



# Manual

Installation, Startup and Application

## Web-IO Digital 4.0

valid for

- #57737 Web-IO 4.0 Digital 2xIn, 2xOut
- #57734 Web-IO 4.0 Digital 12xIn, 6xRelais
- #57730 Web-IO 4.0 Digital 12xIn, 12xOut

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# 1. Legal Notices

## Warning notice system

This manual contains notices that must be observed for your personal safety as well as to prevent damage to equipment. The notices are emphasized using a warning triangle. Depending on the hazard level the warning notices are shown in decreasing severity as follows.

### DANGER

Indicates a hazard which results in death or severe injury if no appropriate preventive actions are taken.

### WARNING

Indicates a hazard which can result in death or severe injury if no appropriate preventive actions are taken.

### CAUTION

Indicates a hazard that can result in slight injury if no appropriate preventive actions are taken.

### NOTE

Indicates a hazard which can result in equipment damage if no appropriate preventive actions are taken.

If more than one hazard level pertains, the highest level of warning is always used. If the warning triangle is used in a warning notice to warn of personal injury, the same warning notice may have an additional warning of equipment damage appended.

## Qualified Personnel

The product described in this manual may be installed and

placed in operation only by personnel who are qualified for the respective task.



The documentation associated with the respective task must be followed, especially the safety and warning notices contained therein.

Qualified personnel are defined as those who are qualified by their training and experience to recognize risks when handling the described products and to avoid possible hazards.

## Disposal

Electronic equipment may not be disposed of with normal waste, but rather must be brought to a proper electrical scrap processing facility.

Symbols on the product

Symbol	Explanation
	CE Mark  The product conforms to the requirements of the relevant EU Directives.
	WEEE Mark  The product may not be disposed of with normal waste, but rather in accordance with local disposal regulations for electrical scrap.

## 2. Safety Notices

### General notices

This manual is aimed at the installer of the Web-IOs described in the manual and must be read and understood before beginning any work. The devices are to be installed and placed in operation only by qualified personnel.

### Intended use

#### DANGER

The digital Web-IOs manufactured by Wiesemann & Theis are network remote switches with integrated web server and digital in- and outputs. They are used as a remote switching and monitoring unit, accessible via TCP/IP-Ethernet using various Web and network protocols in accordance with the present manual.

Non-intended use is any other use or any modification to the described devices.

### Electrical Safety

#### WARNING

Before beginning any kind of work on the Web-IO you must completely disconnect it from power. Be sure that the device cannot be inadvertently turned on again!

The Web-IO may be used only in enclosed and dry rooms.

The device should not be subjected to high ambient temperatures or direct sunlight, and it should be kept away from heat sources. Please observe the limits with respect to maximum ambient temperature.

Ventilation openings must be clear of any obstacles. A distance



of 10-15 cm between the Web-IO and nearby heat sources must be maintained.

Input voltage and output currents must not exceed the rated values in the specification.

When installing be sure that no stray wires stick out through the ventilation slit of the Web-IO into the housing. Ensure that no individual wires stand off from leads, that the lead is fully contained in the clamp and that the screws are tightly fastened. Fully tighten screws on unused terminals.

The power supply used for the Web-IOs must absolutely ensure safe isolation of the low-voltage side from the supply mains according to EN60950-1 and have "LPS" designation.

## EMC

### ▲NOTE

Only shielded network cables may be used for connecting the network to the Web-IOs.

In this case the Web-IOs meet the industrial noise immunity limits and the stricter emissions limits for households and small businesses. Therefore there are no EMC-related limitations with respect to the usability of the devices in such environments.

*The complete Declarations of Conformity for the devices described in the manual can be found on the corresponding Internet page at the W&T homepage: <http://www.wut.de>.*

## Batteries

The Web-IO Digital 4.0 contains a 3V lithium-manganese dioxide button battery type CR1632 for backing up the internal clock. This battery has a life expectancy of 10 years and must be replaced only by a battery of the same type.

When using the Web-IO Digital 4.0 in a network environment  
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with access to a time server, the battery is not essential for correct function of the device and can be removed.

### **CAUTION**

The battery may be removed or replaced only by an electronic specialist.

To remove the battery, open the housing as follows:

#### **57730 and 57734**

Press a pointed object against the side latch hook of the housing while pulling the base of the housing out of the top shell.

Remove the circuit board stack from the bottom of the housing.

The battery for the clock module is located in a holder on mainboard.

After removing/replacing the battery, reassemble in reverse order.

#### **57737**

Remove the green power supply terminal on the bottom of the device. Gently squeeze the body of the case at the front of the narrow sides with your thumb and forefinger. Now pull the housing with the printed circuit board out of the housing.

The battery for the clock module is located in a holder on the mainboard.

After removing/replacing the battery, reassemble in reverse order.

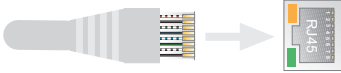
Note re: the Battery Law (BattG):

Batteries and rechargeables must not be disposed of with normal waste, recycling of used batteries and rechargeables is required by law. Used batteries may contain harmful substances which can damage the environment or your health if not disposed of properly.

Batteries also contain important raw materials such iron, zinc, manganese or nickel and are recycled. You can either send the batteries back to us or you can return them free of charge to the local retailer or to the communal collecting point. The return of batteries of the end user to the local retailer is restricted to a reasonable amount of batteries and is restricted to only the batteries that the local retailer offers in his product range.

## 3. Quick Startup

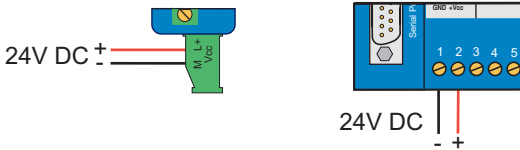
### Network connection



### Supply voltage

#57737

#57730, 57731 und 57734



*For the first test leave the input and outputs unwired.*

### IP address assignment

Install Wutility-Tool (Download: <http://wut.de/wutility>)

After starting Wutility your Web-IO appears in the list. If multiple devices are shown, identify your device by the Mac address

(white sticker "EN = 00c0:3d.....")

If there is a DHCP server in your network, you can use the assigned IP address for a first test. Using the IP address icon in Wutility you can instead assign a free static IP address to the Web-IO.

### Function test

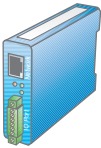
From the browser open the Web page of the Web-IO using address <http://<IP-address of the Web-IO>>.

## 4. Product introduction

### Hardware

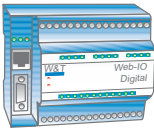
The Web-IO devices differ in their mechanical design and hardware configuration:

#### #57737 - Web-IO 4.0 Digital 2xIn, 2xOut



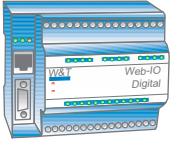
Network interface:	RJ45 10/100BaseT, Power over Ethernet - PoE
Power:	Screw terminal 24 - 48V or PoE
Inputs:	2 Inputs -30 .. +30V DC Switching threshold +8V (+/-1V)
Outputs:	min. +6V, max +30V DC stromtreibend max. 500mA bei PoE gesamt max. 125mA

#### #57730 - Web-IO 4.0 Digital 12xIn, 12xOut



Network interface:	RJ45 10/100BaseT,
Power:	Screw terminal 12 .. 24V
Inputs:	12 Inputs -30 .. +30V DC Switching threshold +8V (+/-1V)
Power:	12 Outputs min. +6V, max +30V DC Current driving max. 500mA
Data interface:	1 x RS232 (only for IP assignment)
Reset button:	for manual restart

## #57734 - Web-IO 4.0 Digital 12xIn, 6xRelais Out



Network interface:	RJ45 10/100BaseT,
Power:	Screw terminal 12 .. 24V
Inputs:	12 Inputs -30 .. +30V DC Switching threshold +8V (+/-1V)
Outputs:	6 normally open potential-free max 48V AC oder DC max. 5A
Data interface:	1 x RS232 (only for IP assignment)
Reset button:	for manual restart

Device status, error status and status of the input/outputs indicated in all versions with corresponding LEDs.

## Network security

The Web-IO has an internal firewall. All available network accesses are configurable and must first be enabled by the administrator. By default only browser access, inventorying via Wutility, and the port for initializing firmware updates are enabled. DHCP is also enabled.

You can explicitly specify for all communication paths whether the outputs may be accessed.

A list of the currently open TCP and UDP ports can be found in the navigation tree under *Port list*.

## Access rights

The Web-IO is configured and operated from the browser. There are three authorization levels for access:

### Guest

The guest has read-access to the status of Inputs, Counters and Outputs without logging in.

### User

A user can switch the outputs after logging in with a password if it is enabled for access via the browser.

### Administrator

After logging in with a password the administrator has unrestricted configuration and access rights.

By default no passwords are assigned for the Web-IO. Simply click on the Login button.

After login the navigation tree on the left side can be used to open the enabled configuration areas. For help and information about the respective configuration possibilities click on the Info buttons on the right side.

Clicking on the Apply button makes the settings immediately effective.

