load<br>10A at 12/24V AC/DC<br>10A at 100/120V AC<br>10A at 230/240V AC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC<br>3A at 230/240V | 0.3A                                                           | Resistive Load<br>10A at 12/24V AC/DC<br>10A at 100/120V AC/DC<br>10A at 230/240V AC/DC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC/DC<br>3A at 230/240V AC/DC | Resistive Load<br>10A at 12/24V AC/DC<br>10A at 100/120V AC<br>10A at 230/240V AC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC<br>3A at 230/240V AC |
|                         | Short Circuit Protection                                                 | External fuse<br>16A maximum                                                                                                                                     | Internal current limiting circuit: 1A                          | External fuse<br>16A maximum                                                                                                                                                    | External fuse<br>16A maximum                                                                                                                                        |
|                         | Minimum Switching Load                                                   | 10 mA, 12V DC                                                                                                                                                    | —                                                              | 10 mA, 12V DC                                                                                                                                                                   | 10 mA, 12V DC                                                                                                                                                       |
|                         | Initial Contact Resistance                                               | 100 mΩ maximum<br>(at 1A, 24V DC)                                                                                                                                | —                                                              | 100 mΩ maximum<br>(at 1A, 24V DC)                                                                                                                                               | 100 mΩ maximum<br>(at 1A, 24V DC)                                                                                                                                   |
|                         | Mechanical Life                                                          | 10,000,000 operations<br>minimum (no load, 10Hz)                                                                                                                 | —                                                              | 10,000,000 operations<br>min (no load, 10Hz)                                                                                                                                    | 10,000,000 operations<br>minimum (no load, 10Hz)                                                                                                                    |
|                         | Electrical Life                                                          | 100,000 operations mini-<br>mum (rated load 10A,<br>1,800 operations/hour)                                                                                       | —                                                              | 100,000 operations min<br>(rated load 10A, 1,800<br>operations/hour)                                                                                                            | 100,000 operations mini-<br>mum (rated load 10A,<br>1,800 operations/hour)                                                                                          |
| Switching Rate          | Mechanical Load                                                          | 10 Hz                                                                                                                                                            | —                                                              | 10 Hz                                                                                                                                                                           | 10 Hz                                                                                                                                                               |
|                         | Electrical Load                                                          | —                                                                                                                                                                | 10 Hz                                                          | —                                                                                                                                                                               | —                                                                                                                                                                   |
|                         | Resistive Load/Lamp Load                                                 | 2 Hz                                                                                                                                                             | 10 Hz                                                          | 2 Hz                                                                                                                                                                            | 2 Hz                                                                                                                                                                |
|                         | Inductive Load                                                           | 0.5 Hz                                                                                                                                                           | 0.5 Hz                                                         | 0.5 Hz                                                                                                                                                                          | 0.5 Hz                                                                                                                                                              |

\* Input terminals 17 and 18 are used for digital and analog inputs.

\*\* When selecting frequency trigger function.

