

# Datalogger DL2 V2

**RESOL®**

beginning with firmware version 2.0.0



48003741

Thank you for buying this RESOL product.  
Please read this manual carefully to get the best performance from this unit.  
Please keep this manual carefully.

en

Manual

[www.resol.com](http://www.resol.com)

## Safety advice

Please pay attention to the following safety advice in order to avoid danger and damage to people and property.

## Instructions

Attention must be paid to the valid local standards, regulations and directives!

## Information about the product

### Proper usage

The RESOL DL2 Datalogger is connected to RESOL controllers via the VBus® interface. It enables logging of system data and parameterisation of a solar thermal system.

- Use in dry interior rooms only.
- Keinen Temperaturen von weniger als 0° C oder mehr als 40° C aussetzen.
- Do not expose to strong electromagnetic fields.

Improper use excludes all liability claims.

### CE Declaration of conformity

The product complies with the relevant directives and is therefore labelled with the CE mark. The Declaration of Conformity is available upon request, please contact RESOL.



#### Note

Strong electromagnetic fields can impair the function of the device.

- Make sure the device as well as the system are not exposed to strong electromagnetic fields.

**Subject to technical change. Errors excepted.**

## Target group

These instructions are exclusively addressed to authorised skilled personnel. Only qualified electricians should carry out electrical works.

## Description of symbols

**WARNING!** Warnings are indicated with a warning triangle!



→ **They contain information on how to avoid the danger described.**

Signal words describe the danger that may occur, when it is not avoided.

- **WARNING** means that injury, possibly life-threatening injury, can occur.
  - **ATTENTION** means that damage to the appliance can occur.
- Arrows indicate instruction steps that should be carried out.



#### Note

Notes are indicated with an information symbol.

### Tool reference



A tool symbol denotes instruction steps that can only be carried out with a tool.

### Cross reference



A book symbol indicates a cross reference to another chapter.

## Disposal

- Dispose of the packaging in an environmentally sound manner.
- Dispose of old appliances in an environmentally sound manner. Upon request we will take back your old appliances bought from us and guarantee an environmentally sound disposal of the devices.

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## 1 Overview

The DL2 Datalogger is a network server for solar thermal systems and is especially suited for owners of large systems, heating installers and interested home system owners who always want to be fully in control of their system.

Parameterise your solar system via a connected computer, a local area network (LAN) or the Internet.

Monitor the power and the yield of your solar system in a customised system scheme.

Log the performance data of your system over a longer period of time and use the data logged to optimise your usage profile.

Different solutions for visualisation and remote parameterisation are available on the RESOL website [www.resol.com](http://www.resol.com). On the website, firmware updates are also available.

- With VBus.net support
- Easy visualisation of the measured and balance values of your system
- Logging system performance data over longer periods of time
- Converting and exporting logged data
- Quick fault diagnosis
- Compatible with all RESOL controllers equipped with a VBus®
- Transfer data with an SD card – no network connection required
- Integrated LAN connection for network connection



### Technical data

**Housing:** plastic, PC-ABS and PMMA

**Protection type:** IP 20 / EN 60529

**Ambient temp.:** 0 ... 40 °C

**Dimensions:** Ø130 mm

**Height:** 45 mm

**Mounting:** Wall mounting

### Display:

LED bar indicating the memory capacity

Control LED indicating normal operation and SD card status

### Interfaces:

RESOL VBus® for the connection to RESOL controllers

10/100Base TX Ethernet, Auto MDIX

**Memory capacity:** 180 MB internal memory

**Power consumption:** 1,75 W

**Nominal current:** 350 mA

**Input voltage:** DL2: > 5 V DC ± 5 %

Mains adapter: 100 ... 240 V~ (50 ... 60 Hz)

## 2 Included



If one of the items mentioned below is missing or defective, please contact your distributor:

- 1 DL2 Datalogger, ready to plug in, including mains adapter and VBus® cable
- 2 Interchangeable mains adapter plugs (EURO, UK, USA, AUS)
- 3 Network cable (CAT5e, RJ45), 1 m
- 4 Wall plugs and screws
- 5 Terminal block for extending the VBus® cable
- 6 CD containing the ServiceCenter software
- 7 Manual (picture similar to original product)

## 3 Installation

### ATTENTION! ESD damage!



Electrostatic discharge can lead to damage to electronic components!

→ Take care to discharge properly before touching the inside of the device. To do so, touch a grounded surface such as a radiator or tap!

### ATTENTION! Short circuit!



A short circuit can lead to damage to electronic components!

→ Close the housing before establishing the mains connection!

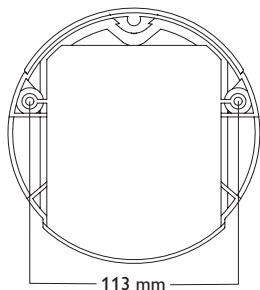
The DL2 Datalogger comes with the mains adapter and the VBus® cable pre-connected.

The housing does not have to be opened in order to mount the device.

Initial installation must be carried out by the system installer or qualified personnel named by the system installer.

The controller must additionally be supplied from a double pole switch with contact gap of at least 3 mm.

### 3.1 Wall mounting



Drill hole positions

The unit must only be located in dry interior locations. In order to function faultlessly, the device must be protected from strong electromagnetic fields in the selected mounting location.

Please pay attention to separate routing of bus cables and mains cables.