*For all other descriptions affecting the configuration, access with Administrator login is required.*

## Application and access possibilities

### Browser access

With password protected access the status of Inputs, Counters and Outputs can be monitored in the browser. You can also switch the outputs with the required access rights.

It is also possible to upload and save a Web page created externally according to your own needs to the device.

### Email sending

The Web-IO offers the option of sending email messages depending on IO states or at fixed intervals. The Web-IO also supports authentication procedures prescribed by public providers.

### Box-to-Box

Two Web-IOs can be configured so that the outputs of the first Web-IO follows the inputs of the second. This works in both directions when configured accordingly.

### Integration into existing system

The Web-IO allows communication using several selected protocols for integration into existing systems when configured accordingly.

### MQTT

In Industry 4.0 and the "Internet of Things" MQTT is an innovative communication path. The Web-IO can determine the status of the IOs via MQTT Publish to an MQTT Broker and even ac-



cept the request to perform a switching action via MQTT Subscribe.

## **REST**

REST (Representational State Transfer) is another Web-based protocol that can be used to integrate the Web-IO into the environment of Industry 4.0 and the Internet of Things.

## **Web-API - HTTP-Requests/AJAX**

The status of Inputs, Counters and Outputs can be queried using HTTP requests. In addition the outputs can be directly controlled using HTTP requests.

## **OPC**

Together with the W&T OPC Server the Web-IO can be accessed from any OPC client applications.

## **SNMP**

The status of Inputs, Counters and Outputs as well as the configuration and error status can be obtained via SNMP. A private MIB for direct download from the device is available for easy incorporation into SNMP systems.

## **Modbus-TCP**

With Modbus-TCP the Web-IO supports one of the most common industry protocols. By reading and writing the corresponding registers any Modbus-TCP master can access the IOs.

## **In-house applications**

The Web-IO offers TCP and UDP socket accesses for access from your own applications. In both cases the Web-IO supports addressing using command strings, but also by exchanging binary structures.

With the support of HTTP requests your own Web applications

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(e.g. with PHP or JavaScript) can also access the Web-IO.

## Actions

Depending on predefined events on the IOs, the Web-IO can initiate actions such as sending an email message. Other actions include sensing syslog messages or SNMP traps, writing to a file via FTP, sending data via TCP or UDP, or switching its own outputs.

## 5. Installation and wiring

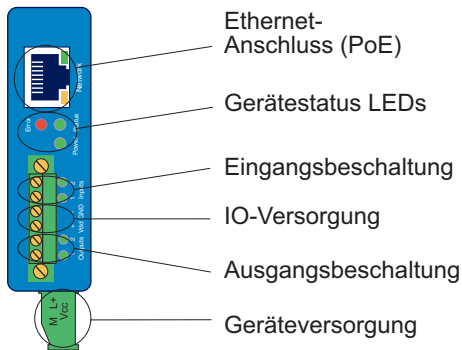
Only qualified personnel should install and wire the Web-IO. The generally applicable state of the art and corresponding prevailing regulations and norms must be observed.

### #57737 - Web-IO Digital 2xIn, 2xOut

#### Installation

The Web-IO Digital 2xIn, 2xOut is designed for installation in a control cabinet. For mechanical attachment the Web-IO should be snapped on to a 35mm DIN rail per DIN EN 50022. The Web-IO has 22mm of installation width.

#### Wiring

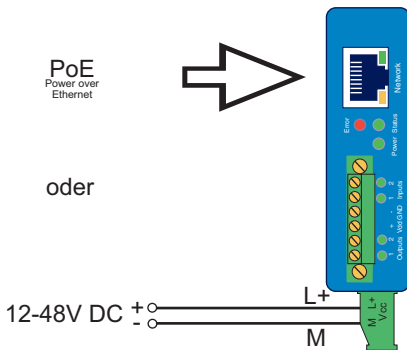


## Connecting the supply voltage

The Web-IO is powered either by PoE (Power over Ethernet Class 2) or with a DC voltage of between 12 and 48V. Power is connected to the green terminal on the underside.

*Only potential-free power supplies may be used for externally powering the Web-IO 57737. Their reference ground for the output voltage must not have any direct connection to the protection ground.*

*Simultaneous connection of an external power supply and a PoE infrastructure is not permitted.*



With a typical industrial supply voltage of 24V the Web-IO draws approx. 100mA.

## Internal auxiliary voltage

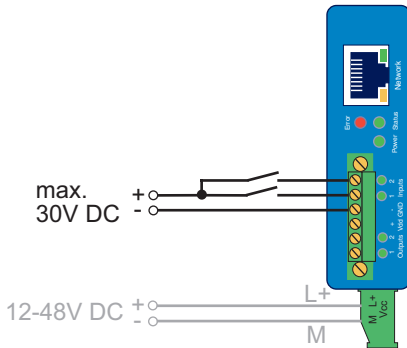
Under Basic settings » Inputs/Outputs » Internal IO supply a 24V auxiliary voltage can after startup be output on terminals +Vdd and – GND. The auxiliary voltage has a maximum load capacity of 150mA and can be used to drive the inputs through potential-free contacts. In addition, the auxiliary voltage, when it is enabled, is output by the outputs in the ON state. This means the Web-IO needs no external power supply when the consumers switched through the outputs do not draw a total of more than 150mA.

Under overload or short-circuit conditions the Web-IO turns the auxiliary voltage off and generates an error message in the Di-

agnostics menu area. The Delete report button can be used to enable the auxiliary voltage again.

### Input wiring

The Web-IO inputs are wired to the terminals labeled Input 0 and Input1. The inputs are designed for voltages between -30V and +30V and galvanically isolated from the internal circuitry up to 1kV by means of optocouplers.

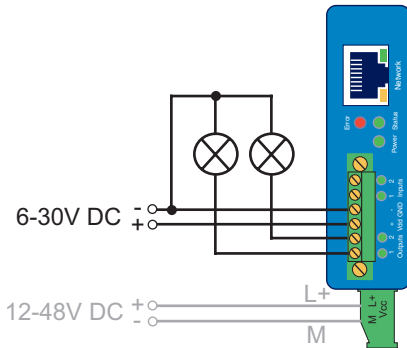


Positive voltages of over 8V referenced to the – GND terminal are recognized as an ON signal and indicated as such by the corresponding LED.

If the auxiliary voltage has been enabled using Basic settings » Inputs/Outputs > Internal IO voltage, it can be tapped on the + Vdd terminal for driving the inputs through potential-free contacts

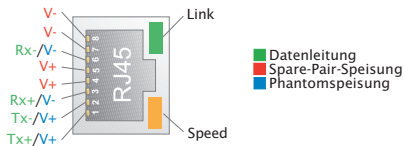
## Output wiring

The outputs are current driving and have a maximum load capacity of 500mA each. The Vdd voltage which is applied to the terminals + Vdd and - GND is switched. When auxiliary voltage is enabled this is switched to the outside from the outputs. The maximum load in this case is reduced to 150mA for both outputs.



## Network connection

A normal Ethernet patch cable (min. CAT5) with RJ45 plugs can be used for the network connection.



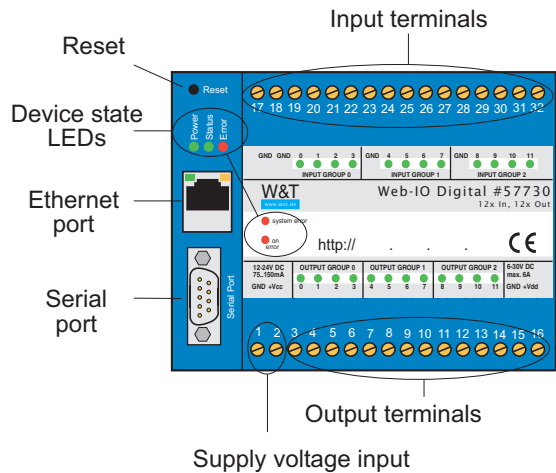
In a PoE-capable (Power over Ethernet) infrastructure the Web-IO can be powered through the network connection.

# #57730 -Web-IO Digital 12xIn, 12xOut

## Installation

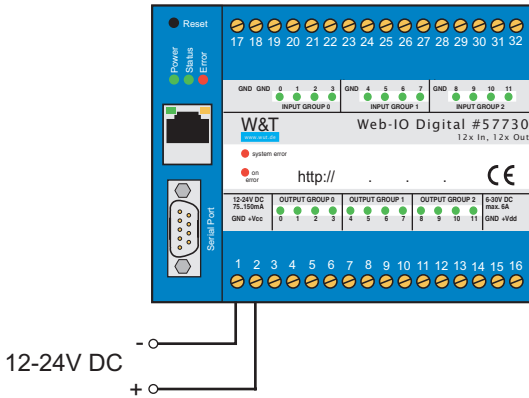
The Web-IO Digital 12xIn, 12xOut is designed for installation in a control cabinet. For mechanical attachment the Web-IO should be snapped on to a 35mm DIN rail per DIN EN 50022. The Web-IO has 107mm of installation width.