Specifications con't

| Expansion I/O Part Number |                                                                          | Combination I/O Module                                                                                                                                           |                                        |                                                                                                                                                                              |                                                                                                                                                                     | Analog Input Module                                      |
|---------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
|                           |                                                                          | FL1B-M08B2R2                                                                                                                                                     | FL1B-M08B1S2                           | FL1B-M08D2R2                                                                                                                                                                 | FL1B-M08C2R2                                                                                                                                                        | FL1B-J2B2                                                |
| Power Supply              | Rated voltage                                                            | 12/24V DC                                                                                                                                                        | 24V DC                                 | 24V AC/DC                                                                                                                                                                    | 100-240V AC/DC                                                                                                                                                      | 12/24V DC                                                |
|                           | Allowable Voltage Range                                                  | 10.8-28.8V DC                                                                                                                                                    | 20.4-28.8V DC                          | 20.4V-26.4V AC<br>20.4V-28.8V DC                                                                                                                                             | 85-265V AC<br>100-253V DC                                                                                                                                           | 10.8-15.6V DC<br>20.4-28.8V DC                           |
|                           | Rated Frequency                                                          | —                                                                                                                                                                | —                                      | 47-63Hz                                                                                                                                                                      | 50/60Hz (47-63Hz)                                                                                                                                                   | —                                                        |
|                           | Input Current                                                            | 30-140 mA (12V DC)<br>22-75 mA (24V DC)                                                                                                                          | 30-45 mA (24V DC)                      | 40-110 mA (24V AC)<br>20-75 mA (24V DC)                                                                                                                                      | 10-30 mA (100V AC)<br>10-20 mA (240V AC)<br>5-15mA (100V DC)<br>5-10mA (240V DC)                                                                                    | 25-50mA                                                  |
|                           | Allowable Momentary Power Interruption                                   | 2 ms (12V DC)<br>5 ms (24V DC)                                                                                                                                   | —                                      | 5 ms                                                                                                                                                                         | 10 ms (100V AC)<br>20 ms (240V AC)                                                                                                                                  | 5 ms                                                     |
|                           | Power Consumption                                                        | 0.3-1.7W (12V DC)<br>0.4-1.8W (24V DC)                                                                                                                           | 0.8-1.1W (24V DC)                      | 0.9-2.7W (24V AC)<br>0.4 to 1.8W (24V DC)                                                                                                                                    | 1.1-3.5W (100V AC)<br>2.4-4.8W (240V AC)<br>0.5-1.8W (100V DC)<br>1.2-2.4W (240V DC)                                                                                | 0.3-0.6W (12V DC)<br>0.6-1.2W (24V DC)                   |
|                           | Reverse Polarity Protection                                              | Yes                                                                                                                                                              | Yes                                    | —                                                                                                                                                                            | —                                                                                                                                                                   | Yes                                                      |
| Input                     | Input Signal                                                             | DC                                                                                                                                                               | DC                                     | AC/DC                                                                                                                                                                        | AC/DC                                                                                                                                                               | Analog                                                   |
|                           | Input Points                                                             | 4                                                                                                                                                                | 4                                      | 4                                                                                                                                                                            | 4                                                                                                                                                                   | —                                                        |
|                           | Analog Input Points                                                      | —                                                                                                                                                                | —                                      | —                                                                                                                                                                            | —                                                                                                                                                                   | 2                                                        |
|                           | Input Impedance                                                          | —                                                                                                                                                                | —                                      | —                                                                                                                                                                            | —                                                                                                                                                                   | 76 k $\Omega$ (0-10V DC)<br>155-250 $\Omega$ (0-20mA DC) |
|                           | Analog Input Range                                                       | —                                                                                                                                                                | —                                      | —                                                                                                                                                                            | —                                                                                                                                                                   | 0-10V DC (28.8V max)<br>0-20mA (40mA max)                |
|                           | Digital Resolution                                                       | —                                                                                                                                                                | —                                      | —                                                                                                                                                                            | —                                                                                                                                                                   | 10 bits (0-1000)                                         |
|                           | Rated Input Voltage                                                      | 12/24V DC                                                                                                                                                        | 24V DC                                 | 24V AC/DC                                                                                                                                                                    | 100-240V AC/DC                                                                                                                                                      | —                                                        |
|                           | Allowable Voltage Range                                                  | 10.8-15.6V DC<br>20.4-28.8V DC                                                                                                                                   | 20.4-28.8V DC                          | 0-26.4V AC<br>0-28.8V DC                                                                                                                                                     | 85-253V AC<br>100-253V DC                                                                                                                                           | —                                                        |
|                           | Isolation                                                                | Not Isolated                                                                                                                                                     | Not Isolated                           | Not Isolated                                                                                                                                                                 | Isolated                                                                                                                                                            | Not Isolated                                             |
|                           | Operating Range                                                          | Turn OFF Voltage                                                                                                                                                 | < 5V DC                                | < 5V DC                                                                                                                                                                      | < 40V AC<br>< 30V DC                                                                                                                                                | —                                                        |
|                           |                                                                          | Turn ON Voltage                                                                                                                                                  | > 8V DC                                | > 8V DC                                                                                                                                                                      | > 79V AC<br>> 79V DC                                                                                                                                                | —                                                        |
