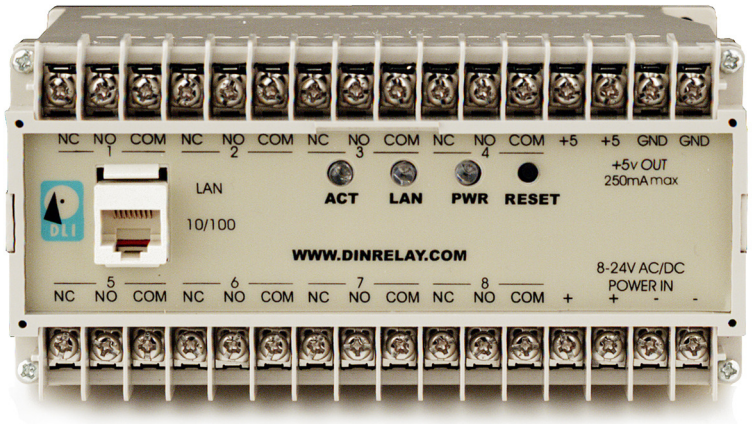
Web Controlled

DIN Relay II



User's Guide

Standard Features

Congratulations on your purchase. The DIN web relay is an industrial Ethernet controlled relay with these standard features:

Web Interface

The internal web server is accessible from any standard web browser. Just enter an IP to configure and control via the web.

8 SPDT Relay Outputs

Eight single pole double throw contact outputs are provided. Screw terminals are rated at 8 amps over commercial temperature range. T-90 relays are used with 15-25A 277V contact ratings.

Universal Power Input

An internal bridge rectifier and switching power supply accepts from 9 to 24 volts, AC or DC. Power input polarity doesn't matter. An accessory 5VDC output is provided to power external logic. New PWM circuitry minimizes power consumption.

Security: Password, HTTP Port and Subnet Restriction

Password security limits access to the relay. A changeable HTTP port makes the relay virtually impossible to access without knowing your custom URL. Subnet restriction restricts control to your LAN. Multiple users are supported with per-user relay masking.

Sequenced "On Timer"

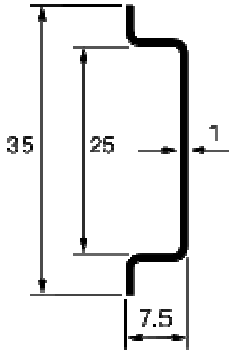
A programmable delay timer allows relays to be switched on in sequence, rather than simultaneously. Many circuits draw more power when they are initially switched on. Sequencing prevents circuit overloads when several devices are attached to a single circuit.

Scripting, AutoPing, and FLASH Firmware Upgrades

A BASIC style scripting language provides simple PLC functionality. AutoPing monitors and reboots routers, servers and IP gear automatically. Upgrade FLASH firmware via TCP/IP as new features become available.

At DLI, we listen. Please send suggestions to engineering@digital-loggers.com. We're constantly working to improve, so product specifications are subject to change.

Optional DIN Mounting Rails



The DIN relay mounts on standard 35mm rail. Use these dimensions when fabricating your own rail or call (408) 330-5599 and we'll cut to your desired length.

To mount with #8 screws, use the four corner mounting holes on 5.308"x1.968" centers.

Important Factory Defaults

DEFAULT IP ADDRESS AND LOGIN

The factory default IP address is 192.168.0.100
User name: admin (lower case)
Password: 1234

RESET PROCEDURE

To reset the IP address and login to defaults:

- Switch the unit on
- Gently depress the reset switch with a pen for 2 seconds.
- The ACT and PWR lights will flash. Wait 10 seconds.

Note: The hardware reset affects the admin login credentials and IP address, but it won't change relay names, links, or scripts.

Quick Setup

Use these shortcuts if you are an experienced installer. Please read the Windows IP section if you haven't connected a web accessible product before.