## Wiring



## Connecting the supply voltage

The Web-IO is powered at terminals 1 (- GND) and 2 (+ Vcc) with a DC voltage of between 12 and 24V.

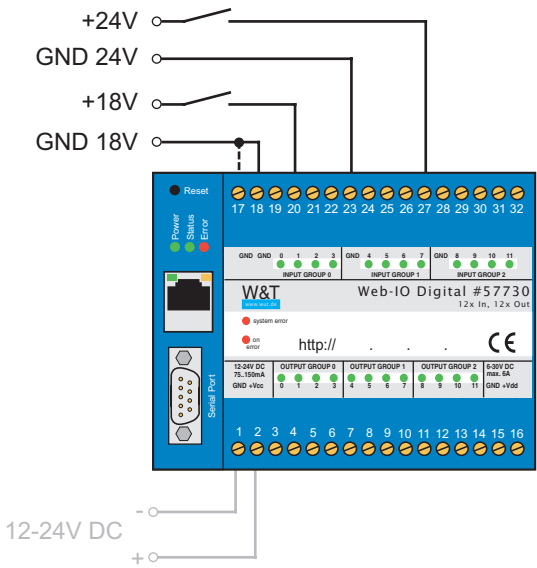


With a typical industrial supply voltage of 24V the Web-IO draws approx. 100mA.



Input wiring

The 12 inputs on the web-IO are divided into 3 groups of 4 inputs each. Each of the groups has its own reference ground (GND). The groups are galvanically isolated from each other and from the internal circuitry of the Web-IO.



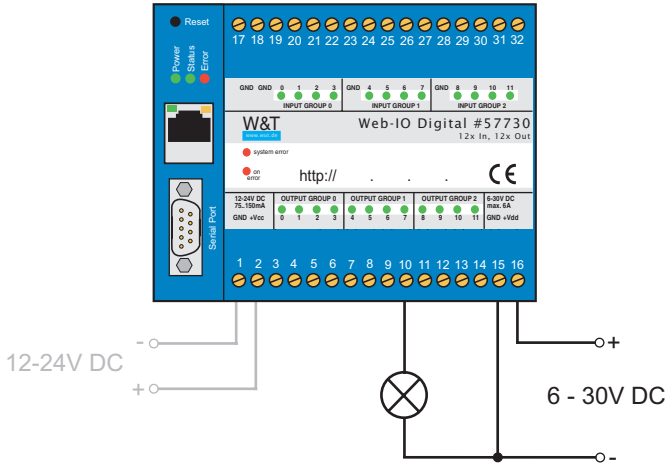
*The galvanic isolation of the input groups means different voltages can be used. Here Group 1 uses 18V and Group 2 uses 24V.*

The inputs are configured for voltages between -30V and +30V.

Positive voltages over 8V referenced to the corresponding -GND terminals are considered as an ON signal, which is indicated by the corresponding LED.

## Output wiring

The outputs are current driving and have a maximum load capacity of 500mA each. The Vdd voltage which is applied to the terminals 15 (-GND) and 16 (+Vdd) is switched. The device supply Vcc and the output supply Vdd may come from the same source if the same voltages are used (e.g. 24V).



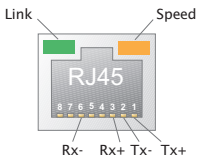
## Terminal assignment

Terminal	Function
1	- GND / Power supply device
2	+ Vcc / Power supply device
3	Output 0
4	Output 1
5	Output 2
6	Output 3
7	Output 4
8	Output 5
9	Output 6
10	Output 7
11	Output 8
12	Output 9
13	Output 10

Terminal	Function
14	Output 11
15	- GND / Power supply device Outputs
16	+ Vdd / Power supply device Outputs
17	- GND / Input group 1
18	- GND / Input group 1
19	Input 0 / Input group 1
20	Input 1 / Input group 1
21	Input 2 / Input group 1
22	Input 3 / Input group 1
23	- GND / Input group 2
24	Input 4 / Input group 2
25	Input 5 / Input group 2
26	Input 6 / Input group 2
27	Input 7 / Input group 2
28	- GND / Input group 3
29	Input 8 / Input group 3
30	Input 9 / Input group 3
31	Input 10 / Input group 3
32	Input 11 / Input group 3

### Network connection

A normal Ethernet patch cable (min. CAT5) with RJ45 plugs can be used for the network connection.

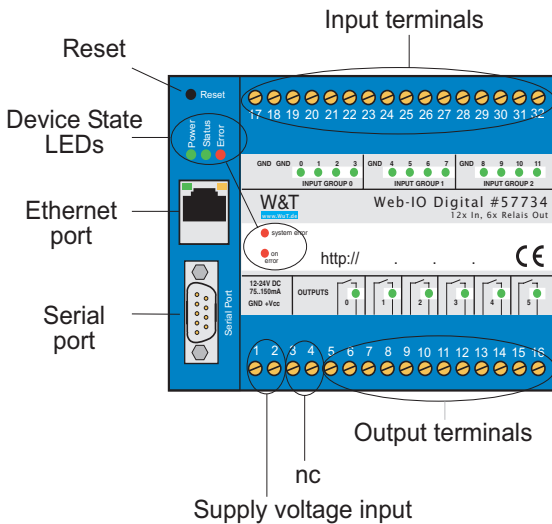


## #57734 - Web-IO Digital 12xIn, 6xRelais Out

### Installation

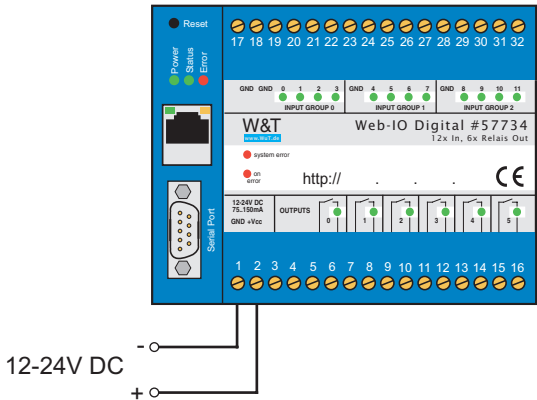
The Web-IO Digital 12xIn, 6xRelais Out is designed for installation in a control cabinet. For mechanical attachment the Web-IO should be snapped on to a 35mm DIN rail per DIN EN 50022. The Web-IO has 107mm of installation width.

### Wiring



Connecting the supply voltage

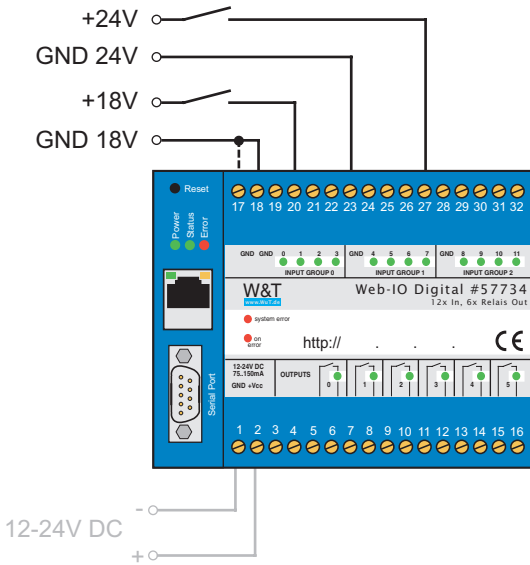
The Web-IO is powered at terminals 1 (- GND) and 2 (+ Vcc) with a DC voltage of between 12 and 48V.



With a typical industrial supply voltage of 24V the Web-IO draws approx. 100mA.

## Input wiring

The 12 inputs on the web-IO are divided into 3 groups of 4 inputs each. Each of the groups has its own reference ground (GND). The groups are galvanically isolated from each other and from the internal circuitry of the Web-IO.



*The galvanic isolation of the input groups means different voltages can be used. Here Group 1 uses 18V and Group 2 uses 24V.*

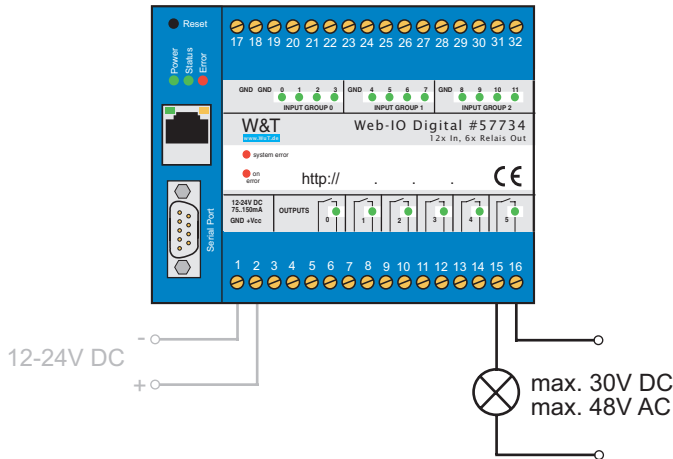
The inputs are configured for voltages between -30V and +30V.