|                           |                                                                          | Turn OFF Current                                                                                                                                                 | < 1.0 mA                               | < 1.0 mA                                                                                                                                                                     | < 0.3 mA                                                                                                                                                            | —                                                        |
|                           |                                                                          | Turn ON Current                                                                                                                                                  | > 1.5 mA                               | > 1.5 mA                                                                                                                                                                     | > 0.08 mA                                                                                                                                                           | —                                                        |
|                           | Turn ON Time                                                             | 1.5ms                                                                                                                                                            | 1.5 ms                                 | 1.5 ms (Typ.)                                                                                                                                                                | 50 ms (Typ.)                                                                                                                                                        | —                                                        |
|                           | Turn OFF Time                                                            | 1.5ms                                                                                                                                                            | 1.5 ms                                 | 15 ms (Typ.)                                                                                                                                                                 | 50 ms (Typ.)                                                                                                                                                        | —                                                        |
|                           | Analog Value Conversion Interval                                         | —                                                                                                                                                                | —                                      | —                                                                                                                                                                            | —                                                                                                                                                                   | 50ms                                                     |
|                           | Wire Length                                                              | 100m                                                                                                                                                             | 100m                                   | 100m                                                                                                                                                                         | 100m                                                                                                                                                                | 10m (twisted-pair shielded cable)                        |
| Output                    | Output Signal                                                            | Relay Output                                                                                                                                                     | Transistor Source Output               | Relay Output                                                                                                                                                                 | Relay Output                                                                                                                                                        | —                                                        |
|                           | Output Type                                                              | 4NO contacts                                                                                                                                                     | 4 points                               | 4NO contacts                                                                                                                                                                 | 4NO contacts                                                                                                                                                        | —                                                        |
|                           | Isolation                                                                | Isolated                                                                                                                                                         | Not Isolated                           | Isolated                                                                                                                                                                     | Isolated                                                                                                                                                            | —                                                        |
|                           | Dielectric Strength (between power/ input terminal and output terminals) | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                           | 2,500V AC/1 minute<br>500V DC/1 minute | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                                       | 2,500V AC/1 minute<br>500V DC/1 minute                                                                                                                              | —                                                        |
|                           | Output Voltage                                                           | —                                                                                                                                                                | Ext. power supply<br>20.4-28.8V DC     | —                                                                                                                                                                            | —                                                                                                                                                                   | —                                                        |
|                           | Maximum Load Current                                                     | Resistive Load<br>10A at 12/24V AC/DC<br>10A at 100/120V AC<br>10A at 230/240V AC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC<br>3A at 230/240V | 0.3A                                   | Resistive Load<br>5A at 12/24V AC/DC<br>5A at 100/120V AC/DC<br>5A at 230/240V AC/DC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC/DC<br>3A at 230/240V AC/DC | Resistive Load<br>10A at 12/24V AC/DC<br>10A at 100/120V AC<br>10A at 230/240V AC<br>Inductive Load<br>2A at 12/24V AC/DC<br>3A at 100/120V AC<br>3A at 230/240V AC | —                                                        |
|                           | Short Circuit Protection                                                 | External fuse required<br>16A max                                                                                                                                | Internal current limiting resistor: 1A | External fuse<br>16A maximum                                                                                                                                                 | External fuse<br>16A maximum                                                                                                                                        | —                                                        |
|                           | Minimum Switching Load                                                   | 10 mA, 12V DC                                                                                                                                                    | —                                      | 10 mA, 12V DC                                                                                                                                                                | 10 mA, 12V DC                                                                                                                                                       | —                                                        |
|                           | Initial Contact Resistance                                               | 100 m $\Omega$ maximum (at 1A, 24V DC)                                                                                                                           | —                                      | 100 m $\Omega$ maximum (at 1A, 24V DC)                                                                                                                                       | 100 m $\Omega$ maximum (at 1A, 24V DC)                                                                                                                              | —                                                        |
|                           | Mechanical Life                                                          | 10,000,000 operations (no load)                                                                                                                                  | —                                      | 10,000,000 operations min (no load, 10Hz)                                                                                                                                    | 10,000,000 operations (no load)                                                                                                                                     | —                                                        |
|                           | Electrical Life                                                          | 100,000 operations (rated resistive load 1,800 operations/hr)                                                                                                    | —                                      | 100,000 operations minimum (rated load 1,800 operations/hour)                                                                                                                | 100,000 operations (rated resistive load 1,800 operations/hr)                                                                                                       | —                                                        |
|                           | Mechanical Load                                                          | 10Hz                                                                                                                                                             | —                                      | 10 Hz                                                                                                                                                                        | 10Hz                                                                                                                                                                | —                                                        |
| Switching Rate            | Electrical Load                                                          | —                                                                                                                                                                | 10Hz                                   | —                                                                                                                                                                            | —                                                                                                                                                                   | —                                                        |
|                           | Resistive Load/Lamp Load                                                 | 2Hz                                                                                                                                                              | 10Hz                                   | 2 Hz                                                                                                                                                                         | 2Hz                                                                                                                                                                 | —                                                        |
|                           | Inductive Load                                                           | 0.5Hz                                                                                                                                                            | 0.5Hz                                  | 0.5 Hz                                                                                                                                                                       | 0.5Hz                                                                                                                                                               | —                                                        |