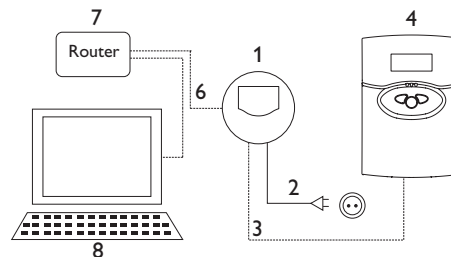
- ➔ Choose a mounting location.
- ➔ Drill 2 holes (Ø 6 mm, centres 113 mm) and insert the wall plugs.
- ➔ Fasten the base part of the housing by means of the enclosed screws (4 x 40 mm, (1))



### 3.2 Electrical connection

Carry out the connection of the Datalogger (pos. 1) to other modules in the order described below:

- ➔ Connect the data cable (RESOLVBus®, pos. 3) to the RESOL controller (pos. 4). If necessary, extend the cable using the terminal block included and a common two-wire cable.
- ➔ Plug the mains adapter (pos. 2) into a socket.
- ➔ For a direct connection to a router or a PC, connect the Datalogger to a router (pos. 7) or a PC (pos. 8) using the network cable (included with the DL2, pos. 6).



Power supply is carried out via an external mains adapter. The supply voltage of the mains adapter must be 100 ... 240 V~ (50 ... 60 Hz).

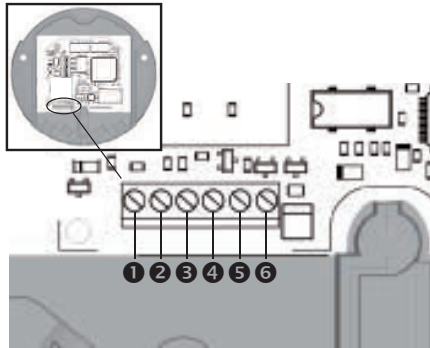
The DL2 Datalogger comes with the mains adapter and the VBus® cable pre-connected.

VBus® connection at the terminals:

1 / 2 = VBus® connection 1

3 / 4 = VBus® connection 2

### 3.3 Connect the VBus® cable to



Terminal connections of the Datalogger

The DL2 Datalogger is to be connected to the controller via the pre-connected VBus® cable. The corresponding terminal allocation is described in the controller manual.


The VBus® cable can be extended using the terminal block included and a common two-wire cable.

The VBus® cable is pre-connected to the Datalogger terminals 3 and 4. Another module can be connected to the terminals 5 and 6.

### 3.4 Connecting the network cable

The DL2 Datalogger can be connected to a computer or a router by using a network cable (CAT5e, RJ45).

➔ Connect the network cable included to the network adapter of the computer or the router.

 For the next step of commissioning, see chap. 6 Basic configuration, page 12.

## 4 Indications, operating controls, and connections

The following elements are featured on / in the housing of the DL2 Datalogger:

Operating control LED

Memory capacity and VBus® signal LEDs

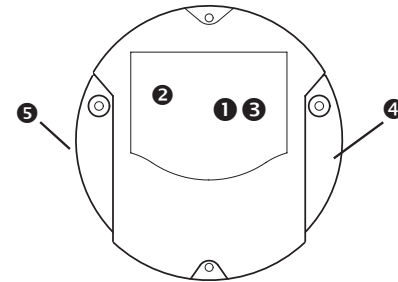
Reset button

LAN connector

SD memory card slot

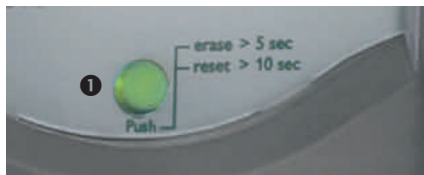
Power supply connection (inside the housing)

VBus® connection (inside the housing)



Positions of the operating controls and connections

## 4.1 Operating control LED

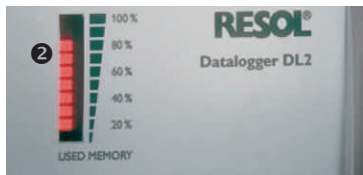


The operating control LED ① indicates the operating status of the DL2 Datalogger by issuing flashing signals.

### LED flashing codes

- LED off:
- The device is booting.
  - No power supply.
- Orange:
- Power supply is working and the device is ready for operation.
- Orange flashing:
- An error occurred during the copy process.
- Green:
- The SD card can be removed.
  - The firmware update is completed.
- Green flashing:
- Do not switch off power supply! A firmware update is being run.
  - Do not remove the SD card!  
Data are being copied onto the SD card

## 4.2 Data memory progress bar



The data memory progress bar ② indicates the currently occupied memory capacity of the DL2 Datalogger.

The data memory progress bar is divided into 10 segments. Each segment represents 10% of the memory capacity.

## Data memory progress bar


LED segment

- permanently on
- The memory capacity of this segment is fully occupied.
- flashing
- The memory capacity of this segment is partly occupied.
  - VBus® connection okay.

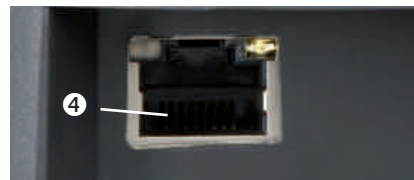
## 4.3 Reset button



The reset button ③ is integrated in the operating control LED. By means of the reset button, data logged can be deleted and the DL2 Datalogger configuration can be reset to the factory settings.

 See chap. 5.4 Erasing logged data, page 11.

## 4.4 LAN connector



The integrated LAN connector ④ is located on the right-hand side of the device. The LAN connector supports transfer rates of up to 100 MBits per second.



## 4.5 SD memory card slot



The SD memory card slot **5** is located at the left-hand side of the device. By means of the SD memory card slot, data logged can be transferred onto an SD or SDHC card of up to 8 GB memory capacity.

**i** The memory of an SD card in the slot is used for data transfer only. It will not enlarge the memory of the DL2 Datalogger.

## 4.6 Power supply connection

Power supply is carried out via a pre-connected mains adapter. The connection terminals are located inside the housing of the DL2 Datalogger.

## 4.7 RESOLVBus® connection

The DL2 Datalogger is to be connected to the controller via the pre-connected VBus® cable. The connection terminals are located inside the housing of the DL2 Datalogger.