Positive voltages over 8V referenced to the corresponding -GND terminals are considered as an ON signal, which is indicated by the corresponding LED.

### Output wiring

The outputs are implemented as potential-free contacts (normally open) and brought out on two terminals. A maximum of 30V DC or 48V DC with a load of 5A can be switched.

*The contacts are not designed for switching 230V!*



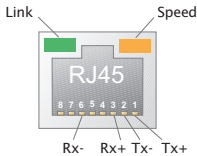
### Terminal assignment

Terminal	Function
1	- GND / Power supply device
2	+ Vcc / Power supply device
3	nc
4	nc
5	Output 0
6	Output 0
7	Output 1
8	Output 1
9	Output 2
10	Output 2
11	Output 3
12	Output 3
13	Output 4

Terminal	Function
14	Output 4
15	Output 5
16	Output 5
17	- GND / Input group 1
18	- GND / Input group 1
19	Input 0 / Input group 1
20	Input 1 / Input group 1
21	Input 2 / Input group 1
22	Input 3 / Input group 1
23	- GND / Input group 2
24	Input 4 / Input group 2
25	Input 5 / Input group 2
26	Input 6 / Input group 2
27	Input 7 / Input group 2
28	- GND / Input group 3
29	Input 8 / Input group 3
30	Input 9 / Input group 3
31	Input 10 / Input group 3
32	Input 11 / Input group 3

### Network connection

A normal Ethernet patch cable (min. CAT5) with RJ45 plugs can be used for the network connection.





## 6. Startup

Once the Web-IO has been properly installed and wired, the power can be turned on. All three status LEDs should come on briefly. After approx. 5 seconds only the Power LED should remain on. The Status LED may flash. If a valid signal is detected on one of the inputs, the corresponding LED will come on.

When a network is connected the green LED in the network socket will indicate an existing link. The orange LED provides information about the network speed.

On = 100MBit/s

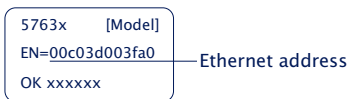
Off = 10MBit/s

### Assigning the IP address

By default IP address 0.0.0.0 and DHCP is activated on the Web-IO.

#### Networks with DHCP

If a DHCP server is active in the network in which the Web-IO is connected, an IP address should be automatically assigned to the Web-IO. To be able to specifically access the Web-IO, you should configure a reservation in the DHCP server so that the Web-IO is always accessible under the same address. The required Ethernet address can be found on the white sticker on the device.



(If in doubt ask your network administrator)

## Networks without DHCP

Install the Wutility Windows PC program (download at <http://www.WuT.de>). If no Windows PC is available, see the Appendix, sub-section Alternatives to IP Address Assignment.

When Wutility is started the local subnet is searched and all found W&T network components are listed. Highlight your Web-IO and click on the IP Address icon. Wutility suggests the network parameters (subnet mask, gateway, DNS server) which also apply to the PC. If the Web-IO will run in the same subnet, you must only modify the IP address.

If you select *Address range > any network*, you can also enter parameters which are different from your local network, for example to pre-configure the Web-IO for a different network.

## Changing the set IP parameters

To later change the IP address, subnet mask, gateway or DNS server, you can either use Wutility again or modify the parameters in the browser under *Basic settings >> Network*.

## 7. Basic settings

The rest of the Web-IO configuration is done in the browser. As an address enter the IP address of the Web-IO. Click on Login in the navigation tree and select Administrator as the user. By default no password is assigned, you need only click on the Login button to configure the Web-IO with Administrator rights.

### Configuring Inputs and Outputs

In Basic settings » Inputs/Outputs you can give individual names to the Inputs and Outputs. These names replace the factory default names Input  $n$  and Output  $n$  in the visualization and any message texts.

#### Expanded Input settings

For special applications some Input properties can be modified:

##### Input filters

A signal state must be present for the time in milliseconds entered here for it to be processed by the Web-IO. This can for example filter out bouncing of mechanical contacts.

##### Signal inversion

Normally signals of over 80V are reliably detected as ON. Enabling inversion means voltages over 80V are considered OFF.

#### Expanded Output settings

For special applications some Output properties can be modified:

##### Switch Output inverted

Normally the Output is turned off in the OFF state, i.e. turned on with no signal and in the ON state. Enabling inversion means the Output behaves in exactly the reverse.

### **Pulse mode**

By enabling Pulse mode, when the Output is switched to the ON state it reverts automatically back to the OFF state after the set pulse duration. When turned on again during the pulse, the pulse duration begins to count over again. Reset allowed means the Output may also be switched to the OFF state during a pulse.

### **Date /Time**

In the Date /Time area you can specify whether there is a cyclical synchronization with a time server. In addition the date and time can be manually set. Here you can also configure a time zone and summer/winter time changes.

### **Language / Info**

In addition to selecting German or English, you can also modify other display elements including the logo.

### **Password**

Here you can specify passwords for Administrators and Users.

*Please note that the same password should not be used for Administrators and Operators.*

If the Administrator password has been forgotten, physical intervention in the Web-IO is required to reset the passwords. See section Emergency access in the appendix to this manual.

## 8. Basic applications

The Web-IO features a variety of different communication options and supports various standard protocols. We recommend enabling only the communication paths actually required in your application. This limits the possibility of unauthorized access and manipulation.

First we will introduce the most commonly used communication methods:

### Browser access

Access from a browser is special in that in addition to monitoring and operating the IOs, if a user is logged in he can also configure the Web-IO from here.

The Administrator has authorization to access the entire configuration. Using the likewise password protected user access all the IOs can be adapted to the respective settings.

Without a login only the states of Inputs and Outputs can be observed.

### HTTP or HTTPS

By default browser access for HTTP is enabled using Port 80. To change access to HTTPS or change the port, select *Basic settings >> Network* in the navigation tree and then Protocol under *Access for Web services*. All other settings applicable in the browser can be made under *Web sites*.

### Hide menu tree

Once configuration is finished, browser display can be restricted in the browser to IO access. To do this go to *Web sites >> Browser access* and select the option *Hide navigation tree*. Use: `http://<URL/IP of Web-IO>/index` to temporarily show the menu

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tree and then permanently turn it off a gain using the option above.

## IO access

The Web-IO provides two pre-prepared Web pages for access to Inputs, Counters and Outputs:

### Home

The Home page provides an overview of Inputs, Outputs and the configured actions. When appropriately logged in the outputs can be switches and the counters cleared. Both must first be enabled under *Web sites >> Home*. By default this is disabled.

The menu point *Web sites >> Home* offers several other display options for the Home page.

Direct opening of the Home page without display of the navigation tree at: <http://<URL/IP of Web-IO>/home>

If Hide menu tree is enabled, a password entry field appears on the Home page. After clicking on the Apply button the Outputs and Counters can be operated until the Home page is exited. Enabling *Web sites >> Home > Save password for switching in browser* saves the password in the browser as a cookie and operation is immediately enabled again after opening the Home page in the same browser.

### My Web page

The preloaded Web page in the Web-IO provides a compact overview of the IO states.

Under *Web sites >> My Web page* the original Web page can be replaced with one you have programmed yourself.

*For the Web page to be able to dynamically refresh the states of Inputs, Counters and Outputs, Allow HTTP requests must be enabled under Communication paths >> Web-API. Here you also specify whether the outputs are allowed to be switched using HTTP*

*requests used for AJAX.*

Direct opening of your own Web page without displaying the navigation tree at: *http://<URL/IP of the Web-IO>/user*

More details on programming your own Web pages can be found in the programming manual for the Web-IO. (Download at: *http://www.WuT.de* – simply enter the article number of your Web-IO in the search field and select *Manual*.)

## Sending email

A few basic settings are necessary in order to send email messages.

### Network parameters

If you want to send via a mail server in the Internet, it is important that the network basic settings are correct. Check under *Basic settings >> Network* especially whether *Gateway* and *DNS server* are correctly specified.

### Mail server access

All mail server-specific settings can be made under *Communication paths >> Mail*. The currently favored authentication procedure is SSL/TLS. For more tips about specific settings for the most common email providers see the info section under *Mail*.

### Creating an email message

To create an email message, click the *Add* button under *Actions*. An input screen will appear for a new action.

Here you can determine the name for an action and what the initiator should be (e.g. the ON state of the input). A detailed description of the possibilities can be found in the *Actions* section.

For the action select *Email message*. In the associated input screen you can compose an individual email message. Use the placeholders described below which replace the current IO status, counter values etc. for sending the email.

Placeholder	Description
<ix>	State of the inputs No. x (ON/OFF)
<ox>	State of the outputs No. x (ON/OFF)
<cx>	Counter state No. x
<i>	State of all inputs as hex. bit pattern
<o>	State of all outputs as hex. bit pattern
<dn>	Device Name
<inx>	Name of the input No. x
<onx>	Name of the output No. x
<t>	Time stamp with date and time
<\$y>	Year in format „YYYY“
<\$m>	Month in format „MM“
<\$d>	Day in format „DD“
<\$h>	Hour in format „hh“
<\$i>	Minutes in format „mm“
<\$s>	Seconds in format „ss“



## Box-to-Box

Box-to-Box mode links two Web-IOs to each other over the same network so that the outputs of the one Web-IO follows the inputs of the other Web-IO (ON on the input of Web-IO A switches the output of Web-IO B to ON).