**Specifications con't**

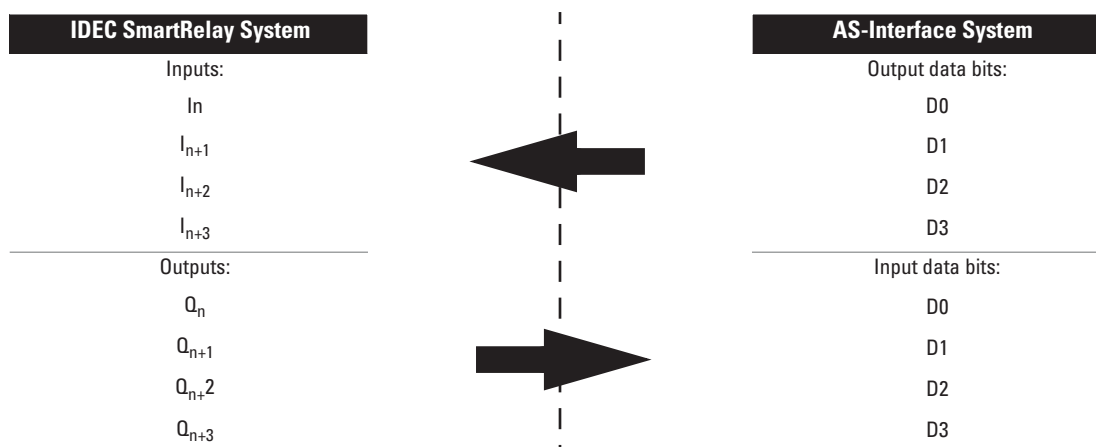
|          |                                                                 |                         |                                                                                                                                                                   |
|----------|-----------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>H</b> | <b>Operating Specifications - LowWorks Communication Module</b> | Operating Temperature   | 0 to 55°C (no freezing)                                                                                                                                           |
|          |                                                                 | Operating Humidity      | 10 to 85% RH (no condensation)                                                                                                                                    |
|          |                                                                 | Storage Temperature     | -40 to +70°C (no freezing)                                                                                                                                        |
|          |                                                                 | Storage Humidity        | 10 to 85% RH (no condensation)                                                                                                                                    |
|          |                                                                 | Rated Power Voltage     | 24V AC/DC                                                                                                                                                         |
|          |                                                                 | Allowable Voltage Range | 20.4 to 26.4V AC, 20.4 to 28.8V DC                                                                                                                                |
|          |                                                                 | Current Draw            | 33 mA max.                                                                                                                                                        |
|          |                                                                 | Dielectric Strength     | 500V DC, 1 minute<br>(between power terminal and dead parts)                                                                                                      |
|          |                                                                 | Insulation Resistance   | 10 MΩ minimum<br>(500V DC megger between power terminal and dead parts)                                                                                           |
|          |                                                                 | EMC                     | Electrostatic Discharge<br>8 kV air discharge<br>6 kV contact discharge                                                                                           |
|          |                                                                 |                         | Burst Pulses<br>2 kV (power terminal)                                                                                                                             |
|          |                                                                 | Vibration Resistance    | 5 to 9 Hz, amplitude 3.5 mm<br>9 to 150 Hz, 9.8 m/s <sup>2</sup>                                                                                                  |
|          |                                                                 | Shock Resistance        | 150 m/s <sup>2</sup>                                                                                                                                              |
|          |                                                                 | Dimensions              | 35.5W × 90H × 58D mm                                                                                                                                              |
|          |                                                                 | Mounting Style          | DIN rail or panel surface                                                                                                                                         |
|          |                                                                 | Degree of Protection    | IP20                                                                                                                                                              |
|          |                                                                 | Terminal Style          | Screw-cage clamp terminal                                                                                                                                         |
|          |                                                                 | Weight                  | 85g                                                                                                                                                               |
|          |                                                                 | Communication System    | LON <sup>®</sup> system                                                                                                                                           |
|          |                                                                 | Transceiver             | FTT-10A                                                                                                                                                           |
|          |                                                                 | Topology                | Bus topology, free topology                                                                                                                                       |
|          |                                                                 | Transmission Rate       | 78 kbps                                                                                                                                                           |
|          |                                                                 | Neuron Chip             | TMPN3120FE5M (Toshiba)                                                                                                                                            |
|          |                                                                 | CPU Clock Frequency     | 20 MHz                                                                                                                                                            |
|          |                                                                 | Transmission Distance   | Bus topology: 1400m<br>(only FTT-10A transceiver, using Level 4 AWG22 cable)<br>Free topology: 500m total, 400m between nodes<br>(when using Level 4 AWG22 cable) |

|                          |                         |                                |                                                          |
|--------------------------|-------------------------|--------------------------------|----------------------------------------------------------|
| <b>Network Variables</b> | Input Network Variable  | SNVT_obj_request: (Quantity 1) | Request object mode                                      |
|                          |                         | SNVT_switch: (Quantity 14)     | Switch light, alarm, window contact, free inputs/outputs |
|                          |                         | SNVT_occupancy: (Quantity 2)   | Occupancy                                                |
|                          |                         | SNVT_temp_p: (Quantity 1)      | Room temperature (°C)                                    |
|                          |                         | SNVT_lux: (Quantity 1)         | Brightness - lighting level (lux)                        |
|                          |                         | SNVT_lev_percent: (Quantity 6) | Position (%)                                             |
|                          | Output Network Variable | SNVT_obj_status: (Quantity 1)  | Output object status                                     |
|                          |                         | SNVT_switch: (Quantity 8)      | Switch light, alarm, window contact, free inputs/outputs |
|                          |                         | SNVT_occupancy: (Quantity 2)   | Occupancy                                                |
|                          |                         | SNVT_tod_event: (Quantity 2)   | Scheduler program<br>Just current state                  |
|                          | Configuration Property  | SCPTmaxSendTime:               | Send heartbeat (Q5 to Q16)                               |

