# DL105 I/O Specifications Retired 05/21

## F1-130DR-D <---->

## Wiring diagram and specifications

### *DC power supply specifications*

Voltage range.....10–30 VDC
..... 10W max.

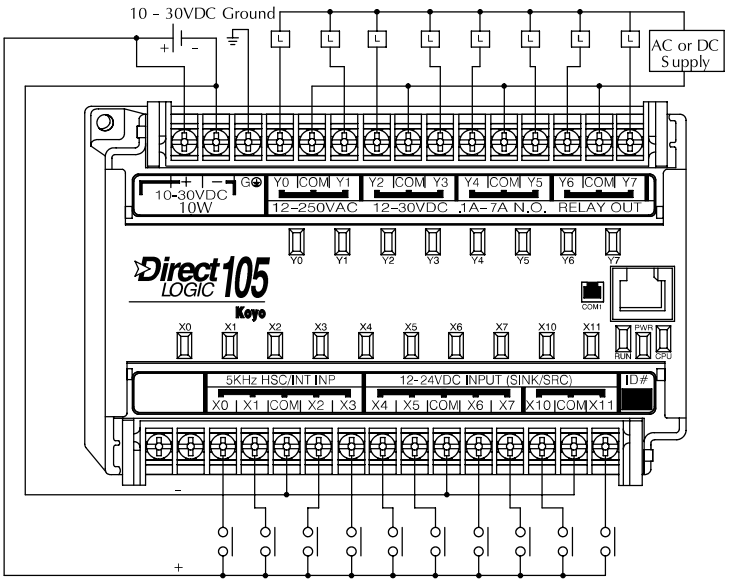
### *DC input specifications*

Number of input points.....10 (sink/source)
Number of commons..... 3 (isolated)
Input voltage range.....X0–X3: 10–26.4 VDC
.....X4–X11: 10–26.4 VDC or
.....21.6–26.4 VAC
Input impedance.....2.8 kΩ @ 12–24 VDC
ON current/voltage level..... > 3mA / > 9VDC
OFF current/voltage level..... < 0.5 mA / < 2VDC
OFF to ON response..... X0–X3: 50µs
.....X4–X11: 2–8 ms
ON to OFF response.....X0–X3: 50µs
.....X4–X11: 2–8 ms
Fuses..... None

### *Relay output specifications*

Number of output points.....8
Number of commons.....4 (isolated)
Output circuitry.....Relay
Output voltage range.....12–250 VAC
.....2–30 VDC
Maximum voltage.....265VAC, 150 VDC
Maximum current.....7A/point (See derating)
Maximum inrush current.....12A
Minimum load.....10mA
Minimum OFF resistance.....100MΩ @ 500VDC
OFF to ON response.....15ms
ON to OFF response.....5ms
Fuses.....None (external recommended)

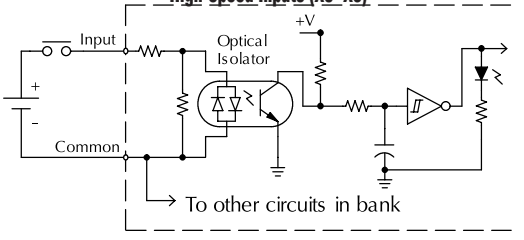
**Output Point Wiring**



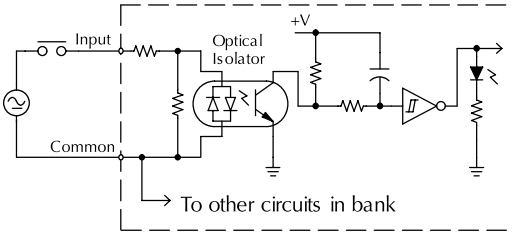

**Input Point Wiring**

***Note: Same supply can be used to power both input and output circuits because all circuits are isolated from the internal logic.***