Box-to-Box mode the idea is to configure one Web-IO as the master and the other as a slave. The master Web-IO (Client) is responsible for opening the connection to the slave Web-IO (Server). After the connection has been opened, both Web-IOs work equally and when correspondingly configured send the switching signals in both directions.

## 9. Integration into existing systems

The Web-IO supports several common standards and protocols and can therefore be integrated easily into many existing systems.

### MQTT

After enabling MQTT and configuring in the menu branch *Communication paths >> MQTT* the Web-IO supports two basic possibilities:

1. Passing the individual IO states and the counter value as an MQTT Topic to an MQTT Broker via MQTT Publish.
2. Switching the output depending on Topic contents received via MQTT Subscribe.

Both cases are handled in the Web-IO as an Action. A detailed description of the Action philosophy used in the Web-IO can be found in the Actions section.

#### **Publish IO states**

To create a new MQTT Publish, click on the Add button under *Actions*. The input screen for a new action will appear.

Here you can specify a name for the action and what the initiator should be.

For example you can specify an Input as the initiator and ON as the trigger.

For the action select *MQTT-Publish*. In the following menu enter the path through which the Topic should be written for the Broker.

You can freely determine the contents of the Topic, where the placeholders described in the infotext can be used.

### Switching outputs using Subscribe

Here again you must add a new action. As initiator select *MQTT-Subscribe*. Then enter the path over which the Topic is send which contains the keyword for switching. For action use *Switch output >> Switch this Web-IO output*. Then specify to what state the output should be switches and if the state should change.

#### Example:

A device writes as a topic the keyword ON for the Broker specified in the Web-IO over the path *wut/webio123/set0*. This path and the Topic are specified for the Web-IO as initiator under *MQTT Subscribe*. Switching the output to ON is specified as the action.

Each time ON is written the output is switched. You can use a second action to specify what should be used to turn the output off again.

### The Web-IO as MQTT gateway

The flexibility which the Web-IO allows in configuring act4ions means that depending on the contents of certain Topics you can also send emails, SNMP traps or messages over other communication paths. For more information see the Actions section.

## REST

The Web-IO uses REST (Representational State Transfer) to provide another Web-based communication path.

Communication is via Web-IO specific HTTP requests using the HTTP or HTTPS port specified under *Basic settings >> Network >> Access for Web services*.

To be able to exchange data via REST, access via *Communication paths >> Rest* must first be enabled.

If you wish to protect REST access against unauthorized manipulation, you can enable digest authentication. The requests must then take place as "admin" user with the Administrator

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password or as “operator” using the user password.

Here you can also specify whether REST is permitted to switch the outputs.

### Read access

For read access REST uses the HTTP command GET.

The Web-IO supports three formats for replies to REST requests:

- JSON
- XML
- Text

The format used for replies can be determined using the request. Using

```
http://<ip-adresse>/rest/json
```

for example opens the entire process image of the Web-IO in JSON format. The reply then looks as follows:

```
{
  "info" :
  {
    "request" : " / rest / json",
    "time" : "2016 - 09 - 09,
09 : 42 : 54",
    "ip" : "10.40.22.227",
    "devicename" : "WEBIO - CAFE27"
  },
  "iostate" :
  {
    "input" : [
      {
        "number" : 0,
        "state" : 0
      },
      {
        "number" : 1,
        "state" : 0
      }
    ],
    "output" : [
      {
        "number" : 0,
        "state" : 0
      },
      {

```

```

        "number" : 1,
        "state" : 0
    },
    ],
    "counter" : [
        {
            "number" : 0,
            "state" : 0
        },
        {
            "number" : 1,
            "state" : 0
        }
    ]
},
"system" :
{
    "time" :
    {
        "time" : "2016 - 09 - 09,
        09 : 42 : 54"
    },
    "diagnosis" : [
        {
            "time" : "06.09.2016 09 : 42 : 54",
            "msg" : "Gerätestatus : OK"
        }
    ],
    "diagarchive" : [
        {
            "time" : "06.09.2016 09 : 42 : 54",
            "msg" : "Gerätestatus : OK"
        }
    ]
}
}

```

To query individual areas or points, you can formulate the request in greater detail:

`http://<ip-adresse>/rest/json/iostate/input`

This causes the Web-IO to return the status of all inputs:

```

{
    "iostate" :
    {
        "input" : [
            {
                "number" : 0,
                "state" : 0
            },
            {
                "number" : 1,
                "state" : 0
            }
        ]
    }
}

```

```
}
}
```

## With

`http://<ip-adresse>/rest/json/iostate/input/0`

you causes the Web-IO to return the status of the input 0.

```
{
  "iostate" :
  {
    "input" : [
      {
        "number" : 0,
        "state" : 0
      }
    ]
  }
}
```

## Changing access

The same URL can be used to turn an output off using the parameter `Set=Off` or to change its state using `Set=TOGGLE`.

Clearing counters for example is done by using a POST to the following URL:

`http://<ip-adresse>/rest/json/iostate/output/0`

The following parameters are sent:

`Set=ON`

The Web-IO replies with

```
{
  "iostate" :
  {
    "output" : [
      {
        "number" : 1,
        "state" : 1
      }
    ]
  }
}
```

The same URL can be used to turn the output off using the parameter `Set=Off` or to change its state using `Set=TOGGLE`.

Clearing counters for example is done by using a POST to the following URL:

```
http://<ip-adresse>/rest/json/iostate/counterclear/0
```

No additional parameter needs to be sent.

The Web-IO replies with

```
{
  "iostate" :
  {
    "counter" : [
      {
        "number" : 1,
        "state" : 0
      }
    ]
  }
}
```

To receive the replies in one of the other formats, simply replace the keyword `json` with `xml` or `text`.

*A detailed description of the supported REST requests and the structure of the replies can be found in the Web-IO Programming Manual (download at <http://WuT.de>). Follow the **Manual** link from the data sheet page for your Web-IO.*

## OPC

By default the Web-IO is set for OPC mode. To use OPC, you must simply enable OPC access under *Communication paths >> OPC* and as needed enable switching of the outputs.

For your OPC client to communicate with the Web-IO the W&T OPC server must be installed. Access via OPC servers from third parties is not possible.

In the OPC server select *Devices >> New I/O device*. Enter the IP address and password for your Web-IO and select the Web-IO model. Confirm with OK. Then you must use *File >> Save as active configuration* to apply the new entries.

## SNMP

SNMP can be used to access the IOs as well as the configuration of the Web-IO. Which parameter, what status, what value can be called under which OID is stored in the private MIB, which can be downloaded directly from the Web-IO Communication paths >> SNMP (or download from <http://www.WuT.de>).

The MIB can be conveniently viewed using the usual MIB browser. This gives you the quickest overview of the assigning of the OIDs.

All settings affecting SNMP can be made using *Communication paths >> SNMP*. To make the outputs switchable using SNMP, it must be enabled here.

### Opening an SNMP session

Read access is possible using SNMP-Get requests after enabling SNMP under *Communication paths >> SNMP*. Write/altering access requires a session login with system password entry.

This is done using SNMP-SET via the OID which you can find in the MIB branch of your Web-IO under



```
wtWebioEA...SessCntrl » wtWebioEA...SessCntrlPassword
```

Whether there is a valid session open can be queried using a GET request to the OID

```
wtWebioEA...SessCntrl » wtWebioEA...SessCntrlConfigMode.
```

(Return 1 = valid session 0 = no session.)

A session can be ended using SET to the OID

```
wtWebioEA...SessCntrl » wtWebioEA...SessCntrlLogout
```

During an SNMP session login attempts from the browser are rejected.

### Access to inputs and outputs

Reading the inputs, counters and outputs is always possible using GET requests to the corresponding OID.

In the OID area

```
wtWebioEA...InOut
```

there are corresponding tables.

*The MIB is symmetrically structured for the various Web-IO models. Input and output tables are kept which have a different number of entries depending on the Web-IO model. In this way the MID remains compatible across different models.*

### Example: Querying the switching state of Input0

```
wtWebioEA...InOut » wtWebioEA...InputTable »
                    wtWebioEA...InputEntry » wtWebioEA...InputState
```

An index is appended to the table entries for the individual IOs. For Input 0 for example „.1“ (return 0 = OFF and 1 = ON.)

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Switching the outputs requires a valid session. There is also a corresponding table for the outputs:

```
wtWebioEA...InOut » wtWebioEA...OutputTable »
wtWebioEA...OutputEntry » wtWebioEA...OutputState
```

Indexing works just like for the outputs. If a 1 is sent via SN-MP-SET, the output switches to ON – and sending a 0 turns it OFF.

## Modbus-TCP

The menu point *Communication paths >> Modbus-TCP* can be used to enable the Web-IO for Modbus slave mode. Here you can also specify whether Modbus-TCP may be used to switch the outputs.