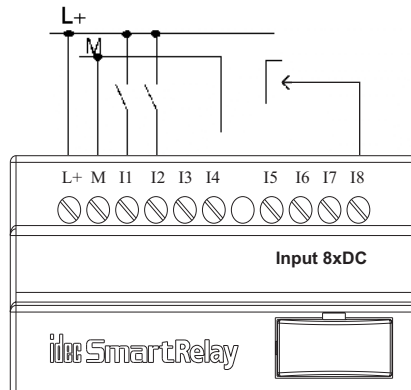
## Specifications con't

|                                                              |                             |                             |                                                                  |
|--------------------------------------------------------------|-----------------------------|-----------------------------|------------------------------------------------------------------|
| Operating Specifications - AS-Interface Communication Module | Operating Temperature       |                             | 0 to 55°C                                                        |
|                                                              | Storage Temperature         |                             | −40 to +70°C                                                     |
|                                                              | Relative Humidity           |                             | 10 to 85% (no condensation)                                      |
|                                                              | Rated As-interface Voltage  |                             | 30 VDC (26.5VDC to 31.6VDC)                                      |
|                                                              | Reverse Polarity Protection |                             | Yes                                                              |
|                                                              | Current Draw                |                             | 70 mA max.                                                       |
|                                                              | EMC                         | Electrostatic Discharge     | 8 kV air discharge (IEC61000-4-2)<br>4 kV contact discharge      |
|                                                              |                             | Electromagnetic filed       | Filed strength 10V/m (IEC61000-4-3)                              |
|                                                              |                             | First Transient Burst Pulse | 1kV (criteria A) (IEC61000-4-4)<br>1kV (criteria B)              |
|                                                              |                             | Radiated Emission           | Class A (EN55011)                                                |
|                                                              | Vibration Resistance        |                             | 5 to 9 Hz, amplitude 3.5 mm<br>9 to 150 Hz, 9.8 m/s <sup>2</sup> |
|                                                              | Shock Resistance            |                             | 147 m/s <sup>2</sup> 11ms (X, Y, Z each direction 3 times)       |
|                                                              | Slave type                  |                             | Standard slave                                                   |
|                                                              | Profile                     |                             | I/O code 7<br>I/D code F<br>I/D2 code F                          |
|                                                              | Degree of Protection        |                             | IP20                                                             |
|                                                              | Terminal Style              |                             | Screw terminal (tightening torque: max. 0.5Nm)                   |
|                                                              | Applicable wire             |                             | 0.5 to 1.5mm <sup>2</sup>                                        |
|                                                              | Instruction                 |                             | on a 35mm mounting rail according to DIN EN50022/wall mounting   |
|                                                              | Dimensions                  |                             | 36W × 90H × 58D mm                                               |
|                                                              | Weight                      |                             | 75g                                                              |

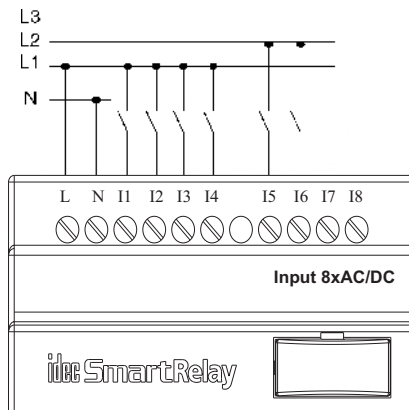
## Logic Assignments



“n” depends on the plug-in position of the expansion module relative to the IDEC SmartRelay CPU. It indicates the number of the input or output in the IDEC SmartRelay program code.

**Connection Diagrams**
**Inputs (CPU)**
**FL1C-H12RCE/-B12RCE/H12SND**


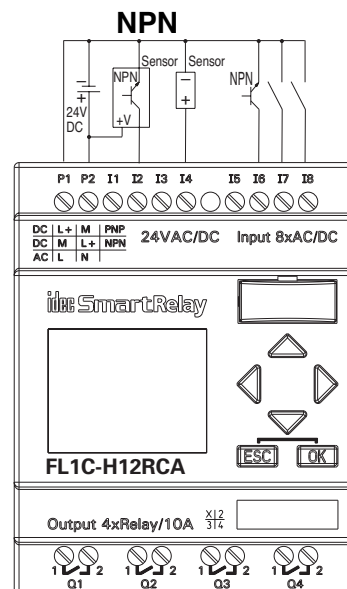
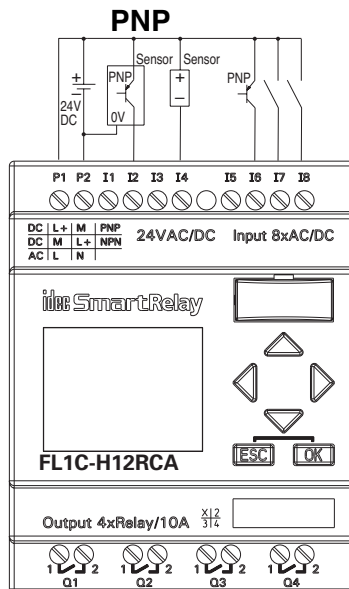
The inputs of these devices are non-isolated and therefore require the same reference potential (ground) as the power supply. With the FL1B-H12RCE/-B12RCE and FL1B-H12SND you can tap the analog signal between the supply voltage and ground

**FL1C-H12RCC/-B12RCC**


The inputs of these devices are arranged in 2 groups with 4 inputs each. Different phases are only possible between, but not within the blocks.



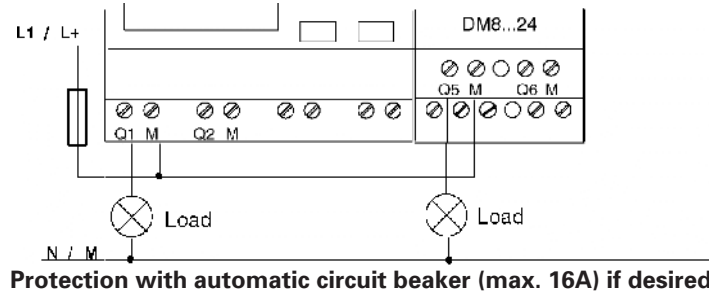
Current safety regulations (VDE 0110, ... and IEC 61131-2, ... as well as UL and CSA) do not permit the connection of different phases to one input group (I1-4 or I5-8) of an AC model or on the inputs of one digital module.