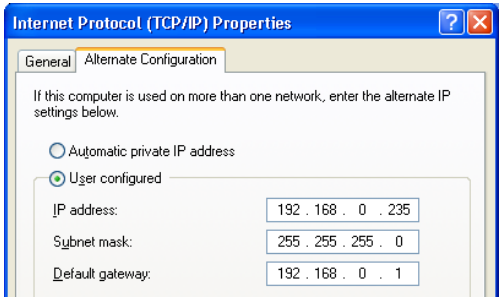
1. Connect to your LAN Using a straight RJ-45 cable. Make sure the 192.168.0.100 address is compatible with your LAN.
2. Apply power to the relay. The PWR light will illuminate.
3. Enter 192.168.0.100 in your web browser address bar. If the login page doesn't appear, follow the network setup instructions.
4. Login using the default user name, **admin** (lower case). Enter the default password, **1234**
5. Use the setup page to add relay names or change the IP.
6. Important ⇒ Set the recovery mode for safety after a power failure. The recovery mode controls default relay settings after power is restored.
7. Change the password for improved security.

Tip: An ohmmeter is handy for testing the relay. This ensures that it has been configured properly before attaching your equipment.

Windows IP Setup (2000, 2003, XP, Vista, W7)

If your default Windows settings won't access the relay, you'll need to add a compatible IP address like 192.168.0.235 to your host. Use a crossover cable and follow these steps to reach the relay:

1. Before adding an IP, close network programs and browsers. Go to the Network Settings – Local Area Network.
2. Use the keyboard shortcut <Windows-R> - type "ncpa.cpl" and click OK.
3. Right click on your LAN connection and choose "Properties". Highlight "Internet Protocol" and click the "Properties" button.
4. Click the "Advanced" button. Under the IP Address settings, click the "Add" button.



5. Enter a new IP, such as 192.168.0.235, and a subnet mask of 255.255.255.0. Press the "Add" button. This new IP is added the list. Close all windows for the configuration to take effect.

Start your Browser and type 192.168.0.100 in the URL field. The login page should now be displayed. The default user name and password are "admin" (lower case) and "1234".

Basic Operation

After power-up, the relay performs a sequence of self-tests to ensure reliability. After self-test, an internal web browser starts at the fixed (static) IP address selected on the setup page.

The relay may then be operated via the web. To access the relay, simply enter the IP address (ie. 192.168.0.100) in the URL field of your web browser.

Home Relay (Outlet) Control Page

To access the home page, first enter the IP address in web browser URL field, then log in. The home page contains links to other pages. The first four are static internal links:

Outlet Control
Clicking “Outlet Control” links to the home page used for manually switching relays on and off. Access to specific relays is determined by your login.

Settings
Clicking “Settings” links the administrator to a configuration page. This page is used to set relay names, power on features, network settings, user information and passwords.

Help
The Help link displays the latest online manual. Since features are subject to change without notice, this manual may not be a perfect match for your relay, but the later manuals will include all legacy features.

Logout
Logout ends the authenticated web session. Login to reconnect.

Programmable Web Links
Four additional user-defined web links are provided on the outlet control page. Factory defaults are “Manual”, “FAQs”, etc. You may change the name and destination URL for these links on the “Setup” page. These links are convenient for connecting to other power switches or to remote sites.

Switching Relays on and Off
The outlet control page lets you control any relay (outlet). The sequence delay in which relays will be switched on is determined by settings on the setup page.

To switch a relay on or off, simply click to the right of the relay name or number. Switching is immediate.

You may also “Cycle” a device which is connected to the relay. This feature is useful for rebooting Ethernet devices which may interrupt the web link to the relay. Clicking “Cycle” switches power off, waits a

few seconds (as specified by the sequence delay), and then switches power back on. This can reboot the attached device. You may also "cycle" all relays using the "Cycle all outlets" button on the bottom of the page.

Depending on your web browser settings, you may need to click the "refresh" button to update the on-screen status display after changing settings. Most browsers update automatically after one minute.

Setup Page

These settings allow the administrator to configure the power relay:

Relay and Outlet Names

The terms "relay" and "outlet" are used synonymously in this product. Use the switch name field to assign a Switch Name to the power relay itself. Examples are "Machine Tool Controls" or "Lighting Relay". The Switch Name field appears on the top of the home page. Assign a readable name to each load, such as "Sump Pump" or "Email Server" to make identification of each circuit simple.