The following tables show which function codes and register addresses are supported by the Web-IO.

## Modbus-Memory

### Bit range:

addresse (hexadec.)	description	memory type	length (byte)	read bits with FC	read reg. with FC	Write bits with FC	write reg. with FC
1000	Input 0	bit	1	0x01, 0x02	-	-	-
1001	Input 1	bit	1	0x01, 0x02	-	-	-
1002	Input 2	bit	1	0x01, 0x02	-	-	-
1003	Input 3	bit	1	0x01, 0x02	-	-	-
1004	Input 4	bit	1	0x01, 0x02	-	-	-
1005	Input 5	bit	1	0x01, 0x02	-	-	-
1006	Input 6	bit	1	0x01, 0x02	-	-	-
1007	Input 7	bit	1	0x01, 0x02	-	-	-
1008	Input 8	bit	1	0x01, 0x02	-	-	-
1009	Input 9	bit	1	0x01, 0x02	-	-	-
100A	Input 10	bit	1	0x01, 0x02	-	-	-
100B	Input 11	bit	1	0x01, 0x02	-	-	-
1020	Output 0	bit	1	0x01, 0x02	-	0x05	0x0F
1021	Output 1	bit	1	0x01, 0x02	-	0x05	0x0F
1022	Output 2	bit	1	0x01, 0x02	-	0x05	0x0F
1023	Output 3	bit	1	0x01, 0x02	-	0x05	0x0F
1024	Output 4	bit	1	0x01, 0x02	-	0x05	0x0F
1025	Output 5	bit	1	0x01, 0x02	-	0x05	0x0F
1026	Output 6	bit	1	0x01, 0x02	-	0x05	0x0F
1027	Output 7	bit	1	0x01, 0x02	-	0x05	0x0F
1028	Output 8	bit	1	0x01, 0x02	-	0x05	0x0F
1029	Output 9	bit	1	0x01, 0x02	-	0x05	0x0F
102A	Output 10	bit	1	0x01, 0x02	-	0x05	0x0F
102B	Output 11	bit	1	0x01, 0x02	-	0x05	0x0F
1040	Alarm state 1	bit	1	0x01, 0x02	-	-	-
1041	Alarm state 2	bit	1	0x01, 0x02	-	-	-
1042	Alarm state 3	bit	1	0x01, 0x02	-	-	-
1043	Alarm state 4	bit	1	0x01, 0x02	-	-	-
1044	Alarm state 5	bit	1	0x01, 0x02	-	-	-
1045	Alarm state 6	bit	1	0x01, 0x02	-	-	-
1046	Alarm state 7	bit	1	0x01, 0x02	-	-	-
1047	Alarm state 8	bit	1	0x01, 0x02	-	-	-
1048	Alarm state 9	bit	1	0x01, 0x02	-	-	-
1049	Alarm state 10	bit	1	0x01, 0x02	-	-	-
104A	Alarm state 11	bit	1	0x01, 0x02	-	-	-
104B	Alarm state 12	bit	1	0x01, 0x02	-	-	-
1060	Exception State	bit	1	0x01, 0x02	-	-	-
1068	Config. state	bit	1	0x01, 0x02	-	-	-
1800	Alarm trigger 1	bit	1	0x01, 0x02	-	0x05	0x0F
1801	Alarm trigger 2	bit	1	0x01, 0x02	-	0x05	0x0F
1802	Alarm trigger 3	bit	1	0x01, 0x02	-	0x05	0x0F
1803	Alarm trigger 4	bit	1	0x01, 0x02	-	0x05	0x0F
1804	Alarm trigger 5	bit	1	0x01, 0x02	-	0x05	0x0F
1805	Alarm trigger 6	bit	1	0x01, 0x02	-	0x05	0x0F
1806	Alarm trigger 7	bit	1	0x01, 0x02	-	0x05	0x0F
1807	Alarm trigger 8	bit	1	0x01, 0x02	-	0x05	0x0F
1808	Alarm trigger 9	bit	1	0x01, 0x02	-	0x05	0x0F
1809	Alarm trigger 10	bit	1	0x01, 0x02	-	0x05	0x0F
180A	Alarm trigger 11	bit	1	0x01, 0x02	-	0x05	0x0F
180B	Alarm trigger 12	bit	1	0x01, 0x02	-	0x05	0x0F

Please note that the number of supported inputs, outputs, counters or alarms varies depending on the Web-IO model.

## 16- and 32-bit range:

adresse (hexadec.)	description	memory type	length (byte)	read bits with FC	read reg. with FC	Write bits with FC	write reg. with FC
2000	Inputs 0 - 11	16-bit	2	-	0x03, 0x04	-	-
2002	Outputs 0 - 11	16-bit	2	-	0x03, 0x04	-	-
2004	Alarm state 1 - 12	16-bit	2	-	0x03, 0x04	-	-
2006	Diagnosis Error count	16-bit	2	-	0x03, 0x04	-	0x06, 0x10
2007	Diagnostic state 0 - 15	16-bit	2	-	0x03, 0x04	-	-
2008	Diagnostic state 16 - 31	16-bit	2	-	0x03, 0x04	-	-
2009	Diagnostic state 32 - 47	16-bit	2	-	0x03, 0x04	-	-
200A	Diagnostic state 48 - 63	16-bit	2	-	0x03, 0x04	-	-
200B	Diagnostic state 64 - 79	16-bit	2	-	0x03, 0x04	-	-
200C	Diagnostic state 80 - 95	16-bit	2	-	0x03, 0x04	-	-
200D	Exception/Conf.-State	16-bit	2	-	0x03, 0x04	-	-
5000	Inputs 0 - 11	32-bit	4	-	0x03, 0x04	-	-
5002	Outputs 0 - 11	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5004	Alarm state 1 - 12	32-bit	4	-	0x03, 0x04	-	-
5006	Counter 0	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5008	Counter 1	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
500A	Counter 2	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
500C	Counter 3	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
500E	Counter 4	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5010	Counter 5	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5012	Counter 6	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5014	Counter 7	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5016	Counter 8	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
5018	Counter 9	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
501A	Counter 10	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
501C	Counter 11	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
504A	Diagnosis Error count	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
504C	Diagnostic state 0 - 31	32-bit	4	-	0x03, 0x04	-	-
504E	Diagnostic state 32 - 63	32-bit	4	-	0x03, 0x04	-	-
5050	Diagnostic state 64 - 95	32-bit	4	-	0x03, 0x04	-	-
7000	virtual Register 0	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7002	virtual Register 1	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7004	virtual Register 2	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7006	virtual Register 3	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7008	virtual Register 4	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
700A	virtual Register 5	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
700C	virtual Register 6	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
700E	virtual Register 7	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7010	virtual Register 8	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
.....	virtual Register 9 - 23	32-bit	4	-	-	-	-
702E	virtual Register 23	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7030	virtual Register 24	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7032	virtual Register 25	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7034	virtual Register 26	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7036	virtual Register 27	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
7038	virtual Register 28	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
703A	virtual Register 29	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
703C	virtual Register 30	32-bit	4	-	0x03, 0x04	-	0x06, 0x10
703E	virtual Register 31	32-bit	4	-	0x03, 0x04	-	0x06, 0x10

A detailed description of the supported function codes and register addresses can be found in the Web-IO programming manual.

## 10. Actions

The Action principle allows the Web-IO to issue individual alarms and messages – but also to switch the outputs. This is done based on defined IO states or other events.

Up to 12 actions can be stored and managed, where an individual name can be specified for each action.

### Initiator

#### Inputs

The inputs can be specified as initiator. For an input you can specify whether a change from OFF to ON, from ON to OFF, or any state change should initiate an action.

#### Outputs

The output can be specified as the initiator. For the output you can specify whether a change from OFF to ON, from ON to OFF, or any state change should initiate an action.

#### Counter

The counter can be specified as the initiator. For the counter you must specify for which count value an action should be initiated. You also need to determine whether the counter is reset to zero after the action is initiated.

#### I/O-Kombination

A combination of inputs and outputs can also initiate an action. Here you can specify whether the individual states should have an AND or OR operation performed.

## Interval Timer

The Web-IO can be configured to perform actions at specified times. The times are entered in Cron format.

Valid characters:

- \* Stands for all valid values in the respective entry field (e.g. all minutes or all hours)
- Specifies a range of from...to (e.g. weekday "2-4" stands for Tuesday to Thursday, whereas entering "\*" triggers the timer on all weekdays).
- / Interval within the specified range (e.g. minute "0-45/2" triggers the timer in a range between the 0th and 45th minute every two minutes (0, 2, 4, 6, 8, 10, ... , 44)).
- , Specifies an absolute value (e.g.: minute „0, 15 ,30" triggers the timer every full hour, every 15th minute and every 30th minute.).

### Beispiel:

An action should be performed in the months of April to October every Monday at 8:00 a.m.

Minute:	0
Hour:	8
Date:	*
Month:	4-10
Day of week:	1

## Device restart

The Web-IO distinguishes between two types when a restart is supposed to initiate an action:

- Cold start  
If the restart is initiated by hardware (applying/interrupting supply voltage or pressing the reset key) the Web-IO treats this as a cold start.