**FL1C-H12RCA/-B12RCA**


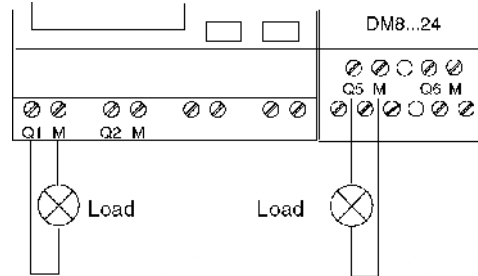
## Connection Diagrams con't

### Outputs

Connecting the load to the FL1C-\*12R\*\*:

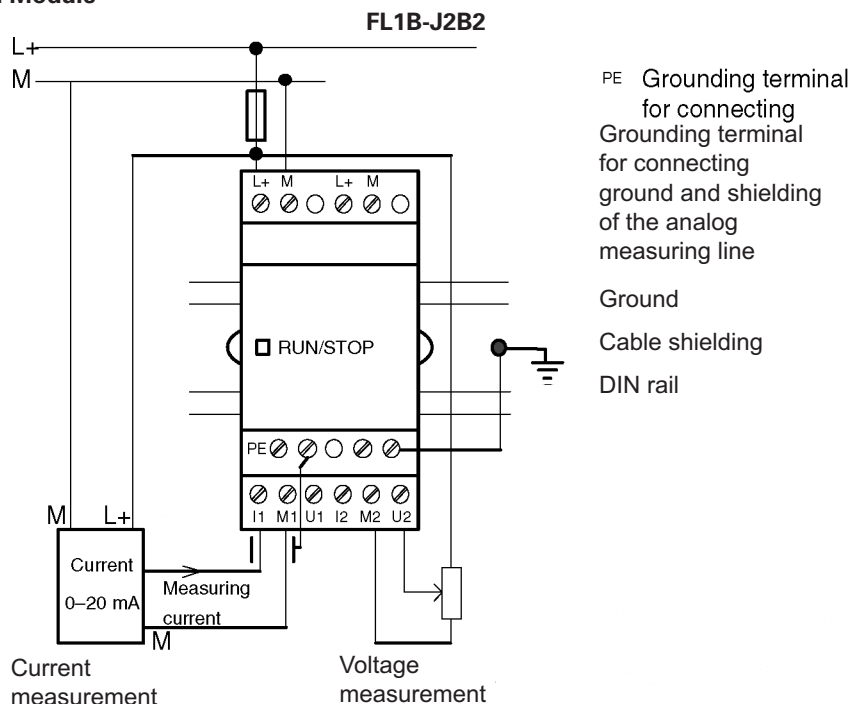


Connecting the load to a IDEC SmartRelay with transistor outputs (FL1C-H12SND):



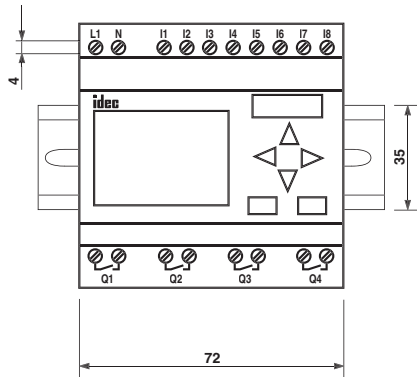
Load: 24 V DC, 0.3 A max.

### Analog Input Expansion Module

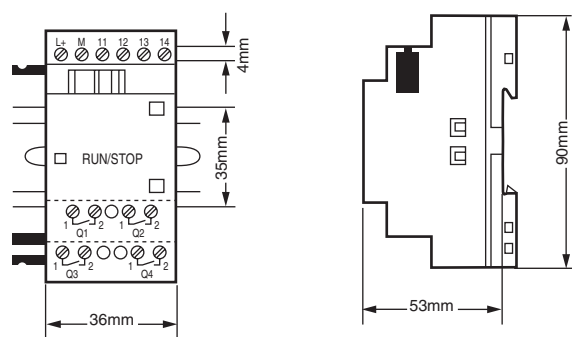


## Dimensions

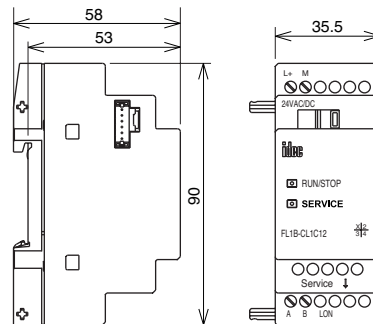
### Base Module



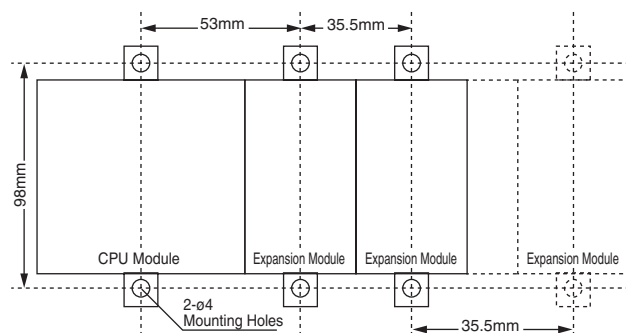
### Expansion Module



### LONWORKS®/AS-Interface Communication Module



### Mounting Hole Layout



## General Information

### Maximum Setup

- Maximum Setup of IDEC SmartRelay With Analog Inputs FL1C-H12RCE/B12RCE/H12SND**  
 (CPU, 4 digital modules and 3 analog modules)