# 5 Web interface

The Web interface is integrated in the DL2 Datalogger and can be run on an Internet browser.

The Web interface has the following functions:

- ➔ Display the status of the DL2 Datalogger.
- ➔ Configure the DL2 Datalogger.
- ➔ Display real-time data in a table.
- ➔ Export, customise and erase data.

## 5.1 Menu

The menu column with all main menus and their corresponding sub-menus are indicated on the left-hand side of the Web interface.

**i** The menu structure may change in later firmware versions.



The menu bar at the top of the Web interface contains the menu items **Home**, **Data** (see below) and **Login**.



In order to use the Web interface to its full extent, login is required. In order to log in, proceed as follows:

➔ Click **Login** on the menu bar.

The **Login** frame appears. The factory setting for both user name and password is **admin**.

➔ Enter the user name in the **User name** input field.

➔ Enter the password in the **Password** input field.

➔ Click the **Login** button.

The message **Login successful!** appears.

## 5.2 Menu overview

Main menu	Sub-menu	Function
Data	Data	Data indication varies depending on the adjustments
	Download	Export data
	Erase	Erase data
Status	Customise	Configure live data display Upload customised live data displays Download customised live data displays Reset live data display adjustments
	General	Display general device information
	Network	Display network configuration
	Remote access	Display remote access configuration
Configuration	General	Change general configuration Change logging configuration Change date and time configuration Change firmware update configuration
	Network	Network configuration Change FTP configuration SSH configuration
	Remote access	Change the remote access password Configure remote access over Internet
About	Users	Change the user password
	General	Order DL2 Datalogger open source software
	Powered by	Display of the open source applications and libraries used
	History	Display of firmware updates
	Links	Useful links

### 5.3 Data

In the live data screen, the values of the controller connected are displayed and refreshed automatically every 10 seconds. The representation and the measurement units of the live data can be customised.

Live data of a controller connected can be displayed as follows:

- In a tabular overview
- In a schematic drawing of the solar system

### 5.4 Erasing logged data

Logged data can be erased over the Web interface. The configuration is not affected.

In order to erase logged data, proceed as follows:

- ➔ In the main menu **Data**, select the sub-menu **Erase**.
- ➔ Click the **Erase** button.

The message **Data erased successfully!** appears.


### 5.5 Displaying firmware versions

In order to display statistics about the firmware updates run, proceed as follows:

- ➔ In the main menu **About**, select the sub-menu **General**.

The following information is displayed:

- Firmware update versions
- Firmware update dates

 See chap. 14.1 Possible export file formats, page 25.


### 5.6 Displaying the Device Date / Time

In order to display the device date and the device time, proceed as follows:

- ➔ In the main menu **Status**, select the sub-menu **General**.

The following information is displayed:

- Current date and time settings of the DL2
- Device uptime since the last reset

 See chap. 6.6 Configuring date and time information, page 14.

### 5.7 Displaying network configuration

In order to display the network configuration, proceed as follows:

- ➔ In the main menu **Status**, select the sub-menu **Network**.

The following information is displayed:

- LAN IP address
- LAN network / netmask
- Gateway
- Nameserver 1
- Nameserver 2

 See chap. 7.5 Network configuration, page 17.

### 5.8 Displaying data communication

In order to display statistics about the data exchange between the DL2 Datalogger and the controllers connected, proceed as follows:

- ➔ In the main menu **Status**, select the sub-menu **General**

The following information is displayed:

- Total received bytes count since last reset
- Total received packet count since last reset
- Total unique packet count since last reset


### 5.9 Displaying the memory capacity

In order to display the memory capacity, proceed as follows:

- ➔ In the main menu **Status**, select the sub-menu **General**.

The following information is displayed:

- Capacity in use
- Capacity free
- Remaining days

 The log interval determines the **Remaining days**. Depending on the adjustment selected, the logging either stops when the capacity is fully used or the oldest data are overwritten.

 See chap. 7.3 Log interval configuration, page 17.

## 5.10 Displaying the remote access

In order to display the status of the remote access, proceed as follows:

→ In the main menu **Status**, select the sub-menu **Remote access**.

On the Remote access tab, the status of **Local network access enabled?** is displayed.

On the **Remote access** over Internet tab, the status of **Use VBus.net for remote access?** is displayed.

## 6 Basic configuration

The basic configuration does not require detailed knowledge about the solar thermal system or the network environment and can be carried out using the guidelines in this manual.

In order to carry out the basic configuration, proceed as follows:

→ Find the DL2 Datalogger by means of the DeviceDiscoveryTool

→ Change the Web interface language

→ Change the live data screen language

→ Change the user password

→ Change the device name

→ Change the time configuration

→ Configure the automatic firmware update configuration

→ Change the remote access password

### 6.1 Finding the DL2 Datalogger by means of the DeviceDiscovery-Tool

The DeviceDiscoveryTool is a software that displays Dataloggers that are connected directly or via the local network.



The factory setting for both user name and password is **admin**.

There are 2 different ways to start the DeviceDiscoveryTool:

- Over the Internet browser
- From the included CD



To start the DeviceDiscoveryTool, Java (version 6 or higher) must be installed on the computer.

### Starting the DeviceDiscoveryTool over the Internet browser

In order to start the DeviceDiscoveryTool over the Internet browser, proceed as follows:

→ Start the Internet browser.

→ Enter **www.resol-DL2.de/discover** into the address bar of the Internet browser and confirm.

→ Click on **Java WebStart-able**.

All Dataloggers found are displayed.

→ Click the DL2 Datalogger to mark it, then click the Open button.

A new window opens.

→ Enter user name and password.

The factory setting for both user name and password is **admin**.

The Home screen of the DL2 Web interface opens.



Continue at chapter 6.2 **Changing the Web interface language** on page 17.

### Starting the DeviceDiscoveryTool from the included CD



Included CD



Starting the DeviceDiscoveryTool from the CD is possible under a Windows operating system only.