Power-On Sequence Delay

When a time value is entered in the "All ON sequence delay" field, the power relay will pause for a period of time before energizing each relay on in sequence. This delay helps prevent the power surges and blown circuit breakers which can occur when multiple devices are switched on simultaneously. A delay of 60-120 seconds is suggested for server applications.

You may also enter a screen refresh delay. If "Enable screen refresh" is checked, and a delay value is entered, your browser should periodically update the status screen.

Power Loss Recovery Modes

The power loss recovery mode setting has three setting options which take effect after every power failure:

1. You can turn all relays off (all systems will be switched off until manually turned on later) by checking the first box.
2. You can automatically turn all relays on using the “All ON sequence delay” described above. Check the second option to do this.
3. You can return to the same relay settings that were used prior to the power loss. The “All ON sequence delay” will also be used in this instance. Check this option for ALL ON.

User Defined Links

You may link to other power relays, your own web pages, or remote web sites by entering up to four URLs and descriptions in the Setup page. For example, enter “Site Two Power Switch” in the description field with a URL of “192.168.0.102” These links appear on the left side of most web pages.

Critical Option Checkbox

Selecting “Critical” causes the web server to issue a confirmation dialog box before accepting any change to a circuit.

Network Settings

A fixed IP address, network mask, gateway, and subnet mask must be entered in this field. To lock these settings, click the “protect” button. This prevents change until the hardware reset button is pressed.

When changing IP addresses, you may need to restart your network switch to validate the new IP on an “auto-configuring” switch port. *Be sure to record the new IP address.*

Internal Scripting Language

The second generation DIN relay with serial numbers DIN22000 and higher includes expanded memory which permits non-volatile storage of scripts. The PLC scripting language uses simple BASIC-like commands. Learn more and find sample scripts at:

www.digital-loggers.com/scripting.html

Auto Ping Automatic Reboot

The internal AutoPing feature is an automatic system for rebooting IP equipment without human intervention. AutoPing works by cycling power when a device becomes unresponsive to IP pings. To learn more about AutoPing and how to use it, visit:

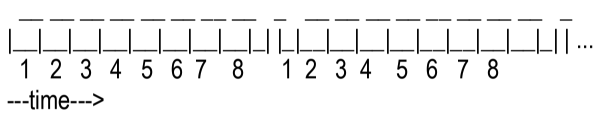
www.digital-loggers.com/AutoPing.html

Status LEDs

Three LEDs provide status indications:

PWR - RED
Illuminates whenever the relay is powered and the CPU is running.

ACT LED - GREEN
The green ACT LED is off when all relays are switched off and none of them is going to be switched on during delayed sequence. The green LED blinks once for each relay switched on according to the following graph:



LAN LED - YELLOW
The yellow LAN LED is an indicator of remote access via the LAN, not solely of LAN activity or packet reception. The LAN LED lights when a non-expired login session exists. The yellow light goes out after all users log out, security expires, or after 30 minutes of inactivity. This LED blinks to display network activity.

Security

Your relay employs secure challenge-response authentication. This gives it good out-of-the box security. Adding more security takes just a moment:

Changing the Password

It's a good idea to change your password for. You will be prompted to change it from the default. Use the Setup page to change it, then write it down in a safe place.

Restricting Subnet Access

To restrict access to only the 255 IP addresses on your local LAN, or "Class C", select the subnet restriction on the setup page.

Changing the HTTP Port

Changing the HTTP port to a non-standard value makes it very difficult for a hacker, even one with your password, to find the relay. The default port is 80. If you changed the port to 5372, you would use http://192.168.0.100:5372 to access the web server.

Installing Inside a Firewall

Install your relay inside a firewall, rather than directly on the internet for an additional layer of security.

Power Input and Consumption

Your relay can be powered from an external AC or DC supply or battery as low as 9V and as high as 24V. Do not exceed 24V input. Connect one side of the supply to the + terminal, and the other to the – terminal. Polarity is unimportant. The relay contacts are fully isolated (1KV hipot tested) from the power supply, but the auxiliary +5 output and ground terminals are not isolated. A potential difference of approximately 1V will exist between the negative ground and the negative power input terminal due to the input bridge rectifier.