**Equivalent Circuit**
**High-Speed Inputs (X0–X3)**

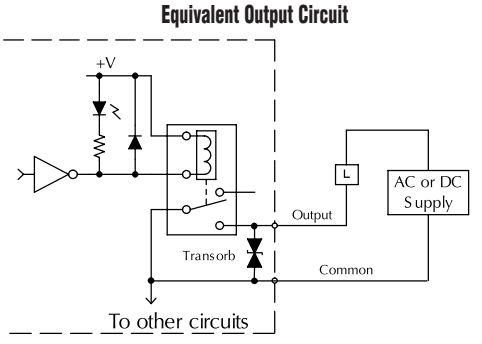



**Equivalent Circuit**
**Standard Inputs (X4–X11)**

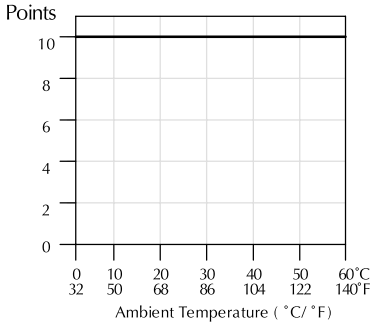



| Typical Relay Life (Operations) at Room Temperature | | | |
|---|---|---|---|
| Voltage and Type of Load | Load Current | | |
| | 50mA | 5A | 7A |
| 24VDC Resistive | 10M | 600K | 300K |
| 24VDC Solenoid | — | 150K | 75K |
| 110VAC Resistive | — | 600K | 300K |
| 110VAC Solenoid | — | 500K | 200K |
| 220VAC Resistive | — | 300K | 150K |
| 220VAC Solenoid | — | 250K | 100K |

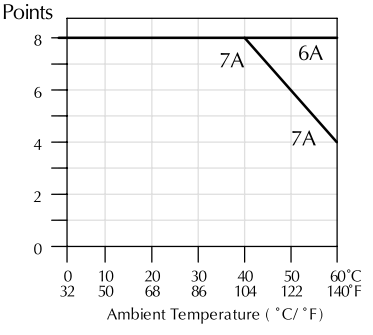
**Equivalent Output Circuit**




Derating Chart for DC Inputs




Derating Chart for Relay Outputs



# Features and Specifications

The DL105 micro PLCs contain the CPU, power supply and I/O all in the same housing. If you examine the CPU Specifications table, you'll see that we included many features found in our modular CPUs.

## Review the specs

Make sure these features can satisfy the requirements of your application. Since these units are completely self-contained, you cannot expand the system or replace the CPU as you would in a modular system.

### System capacity

System capacity is the ability to accommodate a variety of applications. For ladder memory, most Boolean instructions require one word. Some other instructions, such as timers, counters, etc., require two or more words. Our V-memory words are useful for data storage, etc.

### Performance

The performance is simply the scan time, which is the amount of time required to read the inputs, solve the RLL program and update the outputs.

### Instructions and diagnostics

Make sure the unit offers the instructions you need.

### Communications

All DL105 units offer one RS-232 port, capable of 9600 baud.

### Specialty features

With the DC input and/or DC output versions, we also offer several high-speed I/O features.

## AC-powered units

***F1-130AA***
10 AC inputs, 8 AC outputs, 1.7 A/point

***F1-130AR***
10 AC inputs, 8 relay outputs, 7A/point

***F1-130DA***
10 DC inputs, 4 inputs are filtered inputs, can also be configured as a single 5kHz high-speed counter, interrupt input, or pulse catch input
8 AC outputs, 1.7 A/point

***F1-130DD***
10 DC inputs, 4 points are filtered inputs, can also be configured as a single 5 kHz high-speed counter, interrupt input, or pulse catch input
8 DC outputs, 1.0 A/point, 2 outputs can be used as 7kHz pulse output, 0.5 A/point

***F1-130DR***
10 DC inputs, 4 inputs are filtered inputs, can also be configured as a single 5kHz high-speed counter, interrupt input, or pulse catch input
8 relay outputs, 7A/point

## DC-powered units

***F1-130DD-D***
10 DC inputs, 4 inputs can be used as 5kHz high-speed counter, interrupt inputs, or pulse catch inputs
8 DC outputs, 1.0 A/point, two outputs can be used as 7kHz pulse output, 0.5 A/point.

***F1-130DR-D***
10 DC inputs, 4 inputs can be used as 5kHz high-speed counter, interrupt inputs, or pulse catch inputs
8 relay outputs, 7A/point

## Programming

Handheld programmer.....D2-HPP
*Direct*SOFT Programming for Windows
PC-DSOFT6
PC-DS100
PC-R60-U (upgrade)

***Note: Either high-speed input or pulse output can be used, but not in the same configuration.***

## DL105 CPU Specifications

### *System capacity*

| | |
|---|---|
| Total memory available (words) | 2.4K |
| Ladder memory (words) | 2,048 EEPROM |
| V-memory (words) | 384 |
| User V | 256 |
| Non-volatile user V | 128 |
| Battery backup | No |
| Total I/O | 18 |
| Inputs | 10 |
| Outputs | 8 |
| I/O expansion | No |

### *Performance*

| | |
|---|---|
| Contact execution (Boolean) | 3.3 µs |
| Typical scan (1K Boolean)[1] | 5–6 ms |