In order to start the DeviceDiscoveryTool from the included CD, proceed as follows:

- Open the **DeviceDiscoveryTool** folder.
- Start **DeviceDiscoveryToolSetup.exe**.
- Confirm all following dialogues with OK
- Click **Start/Programs/RESOL/DeviceDiscoveryTool/DeviceDiscovery-Tool**.

All DL2 Dataloggers found are displayed.

- Click the DL2 Datalogger to mark it.
- Click **Open**.

A new window opens.

- Enter user name and password.

The Home screen of the DL2 Web interface opens.

## 6.2 Changing the Web interface language



The Web interface can be run in different languages.

- Click one of the small flags on the right-hand side of the Home screen, according to the desired language:
  - German
  - English
  - French

The message **Language selection successful!** appears.

## 6.3 Changing the Live data screen language

In order to select the language of the Live data screen, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **General**.
- On the **General Configuration** tab, in the dropdown menu Default Language, select one of the following languages:
  - German (de)
  - English (en)
  - French (fr)
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 6.4 Changing the user password

In order to change the user password, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **Users**.
- Select **admin**.

The **admin** tab opens.

- Tick the **Change password** checkbox.
- Enter the current password into the **Current FTP password** input field.

The factory setting for the password is **admin**.


- Enter the new password into the **New password** input field.
- Enter the new password into the **Repeat new password** input field.
- Click **Save configuration**.

The **Login** window opens.

- Enter the user name and the new password.

The message **Configuration saved successfully!** appears.

## 6.5 Changing the device name

 Choose a descriptive device name to facilitate identifying the DL2 Datalogger in the network.

In order to change the device name, proceed as follows:

- ➔ In the main menu **Device Config**, select the sub-menu **General**.
- ➔ On the **General Configuration** tab, enter the device name in the **Device Name** input field.

Permitted characters are: letters, numbers, underscores.

- ➔ In the **Default Language** dropdown menu, select the desired language.
- ➔ Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 6.6 Configuring date and time information

The Date and Time Configuration determines where the DL2 Datalogger obtains its date and time information.

The Date and Time Configuration can be set to the following adjustments:

- **Dynamic** (recommended): Date and time information are automatically synchronised between the DL2 Datalogger and the NTP server.
- **Static**: The user manually assigns date and time information to the DL2 Datalogger.

### Synchronising time information automatically

In order to automatically synchronise time information, proceed as follows:

- ➔ In the main menu **Device Config**, select the sub-menu **General**.
- ➔ On the **Date and Time Configuration** tab, in the **Time Zone** dropdown menu, select the desired time zone.
- ➔ In the **NTP synchronisation enabled?** dropdown menu, select **Yes**.
- ➔ Enter the **NTP server address**.

Factory setting: eu.pool.ntp.org.

- ➔ Click **Save configuration**.

The message **Configuration saved successfully!** appears.

### Assigning time information manually

In order to manually assign the time information, proceed as follows:

- ➔ In the main menu **Device Config**, select the sub-menu **General**.
- ➔ On the **Date and Time Configuration** tab, tick the **Manually set time to** checkbox.
- ➔ Enter time information (day, month, year, hours, seconds).
- ➔ Click **Save configuration**.


The message **Configuration saved successfully!** appears.


## 6.7 Configuring automatic firmware update settings


The firmware is the internal software of the DL2 Datalogger. Through firmware updates, the software will be improved in the following ways:

- Extended functional range
- Enhanced operation
- Customisation of the Web interface desktop

When automatic firmware updates are enabled (strongly recommended), the DL2 Datalogger will search for new firmware versions in regular intervals.

 Previous configurations are not affected by a firmware update.

 When there is no Internet connection, firmware updates can only be run with an SD card.

 See chap. 8 Firmware update with SD card, page 21.


In order to enable automatic firmware updates, proceed as follows:

- ➔ In the main menu **Device Config**, select the sub-menu **General**.
- ➔ On the **Firmware update** tab, in the **Automatic firmware updates enabled?** input field, select **Yes**.
- ➔ Enter **firmware update URL**.

Factory setting: <http://www.vbus.net/api/update>.

- ➔ Click **Save configuration**.

The message **Configuration saved successfully!** appears.

 Only change the firmware update URL if required, and consult the system administrator before doing so!

## 6.8 Configuring the remote access

### ATTENTION! Third-party access!



When the default remote access password is not changed, third parties may gain unauthorised access to the controller connected.

→ **Do change the remote access password, note it down and keep it in a suitable place.**

The remote access password is required whenever a controller connected to the DL2 Datalogger is to be accessed via the RESOL ServiceCenter software.

In order to change the remote access password, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **Remote Access**.
- On the **Access VBus over local network** tab, tick the **Change password** checkbox.
- Enter the current password into the **Current password** input field.

The factory setting for the remote access password is **vbus**.

- Enter the new password into the **New password** input field.
- Enter the new password into the **Repeat new password** input field.
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 7 Advanced configuration

### 7.1 Accessing the DL2 Datalogger over the Internet with VBus.net

In order to access a DL2 Datalogger delivered with the firmware version 2.0.0 or higher via VBus.net, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **Remote Access**.
- Note down the alphanumeric 8-10-digit code (Access Token) indicated on the **Remote access over Internet** tab or read the one from the label.
- Enter VBus.net into the address bar of the browser and click **Sign up**.
- Wait for the confirmation e-mail to arrive.
- Click **Claim a new device**.
- Enter the alphanumeric 8-10-digit code (Access Token).

If the firmware update 2.0.0 has been run by means of an SD card, proceed as follows:

- Activate VBus.net in the DL2.
- In the main menu **Device Config**, select the sub-menu **Remote Access**.
- Note down the alphanumeric 8-10-digit code (Access Token) indicated on the **Remote access over Internet** tab.
- Enter VBus.net into the address bar of the browser and click **Sign up**.
- Wait for the confirmation e-mail to arrive.
- Click **Claim a new device**.
- Enter the alphanumeric 8-10-digit code (Access Token).