|                              |              |              |              |              |           |           |           |
|------------------------------|--------------|--------------|--------------|--------------|-----------|-----------|-----------|
| I1...I16, I7, I8<br>AI1, AI2 | I9...I12     | I13...I16    | I17...I20    | I21...I24    | AI3, AI4  | AI5, AI6  | AI7, AI8  |
| CPU                          | FL1B-M08B2R2 | FL1B-M08B2R2 | FL1B-M08B2R2 | FL1B-M08B2R2 | FL1B-J2B2 | FL1B-J2B2 | FL1B-J2B2 |
| Q1...Q4                      | Q5...Q8      | Q9...Q12     | Q13...Q16    |              |           |           |           |

- Maximum Setup of IDEC SmartRelay Without Analog Inputs FL1C-H12RCA/B12RCA/H12RCC/B12RCC**  
 (CPU, 4 digital modules and 4 analog modules)

|                              |          |           |           |           |          |          |          |          |
|------------------------------|----------|-----------|-----------|-----------|----------|----------|----------|----------|
| I1...I16, I7, I8<br>AI1, AI2 | I9...I12 | I13...I16 | I17...I20 | I21...I24 | AI1, AI2 | AI3, AI4 | AI5, AI6 | AI7, AI8 |
| CPU                          | FL1B-M08 | FL1B-M08  | FL1B-M08  | FL1B-M08  | J2B2     | J2B2     | J2B2     | J2B2     |
| Q1...Q4                      | Q5...Q8  | Q9...Q12  | Q13...Q16 |           |          |          |          |          |

- High-speed/Optimal Communication Performance**

For optimal and high-speed communication performance between the IDEC SmartRelay and the various modules, we recommend you install the digital modules first, then the analog modules (see example above).

### Setup With Different Voltage Classes

- Rules**  
 Digital modules can only be connected to devices of the same voltage class.
- Overview:** Connecting an expansion module to IDEC SmartRelay

| CPU         | Expansion Modules |         |         |         |      |          |
|-------------|-------------------|---------|---------|---------|------|----------|
|             | M08B2R2           | M08B1S2 | M08D2R2 | M08C2R2 | J2B2 | AS-i/LON |
| FL1C-H12RCE | X                 | X       | X       | —       | X    | X        |
| FL1C-H12SND | X                 | X       | X       | —       | X    | X        |
| FL1C-H12RCA | X                 | X       | X       | —       | X    | X        |
| FL1C-H12RCC | —                 | —       | —       | X       | X    | X        |
| FL1C-B12RCE | X                 | X       | X       | —       | X    | X        |
| FL1C-B12RCA | X                 | X       | X       | —       | X    | X        |
| FL1C-B12RCC | —                 | —       | —       | X       | X    | X        |

- Overview:** Connecting an additional expansion module to an expansion module

| Expansion Module       | Additional Expansion Modules |         |         |         |      |      |        |
|------------------------|------------------------------|---------|---------|---------|------|------|--------|
|                        | M08B2R2                      | M08B1S2 | M08D2R2 | M08C2R2 | J2B2 | CAS2 | CL1C12 |
| FL1B-M08B2R2           | X                            | X       | X       | —       | X    | X    | X      |
| FL1B-M08B1S2           | X                            | X       | X       | —       | X    | X    | X      |
| FL1B-M08D2R2           | X                            | X       | X       | —       | X    | X    | X      |
| FL1B-M08C2R2           | —                            | —       | —       | X       | X    | X    | X      |
| FL1B-J2B2              | X                            | X       | X       | —       | X    | X    | X      |
| FL1B-CAS2 AS-Interface | X                            | X       | X       | —       | X    | —    | —      |
| FL1B-CL1C12 LONWORKS   | —                            | —       | —       | —       | —    | —    | —      |

### I/O Configuration with LONWORKS® Communication Module

#### Module Combination and Allocation Numbers

- Maximum number of I/O points using LONWORKS® communication module

|                  |             |   |   |   |   |   |   |   |             |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------------|-------------|---|---|---|---|---|---|---|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                  | FL1C-H12RCC |   |   |   |   |   |   |   | FL1B-CL1C12 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Digital Input:I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9           | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Analog Input:AI  |             |   |   |   |   |   |   |   | 1           | 2  | 3  | 4  | 5  | 6  | 7  | 8  |    |    |    |    |    |    |    |    |
| Digital Output:Q | 1           | 2 | 3 | 4 |   |   |   |   | 5           | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |    |    |