### *Instructions and diagnostics*

| | |
|---|---|
| RLL ladder style | Yes |
| RLL*PLUS*/flowchart style (Stages) | Yes/256 |
| Run-time editing | Yes |
| Supports Overrides | No |
| Variable/fixed scan | Variable |
| Instructions | 91 |
| Control relays | 256 |
| Timers | 64 |
| Counters | 64 |
| Immediate I/O | Yes |
| Subroutines | No |
| For/next loops | No |
| Timed interrupt | Yes |
| Integer math | Yes |
| Floating-point math | No |
| PID | No |
| Drum sequencers | Yes |
| Bit of word | No |
| ASCII print | No |
| Real-time clock/calendar | No |
| Internal diagnostics | Yes |
| Password security | Multi-level |
| System and user error log | No |

### *Communications*

| | |
|---|---|
| Built-in ports | one, RS-232-C |
| K-sequence (proprietary protocol) | Yes |
| DirectNET™ | No |
| MODBUS master/slave | No |
| ASCII out | No |
| Baud rate (fixed) | 9600 baud |

### *Specialty features*

| | |
|---|---|
| Filtered inputs | Yes[2] |
| Interrupt input | Yes[2] |
| High-speed counter | Yes, 5kHz[2] |
| Pulse output | Yes, 7kHz[2] |
| Pulse catch input | Yes[2] |

***1- Our 1K program includes contacts, coils, and scan overhead. If you compare our products to others, make sure you include their scan overhead.***

***2- Input features are only available on units with DC inputs. Output features are only available on units with DC outputs.***

# DL105 Hardware Features

## CPU status indicators

RUN……ON…… CPU is in RUN mode
……..OFF……CPU is in PROGRAM mode
PWR……...ON……..CPU power good
……..OFF…… CPU power failure
CPU……...ON……CPU internal diagnostics
……has detected an error
……..OFF…….. CPU is OK

## Mode control

The DL105 units do not have mode switches like many of our modular CPUs. You can set the unit (using special V-memory locations) so that it will power up in RUN mode.

## Communications port

Protocol…… K-sequence slave
Devices……...Can connect with HPP,
…… ……*Direct*SOFT, DV-1000,
……..*C-More* Panels
Specs……..6P6C RJ12 connector
…… RS-232-C, 9,600 baud,
……..Odd parity,
……...Fixed station address (1),
……8 data bits (one start,
……...one stop bit),
……Asynchronous, half-duplex, DTE

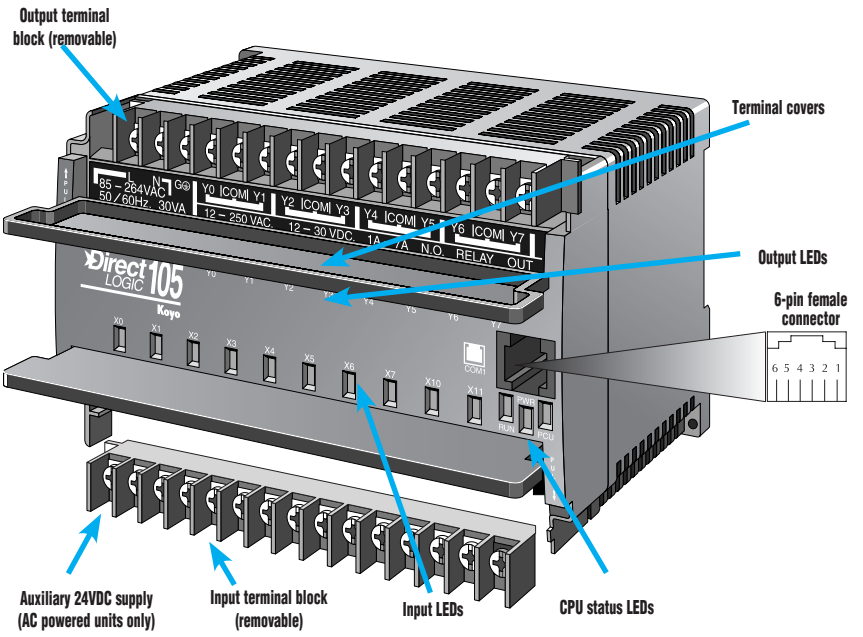
***RJ12 Connector Port 1 Pinout***

| ***Pin*** | ***Signal*** |
|---|---|
| 1 | 0V |
| 2 | 5V |
| 3 | RS-232 Data in |
| 4 | RS-232 Data out |
| 5 | 5V |
| 6 | 0V |

## Fixed EEPROM memory

The DL105 units offer built-in EEPROM memory.