### 7.2 Accessing the DL2 Datalogger over the Internet without VBus.net



**i** The DeviceDiscoveryTool cannot be used for finding a DL2 Datalogger over the Internet.

The following preparations have to be made when a DL2 Datalogger connected to the Internet via a router is to be accessed over the Internet:

- Assign a static address to the router.
- Carry out port routing in the router.

#### Assigning a static router address

In order to access the router and the DL2 connected over the Internet, a static address has to be assigned to the router.

There are 2 different ways to assign a static Internet address to the router:

- Over a dynamic Domain Name Server (DynDNS)
- Over a static Internet IP address

## Using a dynamic Domain Name Server (DynDNS)



Schematic representation: Remote access to the DL2, router with DynDNS address.

**i** Not all routers support DynDNS services. For further information consult the router documentation.

It is possible to reserve an Internet address via a DynDNS service provider. DynDNS services are usually free of charge.

Schematic process representation of using a DynDNS address:

1. Open an account for a DynDNS Internet address at a DynDNS service provider. A DynDNS Internet address and the corresponding access information will be provided.
2. The DynDNS access information has to be entered into the router, so that the router can tell the DynDNS service provider where to route enquiries to.
3. In order to access the router via the Internet, the user has to enter the DynDNS Internet address into the Internet browser.

## Using a static Internet IP address



Schematic representation: Remote access to the DL3, router with static Internet IP address.

It is possible to apply for a static Internet IP address at an Internet Service Provider (ISP). For a static IP address, there usually is a fee required.

Schematic process representation of using a static IP address:

1. Apply for a static IP address at an Internet Service Provider (ISP). A static Internet address and the corresponding access information will be provided.
2. The access information has to be entered into the router, so that the router can register at the ISP with the static IP address.
3. The router registers at the ISP with the static IP address.
4. In order to access the router via the Internet, the user has to enter the static Internet address into the Internet browser.

## Port routing in the router

**i** Not all routers support port routing. For further information consult the router documentation.

In order to access, over the Internet, one or several Dataloggers connected to one router, port routing has to be configured in the router.

The DL2 Datalogger communicates via the following ports:

- Web interface port: 443 (adjustable, default port: 443)
- RESOL ServiceCenter port: 7053 (non-adjustable)

In order to carry out port routing in the router, proceed as follows:

- ➔ Assign a static LAN IP address to the DL2 Datalogger using the configuration menu of the router.
- ➔ Assign a port to the IP address menu using the configuration menu of the router.

In this example (see table below), 3 DL2 Dataloggers are assigned 1 Web interface port and 1 RESOL ServiceCenter software port each.

**i** See chap. 7.4 Log mode configuration, page 17.

The Log interval determines the interval in which the DL2 Datalogger logs data.

**i** Log intervals between 1 second and 86400 seconds (24 hours) are possible.

**i** The smaller the log interval, the more memory capacity is used.



## Example: Port routing

Datalogger number	DynDNS address	Port routing from port:	Port routing to port:	DL2 LAN IP
1	www.Datalogger.ath.cx:443	443	443	192.168.0.10
2	www.Datalogger.ath.cx:444	444	443	192.168.0.11
3	www.Datalogger.ath.cx:445	445	443	192.168.0.12
1	www.Datalogger.ath.cx:7053	7053	7053	192.168.0.10
2	www.Datalogger.ath.cx:7054	7054	7053	192.168.0.11
3	www.Datalogger.ath.cx:7055	7055	7053	192.168.0.12

## 7.3 Log interval configuration

In order to configure the log interval, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **General**.
- On the **Logging Configuration** tab, in the **Log interval** input field, enter the desired value
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

### Example: Log interval

**Interval:** 5 min

**Capacity:** 180 MB

Log interval	1 DeltaSol® MX	1 DeltaSol® MX, 1 EM, 1 HKM	1 DeltaSol® MX, 3 EM, 1 HKM, 1 WMZ module
75 s	8 months	6 months	8 months
150 s	16 months	13 months	16 months
300 s	33 months	26 months	33 months

## 7.4 Log mode configuration

The Log mode determines how the DL2 Datalogger behaves when its internal memory capacity is fully used.

There are 2 different settings possible for the log mode configuration:

- **Cyclic logging (factory setting):** When the memory capacity is fully used, the oldest data are overwritten.
- **Linear logging:** When the memory capacity is fully used, data logging stops.

In order to configure the log mode, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **General**.
- On the **Logging Configuration** tab, in the **Log mode** dropdown menu, select the desired value.
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 7.5 Network configuration

The network configuration determines where the DL2 Datalogger obtains its IP information.

There are 2 different settings possible for the network configuration:

- **Dynamic (DHCP):** The IP information is automatically assigned to the DL2 Datalogger by the DHCP server.
- **Static:** The user manually assigns date and time information to the DL2 Datalogger.



Consult the system administrator before changing the factory settings!

In order to configure the network configuration, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **Network**.
- In the **LAN configuration mode** dropdown menu, select the desired value.
- Click **Save configuration**.

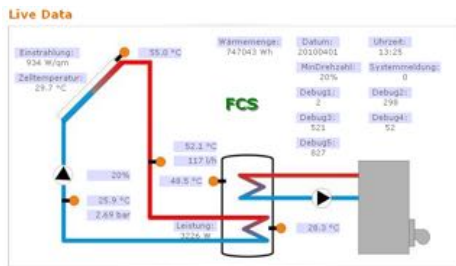
The message **Configuration saved successfully!** appears.