- Using analog inputs on the base module

|                  |             |   |   |   |   |   |   |   |             |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------------|-------------|---|---|---|---|---|---|---|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                  | FL1C-H12RCE |   |   |   |   |   |   |   | FL1B-CL1C12 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Digital Input:I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9           | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Analog Input:AI  | 1           | 2 |   |   |   |   |   |   | 3           | 4  | 5  | 6  | 7  | 8  |    |    |    |    |    |    |    |    |    |    |
| Digital Output:Q | 1           | 2 | 3 | 4 |   |   |   |   | 5           | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |    |    |

- Using expansion I/O modules

|                  | FL1C-H12RCE |   |   |   |   |   |   |   | FL1B-M08B2R2 |    |    |    | FL1B-CL1C12 |   |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
|------------------|-------------|---|---|---|---|---|---|---|--------------|----|----|----|-------------|---|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| Digital Input:I  | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9            | 10 | 11 | 12 |             |   | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |  |  |
| Analog Input:AI  | 1           | 2 |   |   |   |   |   |   |              |    |    |    | 3           | 4 | 5  | 6  | 7  | 8  |    |    |    |    |    |    |    |    |  |  |
| Digital Output:Q | 1           | 2 | 3 | 4 |   |   |   |   | 5            | 6  | 7  | 8  |             |   | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |    |    |    |    |  |  |

FL1B-J2B2

Base module, LONWORKS® communication module, Combination I/O module, Analog input module



- The LONWORKS® communication module can be used with any base module and expansion I/O module.
- The LONWORKS® communication module must be mounted at the right-most position of the row.
- I/O numbers are automatically allocated starting with the base module.

## WindLGC Programming Software

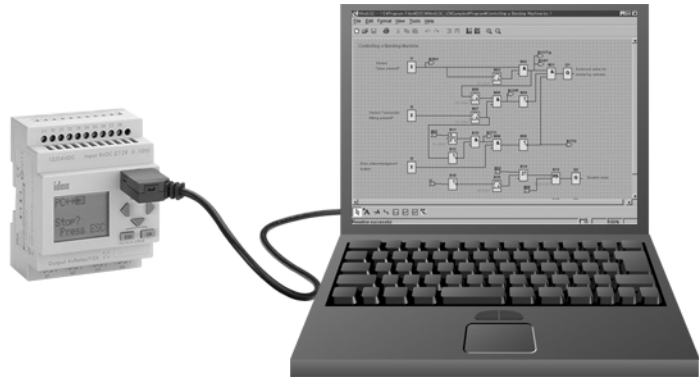
**WindLGC is the exclusive programming software for the IDEC SmartRelay using Windows®. Edit, save, and print out your programs.**

### WindLGC Ver. 4 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.

To configure IDEC SmartRelay FL1C series, you must upgrade to WindLGC version 4.0.

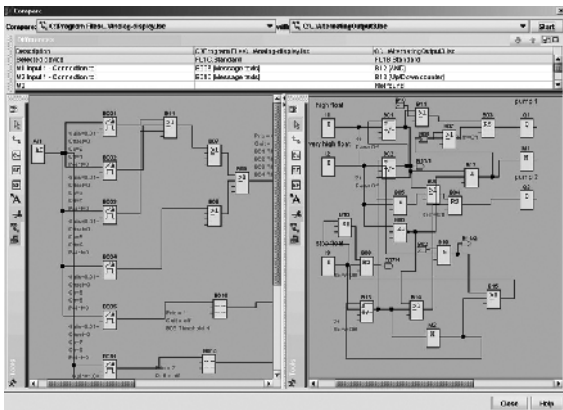


### WindLGC system requirements:

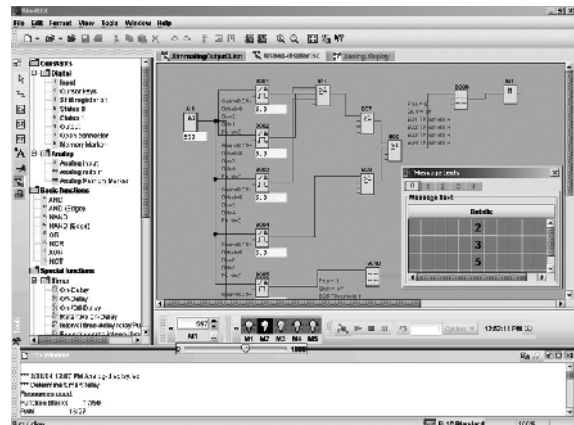
- OS: Windows95/98/ME/NT/2000/XP
- CPU recommendation: Pentium 266MHz or higher
- Memory: 64MB or more
- RAM recommendation: 128MB
- Hard disk space: 90MB or more for installing WindLGC software.
- Monitor Recommendation: Display more than 800 x 600 dots and 256 colors

Free download service, if upgrading from WindLGC Version 3 to Version 4, available at [www.idec.com/usa](http://www.idec.com/usa)

### Program Comparison



### Simulation Mode/Online Monitor



### Ladder Programming