Maximum relay power dissipation occurs at 9V input with a DC power input. Care should be taken to ensure that DC voltages below 9V are not used, as relays may drop out below this voltage. The switching supply can survive input voltages up to 40VDC, but 24V is the maximum recommended. Current drain decreases with input voltage due to the use of a bucking regulator. Power consumption charts do not include loads on the +5V accessory output. The lowest power consumption occurs at idle, approximately 2W. With all relays energized, power consumption increased to approximately 4W. Although the case is well ventilated, ambient air temperature should not exceed 135ºF for maximum reliability. Surges over 40V P-P may damage the internal regulator. Add an external MOV or other protection device across the power input terminals in noisy environments.

DIN II Power Requirements – Idle
All Relays Off - Typical

DC Volts	I (A)	Power (W)
8	0.250	2.00
9	0.211	1.90
10	0.191	1.91
12	0.151	1.81
14	0.129	1.81
16	0.114	1.82
18	0.101	1.82
20	0.092	1.84
22	0.082	1.80
24	0.073	1.75
26	0.061	1.59

DIN II DC Power Requirements All
Relays On - Typical

DC Volts	I (A)	Power (W)
8	0.521	4.17
9	0.460	4.14
10	0.410	4.10
12	0.341	4.11
14	0.315	4.12

16	0.287	4.15
18	0.231	4.16
20	0.207	4.14
22	0.182	4.00
24	0.162	3.89

The +5 output is protected by an auto-resetting polyfuse. Overloading this output will thermally shut down the polyfuse. Remove the load and allow two minutes for the fuse to cool and reset if this occurs.

At 60Hz, AC power requirements are approximately 15% higher than DC with input voltage measured in RMS.

Further specifications for the Din Relay II can be found at:

www.digital-loggers.com/din2spec.pdf

Specifications for early, first generation Din Relays can be found at:

www.digital-loggers.com/dinspec.pdf

Contact Ratings and Protection

All eight internal T-90 Relays have the following ratings:

Relay Contact Ratings		
Voltage	**NO**	**NC**
240VAC	25A	20A
277VAC	20A	15A
30VDC	20A	10A
250VAC	1HP	1/2HP

Relays are RU and CE approved, and manufacturer rated at 250,000 operations MTBF at 50% load and 800,000 operations at 10% load. Relays are sealed, so dust is not an issue.

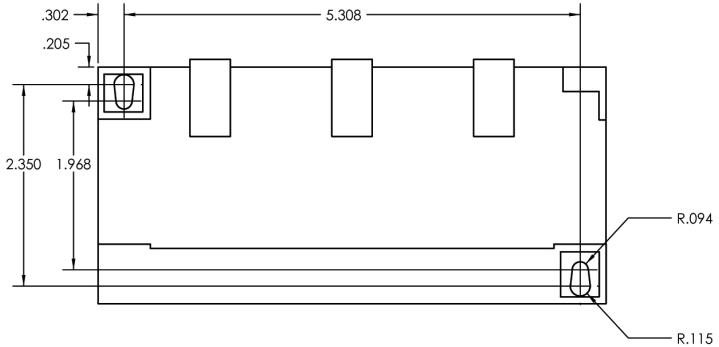
Because the DIN case terminals are rated at 12A peak, 8A continuous, we suggest limiting sustained current to 8A. Only stranded wire of appropriate gauge should be used. Terminals must be well torqued. It is wise to recheck torque after completing the installation.

Heavy traces and gold plating are used to minimize internal resistance between the terminals and relay contacts, typically 25m Ohms, so internal contact power dissipation is not normally a consideration.