The menu item **IP Recovery** can be used to automatically retrieve a new IP address for the DL2 in the case that the previous one is lost. In order to configure the automatic IP address configuration, proceed as follows:

- In the **IP Recovery** menu item, select **Yes**.
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

- Restart the Datalogger



Example of a live data display

The DL2 Datalogger displays live data of the controller connected. In the tabular overview, the data are refreshed automatically every 10 seconds.

The data can be displayed as follows:

- In a schematic drawing of the system in which sensor data are assigned to the components.
- In a tabular overview (factory setting).

In order to reduce the data traffic from the local network to the Internet, the background drawing of the system can optionally be stored on an Internet server.

### Requirements for the display of live data in a schematic drawing of the system

The following requirements must be met in order to display live data (of a controller connected) in a schematic drawing of the system:

- A schematic drawing of the system must be created using a drawing program (e. g. Inkscape or GraphicWorks).
- The schematic drawing must be supplied in one of the following formats: \*.jpg, \*.gif, \*.png, \*.bmp, \*.tif.
- The RESOL ServiceCenter software must be installed on the computer.
- The FTP access to the DL2 Datalogger must be enabled.

 See chap. 10 FTP access configuration, page 21.

The address and the port of the DL2 Datalogger must be on hand.

 See chap. 7.3 Log interval configuration, page 17.

### Uploading a system drawing

In order to upload a system drawing into the Web interface of the DL2 Datalogger, proceed as follows:

- ➔ Start the RESOL ServiceCenter software.
- ➔ In the main menu Window, select the sub-menu Show view -> VBus® logging.
- ➔ Click the **Designer** tab.
- ➔ Right-click the empty graphic (white square) and select **Edit**.
- ➔ Select **Use background image** and click the [...] button to the right.
- ➔ Select the drawing prepared as a background image and click **Open**.
- ➔ Click **OK**.
- ➔ Click **Connect**.
- ➔ Select the DL2 Datalogger and enter the remote access password.
- ➔ Right-click the system drawing and select ➔ **Add VBus® field**.

The **Add VBus® field** menu opens.

- ➔ Select the menu item **Total received packet count**, click the desired VBus® field and confirm by clicking **OK**.

The field is added to the system drawing. When the mouse is moved over the field, field information are displayed.

- ➔ Place the field in the desired position using the left mouse button.
- ➔ When all VBus® fields have been placed, click **Export to DL2**

The **Export designer document to DL2** window opens.

- ➔ Enter the IP address of the DL2 Datalogger into the **DL2 host name** field.
- ➔ Enter the user name into the **DL2 user name** field.
- ➔ Enter the user password into the **DL2 password** field.
- ➔ Save the background image.

A window opens to indicate that the export has been completed successfully. The Web interface automatically opens and displays the system drawing. The upload process has been completed.

## Configuring the units for the live data display

The DL2 Datalogger can display live data in different units. The desired units can be selected from dropdown menus.



Some controllers transmit sensor signals in degrees Fahrenheit over the VBus<sup>®</sup> although temperatures are in fact measured in degrees Centigrade. The **Convert to °F** option can be used to correct this display error. The numerical values are not changed.



For a detailed overview of the conversion factors used, see chap. 14.2 **Unit conversion** table, page 26.

In order to select the units of the Live data screen, proceed as follows:

- In the main menu **Data**, select the sub-menu **Customize**.
- Select the desired format in all dropdown menus.
- Click the **Create** field.

Depending on the Internet browser used, a new tab or window opens.

- Save the template in the HTML format.
- Go back to the DL2 Web interface.
- In the main menu **Data**, select the sub-menu **Customize**.
- Click **Browse**.
- Select the template created.
- Click **Upload**.
- Click **OK**.

The message **Customize: Upload successful!** appears.

## Advanced customisation of the data display

The user interface of the data display can be adapted to specific requirements by an advanced customization.

By editing the user interface with an HTML editor, the page design, the field names, the font etc. can be changed.



For advanced data customization, HTML knowledge and using an HTML editor are required.

In order to configure the data display, proceed as follows:

- In the main menu **Data**, select the sub-menu **Customize**.

The following adjustments are available:

- In the **Create a new customized view** sub-menu, new views can be created.
- Click the **Create** field.
- In the **Upload the customized view** sub-menu, views can be uploaded.
- In the **Download the customized view** sub-menu, views can be downloaded.

In order to upload or download a **Customized view**, proceed as follows:

- Save the page in the HTML format.

The file name must end in \*.htm, e. g. template.htm.

- Open the template in an HTML editor.
- Make the desired changes and save the file.
- Click **Browse**.
- Select the template created.
- Click **Upload**.

The template is loaded into the Datalogger and the live data are displayed in the image created.

## 7.7 Filter configuration

The filter determines which data are to be displayed.

An existing filter can be edited or a new filter can be created.

In order to create a new filter, proceed as follows:

- In the main menu **Data**, select the sub-menu **Customize**.
- Click the **Create a new filter** tab.
- In the **Filter Number** select the Filter slot.
- Enter the desired filter name into the **Filter Name** field.
- In the **Filter Channels** dropdown menu, select the desired data items.
- Click **Create** .

A view of the data filter appears.

- In order to make the filtered data visible to guests, tick the **Visible for guests?** checkbox.
- In order to create a link to the filter, select the desired value in the **Put a link to this filter into** dropdown menu.
- Tick the checkboxes of the desired values and enter the desired names into the name fields.
- Click **Update filter**.

In order to edit an existing filter, proceed as follows:

- In the main menu **Data**, select the sub-menu **Customize**.
- Click the **Edit an existing filter** tab.
- Select the desired filter and click **Edit**.

A view of the data filter appears.

- Edit the filter as described before.
- Click **Update filter**.

## 7.8 Public access configuration

### ATTENTION! Data loss!



If the public access includes access to the Erase data menu, unauthorised third parties can erase data stored in the Datalogger.

→ **In order to prevent unauthorised data erasure, do not enable public access to the Erase data menu!**

The public access configuration determines which DL2 Datalogger menus unregistered users may access.