- Warm start

A warm start can be initiated from the Web page under Maintenance by clicking on the Restart button. Connecting from Port 8888 and using the system password will also cause a reset if the reset port is enabled.

## MQTT Subscribe

If the Web-IO receives the keyword configured as a Topic on the path entered as Topic path, the action is carried. Out. For this *Communication paths >> MQTT* must be used to enable MQTT support, and all the necessary Broker information must be configured.

## Actions

For actions which allow sending alarms, messages and other texts, placeholders can be used within the text which replace actual contents such as IO states, time etc. when performing an action.

Placeholder	Description
<ix>	State of the inputs No. x (ON/OFF)
<ox>	State of the outputs No. x (ON/OFF)
<cx>	Counter state No. x
<i>	State of all inputs as hex. bit pattern
<o>	State of all outputs as hex. bit pattern
<dn>	Device Name
<inx>	Name of the input No. x
<onx>	Name of the output No. x
<t>	Time stamp with date and time
<\$y>	Year in format „YYYY“
<\$m>	Month in format „MM“
<\$d>	Day in format „DD“
<\$h>	Hour in format „hh“
<\$i>	Minutes in format „mm“
<\$s>	Seconds in format „ss“

For text messages not only the actual message sent when initiating, but also a Clear message can be stored. The Clear message is sent when the initiator for the action is no longer active – i.e. the normal state is resumed. Sending of messages takes different amounts of time depending on the protocol. If the initiating state is only present for such a short time that the corresponding message could not be sent, only the Clear message is sent.

### Email message

The recipient, subject and contents of the email can be freely configured.

To be able to send email messages access to the mail server must be configured and Mail enabled as the communication path. All necessary settings can be made under *Communication paths >> Mail*. In the info area you will find the general access data for the most common email providers.

### SNMP trap

The IP address and host name of the SNMP server as well as the message texts can be freely configured.

To be able to send SNMP traps you must enable SNMP under *Communication paths » SNMP*. All other parameters which can be set there are not relevant to sending of SNMP traps.

### MQTT publish

The Web-IO can write any information to an MQTT Broker over a configurable path as an MQTTTopic.

For this access to the MQTT Broker must be configured under *Communication paths >> MQTT*.

### HTTP request

Another possible action is sending of an HTTP request, such as required by devices like cameras, in order to trigger certain



functions.

As the HTTP request enter the complete URL with all parameters expected by the receiving device.

Format:

`http://<Ip/Hostname>/<request>?Parameter1&Parameter2&ParameterN`

For devices which require authentication with user name and password, enable User authentication and fill in the corresponding fields.

### **TCP messages**

When sending TCP messages the Web-IO functions like a TCP client. When initiating the action it opens a TCP connection to the specified TCP server address on the specified port, transmits the message and clear text, and then immediately closes the connection. Any replies from the server are ignored and discarded.

### **UDP messages**

To be able to send UDP messages *UDP-Sockets* must be enabled in *UDP-Sockets ASCII-Mode* under *Communication paths >> Socket-API*.

When sending UDP messages the Web-IO functions as a UDP peer. The message is transmitted in the form of a UDP datagram to the specified UDP peer address on the specified port. Any replies from the server are ignored and discarded.

### **Syslog messages**

IP address and host name of the syslog server, as well as the message texts can be freely configured.

To be able to send syslog messages Syslog must be enabled under *Communication paths >> Syslog*. All other parameters settable there are not relevant to sending of syslog messages.

## FTP messages

The Web-IO can save message texts per FTP to a file.

To do this FTP support must first be enabled under *Communication paths* >> *FTP* and access to the FTP server must be configured.

The file name, message and clear texts can be freely formulated.

The options are used to distinguish whether *STOR* is used for each initiated action to completely overwrite the file or whether *APPEND* is used to append the message and clear texts continuously to the file.

## Switching outputs

When switching outputs the Web-IO differentiates between switching its own outputs or switching the outputs on another Web-IO.

### Switching the own outputs

The outputs can be switched to ON or OFF. Another possibility is to change the existing state.

### Switching the outputs on another Web-IO

Here either a particular or multiple outputs can be switched.

Specify the IP address for which Web-IO should have its outputs switched. As TCP port specify the port which is set for the destination Web-IO as access for the browser. If the destination Web-IO is password protected, this must also be entered.

For the destination Web-IO *Allow HTTP requests* must be enabled (*Communication paths* >> *Web-API*) and the controlled outputs for switching from the browser and HTTP must be enabled.

The outputs on older model Web-IOs (#57630, #57631, #57634 and #57637) can also be switched. In this case the HTTP port of the Web-IO must be specified as the TCP port. The outputs must

be set in *Output Mode Menu*.

Switching outputs as an action offers many interesting application possibilities.

### **Point-to-Point connection**

Similar to box-to-box connections where the inputs on Web-IO A are mapped 1:1 to the outputs on Web-IO B, the switching state of one input can be mapped to any desired output on another Web-IO.

### **Point-to-Multipoint**

By creating multiple actions which use an input as initiator, correspondingly more outputs on different Web-IOs can be controlled.

## 11. Access from own applications

In addition to the numerous standardized access possibilities, the Web-IO also offers the option of accessing from your own application.

This can be done either using TCP/IP sockets from the common high-level languages – but it is also possible to use common Web techniques such as AJAX or PHO to communicate with the Web-IO.

### Access using TCP/IP sockets

The Web-IO offers three ways to access using TCP/IP sockets:

- Command strings      ASCII
- Binary structures     BINARY
- HTTP requests        AJAX

#### Command strings ASCII

The inputs and counters can be read and the outputs set by exchanging simple command strings.

Depending on the configuration the Web-IO operates in this mode as a TCP server or UDP peer.

*A list of the supported commands and additional details on access via ASCII sockets can be found in the Web-IO programming manual. (download at <http://www.WuT.de>). Follow the Manual link on the data sheet page of your Web-IO.*

#### TCP server

To access the Web-IO as a TCP server using ASCII sockets, enable *TCP ASCII-Sockets* under *Communication paths >> Socket-API*. Specify on which server port the Web-IO should accept connections. The Web-IO can provide up to four TCP connections on the specified port at the same time – any additional connection attempt is rejected.

If the Web-IO receives no valid command within 30 seconds, it closes the connection and is then free again to open a new connection. The Web-IO behaves the same way when a defective or unknown command is received.

Reading the inputs is generally done by polling. Event-driven processing is only possible after configuring the input trigger correspondingly.

### **UDP peer**

To access the Web-IO via UDP using ASCII sockets, enable *UDP ASCII-Sockets* under *Communication paths >> Socket-API*. Specify on which local UDP port the Web-IO should accept datagrams.

Using *Remote UDP-Port* you can specify to which UDP port of the requestor the replies from the Web-IO should be sent. Entering AUTO means that the replies go to the port which is entered as the sending port in the received datagram.

Reading the inputs is possible only using polling. Event-driven processing can be achieved by adding a corresponding action (see Actions section).

### **Binary structures BINARY**

The Web-IO provides for binary structures for various functions such as reading the inputs, setting the outputs etc. Access is only by exchanging these structures.

In this mode the Web-IO can work as a TCP client, TCP server or UDP peer. Access can be password protected.

Four binary accesses are available which can be enabled and configured independently of each other under *Communication paths >> Socket-API*.

*In TCP server mode only one client can connect to the corresponding binary access at a time. Any other connection attempt is rejected.*

*A detailed description of the supported HTTP binary structures and more details about access using BINARY sockets can be found in the Web-IO programming manual (download at <http://www.WuT.de>). Follow the **Manual** link on the data sheet page of your Web-IO.*

## **HTTP request**

In addition to traditional socket accesses the Web-IO can also be addressed directly via HTTP using HTTP requests.

By default this access is blocked and must first be enabled using *Communication paths >> Web-API*.

*A detailed description of the supported HTTP requests and more details about access using Web techniques such as AJAX and PHP can be found in the Web-IO programming manual (download at <http://www.WuT.de>). Follow the **Manual** link on the data sheet page of your Web-IO.*

## 12. Appendix

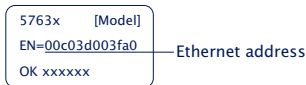
### Alternatives for IP address assignment

For cases where IP address assignment cannot be done via DHCP using the Wutility tool the Web-IO offers another possibility.

#### Assigning the IP address using the ARP command

*This method can be used when the Web-IO does not yet have an IP address and the entry is 0.0.0.0. Another prerequisite is that the Web-IO and computer are in the same network segment.*

Read the Ethernet address of the Web-IO from the sticker on the side of the housing:



Now use the following command line from the ARP table of the computer to enter a static entry:

```
arp -s [IP-Adresse] [MAC-Adresse]
```

Example under Windows:

```
arp -s 10.40.72.15 00-C0-3-00-3F-A0
```

Example under SCO UNIX:

```
arp -s 10.40.72.15 00:C0:3D:00:3F:A0
```

Then start the Web browser and enter

```
http://<IP-Adresse>
```



*In Windows environments IP addresses may only be entered without leading zeros.*

The Web-IO accepts the IP address of the first network packet sent to its Ethernet address as its own and saves it in non-volatile memory. The Web page of the Web-IO is then loaded and all other settings can now be made conveniently using Web-based Management.