For maximum flexibility, relay contacts are unprotected. For high current inductive switching, consider adding an external snubber circuit to extend contact life. Download contact protection information from: www.dinrelay.com/relaycare.pdf

Base Screw Hole Mounting Dimensions

Mounting holes are on 5.308" x 1.968" centers per this diagram:



Download detailed case drawings from:

www.digital-loggers.com/dindrawing.pdf

System Log Feature – Email Reporting

A system activity log is accessible from the Setup page. The system log contains reports of all major activity including login attempts, setting changes, relay state changes, etc. Multiple relays and other DLI power controllers can report to a centralized syslog server. More information on setting up a syslog server is available at:

www.digital-loggers.com/syslog.html

Email reports can be triggered by certain events. DLI provides a free Windows utility to log status and generate automatic emails:

www.digital-loggers.com/pcl.html

Frequently Asked Questions

Check the DIN FAQ page for answers to frequently asked questions:

www.digital-loggers.com/din2faqs.html

Further specifications for the Din Relay II can be found at:

www.digital-loggers.com/din2spec.pdf

Remote Control from your Application

The relay can be easily controlled from your application or a command line using the PERL script below. Use the compiled command-line version from the FAQ page or download source from:

www.digital-loggers.com/lpcperl.txt

```
#!/usr/bin/perl -w
#-------------------------SAMPLE PERL CONTROL SCRIPT-----------------
use LWP::UserAgent;
#--------------------------------------------------------------------
$ua = LWP::UserAgent->new();
#--------------------------------------------------------------------
if ($#ARGV <= 1)
    {
    print STDERR 'Usage: UserUtil <Host>[:port] <login:password>
<[n]{on|off|pulse|status}> ...'."\n";
    exit -1;
    }
($epc, $auth)=splice(@ARGV,0,2);
$base='http://'.$auth.'@'.$epc.'/';
foreach (@ARGV)
{
    $_=lc;
    s/(^[^1-8])/a$1/;
    if (/^([1-8a])on$/)
     {
     RelLink('outlet?'.$1.'=ON');
     }
    elsif (/^([1-8a])off$/)
     {
     RelLink('outlet?'.$1.'=OFF');
     }
    elsif (/^([1-8a])pulse$/)
     {
     RelLink('outlet?'.$1.'=CCL');
     }
    elsif (/^([1-8a])status$/)
     {
     $n=$1;
     defined($response) && ($response->content =~/<a href=outleto/) ||
RelLink('');
     $content=$response->content;
     while ($content =~ /<a href=outlet\?([1-8])=(on|off)>/ig)
         { if (($1 eq $n) || ($n eq 'a'))
          { if ($2 eq "ON")
              {print $1," OFF\n";}
          else
              {print $1," ON\n";}
          } }
     }
    else
     { die "Unknown command $_\n"; }
    }
sub RelLink
{local ($_) = @_;
#print STDERR $base.$_,"\n";
$response = $ua->get($base.$_);
$response->is_error() && die $response->status_line;}
```

Limited One Year Warranty

The terms of this warranty may be legally binding. If you do not agree to the terms listed below, return the product immediately in original unopened condition for a full refund. The purchaser assumes the entire risk as to the results and performance of the unit. DLI warrants this power relay to be free from major defects. No agency, country, or local certifications are included with this unit. It is the responsibility of the user to obtain such certifications if they are necessary. DLI's entire liability and exclusive remedy as to defective hardware shall be, at DLI's option, either (a) return of the purchase price or (b) replacement or repair of the hardware that does not meet DLI's quality control standards and has been returned through proper RMA procedures. DLI's liability for repair or replacement is to DLI's customer ONLY. WARRANTY SERVICE DOES NOT INCLUDE SOFTWARE OR HARDWARE UPGRADES. DLI will not service relays which show evidence of overloading or misuse. No warranty service will be provided without an original invoice from DLI and an RMA number provided by technical support. RMA material must be shipped prepaid to DLI. RMA numbers are valid for 15 days from date of issue. This warranty does not cover products modified, subjected to rough handling, or used in applications for which they were not originally intended. No oral advice or verbal warranties made by DLI's employees, dealers, or distributors shall in any way increase the scope of this warranty. DLI makes no warranty as to merchantability or fitness for any particular purpose. DLI assumes no liability for incidental or consequential damages arising from the use or inability to use this product. This warranty gives you specific legal rights. You may also have other rights that vary from state to state. Since some states do not allow the exclusion of liability for consequential damages, some of the above limitations may not apply to you. This product is neither qualified nor intended for medical or aerospace use.

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