The factory setting for the public access configuration does not enable menu access.

In order to configure the public access to the menus, proceed as follows:

- In the main menu **Device config.**, select the sub-menu **Users**.
- In the sub-menu **Users**, click the user name **guest**.
- In the dropdown menus, select the desired value.
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

Dropdown menu	Functions
Home	Display Home screen
Status	Display device status Display memory capacity
Data - Live	Display live data
Data - Download	Export data over the Web interface
Data - Erase	Erase logged data over the Web interface
About DL2	Order DL2 Datalogger open source software Display firmware versions

Overview of menus configurable for public access

## 8 Firmware update with SD card

New firmware versions extend the functional range and enhance the operation.

The current software can be downloaded from [www.resol.de/firmware](http://www.resol.de/firmware).

In order to run a firmware update over the SD memory card slot, proceed as follows:

- Download the firmware from the Internet: <http://www.resol.com/firmware>
- Insert an SD card formatted with the **FAT 32** format into the PC.
- Copy the firmware update ZIP file onto the SD card.
- Extract the ZIP file on the SD card (the required folder structure will be created automatically).
- Remove the SD card from the PC and insert it into the SD card slot of the DL2. The firmware update is being run and the DL2 automatically reboots. This may take a few minutes. The operating control LED starts flashing, lights up for a while and then all LEDs go out.
- Wait until the operating control LED is permanently green.

## 9 Data export

There are 2 different ways to export logged data from the DL2 Datalogger:


1. Export logged data onto an SD memory card. The data are stored as a VBus® format file and can be read out on a computer using the RESOL ServiceCenter software.
2. Export logged data onto a computer over the Web interface. Different file formats can be selected.


### 9.1 Data export over SD card


In order to copy data onto an SD card, proceed as follows:

- Insert the SD card into the SD card slot
- The operating control LED flashes (green):  
The card has been recognised and data are being transferred.  
The operating control LED is permanently green:  
The transfer is completed. The card can be removed.

### 9.2 Data export over Web interface

 The internal processor of the DL2 Datalogger needs up to 30 minutes to convert logged data. If the data are required in a text format (tab separated, Windows), the data can also be exported onto a computer using the **VBus® protocol** format. Then the data can be converted into a **text** format (tab separated, Windows) more quickly.

 For an overview of file formats available in the Web interface see chap. 14.1 Possible export file formats on page 25.

 Information about further processing transferred data are described in the RESOL ServiceCenter software manual.

In order to copy logged data onto a computer, proceed as follows:

- In the main menu **Data**, select the sub-menu **Download**.
- In the **File format** dropdown menu, select the desired format.
- Click the **Start download** button.
- Save the file in a folder of choice.

## 10 FTP access configuration

The following requirements have to be met in order to upload or download data to and from the DL2 Datalogger by means of an FTP client software:

1. The FTP password has to be known.
2. FTP access must be enabled.

In order to configure the FTP access, proceed as follows:

- In the main menu **Configuration**, select the sub-menu **Network**.
  - On the **FTP configuration** tab, in the **FTP server enabled?** input field, select Yes.
  - Tick the **Change FTP password?** checkbox.
  - Enter the current password into the **Current FTP password** input field.
- Factory setting: ftp
- Enter the new password into the **New FTP password** input field.
  - Enter the new password into the **Repeat new FTP password** input field.
  - Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 11 SSH configuration

The SSH configuration can be used for accessing the operating system of the DL2 Datalogger.

### ATTENTION! Damage through incorrect configuration!



The SSH configuration requires detailed knowledge in the area of Linux administration.

Incorrect configuration causes damage to the operating system of the DL2.

→ **SSH configuration may only be carried out by a specialised Linux administrator, and only if required.**

In order to activate the SSH access, proceed as follows:

- In the main menu **Device Config**, select the sub-menu **Network**.
- On the **SSH configuration** tab, in the **SSH access enabled?** input field, click **Yes**.
- Tick the **Change SSH password?** checkbox.
- Enter the current password into the **Current SSH password** input field.  
Factory setting: no password (empty field).
- Enter the new password into the **New SSH password** input field.
- Enter the new password into the **Repeat new SSH password** input field.
- Click **Save configuration**.

The message **Configuration saved successfully!** appears.

## 12 Eliminating errors

### Problems with the direct connection to a gigabit network device

#### Problem

When a device is connected directly to the DL2 Datalogger using a gigabit network adapter, no network connection is established.

#### Solution



Not all network interface cards support 10 MBits/s half-duplex communication.

- Alternative A: Interconnect a 100 MBits switch between the two devices.
- Alternative B: Set the network connection settings of your computer to 10 MBits/s half-duplex.

### User password not available

#### Problem

The user password is not available.

#### Solution

When the user password is not available, the DL2 Datalogger has to be reset to its factory settings in order to regain access to the Web interface.



When the DL23 Datalogger is reset to its factory settings, all logged data and the configuration will be erased. In order to save the logged data, they can be exported onto an SD card before a reset.



See chapter 9.1 **Data export over SD card on page 26**.