## Assigning the IP address through the serial port

*Only #57730 and #57734.*

- connect the Web-IO to a serial port of your Computer. For a standard PC, a crossed RS232 cable (= nullmodem cable) is required.
- open the used COM port in a terminal application (e.g., Easyterm) with the following parameters: 9600 baud, no parity, 8 bits, 1 stop bit, no handshake.
- Press reset button on the Web-IO for approx. 1 second.
- Now press the X button and hold it down until IPno. + <Enter> appears in the terminal program.
- Enter the IP address and confirm with Enter.

The Web-IO responds with the new IP address. If the serial input is incorrect, the Web-IO responds with FAIL.

## Serial deactivation of the DHCP/BOOTP client

The DHCP/BOOTP function of the Web-IO can be turned off while serially assigning the IP address. We recommend doing this in any case where the IP assignment will not be expressly performed using DHCP/BOOTP.

To deactivate the DHCP/BOOTP client, enter the option „-0“ (zero) immediately following the IP address (no spaces!) and finish the entry with <Enter>.

```
xxx                                -> Web-IO
IP no.+<ENTER>:                   <-Web-IO
10.40.72.15,255.255.255.0,10.40.1.1 -> Web-IO
10.40.72.15,255.255.255.0,10.40.1.1-1 <- Web-IO
```

This of course functions the same way when entering the subnet mask and gateway.



You can reactivate the function at any time later by using Web-Based Management in the browser.

## Firmware update

The Web-IO firmware is continually improved to meet the new requirements of ever growing networks.

The current firmware for your Web-IO can be found at <http://WuT.de> by entering in your search the article number of your Web-IO and selecting Firmware.

To load the firmware update you need a Windows PC with the WuTility tool installed (found in the firmware archive) and unimpeded network access to the Web-IO.

Start Wutility, highlight your Web-IO in the inventory list and click on Firmware in the icon bar. Select the corresponding UHD file. WuTility will guide you through the update process.

Do not interrupt either power or the network connection during the update.

All the settings in the Web-IO are retained and the Web-IO should be immediately ready to use following the update.

## Emergency access

In case you have forgotten the passwords for the Web-IO or simply wish to reset the device to its factory defaults, there are model-dependent emergency access means. In all cases you will require physical access to the device.

### **Models #57730, #57734**

With these models emergency access is via the serial RS232 interface.

First connect the Web-IO to a computer serial port. For a standard PC a crossover RS232 cable (=null modem) is required.

Open the COM port used in a terminal program (e.g. Easyterm) using the following transmission parameters: 9600 baud, no parity, 8 bits, 1 stop bit, no handshake.

### **Delete passwords**

Press the reset key for approx 1 second. Then press the *P* key and hold it until the system error and on error LEDs begin to flash rapidly.

You may now access the Web-IO without a password.

### **Factory default reset**

Press the reset key for approx 1 second. Then press the *F* key and hold it until the system error and on error LEDs begin to flash rapidly.

The Web-IO is on factory defaults now.

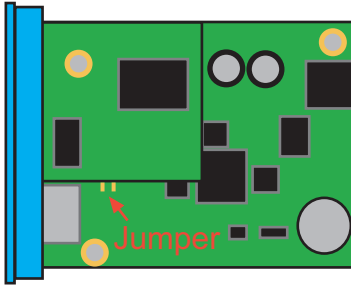
For Web-IOs delivered from *March 2018*, the delivery status can be restored by pressing the reset button for about 10 seconds. After approx. 30 seconds, the reset button must be pressed again to restart the Web-IO.

### **Model #57737**

In this model there is a jumper on the main board which is used to initiate a full reset to factory defaults.

First remove all the connectors. Open the housing by lightly pressing together the housing using thumb and index finger to separate the housing sides. The front panel together with the circuit board can now be pulled out.

Near the network socket there is a jumper (usually open).



Close the jumper and power the Web-IO for approx. 30 seconds. The configuration has now been restored to its factory defaults.

## 11. Technical data

### Web-IO #57730

Connections, displays and control elements:	
Digital outputs:	12 x digital output 6V-30V, 500mA Grouping of 2 or 4 outputs Maximum group current 2A Maximum total current 6A Short-circuit-protected
Digital inputs:	12 x digital inputs, Max. input voltage +/-30 V Protected against polarity reversal within this range Switching threshold 8V +/- 1V „On“ current = 2.2 mA integrated 32-bit counter
Network:	10/100BaseT autosensing
COM-Port:	RS232 for IP assignment only
Power supply:	12-24V DC (approx. 100mA@24V)
Output supply:	6 - 30V DC
Galvanic isolation:	Digital outputs - network: min. 1000 V Digital inputs - network: min. 2000 V Digital inputs - outputs: min. 1000 V
Connections:	2 x 16x screw terminal blocks for IOs and power 1 x RJ45 for network 1 x DB9 plug for RS232
Displays:	Status LEDs for network Error LEDs for system and application 24 LEDs for digital status
Data transmission:	
Protocols:	TCP- and UDP- Sockets, Client and Server SNMP incl. traps SMTP email sending OPC server Modbus-TCP Inventorying, group management
Response times:	Data and switching traffic: typically 40ms
Housing and other data:	

Housing:	Plastic housing for top hat rail installation 106.8 x 87.8 x 62.6 (L x W x H)
Enclosure rating:	IP20
Weight:	approx. 140 g
Storage temperature:	-25°C .. 70°C
Operating temperature:	0°C .. 60°C
Permissible relative humidity:	RH (non-condensing)

## Web-IO #57734

<b>Connections, displays and control elements:</b>	
Digital outputs:	6 potential-free relay contacts for 30V/5A DC (2A when using inductive load) for 48V/5A AC (2A when using inductive load) max. 1800 switching cycles per hour
Digital inputs:	12 x digital inputs, Max. input voltage +/- 30 V Protected against polarity reversal within this range Switching threshold 8V +/- 1V „On“ current = 2.2 mA integrated 32-bit counter
Network:	10/100BaseT autosensing
COM-Port:	RS232 for IP assignment only
Power supply:	12-24V DC (approx. 100mA@24V)
Output supply:	6 - 30V DC
Galvanic isolation:	Digital outputs - network: min. 1000 V Digital inputs - network: min. 2000 V Digital inputs - outputs: min. 1000 V
Connections:	2 x 16x screw terminal blocks for IOs and power 1 x RJ45 for network 1 x DB9 plug for RS232
Displays:	Status LEDs for network Error LEDs for system and application 18 LEDs for digital status
<b>Data transmission:</b>	
Protocols:	TCP- and UDP- Sockets, Client and Server SNMP incl. traps SMTP email sending OPC server Modbus-TCP Inventorying, group management
Response times:	Data and switching traffic: typically 40ms
<b>Housing and other data:</b>	
Housing:	Plastic housing for top hat rail installation 106.8 x 87.8 x 62.6 (L x W x H)
Enclosure rating:	IP20
Weight:	approx. 140 g
Storage temperature:	-25°C .. 70°C
Operating temperature:	0°C .. 60°C

Permissible relative humidity:	RH (non-condensing)
--------------------------------	---------------------

## Web-IO #57737

<b>Connections, displays and control elements:</b>	
Digital outputs:	2 x digital output 6V-30V, 500mA Grouping of outputs Maximum total current 1A Short-circuit-protected
Digital inputs:	2 x digital inputs, Max. input voltage +/-30 V Protected against polarity reversal within this range Switching threshold 8V +/- 1V „On“ current = 2.2 mA integrated 32-bit counter
Network:	10/100BaseT autosensing
Power supply:	Power-over-Ethernet (PoE) or 24-48V DC (approx. 100mA@24V)
Output supply:	6 - 30V DC over screw terminal or internal supply 24V max. 125mA
Galvanic isolation:	Digital outputs - network: min. 1000 V Digital inputs - network: min. 2000 V Digital inputs - outputs: min. 1000 V
Connections:	1 x 6x screw terminal blocks for IOs and IO power 1 x 2x screw terminal blocks for power supply 1 x RJ45 for network
Displays:	Status LEDs for network Error LEDs for system and application 4 LEDs for digital status
<b>Data transmission:</b>	
Protocols:	TCP- and UDP- Sockets, Client and Server SNMP incl. traps SMTP email sending OPC server Modbus-TCP Inventorying, group management
Response times:	Data and switching traffic: typically 40ms
<b>Housing and other data:</b>	
Housing:	Plastic housing for top hat rail installation 105x22x75mm (LxWxH)
Enclosure rating:	IP20
Weight:	approx. 140 g

Storage temperature:	-25°C .. 70°C
Operating temperature:	0°C .. 60°C
Permissible relative humidity:	RH (non-condensing)

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