***NOTE: Terminals accept 16–24 AWG. For 16 AWG, use type TFFN or Type MTW. Other types of 16 AWG may be acceptable, but it really depends on the thickness of the wire insulation.***



# Dimensions and Installation

It is important to understand the installation requirements for your DL105 system. This will help ensure that the DL105 products operate within their environmental and electrical limits.

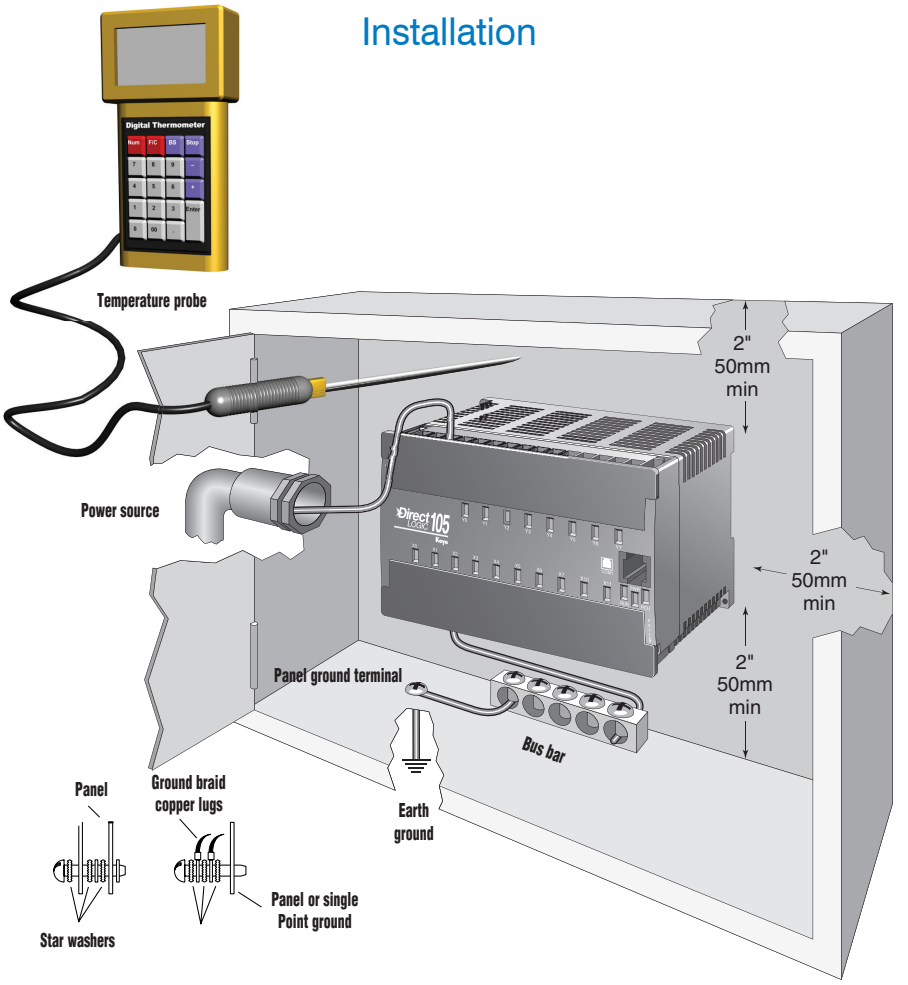
## Plan for safety

**This catalog should never be used as a replacement for the user manual.** The user manual, D1-USER-M, contains important safety information that must be followed. The system installation should comply with all appropriate electrical codes and standards.

## Unit dimensions and mounting orientation

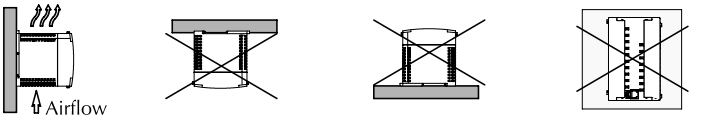
Use the following diagrams to make sure the DL105 system can be installed in your application. DL105 units must be mounted horizontally to ensure proper airflow for cooling purposes. It is important to check these dimensions against the conditions required for your application. For example, we recommend that you leave 2" depth for ease of access and cable clearance; however, your distance may be greater or less. Also, check the installation guidelines for the recommended cabinet clearances.