## The DL2 Datalogger is not found by the DeviceDiscoveryTool

Problem	Solution
<p>The DL2 Datalogger is not found by the DeviceDiscoveryTool.</p>	<p>Check the following points in order to find and eliminate the error:</p> <ul style="list-style-type: none"><li>→ Check if the power supply to the DL2 Datalogger is established.</li><li>→ Check if the network cable is properly connected at both ends!</li><li>→ Check if the firewall software of the computer inhibits the connection to the DL2 Datalogger.</li><li>→ Switch off the firewall software and use the DeviceDiscoveryTool to find the DL2 Datalogger.</li><li>→ When the DL2 Datalogger has been found, the firewall software has to be reconfigured.</li><li>→ Activate the firewall software!</li><li>→ Check if the current Java software is installed.</li></ul> <p>If no or an old Java version is installed, an error message appears.</p> <p>In order to eliminate the error, the current Java software has to be installed from <a href="http://java.com">http://java.com</a>.</p> <ul style="list-style-type: none"><li>→ Check if an IP address is assigned to the Datalogger.</li></ul> <p>An IP address has to be assigned to the Datalogger by a router or a directly connected PC. This process may take several minutes.</p> <p>Computers with a Windows operating system indicate an IP assignment in progress by displaying a symbol on the task bar. The symbol consists of two computers orbited by a yellow ball.</p> <ul style="list-style-type: none"><li>→ Check if an IP address is automatically assigned to the computer upon a direct connection to the Datalogger.</li></ul>
	<p>If Microsoft Windows is used, proceed as follows:</p> <ul style="list-style-type: none"><li>→ Click the <b>Start</b> symbol on the task bar.</li><li>→ In the <b>Settings</b> menu, select the <b>Control panel</b>.</li><li>→ Double-click <b>Network connections</b>.</li><li>→ Right-click the Datalogger connection.</li><li>→ Click <b>Properties</b>.</li><li>→ Mark <b>TCP/IP Internet protocol</b>.</li><li>→ Click the <b>Properties</b> button.</li><li>→ Mark the <b>Obtain IP address automatically</b> field.</li><li>→ Mark the <b>Obtain DNS server address automatically</b> field.</li><li>→ Close all windows by clicking <b>OK</b>.</li><li>→ Check if the proxy server settings for the operating system are correct.</li></ul>

**Problem**

The DL2 Datalogger is not found by the DeviceDiscoveryTool.

**Solution**

If Microsoft Windows is used, proceed as follows:

- ➔ Click the **Start** symbol on the task bar.
- ➔ In the **Settings** menu, select the **Control panel**.
- ➔ Double-click the **Internet Options** symbol.
- ➔ Click the **Connections** tab.
- ➔ Click the **Settings** button.
- ➔ Tick the **Use a proxy server for your LAN** checkbox.
- ➔ Click the **Advanced...** button.
- ➔ Enter 169.254.0.0/16 into the **Exceptions** input field.
- ➔ Close all windows by clicking **OK**.
- ➔ Check if the proxy server settings for the Internet browser are correct.

If Microsoft Windows is used, proceed as follows:

- ➔ Open the Internet browser.
- ➔ In the main menu **Extras**, select the sub-menu **Settings**.
- ➔ In the main menu **Advanced**, select the sub-menu **Network**.
- ➔ Click the **Settings** button.
- ➔ Enter 169.254.0.0/16 into the **No proxy for:** input field.
- ➔ Close all windows by clicking **OK**.



## 13 Ordering software

For an expense allowance of EUR 20,-, a DVD containing the source code and the compiler scripts of the Open Source applications and -libraries can be ordered.

Please send your order to:

RESOL – Elektronische Regelungen GmbH

Heiskampstraße 10

45527 Hattingen

GERMANY

Please name the version number of the firmware in your order. It can be found in the Web interface, main menu **About**, sub-menu **General**, bottom area (e. g.: „1.0 (200805241128”)”). Per order, only one version number can be named.

## 14 Appendix

### 14.1 Possible export file formats

File format	Description
Text (tab-separated, Windows)	<ul style="list-style-type: none"><li>• Text file, optimised for being processed under Windows.</li><li>• Data are separated by a tabulator.</li></ul>
Text (CSV, Windows)	<ul style="list-style-type: none"><li>• Text file, optimised for being processed under Windows.</li><li>• Data are separated by a semicolon.</li></ul>
Text (tab-separated, Linux)	<ul style="list-style-type: none"><li>• Text file, optimised for being processed under Linux or Mac OSX.</li><li>• Data are separated by a tabulator.</li></ul>
Text (CSV, Linux)	<ul style="list-style-type: none"><li>• Text file, optimised for being processed under Linux or Mac OSX.</li><li>• Data are separated by a semicolon.</li></ul>
VBus® protocol data	<ul style="list-style-type: none"><li>• VBus® file, optimised for processing in the RESOL ServiceCenter software.</li></ul>

Export file formats available in the Web interface.

## 14.2 Unit conversion table

Unit	BTU	MBTU	MMBTU
1 Wh	3.412128	0.003412	0.000003
1KWh	3412.128	3.412128	0.003412
1MWh	3412128	3412.128	3.412128

Unit	g CO <sub>2</sub> _OIL	kg CO <sub>2</sub> _OIL	t CO <sub>2</sub> _OIL
1 Wh	0.568	0.000568	$5,68 * 10^{-7}$
1KWh	568	0.568	0.000568
1MWh	568000	568	0.568

Unit	g CO <sub>2</sub> _GAS	kg CO <sub>2</sub> _GAS	t CO <sub>2</sub> _GAS
1 Wh	0.2536	0.000254	$2,536 * 10^{-7}$
1KWh	253.6	0.2536	0.000254
1MWh	253600	253.6	0.2536

Unit	Gallons/h	Gallons/min	
1 l/min	15.85	0.264172	
1 l/h	0.264172	0.004403	

Factors used for unit conversion, rounded to 6 positions after decimal point.

## 15 Accessories



### SD card

Art. no.: 180 007 40

## 16 Spare parts

### VBus® cable, 1.50 m

Art. no.: 750 012 15



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**Important note**

The texts and drawings in this manual are correct to the best of our knowledge. As faults can never be excluded, please note:

Your own calculations and plans, under consideration of the current standards and directions should only be basis for your projects. We do not offer a guarantee for the completeness of the drawings and texts of this manual - they only represent some examples. They can only be used at your own risk. No liability is assumed for incorrect, incomplete or false information and / or the resulting damages.

**Note**

The design and the specifications can be changed without notice.

The illustrations may differ from the original product.

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