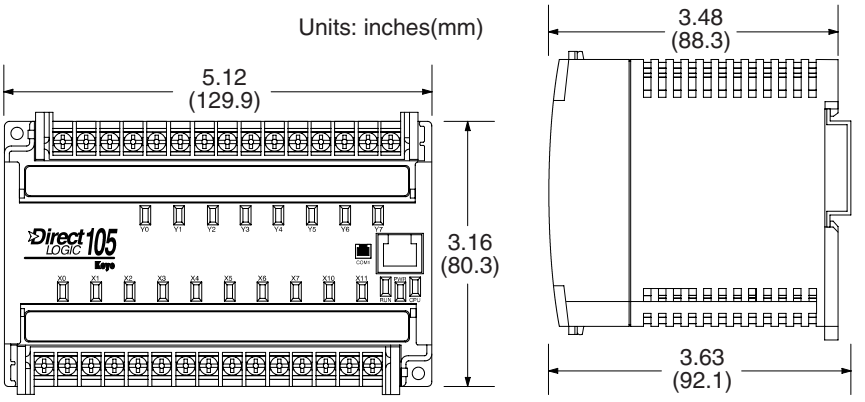
## Installation




***Note: There is a minimum of 2" (50mm) clearance required between the panel door or any devices mounted in the panel door and the nearest DL105 component.***

## Dimensions and mounting




| Environmental Specifications | |
|---|---|
| ***Storage Temperature*** | -4ºF to 158ºF (-20ºC to 70ºC) |
| ***Ambient Operating Temperature*** | 32ºF to 131ºF (0º to 55ºC) |
| ***Ambient Humidity*** | 30% to 95% relative humidity (non-condensing) |
| ***Vibration Resistance*** | MIL STD 810C, Method 514.2 |
| ***Shock Resistance*** | MIL STD810, Method 516.2 |
| ***Noise Immunity*** | NEMA(ICS3-304) |
| ***Atmosphere*** | No corrosive gases |

# Power Supply and Type of I/O

## Power supply options

This product family offers units that operate on 110/220 VAC and 12/24 VDC. Choosing the power supply is probably the most important consideration when specifying a DL105 system, since not all I/O combinations are offered with each power supply option. The table to the right provides the I/O choices and power supply specifications for each type unit.

## Choosing the I/O

The DL105 product family offers several different combinations of I/O points. Once you have chosen the power supply option, you need to choose the unit that offers the type of I/O points needed in your application.

## Fixed I/O

All DL105 Micro PLCs have "fixed" I/O that is updated on every scan. This means that all units have 10 inputs and 8 outputs, regardless of the actual type of points on the units (DC in/Relay out, DC in/DC out, etc.) The DL105 micro PLC is non-expandable, so you cannot add I/O points. If you are concerned about future system expansion, check our DL06 (36 base I/O expandable to 100 total I/O), or the DL205 micro-modular product family. The DL205 also offers a wide array of features and flexible I/O arrangements with several different base sizes.

| Power Supply Options | | |
|---|---|---|
| ***Specification*** | ***AC Powered Units*** | ***24 VDC Powered Units*** |
| ***Part Numbers*** | F1-130AA, F1-130AR<br>F1-130DA<br>F1-130DD, F1-130DR<br>F1-DVNET-AR, F1-DEVNET-DD<br>F1-DVNET-DR | F1-130DD-D<br>F1-130DR-D |
| ***Voltage Withstand (dielectric)*** | One minute @ 1500VAC between primary, secondary and field ground | |
| ***Insulation Resistance*** | > 10MΩ @ 500VDC | |
| ***External Power Requirement*** | 85–132 VAC (110 nominal)<br>170–264 VAC (220 nominal)<br>100–264 VDC (125 nominal) | 10-30 VDC<br>(12 to 24 VDC)<br>With < 10 percent ripple |
| ***Auxiliary 24 VDC Output*** | 500mA max. | Not available |
| ***Maximum Inrush Current*** | 12A | 8A |
| ***Maximum Power*** | 30VA max. | 1A (approx. 10W) |

## Addresses automatically assigned

The DL105 uses automatic addressing, so for the vast majority of applications, there is no setup required. We use octal addressing for many of our products, which means there are no 8s or 9s. The first eight input points use addresses X0-X7, and the last two input points use X10 and X11. If you plan on using the high-speed counting features, there is some very minimal setup required in special V-memory locations.

### AC-powered units

| ***Part No.*** | ***I/O Mix*** |
|---|---|
| F1-130AA | 10 Ac in<br>8 AC out |
| F1-130AR | 10 AC in<br>8 relay out |
| F1-130DA | 10 DC in<br>8 AC out |
| F1-130DD | 10 DC in<br>8 DC out |
| F1-130DR | 10 DC in<br>8 relay out |

### DC-powered units

| ***Part No.*** | ***I/O Mix*** |
|---|---|
| F1-130DD-D | 10 DC in<br>8 DC out |
| F1-130DR-D | 10 DC in<br>8 relay out |